Building Addendum #1

University of North Carolina at Charlotte
Facilities Operations and Parking Services Complex
Building Phase

Date: 09/07/17

The following items are hereby incorporated into the above referenced Project:

BIDDERS MANUAL

1. **Part 1 – Advertisement for Bids:**
   a. Change paragraph at bottom of page 1 of the Advertisement for bids to read: "Sealed proposals will be received at the Student Union Building, Room 200, on the University of North Carolina at Charlotte Campus on **Wednesday, September 27, 2017 at 2:00pm** and immediately thereafter publicly opened. For directions see http://facilities.uncc.edu/maps. Paid parking is available at the Cone Visitor Parking Deck.

2. **Part 2 – Bid Forms**
   a. Bid form has been issued with this addendum. See attached.

3. **Part 3 – Instruction to Bidders:**
   a. Section 1.05 – replace first paragraph with, "Sealed proposals clearly marked with Bid Package number will be received at the Student Union Building, Room 200, on the University of North Carolina at Charlotte Campus, Charlotte, North Carolina up to **2:00 pm, Wednesday, September 27, 2017**. All bids will be opened and read aloud starting after the cutoff time at 2:00 pm. Bidders who will not attend the Bid Opening need to ensure their sealed bids are delivered no later than 1:00 p.m. on September 27, 2017 to the following:"

4. **Part 4 – Bidders Manual:**
   a. Administrative Requirements
      i. Item #13: Delete and replace with: "All trade contractors will be enrolled in New Atlantic Contracting's sub default insurance program in lieu of Payment and Performance bonds."
   b. BP 7A
      i. Trade contractor to include flexible membrane flashing lap over air barrier as indicated (i.e. sheet A-551). See LS3P Addendum No. 4.

QUESTIONS AND ANSWERS

No Questions and Answers.

SPECIFICATIONS & DRAWINGS:

See attached **LS3P ADDENDUM NUMBER FOUR** dated August 28, 2017**.**

GENERAL INFORMATION:

- **Bid Date** for the project has been changed to **Wednesday – 9/27/17 at 2:00PM** at the Student Union Building, Room 200, on campus at UNC Charlotte. Changes noted in the New Atlantic Building Addendum #1 are correct and overrule the note on LS3P Addendum No. 4.
- Deadline for Pre-bid Questions has been extended. All questions and substitution requests are due Thursday – September 14, 2017 at 3:00pm
- LS3P Addendum No. 4 notes that LS3P Addenda 1-3 were issued as part of the Early Site / Structural Package. Early Site / Structural documents have been made available for reference on New Atlantic's FTP Site.
- Pre-bid Meeting Presentation and Sign-in Sheet have been attached for reference.

END OF ADDENDUM

F O R M O F P R O P O S A L

University of North Carolina at Charlotte
Facilities Operations and Parking Services Complex
Building Phase

Bidding Contractor: _____

NC License #: _____

Date: _____

COMPLIANCE STATEMENT

I hereby acknowledge that I have read and accept the complete Bidders Manual dated August 21, 2017. I acknowledge these documents in their entirety and agree that, if awarded a subcontract, these documents will be signed and executed as-is with no modifications. The undersigned bidder proposes to furnish all labor, materials, equipment, engineering, permits, fees, taxes, insurance, scaffolding, hoisting, clean-up, safety measures, and supervision and perform all work necessary for the construction of this Trade Package, in accordance with Drawings and Specifications dated 8/21/17 (as itemized in the Bidders Manual)**,** and the addenda noted below for consideration of the following amount:

ADDENDA Number: _____ Dated: _____

Number: _____ Dated: _____

Number: _____ Dated: _____

BASE BID for Bid Package # _____

Show amount both in words and figures.

_____

_____ Dollars.

$ _____. 00

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Circle "Add" or "Deduct" as appropriate.)

Show amount both in words and figures.

Alternate No. 1: ***Provide brick façade in lieu of metal siding on the south facade of Warehouse building as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 2A: ***Provide pre-engineered metal canopy for Wash Rack as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 2B: ***Provide decorative CMU masonry walls, on two sides, and roof for Wash Rack in lieu of pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 3: ***Provide decorative CMU with ribbed interior finish masonry screenwall with precast cap in lieu of chain link fence around Service Yard as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 4A: ***Provide Gravel Bus Parking as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 4B: ***Provide Concrete Bus Parking in lieu of gravel as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 5: ***Provide Sanitary Dump Station as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 8: ***Extend telecomm infrastructure along Poplar Lane as detailed on the Drawings. Scope of work includes new concrete encased duct bank from existing manhole to new Telecommunications manhole.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 9: ***Provide decorative CMU masonry screenwall with precast cap in lieu of decorative metal fence along south edge of complex as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 10: ***Condition shops areas as indicated on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 11: ***Install event power as indicated on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 12: ***Provide pre-engineered metal canopy for Covered Storage as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 13: ***Provide lightning protection system as described in the specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. P1: ***Provide Schlage Locksets, (no substitutions) as described in Specification Section 087100.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. P2: ***Provide Simplex Fire Detection Systems, (no substitutions) as described in Specification Section 283111.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. P3: ***Provide Open Option Systems, (no substitutions) as described in Specification Section 281300.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. P4: ***Provide Hanson Brick, "Morrocroft Special" brick (no substitutions), as described in Specification Section 042000.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. P5: ***Provide Pine Hall, English Edge Pavers, (no substitutions) as described in Specification Section 321400.***

(Add) *(Deduct)* _____ Dollars ($) _____

UNIT PRICES / QUANTITY ALLOWANCES

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents. Reference Specification Section 012200 - UNIT PRICES for more details.

UP-1: **Trench Rock Excavation, Off-Site Disposal, and Replacement with Off-Site Suitable Fill.**

Include the removal of trench rock including all necessary equipment, material and labor for trench rock excavation and removal off-site. Provide the replacement of trench rock with compacted off-site suitable compacted fill in accordance with Section 312316.26. See Bidder's Manual for quantities to be carried in individual trade package base bids

*QUANTIFY ALLOWANCE 1: Base bid proposal to include **40 CY**, to be used at the discretion of the CMAR.*

($/CY) Unit Price 1 = $ _____

UP-4A1: Face Brick.

Furnish and Install (including masonry accessories) Face Brick.

*QUANTIFY ALLOWANCE 4A1: Bid Package 4A Base bid proposal to include **300 SF**, to be used at the discretion of the CMAR.*

($/SF) Unit Price 4A1 = $ _____

UP-4A2: 4" Shotblasted CMU.

Furnish and Install (including masonry accessories) 4" Shotblasted CMU Block.

*QUANTIFY ALLOWANCE 4A2: Bid Package 4A Base bid proposal to include **300 SF**, to be used at the discretion of the CMAR.*

($/SF) Unit Price 4A2 = $ _____

UP-9A1: Drywall Patching.

Include all materials and labor required for drywall patching.

*QUANTIFY ALLOWANCE 9A1: Bid Package 9A Base bid proposal to include **40 HOURS**, to be used at the discretion of the CMAR.*

($/HR) Unit Price 9A1 = $ _____

UP-9B1: Ceiling Patching.

Include all materials and labor required for ceiling patching.

*QUANTIFY ALLOWANCE 9B1: Bid Package 9B Base bid proposal to include **600 SF**, to be used at the discretion of the CMAR.*

($/SF) Unit Price 9B1 = $ _____

UP-9D1: Floor Leveling.

Include all materials and labor required for floor leveling.

*QUANTIFY ALLOWANCE 9D1: Bid Package 9D Base bid proposal to include **1,500 SF**, to be used at the discretion of the CMAR.*

($/SF) Unit Price 9D1 = $ _____

UP-9D2: Luxury Vinyl Tile.

Furnish and Install Luxury Vinyl Tile.

*QUANTIFY ALLOWANCE 9D2: Bid Package 9D Base bid proposal to include **500 SF**, to be used at the discretion of the CMAR.*

($/SF) Unit Price 9D2 = $ _____

UP-9E1: Touch-up Paint.

Include all materials and labor required for touch-up painting beyond normal touch up.

*QUANTIFY ALLOWANCE 9E1: Bid Package 9E Base bid proposal to include **200 HOURS**, in addition to normal touch up, to be used at the discretion of the CMAR.*

($/HR) Unit Price 9E1 = $ _____

UP-15A1: Wet Sprinkler Heads.

Include all materials and labor required for additional wet sprinkler heads.

*QUANTIFY ALLOWANCE 15A1: Bid Package 15A Base bid proposal to include **10 EA**, to be used at the discretion of the CMAR.*

($/EA) Unit Price 15A1 = $ _____

UP-16A1: Emergency Lighting.

Include all material and labor required for an additional 2'-0"x4'-0" emergency light, including 30' of conduit and wiring.

*QUANTIFY ALLOWANCE 16A1: Bid Package 16A Base bid proposal to include **5 EA**, to be used at the discretion of the CMAR.*

($/EA) Unit Price 16A1 = $ _____

UP-16A2: Horn Strobe.

Include all material and labor required for an additional horn strobe, including 30' of conduit and wiring.

*QUANTIFY ALLOWANCE 16A2: Bid Package 16A Base bid proposal to include **5 EA**, to be used at the discretion of the CMAR.*

($/EA) Unit Price 16A2 = $ _____

UP-16A3: Exit Light.

Include all material and labor required for an additional exit light, including 30' of conduit and wiring.

*QUANTIFY ALLOWANCE 16A3: Bid Package 16A Base bid proposal to include **5 EA**, to be used at the discretion of the CMAR.*

($/EA) Unit Price 16A3 = $ _____

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

_____
(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

_____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

ADDENDUM IV

Date of Addendum: 28 August 2017

Project Name: Facilities Operations / Parking Services Complex

Building Package

SCO ID# 16-15656-02B

PROJECT INFORMATION

A. Owner: University of North Carolina at Charlotte.

B. SCO ID Number: 16-15656-02B.

C. Architect: LS3P.

D. Architect Project Number: 9202-164730.

NOTICE TO BIDDERS

A. This Addendum is issued **to all Pre-Qualified Subcontractors** pursuant to the **Instructions to Bidders and Conditions of the Contract**. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

C. The date for receipt of bids is **unchanged by this Addendum.**

D. **ADDENDUM I, II, AND III HAVE BEEN ISSUED IN THE EARLY SITE/STRUCTURAL PACKAGE.**

ATTACHMENTS

A. This Addendum includes the following attached Documents and Specification Sections:
1. Section 000010 – Table of Contents, dated August 28, 2017, (reissued).
2. Advertisement for Bids, (new).
3. Section 012300 – Alternates, dated August 28, 2107, (reissued).
4. Section 019113 – Commissioning General Requirements, dated August 28, 2107, (reissued).
5. Section 064023 – Interior Architectural Woodwork, dated August 28, 2107, (reissued).
6. Section 093000 – Tiling, dated August 28, 2107, (reissued).
7. Section 260533 – Raceway and Boxes for Electrical Systems, dated August 28, 2107, (reissued).
8. Section 260548 –Vibration and Seismic Controls for Electrical Systems, dated August 28, 2107, (reissued).
9. Section 262413 – Switchboards, dated August 28, 2107, (reissued).

B. This Addendum includes the following attached Sheets:
1. General Sheet G-001 – NC Building Code Summary Office/Shops & Warehouse, dated 08/28/2017, (reissued).

2. General Sheet G-002 – NC Building Code Summary Gas Storage Building and Canopies, dated 08/28/2017, (reissued).
3. General Sheet G-005 – Life Safety Site Plan, dated 08/28/2017, (reissued).
4. Civil Sheet C403 – Site Details, dated 08/28/2017, (reissued).
5. Civil Sheet C404 – Site Details, dated 08/28/2017, (reissued).
6. Civil Sheet C600 – Utility Plan, dated 08/28/17, (reissued).
7. Civil Sheet C603 – Utility Details, dated 08/28/17, (reissued).
8. Structural Sheet S-201 – Office/Shops Building Foundation Plan – For Reference Only, dated 08/28/17, (reissued).
9. Structural Sheet S-202 – Warehouse and Gas Storage Foundation Plan – For Reference Only, dated 08/28/17, (reissued).
10. Structural Sheet S-601 – Sections and Details, dated 08/28/17, (reissued).
11. Architectural Sheet A-004 – Partition Types, dated 08/28/17, (reissued).
12. Architectural Sheet A-103 - Wash Rack and Covered Storage Canopies (Alternate No. 2 & 12), dated 08/28/17, (reissued).
13. Architectural Sheet A-252 – Interior Elevations, dated 08/28/17, (reissued).
14. Architectural Sheet A-353 – Wall Sections – Office / Shops, Warehouse and Misc. Buildings, dated 08/28/2017, (reissued).
15. Architectural Sheet A-410 – Toilet Room Plans and Schedule, dated 08/28/2017, (reissued).
16. Architectural Sheet A-512 – Section Details (Exterior), dated 08/28/2017, (reissued).
17. Architectural Sheet A-551 – Roof Details, dated 08/28/2017, (reissued).
18. Architectural Sheet A-601 – Door Schedule & Door Types, dated 08/28/2017, (reissued).
19. Architectural Sheet A-603 – Frame, Louver, and Storefront Elevations, dated 08/28/2017, (reissued).
20. Fire Protection Sheet FP-001 – Fire Protection - Specifications, Notes and Schedules, dated 08/28/17, (reissued).
21. Fire Protection Sheet FP-011 – Floor Plan - Office/Shops - Fire Protection, dated 08/28/17, (reissued).
22. Fire Protection Sheet FP-012 – Floor Plan - Warehouse - Fire Protection, dated 08/28/17, (reissued).
23. Plumbing Sheet P-002 – Plumbing Schedules, dated 08/28/17, (reissued).
24. Plumbing Sheet P-003 – Plumbing Details, dated 08/28/17, (reissued).
25. Plumbing Sheet P-004 – Plumbing Details, dated 08/28/17, (reissued).
26. Plumbing Sheet P-102B – Floor Plan - Warehouse - Waste and Vent - East, dated 08/28/17, (reissued).
27. Plumbing Sheet P-201A – Floor Plan - PATs/FO - Water and Gas, dated 08/28/17, (reissued).
28. Mechanical Sheet M-005 – Mechanical Sequence of Operations, dated 08/28/17, (reissued).
29. Mechanical Sheet M-006 – Mechanical Points List, dated 08/28/17, (reissued).
30. Mechanical Sheet M-403 – Enlarged Mechanical Room Details, dated 08/28/17, (reissued).
31. Electrical Sheet E-001 – Electrical Notes, dated 08/28/17, (reissued).
32. Electrical Sheet E-002 – Electrical Details, dated 08/28/17, (reissued).
33. Electrical Sheet E-003 – Electrical Details, dated 08/28/17, (reissued).
34. Electrical Sheet E-005 – Electrical Details, dated 08/28/17, (reissued).
35. Electrical Sheet E-006 – Electrical Details, dated 08/28/17, (reissued).
36. Electrical Sheet E-009 – Electrical Site Plan – Overall, dated 08/28/17, (reissued).
37. Electrical Sheet E-101A – Floor Plan - PATs/FO - Power, dated 08/28/17, (reissued).

38. Electrical Sheet E-301A – Reflected Ceiling Plan - PATs/FO - Special Systems, dated 08/28/17, (reissued).
39. Electrical Sheet E-401C – Floor Plan - FO Shops - Power/HVAC, dated 08/28/17, (reissued).
40. Electrical Sheet E-501 – Power Riser, dated 08/28/17, (reissued).
41. Electrical Sheet E-602 – Panel Schedules, dated 08/28/17, (reissued).
42. Electrical Sheet E-603 – Panel Schedules, dated 08/28/17, (reissued).
43. Electrical Sheet E-604 – Panel Schedules, dated 08/28/17, (reissued).

REVISIONS TO DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

Item IV-1. Replace DOCUMENT 000010 – TABLE OF CONTENTS with revised Document, included in the Attachments.

Item IV-2. Add DOCUMENT – ADVERTISEMENT FOR BIDS, included in the Attachments.

REVISIONS TO DIVISIONS 02 - 49 SPECIFICATION SECTIONS

Item IV-3. Replace SECTION 012300 – ALTERNATES with revised Document, included in the Attachments.

Item IV-4. Replace SECTION 019113 – COMMISSIONING GENERAL REQUIREMENTS with revised Document, included in the Attachments.

Item IV-5. Replace SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK with revised Document, included in the Attachments.

Item IV-6. Replace SECTION 093000 – TILING with revised Document, included in the Attachments.

Item IV-7. SECTION 105500.16 - PRIVATE-DELIVERY POSTAL SPECIALTIES, Article: Make the following revisions:

A. Article 2.1.A.1.c.1.a : Revise “Model 1: SC6048GH” to read “Model 1: SG6048GL.”

B. Article 2.1.A.2.a.1: Revise “Size 1: Provide 50 compartments…” to read “Size 1: Provide 60 compartments…”

Item IV-8. SECTION 230500 – COMMON WORK RESULTS FOR HVAC, Article: Make the following revisions:

A. Article 3.3.C.1: Revise “Substantial Completion” to read “Final Acceptance.”

Item IV-9. SECTION 232113 – HYDRONIC PIPING, Article: Make the following revisions:

A. Article 1.7.A: Revise “Substantial Completion” to read “Final Acceptance.”

Item IV-10. SECTION 232500 – HVAC WATER TREATMENT, Article: Make the following revisions:

A. Article 3.4.E: Revise “Substantial Completion” to read “Final Acceptance.”

Item IV-11. SECTION 238126 – SPLIT-SYSTEM AIR-CONDITIONERS, Article: Make the following revisions:

A. Article 1.4.A: Revise “Substantial Completion” to read “Final Acceptance.”

Item IV-12. Replace SECTION 260533 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS with revised Document, included in the Attachments.

Item IV-13. Replace SECTION 260548 – VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS with revised Document, included in the Attachments.

Item IV-14. Replace SECTION 262413 – SWITCHBOARDS with revised Document, included in the Attachments.

Item IV-15. SECTION 321313 – CONCRETE PAVEMENT, Article: Make the following revisions:

A. Article 3.12.D: Revise "Substantial Completion" to read "Final Acceptance."

Item IV-16. SECTION 321400 – UNIT PAVERS, Article: Make the following revisions:

A. Article 1.6.B.1: Revise "Substantial Completion" to read "Final Acceptance."

REVISIONS TO DRAWING SHEETS

Item IV-17. Replace SHEET G-001 – NC BUILDING CODE SUMMARY OFFICE/SHOPS & WAREHOUSE with revised Sheet G-001, included in the Attachments.

Item IV-18. Replace SHEET G-002 – NC BUILDING CODE SUMMARY GAS STORAGE BUILDING AND CANOPIES with revised Sheet G-002, included in the Attachments.

Item IV-19. Replace SHEET G-005 – LIFE SAFETY SITE PLAN with revised Sheet G-005, included in the Attachments.

Item IV-20 Replace SHEET C403 – SITE DETAILS with revised Sheet C403, included in the Attachments.

Item IV-21. Replace SHEET C404 – SITE DETAILS with revised Sheet C404, included in the Attachments.

Item IV-22. Replace SHEET C600 – UTLITY PLAN with revised Sheet C600, included in the Attachments.

Item IV-23. Replace SHEET C603 – UTLITY DETAILS with revised Sheet C603, included in the Attachments.

Item IV-24. Replace SHEET S-201 – OFFICE/SHOPS BUILDING FOUNDATION PLAN – FOR REFERENCE ONLY with revised Sheet S-201, included in the Attachments.

Item IV-25. Replace SHEET S-202 – WAREHOUSE AND GAS STORAGE FOUNDATION PLAN – FOR REFERENCE ONLY with revised Sheet S-202, included in the Attachments.

Item IV-26. Replace SHEET S-601 – SECTIONS AND DETAILS with revised Sheet S-601, included in the Attachments.

Item IV-27. Replace SHEET A-004 – PARTITION TYPES with revised Sheet A-004, included in the Attachments.

Item IV-28. Replace SHEET A-103 - WASH RACK AND COVERED STORAGE CANOPIES (ALTERNATE NO. 2 & 12), with revised Sheet A-103, included in the Attachments.

Item IV-29. Replace SHEET A-252 – INTERIOR ELEVATIONS with revised Sheet A-252, included in the Attachments.

Item IV-30. Replace SHEET A-353 – WALL SECTIONS – OFFICE / SHOPS, WAREHOUSE AND MISC. BUILDINGS with revised Sheet A-353, included in the Attachments.

Item IV-31. Replace SHEET A-410 – TOILET ROOM PLANS AND SCHEDULE with revised Sheet A-410, included in the Attachments.

Item IV-32. Replace SHEET A-512 – SECTION DETAILS (EXTERIOR) with revised Sheet A-512, included in the Attachments.

Item IV-33. Replace SHEET A-551 – ROOF DETAILS with revised Sheet A-551, included in the Attachments.

Item IV-34. Replace SHEET A-601 – DOOR SCHEDULE & DOOR TYPES with revised Sheet A-601, included in the Attachments.

Item IV-35. Replace SHEET A-603 – FRAME, LOUVER, AND STOREFRONT ELEVATIONS with revised Sheet A-603, included in the Attachments.

Item IV-36. Replace SHEET FP-001 – FIRE PROTECTION - SPECIFICATIONS, NOTES AND SCHEDULES with revised Sheet FP-001, included in the Attachments.

Item IV-37. Replace SHEET FP-011 – FLOOR PLAN - OFFICE/SHOPS - FIRE PROTECTION with revised Sheet FP-011, included in the Attachments.

Item IV-38. Replace SHEET FP-012 – FLOOR PLAN - WAREHOUSE - FIRE PROTECTION with revised Sheet FP-012, included in the Attachments.

Item IV-39. Replace SHEET P-002 – PLUMBING SCHEDULES with revised Sheet P-002, included in the Attachments.

Item IV-40. Replace SHEET P-003 – PLUMBING DETAILS with revised Sheet P-003, included in the Attachments.

Item IV-41. Replace SHEET P-004 – PLUMBING DETAILS with revised Sheet P-004, included in the Attachments.

Item IV-42. Replace SHEET P-102B – FLOOR PLAN - WAREHOUSE - WASTE AND VENT - EAST with revised Sheet P-102B, included in the Attachments.

Item IV-43. Replace SHEET P-201A – FLOOR PLAN - PATS/FO - WATER AND GAS with revised Sheet P-201A, included in the Attachments.

Item IV-44. Replace SHEET M-005 – MECHANICAL SEQUENCE OF OPERATIONS with revised Sheet M-005, included in the Attachments.

Item IV-45. Replace SHEET M-006 – MECHANICAL POINTS LIST with revised Sheet M-006, included in the Attachments.

Item IV-46. Replace SHEET M-403 – ENLARGED MECHANICAL ROOM DETAILS with revised Sheet M-403, included in the Attachments.

Item IV-47. Replace SHEET E-001 – ELECTRICAL NOTES with revised Sheet E-001, included in the Attachments.

Item IV-48. Replace SHEET E-002 – ELECTRICAL DETAILS with revised Sheet E-002, included in the Attachments.

Item IV-49. Replace SHEET E-003 – ELECTRICAL DETAILS with revised Sheet E-003, included in the Attachments.

Item IV-50. Replace SHEET E-005 – ELECTRICAL DETAILS with revised Sheet E-005, included in the Attachments.

Item IV-51. Replace SHEET E-006 – ELECTRICAL DETAILS with revised Sheet E-006, included in the Attachments.

Item IV-52. Replace SHEET E-009 – ELECTRICAL SITE PLAN - OVERALL with revised Sheet E-009, included in the Attachments.

Item IV-53. Replace SHEET E-101A – FLOOR PLAN - PATS/FO - POWER with revised Sheet E-101A, included in the Attachments.

Item IV-54. Replace SHEET E-301A – REFLECTED CEILING PLAN - PATS/FO - SPECIAL SYSTEMS with revised Sheet E-301A, included in the Attachments.

Item IV-55. Replace SHEET E-401C – FLOOR PLAN - FO SHOPS - POWER/HVAC with revised Sheet E-401C, included in the Attachments.

Item IV-56. Replace SHEET E-501 – POWER RISER with revised Sheet E-501, included in the Attachments.

Item IV-57. Replace SHEET E-602 – PANEL SCHEDULES with revised Sheet E-602, included in the Attachments.

Item IV-58. Replace SHEET E-603 – PANEL SCHEDULES with revised Sheet E-603, included in the Attachments.

Item IV-59. Replace SHEET E-604 – PANEL SCHEDULES with revised Sheet E-604, included in the Attachments.

END OF ADDENDUM IV

TABLE OF CONTENTS
FOR

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

UNC CHARLOTTE

CHARLOTTE, NORTH CAROLINA

(*Sections listed in *ITALICS* are included for Reference Only)

VOLUME ONE

VOLUME TWO

END OF TABLE OF CONTENTS

ADVERTISEMENT FOR BIDS

UNC Charlotte
Facilities Operations and Parking Services Complex
Building Phase

New Atlantic Contracting, Construction Manager, will accept sealed bids for Building phase of the UNC Charlotte, Facilities Operations and Parking Services Complex project from Pre-Qualified Contractors for the following Bid Packages:

2B	SITE FENCING
3B	POLISHED CONCRETE
4A	MASONRY
6A	ARCHITECTURAL CASEWORK & COUNTERTOPS
7A	WATERPROOFING / AIR BARRIER / JOINT SEALANTS
7B	ROOFING & GUTTERS
8A	DOORS, FRAMES, & HARDWARE
8B	OVERHEAD DOORS & LOADING DOCK EQUIPMENT
8C	STOREFRONT / GLASS & GLAZING
9A	GYPSUM BOARD ASSEMBLIES
9B	ACOUSTICAL CEILINGS
9C	TILE
9D	FLOORING (CARPET & RESILIENT)
9E	PAINTING
10A	SPECIALTIES (TOILET ACCESSORIES & PARTITIONS, FEC, APPLIANCES)
10B	SIGNAGE
10C	METAL LOCKERS
12A	WINDOW TREATMENTS
13A	PRE-ENGINEERED BUILDINGS
15A	FIRE PROTECTION
15B	PLUMBING
15C	HVAC
16A	ELECTRICAL

Sealed proposals will be received at the Cone University Center Building, Lucas Room (#341), on the University of North Carolina at Charlotte Campus on **Tuesday, September 19, 2017** at **2:00pm** and immediately thereafter publicly opened. For directions see http://facilities.uncc.edu/maps. Paid parking is available at the Cone Visitor Parking Deck.

For those not attending the bid opening, sealed proposals may also be submitted via hand delivery or courier delivery no later than **1:00PM** on the bid opening day to:

Mailed Bids:
Attn: Ms. Joyce Clay
The University of North Carolina at Charlotte
Facilities Management – Capital Project
9201 University City Boulevard
Charlotte, NC 28223-0001

Or

Hand Delivered:
Attn: Ms. Joyce Clay – 2nd Floor Capital Projects - *(704) 687-0615*
Facilities Management/Campus Police Building *(#55 on the campus map)*
9151 Cameron Boulevard
Charlotte, NC 28223

New Atlantic Contracting invites all Minority contractors and suppliers to participate in the bidding process.

A pre-bid meeting will be held at 10:30am on August 29, 2017 at the Cone Center Building Rm 111.

The meeting is also to identify preferred brand alternates and their performance standards that the owner will consider for approval on this project.

Per G.S. 133-3, on Tuesday, August 29, 2017 at 10:30am UNC Charlotte would like to hereby serve public notice of formal notification of preferred brand alternates. Any and all persons shall use this time to state concerns or reservation of any preferred alternates.

- **Door Hardware** - Provide Schlage Locksets, (no substitutions) as described in Specification Section 087100.
- **Fire Alarm** – Provide Simplex Fire Detection Systems, (no substitutions) as described in Specification Section 283111.
- **Access Control** – Provide Open Option Systems, (no substitutions) as described in Specification Section 281300
- **Unit Masonry** – Provide Hanson Brick, “Morrocroft Special” brick (no substitutions), as described in Specification Section 042000
- **Unit Pavers** – Provide Pine Hall, English Edge Pavers, (no substitutions) as described in Specification Section 321400.

Justification of any approvals will be made available to the public in writing no later than seven (7) days prior to bid date.

Contract Documents may be purchased from the following locations:

⇒ **Triad Area:** Sharpe Co., P: (336) 724-2871, 1020 Burke Street, Winston-Salem, NC 27101
⇒ **Charlotte Area:** Sharpe Co., P: (800) 688-0629, 532 S. New Hope Road, Charlotte, NC 28217

Complete plans, specifications and contract documents will be open for inspection at:

1. Construction Manager - New Atlantic Contracting, Inc., 2635 Reynolda Rd, Winston-Salem, NC 27106, Phone: (336) 759-7440.
2. Designer – LS3P, 227 W Trade Street, Suite 700, Charlotte, NC 28208, Phone: (704) 371-7845

3. Owner – UNC Charlotte, Facilities Management/Police Building, 2nd floor – Capital Projects, 9151 Cameron Blvd, Charlotte, NC 28223, Phone: (704) 687-0615

Digital copies of the plans, specifications and contract documents are available at the following;

1. New Atlantic Contracting website – www.new-atlantic.net
    a. Click “Subcontractor Portal” – open the “Estimating” folder
2. Construct Connect at content@constructconnect.com, (800) 364-2059
3. North Carolina Offices of Dodge Data & Analytics – (800) 393-6343 – http://dodgeprojects.construction.com/
4. Metrolina Minority Contractors Association (MMCA) – mmca@mmcaofcharlotte.org, (877) 526-6205

For further information contact Grady Dwiggins at 336-759-7440 or gdwiggins@new-atlantic.net

NOTE: Bids will be accepted from pre-qualified bidders only. The bidder shall include with the bid proposal the form Identification of Minority Business Participation identifying the minority business participation it will use on the project and shall include either Affidavit **A** or Affidavit **B** as applicable. Forms and instructions are included within the Proposal Form in the Bid Documents. Failure to complete these forms is grounds for rejection of bid. (GS143-128.2C Effective 1/1/2002).

New Atlantic Contracting is an Equal Opportunity Employer.

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

B. Base Bid: The amount for which the bidder proposes to perform the Work, not including that work for which Alternate bids are also submitted.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Provide brick façade in lieu of metal siding on the south facade of Warehouse building as detailed on the Drawings and described in the Specifications.

B. Alternate No. 2A: Provide pre-engineered metal canopy for Wash Rack as detailed on the Drawings and described in the Specifications.

C. Alternate No. 2B: Provide decorative CMU masonry walls, on two sides, and roof for Wash Rack in lieu of pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.

D. Alternate No. 3: Provide decorative CMU with ribbed interior finish masonry screenwall with precast cap in lieu of chain link fence around Service Yard as detailed on the Drawings and described in the Specifications.

E. Alternate No. 8: Extend telecomm infrastructure along Poplar Lane as detailed on the Drawings. Scope of work includes new concrete encased duct bank from existing manhole to new Telecommunications manhole.

F. Alternate No. 9: Provide decorative CMU masonry screenwall with precast cap in lieu of decorative metal fence along south edge of complex as detailed on the Drawings and described in the Specifications.

G. Alternate No. 10: Condition shops areas as indicated on the Drawings and described in the Specifications.

H. Alternate No. 11: Install event power as indicated on the Drawings and described in the Specifications.

I. Alternate No. 12: Provide pre-engineered metal canopy for Covered Storage as detailed on the Drawings and described in the Specifications.

J. Alternate No. 13: Provide lightning protection system as described in the specifications.

K. Alternate No. 4A: Provide Gravel Bus Parking as detailed on the Drawings.

L. Alternate No. 4B: Provide Concrete Bus Parking in lieu of gravel as detailed on the Drawings.

M. Alternate No. 5: Provide Sanitary Dump Station as detailed on the Drawings.

3.2 SCHEDULE OF OWNER PREFERRED ALTERNATES: State the amount to be added to the base bid to provide the Work required to provide the following Owner preferred items in lieu of base bid items specified:

A. Alternate No. P1: Provide Schlage Locksets, (no substitutions) as described in Specification Section 087100.

B. Alternate No. P2: Provide Simplex Fire Detection Systems, (no substitutions) as described in Specification Section 283111.

C. Alternate No. P3: Provide Open Option Systems, (no substitutions) as described in Specification Section 281300.

D. Alternate No. P4: Provide Hanson Brick, “Morrocroft Special” brick (no substitutions), as described in Specification Section 042000.

E. Alternate No. P5: Provide Pine Hall, English Edge Pavers, (no substitutions) as described in Specification Section 321400.

END OF SECTION 012300

SECTION 019113 – COMMISSIONING GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Section 220800 – Commissioning of Plumbing Systems

C. Section 230800 – Commissioning of Mechanical Systems

D. Section 250800 – Commissioning of Integrated Automation Systems

E. Section 260800 – Commissioning of Electrical Systems

F. Commissioning Plan

1.2 DESCRIPTION OF WORK

A. An independent third party Commissioning Agent has been retained to lead the project participants through the commissioning process. The section below is provided for informational purposes and to inform the contractor of the extent of the commissioning process and the involvement required. The Commissioning Agent is RMF Engineering, Inc.

B. The purpose of the construction phase commissioning is to provide the Owner and Operators of the facility with a high level of assurance that each commissioned system has been installed in the prescribed manner and operates within the performance guidelines set forth in the design intent. The Commissioning Agent shall provide the Owner with an unbiased, objective view of the system's installation, operation, and performance. This commissioning process shall not take away or reduce the responsibility of the System Design Professional(s) or installing contractors to provide a finished product. Commissioning is intended to enhance the quality of system start-up and aid in the orderly transfer of systems to beneficial use by the owner. The Commissioning Agent will be a member of the construction team, cooperating and coordinating all commissioning activities with the Owner, Design Professionals, Construction Manager or General Contractor, Subcontractors, Manufacturers and Equipment Suppliers.

1.3 DEFINITIONS

A. Commissioning Agent: The Commissioning Agent is a third party consulting company interested in providing quality control to the project and quality assurance to the Owner. The Commissioning Agent provides a non-biased perspective of issues. The goal of the Commissioning Agent is to discover equipment and system issues early and resolve them quickly for an overall smooth construction process and to keep costs down for both the Owner and Contractor(s).

B. Commissioning Team: The Commissioning Team is a group of individuals selected by each company to represent that company for direct involvement in the commissioning activities during the construction phase of the project. A minimum of one individual must be included to represent every company. Companies include but are not limited to; Commissioning Agent, Owner, Architect, System Design Engineer, Construction Manager or General Contractor, and all Sub-Contracting Companies.

C. System Design Professional(s): The System Design Professional(s) are the designers and design firm representatives for the mechanical, electrical, plumbing, telecommunications and other systems outside of the scope of the Architect. Typically, the System Design Professional(s) do not include structural and civil design representatives unless structural or civil systems are specifically included within, or are associated with the systems being commissioned.

D. Contractor(s): The term Contractor(s) utilized herein refers to the primary contracting party responsible for the specific item being referenced. Contractor(s) may refer to one or more of the general contractors, construction managers, sub-contractors and/or venders whom are responsible for the construction or other provisions regarding any of the systems to be commissioned as outlined within Specification 019113 Section 1.5 - Systems to be Included in Commissioning. Contracting parties outside of the scope of the systems being commissioned are not included.

E. Subcontractors: The term Subcontractors utilized herein refers to the any and all subcontracting companies or venders whom are responsible for the construction or other provisions regarding any of the systems to be commissioned as outlined within Specification 019113 Section 1.5 - Systems to be Included in Commissioning. Subcontracting parties outside of the scope of the systems being commissioned are not included.

1.4 ROLES AND RESPONSIBILITIES

A. Owner

1. The commissioning roles and responsibilities of the Owner are outlined within the Commissioning Plan. The Owner is not contractually obligated to complete any tasks defined within the Commissioning Plan. Rather, the roles and responsibilities defined within the Commissioning Plan are in the best interest of the Owner and are highly recommended for the successful completion of Commissioning.
2. If the Owner's Project Requirements have been outlined and documented, the Owner shall provide a copy of this document to the Commissioning Agent. This document shall set the goals towards which each of the commissioning tools implemented will drive the final product.
3. The Owner shall be required to review many Commissioning Forms prior to their completion. The Owner must verify that the forms are constructed and being utilized in the most effective way for their own benefit. Commissioning documentation should only provide information which will be useful to the Owner and their Operations and Maintenance throughout the construction process and in the future.

B. Commissioning Agent

1. Schedule the Construction Phase Commissioning Kick-Off meeting within 90 days of the award of the contract, at some convenient location and at a time suitable to the Contractor and System Design Professional(s). This meeting shall be for the purpose of reviewing the complete commissioning program and establishing tentative schedules for system orientation and inspections, O&M submittals, training sessions, system flushing and testing, job completion, test, adjust and balance (TAB) work, and verification and functional performance testing.
2. Prepare the Commissioning Plan after the Commissioning Kick-Off meeting. Include list of all contractors for commissioning events by name, firm and trade specialty.
3. Coordinate the integration of Commissioning Activities into the Construction Schedule. The Commissioning Agent shall hold a meeting with the Owner, System Design Professional(s) and all Contractors for the explicit purpose of integrating each Commissioning Activity into the Construction Schedule. See Specification 019113 Section 2.1 – Project Schedule for details.
4. Review all documentation regarding changes to the Contract Documents or Clarifications. These include Meeting Minutes, Addendums, RFI's, Change Orders, ASI's, etc. for their effect on Commissioning. The Commissioning Agent shall receive a copy of all submittals pertaining to the systems being commissioned from the Contractor(s). The Commissioning Agent shall review all submittals for approval. Commissioning submittal review shall be coordinated with the System Design Professional(s) review to avoid redundancy. Submittal approval by the Commissioning Agent shall not supersede any submittal comments or rejection by the System Design Professional(s) and vise versa.
5. Review submittals associated with systems to be commissioned (e.g. equipment, ductwork, piping, automatic controls, and TAB procedures, etc.) for their affect on the commissioning process and the final performance of the HVAC system.
6. The Commissioning Agent shall receive a copy of all controls submittals from the Contractor(s). The Commissioning Agent shall perform an explicit review of these submittals to verify their compliance with the design sequence of events and Owner's Project Requirements.
7. Provide Pre-Functional Checklists for the purposes of verifying proper installation. Checklists shall be based upon submitted documentation and updates to the Construction Documents.
8. The Commissioning Agent shall conduct approximately 12 Commissioning Meetings throughout the construction phase. Meetings shall be held more frequently as Commissioning Activities increase. Meetings are typically held monthly until systems are prepared for verification testing. The Commissioning Agent shall prepare minutes for every Commissioning Meeting and distribute copies to all attendees and other interested parties.
9. Attend select Coordination Meetings, aside from Commissioning Meetings, held between the Owner, System Design Professional(s) and Contractor(s).
10. The Commissioning Agent shall conduct periodic inspections of work in progress and shall generate and distribute a report for each inspection. The Commissioning Agent shall also perform select site visits for the explicit purpose of witnessing duct and piping pressure test procedures. The Commissioning Agent shall perform select site visits for the explicit purpose of witnessing piping system cleaning and flushing procedures. All issues and discrepancies found during these inspections shall be listed on a Commissioning Issues Log, maintained by the Commissioning Agent.
11. Submit detailed installation checklists entitled Pre-Functional Checklists. These checklists shall be developed by the Commissioning Agent specific to the project and

shall be required to be completed by the installing contractors. The Commissioning Agent is required only to spot-check these checklists upon completion of the installations.

12. Submit detailed Functional Performance Test procedures for review and acceptance by the Commissioning Team. These tests are specifically custom designed by the Commissioning Agent for verifying each system operates per the design intent and meets both the Basis of Design (BOD) and the Owner's Project Requirements (OPR.)
13. Provide and install calibrated data loggers to monitor and record data as required by the Functional Performance Tests.
14. Upon receipt of notification from the System Design Professional(s) that the mechanical systems have been completed and are operational, the Commissioning Agent shall proceed to verify on a random basis the TAB report and operation of the control systems in accordance with the Commissioning Specification. The Commissioning Agent shall recommend acceptance of the Final Test, Adjustment and Balance Report.
15. Oversee Functional Performance Testing which shall be performed by the installing contractors. All issues and discrepancies found during Functional Performance Testing shall be listed on the Commissioning Issues Log, maintained by the Commissioning Agent.
16. The Commissioning Agent shall not perform any site visits for the purpose of witnessing Functional Performance Testing until the installing contractor has verified that the system is ready for Functional Performance Testing and made proper notice to the Commissioning Agent with appropriate lead time.
17. Witness repeated conducting of Functional Performance Tests if deficiencies are found during the original testing. The Commissioning Agent will invoice the Owner for additional time required for any retesting, and the Owner at his discretion may deduct this cost from the CM’s Application for Payment. It is the Contractors' responsibility to properly de-bug systems and verify successful system performance prior to inviting the Commissioning Agent to witness the test.
18. Prepare the Final Commissioning Report. Submit completed Functional Performance Tests as part of Final Report to the owner. Recommend acceptance of the Final Product, by the Owner, based upon the results of Commissioning.
19. Repeat Functional Performance Tests to accommodate seasonal tests.

C. Construction Manager / General Contractor

1. Read, understand and follow the Commissioning Plan as a guideline for the Commissioning Process implemented into this construction project.
2. Include commissioning requirements in the mechanical subcontracts, electrical subcontracts, and all other subcontracts relating to the systems to be commissioned as outlined within Specification 019113 Section 1.5 - Systems to be Included in Commissioning. Ensure full cooperation of all contracting, manufacturing and testing parties required to participate in commissioning.
3. Include cost for commissioning requirements in the contract price. Include specific line items within the Schedule of Values according to Specification 019113 Section 2.2 – Schedule of Values.
4. Provide copies of the Project Schedule to the Commissioning Agent as outlined within Specification 019113 Section 2.1 – Project Schedule. Update the overall project schedule to reflect all Commissioning Activities. Ensure cooperation by subcontractors in coordinating the inclusion of subcontractor activities related to commissioning into the overall Project schedule.

5. Provide all submittals to the Commissioning Agent as outlined within Specification 019113 Section 2.3 – Submittals.
6. Ensure acceptable representation, with the means and authority to prepare and coordinate execution of the entire commissioning program as described in the contract documents.
7. Provide a representative to regularly attend every Commissioning Meeting. Ensure all Subcontractors also provide a representative at each Commissioning Meeting. These representatives are to remain the same individual throughout the construction project unless termination with the representing company occurs or their replacement is approved by the Owner and Commissioning Agent.
8. Coordinate all scheduled commissioning activities with the Commissioning Agent. The Contractor(s) must apprise the Commissioning Agent of various construction activities. These activities include but are not limited to: System Start-up, Equipment Start-up, Duct Pressure Tests, Pipe Pressure Tests, Pipe Flushing and Cleaning, Completion of Pre-Functional Checklists, readiness for Functional Performance Testing and System Completion.
9. Remedy all contractual deficiencies as outlined within the Commissioning Issues Log. The Commissioning Agent shall issue an updated deficiency log throughout construction based upon site visits, Pre-Functional Checklist completion, Commissioning Meeting topics and Functional Performance Test results.
10. Maintain a master copy of all PFC's. There are several methods for keeping these documents organized which is the responsibility of the Construction Manager/General Contractor. Reference the Commissioning Plan for examples of methods previously utilized to keep these documents organized. The Construction Manager/General Contractor must verify all PFC's and FPT's are complete. Sign all completed PFC's and FPT's prior to inviting the Commissioning Agent to witness and sign-off on these documents.
11. Evaluate performance deficiencies identified in the completed FPT's for non-conformance with contract documents. Remedy all contractual deficiencies identified in through Functional Performance Testing and other verification tests.
12. The Commissioning Agent shall not have any direct authority to order construction changes or make any project alterations without the written approval of the Owner or System Design Professional. Any changes or project alterations made by a Contractor(s) without such written approval shall be the responsibility of that Contractor(s).

D. Subcontractors

1. Subcontractor responsibilities are outlined within respective Commissioning Specification Sections.

    a. Plumbing Subcontractor responsibilities are outlined in Section 220800 – Commissioning of Plumbing Systems
    b. Mechanical Subcontractor responsibilities are outlined in Section 230800 – Commissioning of HVAC Systems.
    c. Controls Subcontractor responsibilities are outlined in Section 250800 – Commissioning of Integrated Automation Systems
    d. Electrical Subcontractor responsibilities are outlined in Section 260800 – Commissioning of Electrical Systems.
    e. All Subcontractors are additionally responsible for all requirements outlined within this Specification Section 019113 – Commissioning General Requirements.

2. Provide a representative at each Commissioning Meeting. These representatives are to remain the same individual throughout the construction project unless termination with the representing company occurs or their replacement is approved by the Owner and Commissioning Agent. The Subcontractor(s) must attend the Commissioning "Card Trick" Meeting as defined within Specification 019113 Section 1.7 – Schedule and provide all schedule activities and durations within their scope.
3. All Subcontractors must follow the same procedure for the completion of Pre-Functional Checklists as organized by the Construction Manger/General Contractor.
4. The Commissioning Agent shall not have any direct authority to order construction changes or make any project alterations without the written approval of the Owner or System Design Professional. Any changes or project alterations made by any Contractor(s) without such written approval shall be the responsibility of that Contractor(s).

1.5 SYSTEMS TO BE INCLUDED IN COMMISSIONING

A. For the systems listed, all requirements specified within the Commissioning Specifications Sections 019113, 220800, 230800, 250800, and 260800 shall apply including but not limited to:

1. All system related documentation shall be tracked within forms provided by the Commissioning Agent.
2. All required equipment and component submittals shall be copied to the Commissioning Agent per Specification 019113 Section 2.3 – Submittals.
3. All system related documentation shall be copied by the Contractor and provided to the Commissioning Agent for inclusion into the Commissioning Record Documents.
4. All systems shall be inspected by the Commissioning Agent while under construction and all issues discovered by the Commissioning Agent shall be corrected or otherwise addressed by the contractor.
5. All systems shall have Pre-Functional Checklists and Functional Performance Tests provided by the Commissioning Agent and completed by the Contractor(s) as per Specification 019113 Sections 2.4 – Pre-Functional Checklists and 2.6 – Functional Performance Tests.

B. The following systems, equipment and components shall be commissioned:

Primary System	**Sub-System**
Chilled Water System	Water Cooled Chillers
	Primary Pumps
	Secondary Pumps
	Piping Systems and Accessories[2]
Ventilation Air System	Office/Admin Air Handling Unit
	Office VAV Terminal Units
	Warehouse Core Air Handling Unit
	Warehouse Core Terminal Units
	Warehouse Storage Single Zone Air Handling Unit
	Shop Ventilation and Specialty Exhaust
Hot Water System	Condensing Natural Gas Boilers
	Primary Hot Water Pumps

Primary System	**Sub-System**
	Secondary Hot Water Pumps
	Piping System and Accessories[2]
Domestic Water	Domestic Water Booster Pump
	Domestic Hot Water System
Electrical System	Medium Voltage Distribution with Campus Loop
	1500 KVA 480/277 Transformer
	750 KW Emergency Power Generator
	Paralleling Switchgear
	Main Switch Boards
	Panel Boards
	Interior Lighting Control/Occupancy Sensors

[2]Strainers, Expansion Tanks, Air Separators, Duct Detectors, Dampers, etc.

1.6 COORDINATION

A. General coordination is required by the Owner, Architect, System Design Professional(s), Contractor(s) and the Commissioning Agent to maintain an efficient commissioning process.

B. The Architect, System Design Professional(s) and Contractor(s) shall submit to the Commissioning Agent a copy of all construction documents, addenda, change orders, overall project schedule, and any approved submittals, shop drawings, value engineering proposals and training plan related to commissioned systems.

C. The Commissioning Authorities primary responsibility is to the Owner, and as such, shall regularly apprise the Contractor and the Owner of progress, pending problems and/or disputes, and shall provide regular status updates on progress with each system.

D. The Commissioning Agent shall coordinate the schedule of commissioning activities with the construction schedule with assistance from the Owner, Architect, System Design Professional(s) and Contractor(s).

E. The Contractor(s) must apprise the Commissioning Agent of various construction activities. These activities include: System Start-up, Duct Pressure Tests, Pipe Pressure Tests, Pipe Flushing and Cleaning, Completion of Pre-Functional Checklists, readiness for Functional Performance Testing and System Completion.

1.7 SCHEDULE

A. Commissioning of systems shall proceed per the criteria established in the specific sections that follow, with activities to be performed on a timely basis. Site visits which are specifically scheduled for the purpose of demonstrating system functionality shall be coordinated by the Contractor(s) such that all required parties are present during the visit. The Contractor(s) shall be responsible for demonstrating system functionality during these scheduled periods.

B. All Commissioning activities which require the presence of the Commissioning Agent shall be scheduled such that the Commissioning Agent is made aware of the required site visit with a minimum of two weeks (14 days) notice.

C. Upon the discovery of deficient items during inspection or testing, the Contractor(s) shall be notified via distribution of an updated Commissioning Issues Log. Additional visits to the site for re-inspection or re-testing shall be scheduled as required. Prior to these additional visits, related deficiencies shall be rectified by the responsible party. The Contractor(s) shall be responsible for ensuring that all required corrective actions are performed in a timely manor in order to maintain the project schedule.

D. Contractor schedules and scheduling is the responsibility of the Contractor(s). The Commissioning Agent shall provide commissioning scheduling information to the Construction Manager or General Contractor for incorporation into the main CPM schedule for review and planning activities.

E. The Commissioning Agent shall hold a meeting with the Owner, System Design Professional(s) and all Contractors for the explicit purpose of integrating each Commissioning Activity into the Construction Schedule. Contractor(s) shall be required to be prepared with construction activities and durations as they enter this meeting. Activities shall be any which are related to the Commissioning of Systems as Identified in Specification 019113 Section 1.5 – Systems to be Included in Commissioning and shall include but not be limited to the following: Building Envelope Enclosure, Equipment Installations, Equipment Start-up, Duct Pressure Tests, Pipe Pressure Tests, Pipe Flushing and Cleaning, Construction Clean-up, System Start-up, Test and Balance, System Completion, etc.

F. Prior to ~~substantial completion~~ **Final Acceptance**, all Functional Performance Tests must be successfully completed and documented by the Commissioning Agent, such that each tested system has proven full and efficient functionality.

1.8 RELATED WORK SPECIFIED ELSEWHERE

A. Commissioning requires support from the contractors. The commissioning process does not relieve any contractors from their obligations to complete all portions of work in a satisfactory manner prior to commissioning any system.

B. Refer to Sections 220800, 230800, 250800, and 260800 for contractor responsibilities relative to the commissioning process.

PART 2 - PRODUCTS

2.1 PROJECT SCHEDULE

A. Contractor(s) shall submit two copies of a complete project schedule to the Commissioning Agent. The Contractor(s) must submit the schedule no later than two weeks after the Commissioning Kick-Off Meeting.

B. Contractor(s) shall be required to incorporate all Commissioning Activities into the overall project schedule.

2.2 SCHEDULE OF VALUES

A. The Contractor(s) shall include within the Schedule of Values, specific line items to reflect Commissioning progress. For each system to be commissioned as outlined in Specification 019113 Section 1.5 – Systems to be Included in Commissioning, a line item shall be listed in the Schedule of Values for the following:

1. Pre-Functional Checklist
2. System Start-Up
3. Functional Performance Test
4. Equipment/System Training

B. The Contractor(s) shall submit two copies of the Schedule of Values to the Commissioning Agent for review. The Commissioning Agent shall review and comment on line items relevant to commissioning and systems to be commissioned. Any comments by the Commissioning Agent will be forwarded to the System Design Professional(s) for review and inclusion.

2.3 SUBMITTALS

A. Contractor(s) shall submit two copies of all equipment and component submittals to the Commissioning Agent for each of the Systems to Be Commissioned as outlined within this specification section. Any comments by the Commissioning Agent will be forwarded to the System Design Professional(s) for review and inclusion.

B. Manufacturer's Product Data: The Contractor(s) shall provide to the Commissioning Agent all product data as required within each individual specification section.

C. Coordination Drawings: The Contractor(s) shall provide to the Commissioning Agent all Coordination Drawings as required within each individual specification section.

D. Manufacturer's Installation Instructions: The Contractor(s) shall provide to the Commissioning Agent a minimum of one copy of installation instructions for every piece of equipment and accessory included as part of a commissioned system.

E. Manufacturer's Controls Calibration Instructions: The Contractor(s) shall provide to the Commissioning Agent a minimum of one copy of calibration instructions for each type of control device to be installed. Submit only control device calibration instructions for devices which have been approved by the System Design Professional(s).

F. The Contractor(s) shall submit a copy of the Record Documents to the Commissioning Agent for review. The Commissioning Agent shall forward comments to the Owner, Architect, System Design Professionals and Contractor(s). The Commissioning Agent shall recommend approval of the Record Documentation.

G. The Contractor(s) shall submit a copy of all Warranties to the Commissioning Agent for review. The Commissioning Agent shall forward comments to the Owner, Architect, System Design Professionals and Contractor(s). The Commissioning Agent shall recommend approval of the Warranties.

H. The Contractor(s) shall submit a copy of all Operations and Maintenance Manuals to the Commissioning Agent for review. The Commissioning Agent shall forward comments to the Owner, Architect, System Design Professionals and Contractor(s). The Commissioning Agent shall recommend approval of the O&M Manuals.

I. The Contractor(s) shall submit a copy of all final Training Documentation to the Commissioning Agent for review. The Commissioning Agent shall forward comments to the Owner, Architect, System Design Professionals and Contractor(s). The Commissioning Agent shall recommend approval of the Training based upon the documentation provided.

2.4 PRE-FUNCTIONAL CHECKLISTS

A. Pre-Functional Checklists (PFC) shall be issued by the Commissioning Agent to the Commissioning Team. Each member of the Commissioning Team representing a project contractor shall receive a minimum of one copy of every PFC issued by the Commissioning Agent. The PFC's shall consist of a series of installation checklist items, required to be completed by the installing contractors. Each PFC is customized for each type of equipment or system component.

B. A series of checklist items must be completed for every single piece of equipment and system component included within the systems being commissioned as outlined in Specification 019113 Section 1.5 – Systems to be Included in Commissioning.

C. It is the contractor's responsibility to estimate the extent and depth of the PFC requirements, based upon the level of involvement required to install each individual piece of equipment or system component. Each contractor shall be responsible for providing a cost associated with Pre-Functional Checklists based upon this extent and depth.

1. The number of checklist items for each piece of equipment or system component shall range from approximately 10 checklist items up to approximately 30 checklist items with respect to the level of involvement required by the contractors. For example, a PFC of only 10 checklist items would represent a piece of equipment which requires only to be connected to an inlet and outlet pipe such as a strainer or other pipe accessory. A PFC of 30 checklist items is more involved and requires in depth installation and adjustment by multiple contractors, such as a Variable Volume Terminal Reheat Box.
2. All checklist items on a PFC are static installation requirements. Proper storage and installation methods may be included within the PFC checklists. Operational checklist items and test, adjustment and balance items shall NOT be included. PFC's may include checklist items requiring submittals to be completed which indicate operational characteristics have been verified. These submittals shall only be included within a PFC if they are a requirement of the contract documents.
3. Equipment PFC's shall list for comparison the manufacturer's data of the equipment as per the design, approved submittal and the installed equipment. These items are initially blank on the forms provided to the contractors by the Commissioning Agent. The Contractors are responsible for obtaining this information and filling in these blanks.

a. Design: The manufacturer's data shall be filled in by the contractor according to the design criteria outlined within the design specifications or equipment schedules.
b. Submitted: The manufacturer's data shall be filled in by the contractor according to the product submittal, submitted by the contractor and approved of by the design representative
c. Installed: The manufacturer's data shall be filled in by the contractor according to the actual piece of equipment installed in the field nameplate data.

4. The contractor shall remain responsible for completing all manufacturer's data. PFC manufacturer's data are not considered checklist items and are not included in the range of installation checklist items defined in Specification 019113 Section 2.4 – Pre-Functional Checklists, Sub-section D-1 above (06150-2.4-D-1.)
5. PFC's shall not require an extension of the project schedule. PFC's require no additional installation work above and beyond the scope of the contract documents. PFC checklist items shall be checked-off as equipment is being installed according to the project schedule. PFC's shall be completed in conjunction with the completion of equipment installations.

D. PFC's are multi-discipline and therefore must be partially completed by multiple contractors. The division of each PFC is the contractor's responsibility. Division of project work is determined by the CM and subcontractors and is not within the jurisdiction of the Commissioning Agent. Therefore, the division of work outlined within each PFC is generalized and has not taken into account the true scope of each individual sub-contracting company. Each contractor must review every PFC to determine their own obligation to the installation checklist items described therein.

E. PFC's shall include full calibration documentation of all field calibrated devices as required by the specifications of equipment or controls.

F. In the event, the Commissioning Agent has omitted a piece of equipment or system component from its applicable PFC form, which is included within the systems to be commissioned. The sub-contractor shall remain responsible for completing a column of checklist items within the appropriate PFC form for that particular piece of equipment or system component. The contractor may bring the omitted item to the attention of the Commissioning Team or Commissioning Agent, whom may in turn provide an additional form for the omitted item. The contractor shall otherwise copy an existing blank PFC form and alter the equipment or system component designation at the top of one column of checklist items to represent the omitted item. The contractor shall then complete the column of checklist items and include the form within the master PFC.

G. The CM shall be responsible for maintaining a master PFC for each PFC provided by the Commissioning Agent. The master PFC shall be completed in black fine-point ink unless kept electronically via PDF. All marks must be permanent and legible. Each PFC checklist item shall be verified by the responsible contractor and checked-off on the master copy of the respective PFC. Sub-contractors may utilize their personal copies of each PFC's in the field to verify installations and then transfer all checks, notes an initials to the master PFC. Otherwise, sub-contractors my check-off items directly on the master PFC, while in the field. Contractors shall not assemble pages from multiple copies of a PFC, which have been completed by multiple sub-contractors, to create a single PFC representing the master PFC.

H. Each PFC checklist item shall be checked by the responsible contractor. The specific individual person who checks off any single item on a PFC shall legibly scribe their personal three-letter initials in the space provided adjacent to the item checkbox. Upon completion of any contractor's portion of checklist items, the responsible manager or field superintendent for that company shall sign their full signature in all required places indicated on the PFC. The day's date shall be scribed next to the signature. Typically, the only signature space shall be on the title page of each PFC.

I. The CM shall be responsible to verify any general contracting items, for which the sub-contractors are not responsible. The CM shall be responsible for determining these checklist items within each PFC and completing them in kind.

J. The CM shall be responsible to verify all sub-contractors complete each checklist item for which they are responsible. The CM may complete any outstanding checklist items which have not been completed by the sub-contractors, understanding that by checking and initialing any blank item, the CM accepts responsibility for the truthful state of that installation item.

K. Checklist items within a PFC shall not require any additional work or installation above and beyond that which is called for in the project construction documents or manufacturer's installation requirements. Items above and beyond the scope outlined within the construction documents or manufacturer's installation requirements may be brought to the attention of the Commissioning Team or Commissioning Agent and will likely be removed from the PFC checklist requirements.

L. Prior to proceeding with any particular system Functional Performance Test, all PFC's associated with equipment or system components which fall under the scope of that particular system, shall be 100% complete and approved by the Commissioning Agent.

M. The Commissioning Agent shall require the following for the approval of each Pre-Functional Checklist: Each checklist item shall be checked or noted otherwise. Each checklist item shall bear a three-letter initial next to it if an initial space is provided. Each piece of manufacturer's data shall be complete and accurate. Each device calibration checklist shall be complete. Every space on each PFC which requires a signature shall bear the appropriate signature. All marks shall be black and legible according to the Owner or Commissioning Agent.

2.5 START-UP AND TEST REPORTS

A. Contractor(s) shall submit copies of all start-up reports for systems to be commissioned, test reports and any additional reports relating to work performed by subcontractors and manufacturers as required by the project specifications. Reports shall be submitted with the appropriate Pre-Functional Checklists. Reports shall include but are not limited to: equipment start-up, weld tests, pressure tests, system flushing, system cleaning, chemical treatment, equipment repair, feeder tests, grounding tests, electrical equipment tests, gauge calibration, etc.

2.6 FUNCTIONAL PERFORMANCE TESTS

A. Functional Performance Tests (FPT's) shall be issued by the Commissioning Agent to the Commissioning Team. Each member of the Commissioning Team representing a project contractor shall receive a minimum of one copy of every FPT issued by the Commissioning Agent. Each system FPT shall consist of a multitude of operational procedures which shall encompass all operational procedures for which that system is required to be capable of performing per the contract documents. Each FPT is customized for each system according to the specifications, contract drawings and equipment submittals.

B. A Functional Performance Test must be completed for each of the systems to be commissioned as outlined in Specification 019113 Section 1.5 – Systems to be Included in Commissioning.

C. It is the contractor's responsibility to estimate the extent and depth of the FTP requirements, based upon the level of involvement required to perform each individual sequence of operations. Each contractor shall be responsible for providing a cost associated with Functional Performance Testing based upon this extent and depth.

1. Functional Performance Tests shall be composed of a very detailed series of step-by-step procedures required to be performed by the installing contractors in order to prove the sequence of operations has been properly met according to the construction documents.
2. FPT's shall include functional test procedures for each operational piece of equipment within a system. Each piece of equipment shall be individually tested for correct operation and load capabilities according to the contract documents. These shall be tested by both the remote BAS control system as well as any localized controls. Local controls may range from a fully programmable control panel down to a simple disconnect switch. Equipment which has been adjusted by the TAB contractor shall be tested against the information provided by the TAB Contractor within the TAB Report. Certain parameters may be required for Functional Performance Testing which are not fully encompassed within the Test, Adjustment and Balance scope if these parameters are essential for verifying equipment operational characteristics or performance.
3. Every sequence of operation shall be tested as identified within the contract documents. Various sequence requirements are outlined within the project specifications and several requirements are outlined within the contract drawings. Sequences tested shall verify equipment integration and overall system performance. Items identified during system testing include correct order of operations and system efficiencies. System sequence of operations testing shall test every sequence of operations for every case-scenario possible. Each sequence of operations shall be tested for each piece of redundant equipment. Each sequence of operations which has a reverse process shall be tested through the reverse process. Sequence of operations test shall encompass all controls devices as well as all major equipment.
4. Each auxiliary system requirement shall be tested as identified within the contract documents. Various auxiliary requirements are outlined within the project specifications and several requirements are outlined within the contract drawings. Auxiliaries tested shall verify system alarms, notifications and operation of auxiliary equipment. Equipment failures shall be tested to verify system response. Sub-systems to large systems which have not been functionally tested elsewhere shall be tested, such as a refrigerant pump-out system to a chilled water system.

D. The contractor must account for performing each Functional Performance Test two (2) times:

1. Upon receipt of each Functional Performance Test, the contractor shall be responsible for reviewing all steps and procedures within, to verify each test is congruent to the applicable system as installed. The contractor is responsible for updating the Commissioning Team and Commissioning Agent of any and all changes within the project which may have an effect on the sequence of operations of any system as it is tested by Functional Performance Test. It is important that the Final Functional Performance Tests, performed in the field and witnessed by the Commissioning Agent are in-fact finalized drafts which encompass all changes made to the systems.
2. The contractor shall be responsible for performing all steps within a Functional Performance Test prior to issuing a formal request for the Commissioning Agent to witness functional testing. The contractor shall utilize the Functional Performance Tests as received from the Commissioning Agent to internally verify all sequences are fully operational. Upon successful completion of each Functional Performance Test, the contractor may request the presence of the Commissioning Agent to witness the test. The Commissioning Agent shall then witness each test in its entirety.

E. Redundant Equipment: A Functional Performance Test shall be provided to test every piece of redundant equipment. The contractor shall be responsible for testing every unit to verify correct operation. All redundant equipment shall not necessarily be retested and witnessed by the Commissioning Agent. The Commissioning Agent will select a certain percentage of redundant equipment to be tested. These units shall be chosen at random by the Commissioning Agent, during functional testing. A failure of a certain percentage (typically 10%) or greater of the redundant equipment tested shall indicate improper installation and performance and shall result in system failure. Terminal Reheat Boxes are an example of redundant equipment which are typically tested by random sampling.

2.7 TAB VERIFICATION

A. Tab Verification shall not be included within the scope of Commissioning and is not a requirement of the Contractor(s).

B. The Test, Adjustment and Balance Report is to be spot-checked by the Commissioning Agent. The TAB Contractor shall be required to repeat measurements selected at random by the Commissioning Agent to confirm the accuracy of the submitted report. See Specification 23 08 00 – Commissioning of Mechanical Systems for detailed TAB Contractor requirements. TAB Verifications shall be included within the scope of the Functional Performance Testing. Repeated measurements shall be taken using the original instruments utilized by the TAB Contractor.

2.8 TEST EQUIPMENT

A. All industry standard test equipment required for performing the specified tests shall be indicated by the Commissioning Agent within the testing protocol documents and provided by the contractors. Any proprietary vendor specific test equipment shall be provided by that vendor or manufacturer.

B. Any portable or hand-held setup / calibration devices required to initialize the control system shall be made available by the control vendor (at no cost) to the Commissioning Agent.

C. The instrumentation provided by the contractor shall meet the following standards:

1. Be of sufficient quality and accuracy to test and/or measure system performance within the tolerances required.
2. Be calibrated at the manufacturer's recommended intervals with calibration tags permanently affixed to the instrument
3. Be maintained in good repair and operating condition throughout the duration of use on this project.
4. Be immediately replaced if dropped and/or damaged in any way during use on this project.

PART 3 - EXECUTION

3.1 COMMISSIONING PLAN AND SCHEDULE

A. The Contractor(s) shall submit to the Commissioning Agent a copy of the overall project schedule. The Contractor(s) shall be responsible for submitting updated copies of this schedule to the Commissioning Agent.

B. The Commissioning Agent will, in coordination with the Commissioning Team, develop a general commissioning schedule with the ideal time frame for implementation of the various commissioning tasks. The Commissioning Schedule will be reviewed with the Owner, the System Design Professional(s) and Construction Manager or General Contractor for integration into the overall project construction schedule. All commissioning tasks as well as critical milestone dates will be tracked on the master project schedule.

C. The Construction Manager/General Contractor and Contractor(s) shall be responsible for providing periodic updates to the commissioning tasks within the master schedule, identifying areas where commissioning is falling behind schedule.

D. After the pre-construction meeting, a Commissioning Kick-Off Meeting will be held and attended by all Contractor(s) involved in the commissioning process. A commissioning plan will be distributed at this meeting to the Construction Manager or General Contractor, System Design Professional(s), and prime contractors outlining the specific commissioning process for this project and the names and contact information, to be determined at this meeting, of all commissioning team members. A final plan will be issued soon after the meeting listing all team contact information.

3.2 CONSTRUCTION OBSERVATION

A. The Architect and System Design Professional(s) shall make standard construction inspection site visits as required by their respective contracts with the Owner.

B. Construction observation by the Commissioning Agent is required as part of the commissioning and coordination process. A specific number of scheduled site visits will be provided during construction and prior to Functional Performance Testing. Functional Performance Testing shall not be for the purposes of installation inspection and shall be scheduled separately.

3.3 TEST AND BALANCE

A. See Specification 230800 Section 1.5 – Roles and Responsibilities for the requirements of the Test, Adjustment and Balance Contractor as related to Commissioning.

3.4 PRE-FUNCTIONAL CHECKLISTS AND FUNCTIONAL PERFORMANCE TEST PROCEDURES

A. Pre-functional checklists and functional performance testing will be provided by the Commissioning Agent after equipment submittal and start-up information is provided by the contractors to the Commissioning Agent. The contractors shall use only PFC and FPT forms provided by the Commissioning Agent. PFC and FPT forms are required to be completed by the Contractor(s) and approved by the Commissioning Agent.

3.5 PRE-FUNCTIONAL CHECKLISTS - OBSERVATION

A. The pre-functional test forms shall be completed by the installing contractor, manufacturer's, and all others with related involvement with the commissioned equipment. The test forms shall be signed verifying completion by the Construction Manager or General Contractor and all related contractors and sub-contractors. The Commissioning Agent shall spot check forms to verify completion. If the spot check reveals discrepancies, the contractors will be required to redo the forms. The Commissioning Agent again spot check the forms and will invoice the Owner for additional time required for any retesting required due to failed PFC's, and the Owner at his discretion may deduct this cost from the Construction Manager or General Contractor's Application for Payment. It is the contractor's responsibility to properly install equipment and components and verify such prior to inviting the Commissioning Agent to spot check these installations.

B. Checklists shall be completely comprehensive and to the extent necessary to enable the Commissioning Agent to assure the Owner and System Design Professional(s) that the systems are installed correctly.

3.6 FUNCTIONAL PERFORMANCE TESTING - OBSERVATION

A. The functional performance testing shall be performed by the installing contractor. The Commissioning Agent shall direct and witness final testing. The Contractor(s) shall initiate the tests provided by the Commissioning Agent, debug the systems, and verify compliance prior to requesting the tests be witnessed by the Commissioning Agent. The Commissioning Agent, upon witness of any system functional deficiency shall require complete retesting. The Commissioning Agent will invoice the Owner for additional time required for any retesting required due to failed FPT's, and the Owner at his discretion may deduct this cost from the CM's Application for Payment. It is the contractor's responsibility to properly de-bug systems and verify successful system performance prior to inviting the Commissioning Agent to witness the test.

B. Tests shall be completed comprehensively and to the extent necessary to enable the Commissioning Agent to assure the Owner and System Design Professional(s) that the systems do perform per the design intent.

3.7 TRAINING

A. The Commissioning Agent shall review the Contractor(s) Training Plan for adequacy. The Contractor(s) may otherwise utilize forms provided by the Commissioning Agent to facilitate the Training Plan. Forms shall facilitate the scheduling, agendas, and Operations and Maintenance Staff review of each training session.

B. The Contractor(s) shall be required to complete all training requirements set forth throughout the specifications. The Commissioning Agent shall verify all training requirements have been met through collection of all training documentation. The Commissioning Agent shall review the training documentation for approval.

3.8 EXCLUSIONS

A. Responsibility for construction means and methods: The Commissioning Agent is not responsible for construction means, methods, job safety, or any construction management functions on the job site.

B. Hands-on work by the Commissioning Agent: The contractors shall provide all services requiring tools or the use of tools to start-up, test, adjust, or otherwise bring equipment and systems into a fully operational state. The Commissioning Agent shall coordinate and observe these procedures (and may make minor adjustments), but shall not perform construction or technician services other than verification of testing, adjusting, balancing, and control functions.

3.9 PREREQUISITES TO ~~SUBSTANTIAL COMPLETION~~ **FINAL ACCEPTANCE**

A. All commissioning of mechanical and electrical systems must be complete prior to ~~Substantial Completion~~ **Final Acceptance**. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. Prerequisites include for all systems, but are not limited to:

1. Completed and signed start-up and pre-functional checklist documentation
2. Submission of final approved TAB report
3. Completion of all functional testing
4. Required training of Owner personnel completed and approved
5. Submission of the approved O&M manuals
6. All identified deficiencies have been corrected or are approved by the Owner for ~~substantial completion~~ **Final Acceptance**.

B. The Owner's Project Manager will determine the date of Functional Completion after reviewing the Commissioning Agent's recommendation for ~~Substantial Completion~~ **Final Acceptance**.

C. Commissioning activities are non-compensable and cannot be a cause for delay claims. Failure of the contractors to complete all work, including commissioning activities, in a timely manner resulting in overall project delays shall be the fault of the contractor.

END OF SECTION 019113

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.
2. Solid-surfacing-material countertops.
3. Closet and utility shelving.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 ACTION SUBMITTALS

A. Product Data: For high-pressure decorative laminate, adhesive for bonding plastic laminate, solid-surfacing material, cabinet hardware and accessories, and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, and other items installed in architectural woodwork.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Samples for Verification:

1. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
2. Lumber and panel products with shop-applied opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with 1/2 of exposed surface finished.
3. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish.

4. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on 1 edge.
5. Solid-surfacing materials, 6 inches square.
6. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and/or fabricator.

B. Product Certificates: For each type of product, signed by product manufacturer.

C. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that 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. Shop is a certified participant in AWI's Quality Certification Program.

B. Installer Qualifications: Certified participant in AWI's Quality Certification Program.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers.

D. Quality Standard: Unless otherwise indicated, comply with “Architectural Woodwork Standards” published jointly by the Architectural Woodwork Institute, the Architectural Woodwork Manufacturers Association of Canada and the Woodwork Institute for grades of interior architectural woodwork indicated for construction, finishes, installation and other requirements.

1. Provide AWI Quality Certification Program certificates indicating that woodwork, including installation, complies with requirements of grades specified.
2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Final Acceptance.

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation

areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWS quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species for Opaque Finish: Any closed-grain hardwood.

C. Wood Products: Comply with the following:

1. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
2. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

D. Thermoset Decorative Panels: Medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.

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

1. Basis-of-Design Product: Subject to compliance with requirements, provide high-pressure decorative laminates as scheduled on Room Finish Legend on Drawings or a comparable product by one of the following:

a. Formica Corporation.
b. Lamin-Art, Inc.
c. Panolam Industries International Incorporated.
d. Wilsonart LLC.

2. Products: As indicated on Room Finish Legend on Drawings.

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

1. Basis-of-Design Product: Subject to compliance with requirements, provide solid-surfacing material as scheduled on Room Finish Legend on Drawings or a comparable product by one of the following:
a. Corian; DuPont.
b. Formica Corporation.
c. InPro Corporation.
d. Wilsonart LLC.

2. Products: As indicated on Room Finish Legend on Drawings.
3. Type: Standard type, unless Special Purpose type is indicated.
4. Colors and Patterns: As indicated on Room Finish Legend on Drawings.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."

B. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:

1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361; Nickel finish.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.

D. Wire Pulls: As scheduled on Room Finish Legend on Drawings.

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081 BHMA A156.9, B04102; with shelf brackets, B04112.

F. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

G. Drawer Slides: BHMA A156.9, B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
2. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
3. File Drawer Slides: Grade 1HD-100; for drawers more than 6 inches high or 24 inches wide.
4. Trash Bin Slides: Grade 1 HD-100; for trash bins not more than 20 inches high and 16 inches wide.

H. Door Locks: BHMA A156.11, E07121.

I. Drawer Locks: BHMA A156.11, E07041.

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

1. **Basis-of-Design** Product: Subject to compliance with requirements, provide ~~"OG series" by~~ Doug Mockett & Company, Inc. **or a comparable product by one of the following:**
   a. Doug Mockett Company (Basis-of-Design)
      1) Product: OG series.
   b. Richelieu Hardware.
   c. Rockler Woodworking and Hardware

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

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

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

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

C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

D. Adhesives, General: Adhesives shall not contain urea formaldehyde.

E. VOC Limits for Installation Adhesives: Installation adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24 and South Coast Air Quality Management District (SCAQND) – Rule 1168):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Contact Adhesive: 250 g/L.

F. Adhesive for Bonding Plastic Laminate: Contact cement.

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

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.

D. Complete fabrication, including assembly, finishing, 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.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items, including trash disposal openings. 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.

1. Seal edges of openings in wood countertops with a coat of varnish.

2.5 PLASTIC-LAMINATE CABINETS

A. Grade: Custom.

B. Type of Construction: Frameless.

C. Cabinet and Door and Drawer Front Interface Style: Flush overlay.

D. Reveal Dimension: As indicated.

E. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade VGS.
4. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.

F. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
   a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.
   b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
2. Drawer Sides and Backs: Medium density fiberboard or hardwood plywood.
3. Drawer Bottoms: Medium density fiberboard or hardwood plywood.

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

H. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.6 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Custom.

B. Solid-Surfacing-Material Thickness: 1/2 inch.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

1. As indicated on Interior Finishes Legend on Drawings.

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

1. Fabricate tops with shop-applied edges of materials and configuration indicated.
2. Fabricate tops with loose backsplashes for field application.

E. Install integral sink bowls in countertops in shop.

F. Drill holes in countertops for plumbing fittings in shop.

2.7 CLOSET AND UTILITY SHELVING

A. Grade: Custom.

B. Shelf Material: 3/4-inch thermoset decorative panels.

C. Cleats: 3/4-inch solid lumber.

D. Wood Species: Any closed-grain hardwood.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except where shorter single-length pieces are necessary.

1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
2. Install wall railings on indicated metal brackets securely fastened to wall framing.
3. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

G. Cabinets: Install without distortion so doors and drawers fit openings properly 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.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.

3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

H. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

I. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

J. Refer to Division 09 Sections for final finishing of installed architectural woodwork not indicated to be shop finished.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Waterproof membrane.
3. Crack isolation membrane.
4. Tile backing panels.
5. Metal edge strips.

B. Related Sections:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for cementitious backer units and water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1-2012 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction: For tile installed on walkway surfaces, provide products that meet the requirements of ANSI A 137.1-2012 testing method, the DCOF AcuTest.

1. Minimum Threshold: 0.42 for level interior spaces expected to be walked upon when wet.

1.5 ACTION SUBMITTALS

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

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Adhesives shall have a VOC content of 65 g/L or less.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
4. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, locations and field verified locations of drains, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required, including tile base.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product, signed by product manufacturer.

D. Material Test Reports: For each tile-setting and -grouting product.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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

1. Tile and Trim Units: Furnish quantity of full-size units equal to 2 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 2 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Waterproof membrane.
2. Crack isolation membrane.
3. Joint sealants.
4. Cementitious backer units.
5. Metal edge strips.

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

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Approved mockups may become part of the completed Work if undisturbed at time of Final Acceptance.

E. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type: Porcelain floor tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Basis-of-Design products as scheduled on Room Finish Legend on Drawings or comparable product by one of the following:

    a. American Marazzi Tile, Inc.
    b. American Olean; Division of Dal-Tile International Inc.
    c. Crossville, Inc.
    d. Daltile; Division of Dal-Tile International Inc. (Basis-of-Design).
    e. Florida Tile Industries, Inc.
    f. Florim USA.
    g. Stone Source LLC.
    h. Trinity Surfaces (Basis-of-Design).

2. Composition: Porcelain.
3. Module Size: As indicated on Room Finish Legend on Drawings.
4. Tile Color and Pattern: As indicated on Room Finish Legend on Drawings.
5. Grout Color: As selected by Architect from manufacturer's full range.
6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows:

    a. Base Cove: Cove, module size as indicated on Room Finish Legend on Drawings.

B. Tile Type: Porcelain wall tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Basis-of-Design products as scheduled on Room Finish Legend on Drawings or comparable product by one of the following:

    a. American Olean; Division of Dal-Tile International Inc.
    b. Crossville, Inc.
    c. Daltile; Division of Dal-Tile International Inc. (Basis-of-Design).
    d. Florida Tile Industries, Inc.
    e. Mosaic Tile Company.

2. Module Size: As indicated on Room Finish Legend on Drawings.
3. Tile Color and Pattern: As indicated on Room Finish Legend on Drawings.
4. Grout Color: As selected by Architect from manufacturer's full range.
5. Mounting: Factory, back mounted.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 12 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.

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

a. Schluter Systems L.P.; KERDI.
b. Or approved equal.

C. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Laticrete or a comparable product by one of the following:

a. ARDEX Engineered Cements.
b. Custom Building Products.
c. Laticrete International, Inc. (Basis-of-Design).
1) Product: 9235 Waterproofing Membrane.
d. MAPEI Corporation.

2.5 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.

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

a. Schluter Systems L.P.; KERDI.
b. Or approved equal.

C. Corrugated Polyethylene/Uncoupling Membrane: Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 3/16-inch nominal thickness.

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

    a. ARDEX Americas; ARDEX IU 740 Flexbone.
    b. Schluter Systems L.P.; DITRA.
    c. Or approved equal.

D. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

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

    a. Boiardi Products; a QEP company; Elastiment 344 Reinforced Waterproofing and Anti-Fracture/Crack Suppression Membrane.
    b. Bonsal American; an Oldcastle company; B 6000 Waterproof Membrane with Glass Fabric.
    c. Bostik, Inc.; Hydroment Blacktop 90210.
    d. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
    e. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
    f. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.
    g. Mer-Kote Products, Inc.; Hydro-Guard 2000.
    h. Summitville Tiles, Inc.; S-9000.

2.6 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

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

    a. Custom Building Products.
    b. Laticrete International, Inc.
    c. MAPEI Corporation.
    d. TEC; a subsidiary of H. B. Fuller Company.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

2.7 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

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

    a. ARDEX Engineered Cements.
    b. Custom Building Products.
    c. Laticrete International, Inc.

d. MAPEI Corporation.
e. TEC; a subsidiary of H. B. Fuller Company.

2.8 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, aluminum, designed specifically for flooring applications; aluminum exposed-edge material.

1. Basis-of-Design: **Subject to compliance with requirements,** provide products by Schluter as indicated on Room Finish Legend on Drawings **or a comparable product by one of the following**:
   a. **Blanke Corporation.**
   b. **Ceramic Tool Company, Inc.**
   c. **Schluter Systems L.P. (Basis-of-Design).**

C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

    a. Tile floors in wet areas.
    b. Tile floors in laundries.
    c. Tile floors composed of tiles 8 by 8 inches or larger.
    d. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the joint widths the narrowest joint recommended in writing by the tile manufacturer.

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on approved Shop Drawings. Form full depth joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles. Provide expansion joints as follows:

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them and of equal or greater widths.
2. Where tilework abuts restraining surfaces such as perimeter walls, curbs, columns, and ceilings.
3. Where there is a change in substrate material.
4. Interior Tilework: 20 to 25 feet in each direction.
5. Above ground concrete substrates: 8 to 12 feet in each direction.
6. Interior tilework exposed to direct sunlight: 8 to 12 feet in each direction.
7. Interior tilework exposed to moisture: 8 to 12 feet in each direction.

I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

J. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and

plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F113: Thin-set mortar; TCNA F113.

   a. Tile Type: Unglazed ceramic and unglazed porcelain paver tile.
   b. Thin-Set Mortar: Latex-portland cement mortar.
   c. Grout: Polymer-modified sanded grout.

2. Tile Installation F125A: Thin-set mortar on crack isolation membrane; TCNA F125A.

   a. Tile Type: Unglazed ceramic or unglazed porcelain paver tile.
   b. Thin-Set Mortar: Latex-portland cement mortar.
   c. Grout: Polymer-modified sanded grout.

B. Interior Wall Installations, Metal Studs or Furring:

1. Tile Installation W243: Thin-set mortar on gypsum board; TCNA W243:

   a. Tile Type: Ceramic wall base.
   b. Thin-Set Mortar: Latex-portland cement mortar.
   c. Grout: Polymer-modified sanded grout.

END OF SECTION 093000

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:

1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

C. Raceways shall be metal except as specifically noted, or where non-metallic raceway is permitted by these specifications. A Green Grounding conductors shall be provided in all conduit except for telecommunications, data and audio conduits.

1. Use heavy wall metal conduit (RMC) or intermediate metal conduit (IMC) for any conduit exposed below a height of 60".

2. Electric metallic tubing (EMT) is permitted for most other general applications except for:

a. Where tubing, couplings, elbows and fittings would be in direct contact with the earth or underground (in/below slab-on-grade or in earth).

b. Any location outdoors where the tubing, etc., would be exposed to the elements.

c. Where exposed to severe corrosive influence and/or physical damage.

D. Use flexible conduit for appropriate applications. Use galvanized type for dry locations and liquid-tight type for wet locations, or as noted. Flexible conduit shall be minimum 1/2" diameter. Liquid-tight flexible metal conduit shall be used for final connection to all motors, transformers, and other rotating or vibrating equipment. Flexible metal conduit shall be used for final connection to fluorescent lighting fixtures mounted in or on suspended ceilings, and similar applications with a maximum of 6’ length. **MC cable shall NOT be allowed to be used as a wiring method for branch circuits.**

E. Non-metallic raceway shall be minimum Schedule 40 PVC. In general, non-metallic raceway will be permitted for use underground or in poured concrete (including panel feeders, branch circuits, etc.), provided all 90 degree Ells up out of the floor are heavy wall rigid metal conduit

(RMC), no exception. Non-metallic raceways will not be permitted for any exposed work or for raceways in ceiling spaces, etc.

F. No raceway may be exposed in any finished space unless specifically so approved, in written form, prior to rough-in. Raceways exposed in finished spaces shall be of an appropriate type "wiremold" type surface raceway or approved equal. In the event of an accepted alternate that requires exposed conditions in a finished space, devices and fixtures shall be located to minimize exposure of raceway and maintain all required clearances, coverage, etc. Devices, fixture, etc. shall be positioned aesthetically/orthogonal to the orientation of the room.

G. Minimum metal conduit size shall be 3/4" (interior) and 1" (exterior) for premises wiring system. Exception shall be 1/2" for switch legs, control circuits, signal wiring and applications for flexible metal conduits not exceeding four circuit conductors.

H. Where installing conduit on exterior surface of exterior walls, mount conduit minimum ¼ -inch from wall with clamp-backs or strut.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing, not allowed on this project.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit, not allowed on this project.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1. Custom enclosures and cabinets.
2. For handholes and boxes for underground wiring, including the following:

a. Duct entry provisions, including locations and duct sizes.
b. Frame and cover design.
c. Grounding details.
d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
e. Joint details.

C. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For professional engineer and testing agency.

E. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS -

2.1 METAL CONDUIT AND TUBING

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

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.

5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6..5.

D. PVC-Coated Steel Conduit: PVC-coated IMC.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

E. EMT: ANSI C80.3.

F. FMC: Zinc-coated steel.

G. LFMC: Flexible steel conduit with PVC jacket.

H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, compression type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

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

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.

11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. ENT: Not allowed.

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

D. LFNC: Not allowed.

E. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

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

1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.

B. Description: Comply with UL 2024; flexible type, approved for plenum installation.

2.4 METAL WIREWAYS

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

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 12, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.5 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized metallic with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.

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

    a. Thomas & Betts Corporation.
    b. Walker Systems, Inc.; Wiremold Company (The).
    c. Wiremold Company (The); Electrical Sales Division.

2.6 BOXES, ENCLOSURES, AND CABINETS

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

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular.

F. Nonmetallic Floor Boxes: Nonadjustable, round.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.

J. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: See drawings.
2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, as indicated for each service.
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

    a. Armorcast Products Company.
    b. Carson Industries LLC.
    c. CDR Systems Corporation.
    d. NewBasis.

C. Fiberglass Handholes and Boxes with Polymer-Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester-resin enclosure joined to polymer-concrete top ring or frame.

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

    a. Armorcast Products Company.
    b. Carson Industries LLC.
    c. Christy Concrete Products.
    d. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.

D. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers of polymer concrete.

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

a. Carson Industries LLC.
b. Christy Concrete Products.
c. Nordic Fiberglass, Inc.

2.8 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.9 SLEEVE SEALS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Carbon steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.10 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by a independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION

A. Underground runs, except under concrete floor slabs, shall have a minimum of 24" cover. Backfill shall be made in 6" layers – tamping each layer to a density of 95% of maximum possible.

B. Raceways run external to building foundation walls, with the exception of branch circuit raceways, shall be encased with a minimum of 3" of concrete on all sides. Encased raceways shall have a minimum cover of 18", except for raceways containing circuits with voltages above 600 volts, which shall have a minimum cover of 30".

C. All underground raceways shall be identified by underground line marking tape located directly above the raceway at 6" to 8” below finished grade. Tape shall be permanent, bright colored, continuous printed, metal compounded for direct burial not less than 6" wide and 4 mils thick. Printed legend on tape shall indicate general type of underground line below.

3.2 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit
2. Concealed Conduit, Aboveground: IMC (including elbows that turn up from below grade).
3. Underground Conduit: RNC, Type EPC- 80-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.
6. Application of Handholes and Boxes for Underground Wiring:

a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.

b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.
c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:

   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical rooms.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: Riser-type, optical fiber/communications cable raceway.
9. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway.
10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

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3.3 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
   c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
   d. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.4 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to

provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
    b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. All underground raceways shall be identified by underground line marking tape located directly above the raceway at 6 to 8 inches below finished grade. Tape shall be permanent, bright-colored, continuous printed, plastic tape compounded for direct burial not less than 6 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.

3.5 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes and boxes with bottom below the frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.9 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Isolation pads.
2. Spring isolators.
3. Restrained spring isolators.
4. Channel support systems.
5. Restraint cables.
6. Hanger rod stiffeners.
7. Anchorage bushings and washers.

B. Related Sections include the following:

1. Division 26 Section "Hangers and Supports For Electrical Systems" for commonly used electrical supports and installation requirements.

1.3 DEFINITIONS

A. The IBC: International Building Code.

B. ICC-ES: ICC-Evaluation Service.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: D
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: I

a. Component Importance Factor: 1.25
b. Component Response Modification Factor:
c. Component Amplification Factor:

3. Design Spectral Response Acceleration at Short Periods (0.2 Second):

4. Design Spectral Response Acceleration at 1.0-Second Period:

1.5 SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.

    a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
    b. Annotate to indicate application of each product submitted and compliance with requirements.

3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.

B. Delegated-Design Submittal: For vibration isolation and seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, **Licensed in North Carolina**, responsible for their preparation.

1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.

    a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other Division 26 Sections for equipment mounted outdoors.

2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
3. Field-fabricated supports.
4. Seismic-Restraint Details:

    a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
    b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    c. Preapproval and Evaluation Documentation: an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

C. Coordination Drawings: Show coordination of seismic bracing for electrical components with other systems and equipment in the vicinity, including other supports and seismic restraints.

D. Welding certificates.

E. Qualification Data: For professional engineer and testing agency.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Ace Mountings Co., Inc.
2. Amber/Booth Company, Inc.
3. California Dynamics Corporation.
4. Isolation Technology, Inc.
5. Kinetics Noise Control.
6. Mason Industries.
7. Vibration Eliminator Co., Inc.
8. Vibration Isolation.
9. Vibration Mountings & Controls, Inc.

B. Pads: Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant neoprene rubber hermetically sealed compressed fiberglass.

C. Spring Isolators: Freestanding, laterally stable, open-spring isolators.

1. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
2. Minimum Additional Travel: 50 percent of the required deflection at rated load.
3. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
4. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
5. Baseplates: Factory drilled for bolting to structure and bonded to 1/4-inch- thick, rubber isolator pad attached to baseplate underside. Baseplates shall limit floor load to 500 psig.
6. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

D. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch- thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 SEISMIC-RESTRAINT DEVICES

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Amber/Booth Company, Inc.
2. California Dynamics Corporation.
3. Cooper B-Line, Inc.; a division of Cooper Industries.
4. Hilti Inc.
5. Loos & Co.; Seismic Earthquake Division.
6. Mason Industries.
7. TOLCO Incorporated; a brand of NIBCO INC.

8. Unistrut; Tyco International, Ltd.

B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an evaluation service member of ICC-ES OSHPD an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

D. Restraint Cables: ASTM A 603 galvanized -steel cables with end connections made of steel assemblies with thimbles, brackets, swivels, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Do not weld stiffeners to rods.

F. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.

G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.

H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

I. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

J. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.3 FACTORY FINISHES

A. Finish: Manufacturer's standard prime-coat finish ready for field painting.

B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested equipment before shipping.

1. Powder coating on springs and housings.
2. All hardware shall be galvanized. Hot-dip galvanize metal components for exterior use.
3. Baked enamel or powder coat for metal components on isolators for interior use.
4. Color-code or otherwise mark vibration isolation and seismic-control devices to indicate capacity range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

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

3.2 APPLICATIONS

A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Equipment and Hanger Restraints:

1. Install restrained isolators on electrical equipment.
2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

D. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post-connection testing has been approved), and with at least seven days' advance notice.
3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.

4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 260548

SECTION 262413 - SWITCHBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. E.C. responsible for all Breaker Testing required.

C. Gear manufacturer shall provide a full coordination study to the Engineer for approval during submittal process. Coordination Study is to be sealed by an engineer licensed in North Carolina.

D. A. Switchboard shall be provided with painted "schematic" bus on front of enclosure to depict actual bus arrangement inside cubicles.

E. Provide a laminated drawing of the building electrical riser next to each switchboard in the main electrical room framed and mounted under glass.

1.2 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Transient voltage suppression devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.
7. Identification.
8. Mimic bus.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Switchboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.4 SUBMITTALS

A. Product Data: For each type of switchboard, overcurrent protective device, transient voltage suppression device, ground-fault protector, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Detail utility company's metering provisions with indication of approval by utility company.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
9. Include diagram and details of proposed mimic bus.
10. Include schematic and wiring diagrams for power, signal, and control wiring.
11. The engineer of record must seal and sign the manufacturers’ Short-Circuit Analysis.

C. Samples: Representative portion of mimic bus with specified material and finish, for color selection.

D. Qualification Data: For qualified Installer.

E. Seismic Qualification Certificates: Submit certification that switchboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

G. Operation and Maintenance Data: For switchboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Routine maintenance requirements for switchboards and all installed components.
2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
3. Time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers qualified as defined in NEMA PB 2.1 and trained in electrical safety as required by NFPA 70E.

B. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

C. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

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

F. Comply with NEMA PB 2.

G. Comply with NFPA 70.

H. Comply with UL 891.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and install temporary electric heating (250 W per section) to prevent condensation.

C. Handle and prepare switchboards for installation according to NEMA PB 2.1.

1.7 PROJECT CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Environmental Limitations:

1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
b. Altitude: Not exceeding 6600 feet (2000 m).

C. Service Conditions: NEMA PB 2, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Architect's written permission.
4. Comply with NFPA 70E.

1.8 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion of work.

1.10 EXTRA MATERIALS

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

1. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
3. Fuses and Fusible Devices for Fused Circuit Breakers: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
4. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
5. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
6. Indicating Lights: Equal to 10 percent of quantity installed for each size and type, but no fewer than one of each size and type.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Front-Connected, Front-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

C. Nominal System Voltage: as indicated on the drawings.

D. Main-Bus Continuous: silver plated copper of the ampacity as indicated on the drawings.

E. Seismic Requirements: Fabricate and test switchboards according to IEEE 344 to withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

F. Indoor Enclosures: Steel, NEMA 250, Type 1.

G. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.

H. Barriers: Between adjacent switchboard sections.

I. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.

J. Cubical Space Heaters: Factory-installed electric space heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.

1. Space-Heater Control: Thermostats to maintain temperature of each section above expected dew point.
2. Space-Heater Power Source: Transformer, factory installed in switchboard.

K. Customer Metering Compartment: A separate customer metering compartment and section with front hinged door, for indicated metering, and current transformers for each meter. Current transformer secondary wiring shall be terminated on shorting-type terminal blocks. Include potential transformers having primary and secondary fuses with disconnecting means and secondary wiring terminated on terminal blocks.

L. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

M. Removable, Hinged Rear Doors and Compartment Covers: Secured by captive thumb screws, for access to rear interior of switchboard.

N. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

O. Pull Box on Top of Switchboard:

1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
2. Set back from front to clear circuit-breaker removal mechanism.
3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.

P. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Phase- and Neutral-Bus Material: silver plated hard-drawn copper of 98 percent conductivity, copper feeder circuit-breaker line connections.
2. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with compression connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
3. Ground Bus: 1/4-by-2-inch- hard-drawn copper of 98 percent conductivity, equipped with compression connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
4. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
5. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with compression connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
6. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

Q. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

R. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

S. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, fully rated to interrupt the short-circuit current available at terminals. Series ratings are not allowed.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
6. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
7. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor material.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
    f. Communication Capability: Din-rail-mounted communication module with functions and features compatible with power monitoring and control system specified in Division 26 Section "Electrical Power Monitoring and Control."
    g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
    h. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
    i. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
    j. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.

B. Insulated-Case Circuit Breaker (ICCB): 100 percent rated, sealed, insulated-case power circuit breaker with interrupting capacity rating to meet available fault current.

1. Fixed circuit-breaker mounting.
2. Two-step, stored-energy closing.
3. Standard-function, microprocessor-based trip units with interchangeable rating plug, trip indicators, and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time time adjustments.
    c. Ground-fault pickup level, time delay, and I^2t response.

4. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
5. Remote trip indication and control.
6. Communication Capability: Integral communication module with functions and features compatible with power monitoring and control system specified in Division 26 Section "Electrical Power Monitoring and Control."

7. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
8. Control Voltage: 120-V ac. Retain one of first two paragraphs below.

C. Breakers 600A or larger shall be a solid state trip type.

2.3 INSTRUMENTATION

A. Instrument Transformers: IEEE C57.13, NEMA EI 21.1, and the following:

1. Potential Transformers: IEEE C57.13; 120 V, 60 Hz, tapped secondary; disconnecting type with integral fuse mountings. Burden and accuracy shall be consistent with connected metering and relay devices.
2. Current Transformers: IEEE C57.13; 5 A, 60 Hz, secondary; wound type; double secondary winding and secondary shorting device. Burden and accuracy shall be consistent with connected metering and relay devices.
3. Control-Power Transformers: Dry type, mounted in separate compartments for units larger than 3 kVA.
4. Current Transformers for Neutral and Ground-Fault Current Sensing: Connect secondary wiring to ground overcurrent relays, via shorting terminals, to provide selective tripping of main and tie circuit breaker. Coordinate with feeder circuit-breaker, ground-fault protection.

B. Multifunction Digital-Metering Monitor: Microprocessor-based unit suitable for three- or four-wire systems and with the following features:

1. Switch-selectable digital display of the following values with maximum accuracy tolerances as indicated: All values to be in true RMS.

a. Phase Currents, Each Phase: Plus or minus 1 percent.
b. Phase-to-Phase Voltages, Three Phase: Plus or minus 1 percent.
c. Phase-to-Neutral Voltages, Three Phase: Plus or minus 1 percent.
d. Megawatts: Plus or minus 2 percent.
e. Megavars: Plus or minus 2 percent.
f. Power Factor: Plus or minus 2 percent.
g. Frequency: Plus or minus 0.5 percent.
h. Accumulated Energy, Megawatt Hours: Plus or minus 2 percent; accumulated values unaffected by power outages up to 72 hours.
i. Megawatt Demand: Plus or minus 2 percent; demand interval programmable from five to 60 minutes.
j. Phase current Demand.
k. VA Demand.
l. VAR demand
m. Contact devices to operate remote impulse-totalizing demand meter.
n. 4 output relays and 4 isolated analog outputs that can replace tranducers
o. The Power Meter shall have built-in data communications to allow Multi-point communication to multiple computer workstations, programmable controllers, and

other host devices, at a minimum data rate of 9600 baud. The Power Meter shall be able to communicate with the Owners Tridium Niagara Software through the Network Area Controller, NAC, Panel for building management and/or other monitoring functions. The Power Meter shall be compatible with Modbus RTU Communications.

p. The Power Meter shall be able to perform Harmonic Analysis with trigger trace memory, waveform capture, event recorder and data logger.

2. Mounting: Display and control unit flush or semiflush mounted in instrument compartment door.

2.4 CONTROL POWER

A. Control Circuits: 120-V ac, supplied through secondary disconnecting devices from control-power transformer.

B. Not Used.

C. Not Used.

D. Not Used.

E. Control-Power Fuses: Primary and secondary fuses for current-limiting and overload protection of transformer and fuses for protection of control circuits.

F. Control Wiring: Factory installed, with bundling, lacing, and protection included. Provide flexible conductors for No. 8 AWG and smaller, for conductors across hinges, and for conductors for interconnections between shipping units.

2.5 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Not Used.

C. Not Used.

D. Not Used.

E. Not Used.

2.6 IDENTIFICATION

A. Mimic Bus: Entire single-line switchboard bus work, as depicted on factory record drawing, on a photoengraved nameplate.

1. Nameplate: At least 0.032-inch- thick anodized aluminum, located at eye level on front cover of the switchboard incoming service section.

B. Coordinate mimic-bus segments with devices in switchboard sections to which they are applied. Produce a concise visual presentation of principal switchboard components and connections.

C. Presentation Media: Painted graphics in color contrasting with background color to represent bus and components, complete with lettered designations.

D. Service Equipment Label: NRTL labeled for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

E. Upon completion of installation, and prior to final inspection, the contractor shall reduce in size the "as-built" single line diagram (riser), frame diagram under glass, and mount in a conspicuous place adjacent to the switchboard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store switchboards according to NEMA PB 2.1.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install switchboards and accessories according to NEMA PB 2.1.

B. Equipment Mounting: Install switchboards on concrete base, 4-inch nominal thickness. Comply with requirements for concrete base specified in Division 03 Section " Miscellaneous Cast-in-Place Concrete."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to switchboards.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

E. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

F. Install filler plates in unused spaces of panel-mounted sections.

G. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.

1. Set field-adjustable switches and circuit-breaker trip ranges.

H. Install spare-fuse cabinet.

I. Comply with NECA 1.

3.3 CONNECTIONS

A. Comply with requirements for terminating feeder bus specified in Division 26 Section "Enclosed Bus Assemblies." Drawings indicate general arrangement of bus, fittings, and specialties.

B. Comply with requirements for terminating cable trays specified in Division 26 Section "Cable Trays for Electrical Systems." Drawings indicate general arrangement of cable trays, fittings, and specialties.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

D. Switchboards identified for use as service equipment shall be so labeled.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections as required by the equipment manufacturer to ensure all warranties are valid.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

E. Tests and Inspections:

1. Not used.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After ~~Substantial Completion~~ **Final Acceptance**, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front and rear panels so joints and connections are accessible to portable scanner.
b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of ~~Substantial Completion~~ **Final Acceptance**.
c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

5. The following tests shall be performed on the service circuit breakers and the distribution circuit breakers. Testing shall be performed by a qualified factory technician at the job site. All readings shall be tabulated:

a. Phase tripping tolerance (within 20% of U/L requirements)
b. Trip time (per phase) in seconds.
c. Instantaneous trip (amps) per phase.

d. Insulation resistance (in megohms) at 100 volts (phase to phase, and line to load).

6. The ground fault protection on the new circuit breakers (if provided) shall be performance tested in the field and properly calibrated and set in accordance with the coordination study.

F. Switchboard will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action. All tests shall be completely documented indicating time of day, date, temperature and all pertinent test information. All required documentation of readings indicated above shall be submitted to the engineer prior to, and as one of the prerequisites for final acceptance of the project.

3.6 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.7 PROTECTION

A. Temporary Heating: Apply temporary heat, to maintain temperature according to manufacturer's written instructions, until switchboard is ready to be energized and placed into service.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories, and to use and reprogram microprocessor-based trip, monitoring, and communication units.

3.9 SHORT CIRCUIT STUDY:

a. A complete short circuit and protection coordination study with coordination plots for each medium and low voltage distribution system shall be provided. The studies shall include the power company's system and relay characteristics, the base quantities selected, impedance source data, calculation methods and tabulations, one line diagrams, impedance diagrams, conclusions and recommendations. A ground fault study shall be provided for the low voltage system, which shall include the associated zero sequence impedance diagrams. Short circuit momentary duties, when applicable, and interrupting duties shall be calculated on the basis of an assumed fault at each medium voltage switchgear line-up, low voltage switchgear line-up, switchboard, distribution panelboard, pertinent

branch circuit panelboard, generator and other significant locations throughout the systems. The short circuit tabulations shall include the fault impedances, X to R ratios, asymmetry factors, KVA symmetrical and asymmetrical fault currents. **This study is to be prepared and sealed by a professional engineer licensed in North Carolina.**

b. The coordination plots required shall graphically indicate the coordination proposed for the several systems centered on full scale log forms. The coordination plots shall include complete titles, representative one line diagrams and legends, associated power company's relay or system characteristics, medium voltage fuses and relays, significant equipment starting characteristics, complete parameters for transformers, complete operating bands for low voltage switchgear or switchboard circuit breaker trip devices, and the associated system load protective devices. The coordination plots shall define the types of protective devices selected, together with the proposed coil taps, time dial settings and pick up settings required. The long time region of the coordination plots shall indicate a complete tap scale for each medium voltage relay, full load current and 150, 400 or 600 percent full load current transformer parameters and designate the pick ups required for the low voltage circuit breakers. The short time region shall indicate the medium voltage relay instantaneous elements, the magnetizing inrush, ANSI withstand thermal and mechanical transformer parameters, fuse manufacturing tolerance bands, and significant symmetrical and asymmetrical fault currents. Each primary protective device required for a delta-grounded wye connected transformer shall be selected so the characteristic or operating band is within the transformer parameters, and shall include a parameter equivalent to 58 percent of the ANSI withstand point to afford protection for secondary line to ground faults. The transformer damage curve shall be included for each transformer. Low voltage power circuit breakers shall provide long time, long time delay, short time, short time delay, ground fault, ground fault delay, and I^2t in/out settings with coordination plots and shall be separated from each other and the associated primary protective device by a 16 percent current margin for coordination and protection in the event of secondary line to line or line to ground fault. Medium voltage relays shall be separated by a 0.4 second time margin when the maximum three phase fault flows, to assure proper selectivity. The protective device characteristics or operating band shall reflect the actual symmetrical and asymmetrical fault currents sensed by the device.

c. The contractor shall note that the drawings and specifications indicate the general requirements for the equipment, the medium voltage and low voltage equipment, but additional specific characteristics of equipment furnished shall be determined in accordance with the results of the short circuit and protection coordination study. The equipment design discrepancies and the proposed corrective modifications, if required, shall be submitted with the short circuit and protection coordination study with any variations clearly noted on the subsequent shop drawings. Necessary field settings, adjustments and minor modifications for conformance with the approved short circuit and protection coordination study shall be accomplished by the particular manufacturer or by the Contractor without additional expense to the Owner. However, should equipment specified be outside the parameters required by this study, a change order to modify the equipment shall be issued if the engineer's review warrants such a change. Equipment shop drawings shall not be submitted until the short circuit and protection coordination study has been reviewed by the Owner's engineer.

d. Arc-Flash labels shall be printed per OSHA requirements and shall be installed by the contractor.

PART 3: EXECUTION

POINT SETTINGS:

a. The Electrical Contractor shall set and calibrate all target points and settings indicated on the approved coordination study prior to energizing and testing the system.

b. The study shall require the Electrical Contractor to provide the following information:

1. Length, type, resistance, reactance of all cables both medium and low voltages.

2. Fuse curves as required.

3. Utility information.

END OF SECTION 262413

2012 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS - STATE CONSTRUCTION (EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)

OFFICE/SHOPS BUILDING

Name of Project: UNC Charlotte Facilities Operations/ Parking Services Complex
Address: 9201 University City Blvd., Charlotte, NC Zip Code 28223
Proposed Use: Business and shop space
Owner or Authorized Agent: Brian Kugler Phone #: 704.687.0522 E-Mail bhkugler@uncc.edu
Owned By: ☐ City/ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City ☐ County ■ State

LEAD DESIGN PROFESSIONAL:

DESIGNER	FIRM	NAME	LICENSE#	TELEPHONE#	E-MAIL
Architectural	LS3P Associates, LTD.	William Scott Baker	8326	704.333.6686	scottbaker@ls3p.com
Civil	LandDesign	Marc Momsen	33804	704.376.7777	mmomsen@landdesign.com
Electrical	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Fire Alarm	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Plumbing	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Mechanical	Optima Engineering	Ronald Almond	17228	704.338.1292	ralmond@optimapa.com
Sprinkler-Standpipe	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Structural	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Retaining Walls >5' High	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Other	LandDesign	Allison Merriman	0797	704.376.7777	AMerriman@landdesign.com

2012 EDITION OF NC CODE FOR: ■ New Construction ☐ Addition ☐ Upfit
EXISTING: ☐ Reconstruction ☐ Alteration ☐ Repair ☐ Renovation
CONSTRUCTED: (date) ______ **ORIGINAL USE(S)** (Ch. 3): ______
RENOVATED: (date) ______ **CURRENT USE(S)** (Ch. 3): ______
PROPOSED USE(S) (Ch. 3): ______

BASIC BUILDING DATA

Office/Shops Building
Construction Type: (check all that apply) ☐ I-A ☐ II-A ☐ III-A ☐ IV ☐ V-A ☐ I-B ■ II-B ☐ III-B ☐ V-B
Sprinklers: ☐ No ☐ Partial ■ Yes ■ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ■ No ☐ Yes (Primary) **Flood Hazard Area:** ■ No ☐ Yes
Building Height: (feet) 29'-3"
Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
1st Floor		36,578sf	
TOTAL		36,578sf	

ALLOWABLE AREA

Occupancy:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ■
Educational ☐
Factory ■ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ■ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Accessory Occupancies:
Assembly ☐ A-1 ☐ A-2 ■ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Incidental Uses (Table 508.2.5):
☐ Furnace room where any piece of equipment is over 400,000 Btu per hour input
■ Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower
☐ Refrigerant machine room
☐ Hydrogen cutoff rooms, not classified as Group H
☐ Incinerator rooms
☐ Paint shops, not classified as Group H, located in occupancies other than Group F
☐ Laboratories and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy
☐ Laundry rooms over 100 square feet
☐ Group I-3 cells equipped with padded surfaces
☐ Group I-2 waste and linen collection rooms
☐ Waste and linen collection rooms over 100 square feet
☐ Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies
■ Rooms containing fire pumps
☐ Group I-2 storage rooms over 100 square feet
☐ Group I-2 commercial kitchens
☐ Group I-2 laundries equal to or less than 100 square feet
☐ Group I-2 rooms or spaces that contain fuel-fired heating equipment

Special Uses: ☐ 402 ☐ 403 ☐ 404 ☐ 405 ☐ 406 ☐ 407 ☐ 408 ☐ 409 ☐ 410 ☐ 411 ☐ 412 ☐ 413 ☐ 414 ☐ 415 ☐ 416 ☐ 417 ☐ 418 ☐ 419 ☐ 420 ☐ 421 ☐ 422 ☐ 423 ☐ 424 ☐ 425 ☐ 426 ☐ 427
Special Provisions: ☐ 509.2 ☐ 509.3 ☐ 509.4 ☐ 509.5 ☐ 509.6 ☐ 509.7 ☐ 509.8 ☐ 509.9
Mixed Occupancy: ☐ No ■ Yes Separation: 0 HR Exception: 508.3.3
■ Incidental Use Separation (508.2.5)
This separation is not exempt as a Non-Separated Use (see exceptions).
■ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☐ Separated Use (508.4) - See below for area calculations
For each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \le 1$

______ + ______ = ___ + ___ = ___ ≤ 1.00

STORY NO	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 503[5] AREA	(C) AREA FOR OPEN SPACE INCREASE[1]	(D) AREA FOR SPRINKLER INCREASE[2]	(E) ALLOWABLE AREA OR UNLIMITED[3]	(F) MAXIMUM BUILDING AREA[4]
1ST FLOOR	F-1	36,578sf	15,500sf	11,625sf	46,500sf		73,625sf

1 Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width. 989' (F).
b. Total Building Perimeter = 989' (P).
c. Ratio (F/P) = 1 (F/P).
d. W = Minimum width of public way = 30'-0" (W).
e. Percent of frontage increase I_f = 100 (F/P - 0.25) x W/30= 75%
2 The sprinkler increase per Section 506.3 is as follows:
a. Multi-story building I_S = 200 percent
b. Single story building I_S = 300 percent
3 Unlimited area applicable under conditions of Sections 507.
4 Maximum Building Area = total number of stories in the building x E (506.4).
5 The maximum area of open parking garages must comply with Table 406.3.5. The maximum area of air traffic control towers must comply with Table 412.1.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	INCREASE FOR SPRINKLERS	SHOWN ON PLANS	CODE REFERENCE
Type of Construction	Type IIB		Type IIB	Table 601
Building Height in Feet	55'	Feet = H + 20' = 75'	29'-3"	Table 503
Building Height in Stories	2	Stories + 1= 3	1 Story	Table 503

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING Req'd	RATING Provided (w/_____* Reduction)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses	>30	0	0				
Bearing walls							
Exterior							
North	>30	0	0				
East	>30	0	0				
West	>30	0	0				
South	>30	0	0				
Interior							
Nonbearing walls and partitions		0	0				
Exterior walls		0	0				
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists		0	0				
Roof construction Including supporting beams and joists		0	0				
Shaft Enclosures-Exit							
Shaft Enclosures-Other							
Corridor Separation							
Occupancy Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Tenant Separation							
Incidental Use Separation		1	1	G-004 FP-001 P-004 M-502 E-004	U419	WL-1054 C-AJ-1155 WL-1054 WL-5029 C-AJ-1226 C-AJ-5091 WL-1054 CAJ-1226 CAJ-5091 WL-5029 WL-8047 WJ8007 WL8013 WL3065 WL1054 WL1085 WL8004	

* Indicate section number permitting reduction

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ■ Yes
Exit Signs: ☐ No ■ Yes
Fire Alarm: ☐ No ■ Yes
Smoke Detection Systems: ☐ No ■ Yes ■ Partial ______
Panic Hardware: ☐ No ■ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: G-005 - G-007
■ Fire and/or smoke rated wall locations (Chapter 7)
■ Assumed and real property line locations
■ Exterior wall openingwith respect to distance to assumed property lines (705.8)
☐ Existing structures within 30' of the proposed building
■ Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.1)
■ Occupant loads for each area
■ Exit access travel distance (1016)
■ Common path of travel distances (1014.3 & 1028.8)
■ Dead end lengths (1018.4)
■ Clear exit widths for each exit door
■ Maximum calculated occupant load capacity each exit door can accomodate based on egress width (1005.1)
■ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire-rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
■ Location of doors with panic hardware (1008.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1008.1.9.7)
☐ Location of doors with electromagnetic egress locks (1008.1.9.8)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1029)
☐ The square footage of each fire area (902)
☐ The square footage of each smoke compartment (407.4)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING (SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED: REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
VISITOR		14			2	2
TOTAL		14			2	2

STRUCTURAL DESIGN

DESIGN LOADS:
Importance Factors: Wind (Iw) 1.0; Snow (Is) 1.10; Seismic (Ie) 1.0
Live Loads: Roof 20 psf; Mezzanine ____ psf; Floor 100 psf
Ground Snow Load: 10 psf
Wind Load: Basic Wind Speed 90 mph (ASCE-7)
Exposure Category C
Wind Base Shears (for MWFRS) Vx= 40.9 KIPS Vy=58.1 KIPS
SEISMIC DESIGN CATEGORY ☐ A ■ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) ☐ I ■ II ☐ III ☐ IV
Spectral Response Acceleration S_s 0.231 %g S_1 0.101 %g
Site Classification (Table 1613.5.2) ☐ A ☐ B ■ C ☐ D ☐ E ☐ F
Data Source: ■ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system (check one)
☐ Bearing Wall ☐ Dual w/ Special Moment Frame
■ Building Frame ☐ Dual w/ Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Seismic Base Shear Vx=55.3 KIPS Vy=55.3 KIPS
Analysis Procedure ☐ Simplified ■ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ■ No
LATERAL DESIGN CONTROL: Earthquake ☐ Wind ■
SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) 3,000 psf
Presumptive Bearing Capacity ____ psf
Pile size, type, and capacity ______

PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1)

USE		WATERCLOSETS MALE	WATERCLOSETS FEMALE	URINALS	LAVATORIES MALE	LAVATORIES FEMALE	SHOWERS /TUBS	DRINKING FOUNTAINS REGULAR	DRINKING FOUNTAINS ACCESSIBLE
SPACE	EXISTING								
	NEW	5	7	6	9	6	2	2	2
	REQUIRED*	5	6	4	8	4	0	2	2

* Total occupant load of shops wing is 90% male, 10% female; 2902.1.1 exception applied

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Climate Zone: ■ 3 ☐ 4 ☐ 5
Method of Compliance:
☐ Prescriptive (Energy Code)
☐ Performance (Energy Code)
☐ Prescriptive (ASHRAE 90.1)
■ Performance (ASHRAE 90.1)

THERMAL ENVELOPE
Roof/Ceiling Assembly (each assembly)
Description of assembly: Standing seam metal roof panels, 15lb felt, 1/2" gypsum sheathing, R 25.5 rigid insulation, on metal deck
U-Value of total assembly: 0.038
R-Value of insulation: 25.5
Skylights in each assembly N/A
U-Value of skylight: N/A
Total square footage of skylight in each assembly N/A
Exterior Walls (each assembly)
Description of assembly: Brick veneer, 2" air space, R-10 rigid insulation, fluid applied air barrier, 1/2" sheathing, 6" metal studs and R-13 unfaced batt insulation and 5/8" gypsum board
U-Value of total assembly: 0.038
R-Value of insulation: 23
Openings (windows or doors with glazing)
U-Value of assembly: 0.39
Solar heat gain coefficient: 0.22
Projection Factor: N/A
Door U-values: .50
Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floors over unconditioned space (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floor slabs on grade (each assembly)
Description of assembly: 4" Concrete Slab on Grade
U-Value of total assembly: .95
R-Value of insulation: 15
Horizontal/Vertical requirement: 24"
Slab Heated: No

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: 21.6°F
summer dry bulb: 94.2°F
Interior design conditions
winter dry bulb: 72°F
summer dry bulb: 75°F
relative humidity: 50%
Building heating load: 1800 MBH
Building cooling load: 135 TONS
Mechanical Spacing Conditioning System
Unitary
description of unit: Refer to Mechanical Drawings
heating efficiency: Refer to Mechanical Drawings
cooling efficiency: Refer to Mechanical Drawings
size category of unit: Refer to Mechanical Drawings
Boiler
Size category. If oversized, state reason. Refer to Mechanical Drawings
Chiller
Size category. If oversized, state reason. Refer to Mechanical Drawings
List equipment efficiencies: Refer to Mechanical Drawings

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance:
Energy Code: ☐ Prescriptive ■ Performance
ASHRAE 90.1: ☐ Prescriptive ☐ Performance
Lighting schedule
lamp type required in fixture Refer to Electrical Drawings
number of lamps in fixture Refer to Electrical Drawings
ballast type used in the fixture Refer to Electrical Drawings
number of ballasts in fixture Refer to Electrical Drawings
total wattage per fixture Refer to Electrical Drawings
total interior wattage specified vs. allowed (whole building or space by space) Refer to Electrical Drawings
total exterior wattage specified vs. allowed Refer to Electrical Drawings
Additional Prescriptive Compliance
☐ 506.2.1 More Efficient Mechanical Equipment
■ 506.2.2 Reduced Lighting Power Density
☐ 506.2.3 Energy Recovery Ventilation Systems
☐ 506.2.4 Higher Efficiency Service Water Heating
☐ 506.2.5 On-Site Supply of Renewable Energy
☐ 506.2.6 Automatic Daylighting Control Systems

2012 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS - STATE CONSTRUCTION (EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)

WAREHOUSE BUILDING

Name of Project: UNC Charlotte Facilities Operations/ Parking Services Complex
Address: 9201 University City Blvd., Charlotte, NC Zip Code 28223
Proposed Use: Warehouse storage and business
Owner or Authorized Agent: Brian Kugler Phone #: 704.687.0522 E-Mail bhkugler@uncc.edu
Owned By: ☐ City/ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City ☐ County ■ State

LEAD DESIGN PROFESSIONAL:

DESIGNER	FIRM	NAME	LICENSE#	TELEPHONE#	E-MAIL
Architectural	LS3P Associates, LTD.	William Scott Baker	8326	704.333.6686	scottbaker@ls3p.com
Civil	LandDesign	Marc Momsen	33804	704.376.7777	mmomsen@landdesign.com
Electrical	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Fire Alarm	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Plumbing	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Mechanical	Optima Engineering	Ronald Almond	17228	704.338.1292	ralmond@optimapa.com
Sprinkler-Standpipe	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Structural	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Retaining Walls >5' High	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Other	LandDesign	Allison Merriman	0797	704.376.7777	AMerriman@landdesign.com

2012 EDITION OF NC CODE FOR: ■ New Construction ☐ Addition ☐ Upfit
EXISTING: ☐ Reconstruction ☐ Alteration ☐ Repair ☐ Renovation
CONSTRUCTED: (date) ______ **ORIGINAL USE(S)** (Ch. 3): ______
RENOVATED: (date) ______ **CURRENT USE(S)** (Ch. 3): ______
PROPOSED USE(S) (Ch. 3): ______

BASIC BUILDING DATA

Warehouse Building
Construction Type: (check all that apply) ☐ I-A ☐ II-A ☐ III-A ☐ IV ☐ V-A ☐ I-B ■ II-B ☐ III-B ☐ V-B
Sprinklers: ☐ No ☐ Partial ■ Yes ■ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ■ No ☐ Yes (Primary) **Flood Hazard Area:** ■ No ☐ Yes
Building Height: (feet) 23'-8"
Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
1st Floor		22,465sf	
TOTAL		22,465sf	

ALLOWABLE AREA

Occupancy:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ■
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ■ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Accessory Occupancies:
Assembly ☐ A-1 ☐ A-2 ■ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Incidental Uses (Table 508.2.5):
☐ Furnace room where any piece of equipment is over 400,000 Btu per hour input
☐ Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower
☐ Refrigerant machine room
☐ Hydrogen cutoff rooms, not classified as Group H
☐ Incinerator rooms
☐ Paint shops, not classified as Group H, located in occupancies other than Group F
☐ Laboratories and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy
☐ Laundry rooms over 100 square feet
☐ Group I-3 cells equipped with padded surfaces
☐ Group I-2 waste and linen collection rooms
☐ Waste and linen collection rooms over 100 square feet
☐ Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies
☐ Rooms containing fire pumps
☐ Group I-2 storage rooms over 100 square feet
☐ Group I-2 commercial kitchens
☐ Group I-2 laundries equal to or less than 100 square feet
☐ Group I-2 rooms or spaces that contain fuel-fired heating equipment

Special Uses: ☐ 402 ☐ 403 ☐ 404 ☐ 405 ☐ 406 ☐ 407 ☐ 408 ☐ 409 ☐ 410 ☐ 411 ☐ 412 ☐ 413 ☐ 414 ☐ 415 ☐ 416 ☐ 417 ☐ 418 ☐ 419 ☐ 420 ☐ 421 ☐ 422 ☐ 423 ☐ 424 ☐ 425 ☐ 426 ☐ 427
Special Provisions: ☐ 509.2 ☐ 509.3 ☐ 509.4 ☐ 509.5 ☐ 509.6 ☐ 509.7 ☐ 509.8 ☐ 509.9
Mixed Occupancy: ☐ No ■ Yes Separation: 0 Exception: 508.3.3
☐ Incidental Use Separation (508.2.5)
This separation is not exempt as a Non-Separated Use (see exceptions).
■ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☐ Separated Use (508.4) - See below for area calculations
For each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \le 1$

______ + ______ = ___ + ___ = ___ ≤ 1.00

STORY NO	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 503[5] AREA	(C) AREA FOR OPEN SPACE INCREASE[1]	(D) AREA FOR SPRINKLER INCREASE[2]	(E) ALLOWABLE AREA OR UNLIMITED[3]	(F) MAXIMUM BUILDING AREA[4]
1ST FLOOR	S-1	22,465sf	17,500sf	13,125sf	52,500sf		83,125sf

1 Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width. 789' (F).
b. Total Building Perimeter = 789' (P).
c. Ratio (F/P) = 1 (F/P).
d. W = Minimum width of public way = 30'-0" (W).
e. Percent of frontage increase I_f = 100 (F/P - 0.25) x W/30= 75%
2 The sprinkler increase per Section 506.3 is as follows:
a. Multi-story building I_S = 200 percent
b. Single story building I_S = 300 percent
3 Unlimited area applicable under conditions of Sections 507.
4 Maximum Building Area = total number of stories in the building x E (506.4).
5 The maximum area of open parking garages must comply with Table 406.3.5. The maximum area of air traffic control towers must comply with Table 412.1.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	INCREASE FOR SPRINKLERS	SHOWN ON PLANS	CODE REFERENCE
Type of Construction	Type IIB		Type IIB	Table 601
Building Height in Feet	55'	Feet = H + 20' = 75'	23'-8"	Table 503
Building Height in Stories	2	Stories + 1= 3	1 Story	Table 503

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING Req'd	RATING Provided (w/_____* Reduction)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses	>30	0	0				
Bearing walls							
Exterior							
North	>30	0	0				
East	10>X>30	0	0				
West	10>X>30	0	0				
South	>30	0	0				
Interior							
Nonbearing walls and partitions		0	0				
Exterior walls		0	0				
North							
East							
West							
South							
Interior walls and partitions		0	0				
Floor Construction Including supporting beams and joists		0	0				
Roof construction Including supporting beams and joists		0	0				
Shaft Enclosures-Exit							
Shaft Enclosures-Other							
Corridor Separation							
Occupancy Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Tenant Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ■ Yes
Exit Signs: ☐ No ■ Yes
Fire Alarm: ☐ No ■ Yes
Smoke Detection Systems: ☐ No ■ Yes ■ Partial ______
Panic Hardware: ☐ No ■ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: G-005 - G-007
☐ Fire and/or smoke rated wall locations (Chapter 7)
■ Assumed and real property line locations
■ Exterior wall openingwith respect to distance to assumed property lines (705.8)
☐ Existing structures within 30' of the proposed building
■ Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.1)
■ Occupant loads for each area
■ Exit access travel distance (1016)
■ Common path of travel distances (1014.3 & 1028.8)
■ Dead end lengths (1018.4)
■ Clear exit widths for each exit door
■ Maximum calculated occupant load capacity each exit door can accomodate based on egress width (1005.1)
■ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire-rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
■ Location of doors with panic hardware (1008.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1008.1.9.7)
☐ Location of doors with electromagnetic egress locks (1008.1.9.8)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1029)
☐ The square footage of each fire area (902)
☐ The square footage of each smoke compartment (407.4)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING (SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED: REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
VISITOR		7			1	1
TOTAL		7			1	1

STRUCTURAL DESIGN

DESIGN LOADS:
Importance Factors: Wind (Iw) 1.0; Snow (Is) 1.10; Seismic (Ie) 1.0
Live Loads: Roof 20 psf; Mezzanine ____ psf; Floor 125 psf
Ground Snow Load: 10 psf
Wind Load: Basic Wind Speed 90 mph (ASCE-7)
Exposure Category C
Wind Base Shears (for MWFRS) Vx= 26.3 KIPS Vy=90.4 KIPS
SEISMIC DESIGN CATEGORY ☐ A ■ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) ☐ I ■ II ☐ III ☐ IV
Spectral Response Acceleration S_s 0.231 %g S_1 0.101 %g
Site Classification (Table 1613.5.2) ☐ A ☐ B ■ C ☐ D ☐ E ☐ F
Data Source: ■ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system (check one)
☐ Bearing Wall ☐ Dual w/ Special Moment Frame
■ Building Frame ☐ Dual w/ Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Seismic Base Shear Vx=14.7 KIPS Vy=14.7 KIPS
Analysis Procedure ☐ Simplified ■ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ■ No
LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐
SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) 3,000 psf
Presumptive Bearing Capacity ____ psf
Pile size, type, and capacity ______

PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1)

USE		WATERCLOSETS MALE	WATERCLOSETS FEMALE	URINALS	LAVATORIES MALE	LAVATORIES FEMALE	SHOWERS /TUBS	DRINKING FOUNTAINS REGULAR	DRINKING FOUNTAINS ACCESSIBLE
SPACE	EXISTING								
	NEW	1	2	1	1	1	0	1	1
	REQUIRED	1	1	0	1	1	0	1	1

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Climate Zone: ■ 3 ☐ 4 ☐ 5
Method of Compliance:
☐ Prescriptive (Energy Code)
☐ Performance (Energy Code)
☐ Prescriptive (ASHRAE 90.1)
■ Performance (ASHRAE 90.1)

THERMAL ENVELOPE
Roof/Ceiling Assembly (each assembly)
Description of assembly: Standing seam metal roof panels, R-10 unfaced batt insulation, R-5 thermal blocks, on metal purlins, R-19 vinyl faced batt insulation
U-Value of total assembly: 0.034
R-Value of insulation: 29
Skylights in each assembly
U-Value of skylight:
Total square footage of skylight in each assembly
Exterior Walls (each assembly)
Description of assembly: Metal panel, R-13 vinyl faced batt insulation on 8" z-girt, aluminum liner panel
U-Value of total assembly: 0.072
R-Value of insulation: 13
Openings (windows or doors with glazing)
U-Value of assembly: 0.39
Solar heat gain coefficient: 0.22
Projection Factor: N/A
Door U-values: .50
Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floors over unconditioned space (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floor slabs on grade (each assembly)
Description of assembly: 4" Concrete Slab on Grade
U-Value of total assembly: 0.95
R-Value of insulation: 15
Horizontal/Vertical requirement: 24"
Slab Heated: No

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: 21.6°F
summer dry bulb: 94.2°F
Interior design conditions
winter dry bulb: 70°F (OFFICES 72°F)
summer dry bulb: 78°F (OFFICES 75°F)
relative humidity: 50%
Building heating load: 300 MBH
Building cooling load: 28 TONS
Mechanical Spacing Conditioning System
Unitary
description of unit: Refer to Mechanical Drawings
heating efficiency: Refer to Mechanical Drawings
cooling efficiency: Refer to Mechanical Drawings
size category of unit: Refer to Mechanical Drawings
Boiler
Size category. If oversized, state reason. ______
Chiller
Size category. If oversized, state reason. ______
List equipment efficiencies: Refer to Mechanical Drawings

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance:
Energy Code: ☐ Prescriptive ■ Performance
ASHRAE 90.1: ☐ Prescriptive ☐ Performance
Lighting schedule
lamp type required in fixture Refer to Electrical Drawings
number of lamps in fixture Refer to Electrical Drawings
ballast type used in the fixture Refer to Electrical Drawings
number of ballasts in fixture Refer to Electrical Drawings
total wattage per fixture Refer to Electrical Drawings
total interior wattage specified vs. allowed (whole building or space by space) Refer to Electrical Drawings
total exterior wattage specified vs. allowed Refer to Electrical Drawings
Additional Prescriptive Compliance
☐ 506.2.1 More Efficient Mechanical Equipment
■ 506.2.2 Reduced Lighting Power Density
☐ 506.2.3 Energy Recovery Ventilation Systems
☐ 506.2.4 Higher Efficiency Service Water Heating
☐ 506.2.5 On-Site Supply of Renewable Energy
☐ 506.2.6 Automatic Daylighting Control Systems

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

WILLIAM SCOTT BAKER REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 08/28/17

LS3P ASSOCIATES LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

NC BUILDING CODE SUMMARY OFFICE/SHOPS & WAREHOUSE

G-001

BUILDING BID DOCUMENTS

2012 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS - STATE CONSTRUCTION WASH RACK

Name of Project: UNC Charlotte Facilities Operations/ Parking Services Complex
Address: 9201 University City Blvd., Charlotte, NC Zip Code 28223
Proposed Use: Permanent Canopy to Wash Buses/Trucks
Owner or Authorized Agent: Brian Kugler Phone #: 704.687.0522 E-Mail bhkugler@uncc.edu
Owned By: ☐ City/ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City______ ☐ County______ ■ State

LEAD DESIGN PROFESSIONAL:

DESIGNER	FIRM	NAME	LICENSE#	TELEPHONE#	E-MAIL
Architectural	LS3P Associates, LTD.	William Scott Baker	8326	704.333.6686	scottbaker@ls3p.com
Civil	LandDesign	Marc Momsen	33804	704.376.7777	mmomsen@landdesign.com
Electrical	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Fire Alarm	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Plumbing	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Mechanical	Optima Engineering	Ronald Almond	17228	704.338.1292	ralmond@optimapa.com
Sprinkler-Standpipe	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Structural	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Retaining Walls >5' High	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Other	LandDesign	Allison Merriman	0797	704.376.7777	AMerriman@landdesign.com

2012 EDITION OF NC CODE FOR: ■ New Construction ☐ Addition ☐ Upfit
EXISTING: ☐ Reconstruction ☐ Alteration ☐ Repair ☐ Renovation
CONSTRUCTED: (date)______ **ORIGINAL USE(S)** (Ch. 3): ______
RENOVATED: (date)______ **CURRENT USE(S)** (Ch. 3): ______
PROPOSED USE(S) (Ch. 3): ______

BASIC BUILDING DATA

Gas Storage Building
Construction Type: (check all that apply) ☐ I-A ☐ II-A ☐ III-A ☐ IV ☐ V-A ☐ I-B ■ II-B ☐ III-B ☐ V-B
Sprinklers: ■ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ■ No ☐ Yes (Primary) **Flood Hazard Area:** ■ No ☐ Yes
Building Height: (feet) 19'-2"
Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
1st Floor		2,232sf	
TOTAL		2,232sf	

ALLOWABLE AREA

Occupancy:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ■

Accessory Occupancies:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Incidental Uses (Table 508.2.5):
☐ Furnace room where any piece of equipment is over 400,000 Btu per hour input
☐ Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower
☐ Refrigerant machine room
☐ Hydrogen cutoff rooms, not classified as Group H
☐ Incinerator rooms
☐ Paint shops, not classified as Group H, located in occupancies other than Group F
☐ Laboratories and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy
☐ Laundry rooms over 100 square feet
☐ Group I-3 cells equipped with padded surfaces
☐ Group I-2 waste and linen collection rooms
☐ Waste and linen collection rooms over 100 square feet
☐ Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies
☐ Rooms containing fire pumps
☐ Group I-2 storage rooms over 100 square feet
☐ Group I-2 commercial kitchens
☐ Group I-2 laundries equal to or less than 100 square feet
☐ Group I-2 rooms or spaces that contain fuel-fired heating equipment

Special Uses: ☐ 402 ☐ 403 ☐ 404 ☐ 405 ☐ 406 ☐ 407 ☐ 408 ☐ 409 ☐ 410 ☐ 411 ☐ 412 ☐ 413 ☐ 414 ☐ 415 ☐ 416 ☐ 417 ☐ 418 ☐ 419 ☐ 420 ☐ 421 ☐ 422 ☐ 423 ☐ 424 ☐ 425 ☐ 426 ☐ 427
Special Provisions: ☐ 509.2 ☐ 509.3 ☐ 509.4 ☐ 509.5 ☐ 509.6 ☐ 509.7 ☐ 509.8 ☐ 509.9
Mixed Occupancy: ■ No ☐ Yes Separation:______ Exception:______
☐ Incidental Use Separation (508.2.5)
This separation is not exempt as a Non-Separated Use (see exceptions).
☐ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☐ Separated Use (508.4) - See below for area calculations
For each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$

______ + ______ = ___ + ___ = ___ ≤ 1.00

STORY NO	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 503[5] AREA	(C) AREA FOR OPEN SPACE INCREASE[1]	(D) AREA FOR SPRINKLER INCREASE[2]	(E) ALLOWABLE AREA OR UNLIMITED[3]	(F) MAXIMUM BUILDING AREA[4]
1ST FLOOR	U CANOPY	2,232sf	8,500sf				8,500sf

[1] Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width. ____ (F).
b. Total Building Perimeter = ______ (P).
c. Ratio (F/P) = ________ (F/P).
d. W = Minimum width of public way = ________ (W).
e. Percent of frontage increase I_f = 100 (F/P - 0.25) x W/30= _____ (%)
[2] The sprinkler increase per Section 506.3 is as follows:
a. Multi-story building I_s = 200 percent
b. Single story building I_s = 300 percent
[3] Unlimited area applicable under conditions of Sections 507.
[4] Maximum Building Area = total number of stories in the building x E (506.4).
[5] The maximum area of open parking garages must comply with Table 406.3.5. The maximum area of air traffic control towers must comply with Table 412.1.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	INCREASE FOR SPRINKLERS	SHOWN ON PLANS	CODE REFERENCE
Type of Construction	Type IIB		Type IIB	Table 601
Building Height in Feet	55'	N/A	19'-2"	Table 503
Building Height in Stories	2	N/A	1 story	Table 503

FIRE PROTECTION REQUIREMENTS

1 (revision)

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING Req'd	RATING Provided (w/_____* Reduction)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses**	10<X<30	0	0				
Bearing walls							
Exterior							
North							
East***	10<X<30	0	0				
West***	10<X<30	0	0				
South							
Interior							
Nonbearing walls and partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists		0	0				
Roof construction Including supporting beams and joists		0	0				

* Indicate section number permitting reduction
** Alternate 2A
*** Alternate 2B

2012 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS - STATE CONSTRUCTION COVERED STORAGE

Name of Project: UNC Charlotte Facilities Operations/ Parking Services Complex
Address: 9201 University City Blvd., Charlotte, NC Zip Code 28223
Proposed Use: Permanent Canopy
Owner or Authorized Agent: Brian Kugler Phone #: 704.687.0522 E-Mail bhkugler@uncc.edu
Owned By: ☐ City/ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City______ ☐ County______ ■ State

LEAD DESIGN PROFESSIONAL:

DESIGNER	FIRM	NAME	LICENSE#	TELEPHONE#	E-MAIL
Architectural	LS3P Associates, LTD.	William Scott Baker	8326	704.333.6686	scottbaker@ls3p.com
Civil	LandDesign	Marc Momsen	33804	704.376.7777	mmomsen@landdesign.com
Electrical	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Fire Alarm	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Plumbing	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Mechanical	Optima Engineering	Ronald Almond	17228	704.338.1292	ralmond@optimapa.com
Sprinkler-Standpipe	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Structural	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Retaining Walls >5' High	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Other	LandDesign	Allison Merriman	0797	704.376.7777	AMerriman@landdesign.com

2012 EDITION OF NC CODE FOR: ■ New Construction ☐ Addition ☐ Upfit
EXISTING: ☐ Reconstruction ☐ Alteration ☐ Repair ☐ Renovation
CONSTRUCTED: (date)______ **ORIGINAL USE(S)** (Ch. 3): ______
RENOVATED: (date)______ **CURRENT USE(S)** (Ch. 3): ______
PROPOSED USE(S) (Ch. 3): ______

BASIC BUILDING DATA

Gas Storage Building
Construction Type: (check all that apply) ☐ I-A ☐ II-A ☐ III-A ☐ IV ☐ V-A ☐ I-B ■ II-B ☐ III-B ☐ V-B
Sprinklers: ■ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ■ No ☐ Yes (Primary) **Flood Hazard Area:** ■ No ☐ Yes
Building Height: (feet) 19'-0"
Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
1st Floor		2,232sf	
TOTAL		2,232sf	

ALLOWABLE AREA

Occupancy:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ■ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Accessory Occupancies:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Incidental Uses (Table 508.2.5):
☐ Furnace room where any piece of equipment is over 400,000 Btu per hour input
☐ Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower
☐ Refrigerant machine room
☐ Hydrogen cutoff rooms, not classified as Group H
☐ Incinerator rooms
☐ Paint shops, not classified as Group H, located in occupancies other than Group F
☐ Laboratories and vocational shops, not classified as Group H, located in a Group E or I-2 occupancy
☐ Laundry rooms over 100 square feet
☐ Group I-3 cells equipped with padded surfaces
☐ Group I-2 waste and linen collection rooms
☐ Waste and linen collection rooms over 100 square feet
☐ Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies
☐ Rooms containing fire pumps
☐ Group I-2 storage rooms over 100 square feet
☐ Group I-2 commercial kitchens
☐ Group I-2 laundries equal to or less than 100 square feet
☐ Group I-2 rooms or spaces that contain fuel-fired heating equipment

Special Uses: ☐ 402 ☐ 403 ☐ 404 ☐ 405 ☐ 406 ☐ 407 ☐ 408 ☐ 409 ☐ 410 ☐ 411 ☐ 412 ☐ 413 ☐ 414 ☐ 415 ☐ 416 ☐ 417 ☐ 418 ☐ 419 ☐ 420 ☐ 421 ☐ 422 ☐ 423 ☐ 424 ☐ 425 ☐ 426 ☐ 427
Special Provisions: ☐ 509.2 ☐ 509.3 ☐ 509.4 ☐ 509.5 ☐ 509.6 ☐ 509.7 ☐ 509.8 ☐ 509.9
Mixed Occupancy: ■ No ☐ Yes Separation:______ Exception:______
☐ Incidental Use Separation (508.2.5)
This separation is not exempt as a Non-Separated Use (see exceptions).
☐ Non-Separated Use (508.3)
The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☐ Separated Use (508.4) - See below for area calculations
For each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$

______ + ______ = ___ + ___ = ___ ≤ 1.00

STORY NO	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 503[5] AREA	(C) AREA FOR OPEN SPACE INCREASE[1]	(D) AREA FOR SPRINKLER INCREASE[2]	(E) ALLOWABLE AREA OR UNLIMITED[3]	(F) MAXIMUM BUILDING AREA[4]
1ST FLOOR	S-1 STORAGE	2,232sf	17,500sf				17,500sf

[1] Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width. ____ (F).
b. Total Building Perimeter = ______ (P).
c. Ratio (F/P) = ________ (F/P).
d. W = Minimum width of public way = ________ (W).
e. Percent of frontage increase I_f = 100 (F/P - 0.25) x W/30= _____ (%)
[2] The sprinkler increase per Section 506.3 is as follows:
a. Multi-story building I_s = 200 percent
b. Single story building I_s = 300 percent
[3] Unlimited area applicable under conditions of Sections 507.
[4] Maximum Building Area = total number of stories in the building x E (506.4).
[5] The maximum area of open parking garages must comply with Table 406.3.5. The maximum area of air traffic control towers must comply with Table 412.1.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	INCREASE FOR SPRINKLERS	SHOWN ON PLANS	CODE REFERENCE
Type of Construction	Type IIB		Type IIB	Table 601
Building Height in Feet	55'	N/A	19'-0"	Table 503
Building Height in Stories	2	N/A	1 story	Table 503

FIRE PROTECTION REQUIREMENTS

1 (revision)

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING Req'd	RATING Provided (w/_____* Reduction)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses	10<X<30	0	0				
Bearing walls							
Exterior							
North	10<X<30	0	0				
East							
West	10<X<30	0	0				
South							
Interior							
Nonbearing walls and partitions							
Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists		0	0				
Roof construction Including supporting beams and joists		0	0				

* Indicate section number permitting reduction

2012 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS - STATE CONSTRUCTION (EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES) GAS STORAGE BUILDING

Name of Project: UNC Charlotte Facilities Operations/ Parking Services Complex
Address: 9201 University City Blvd., Charlotte, NC Zip Code 28223
Proposed Use: Gas Storage
Owner or Authorized Agent: Brian Kugler Phone #: 704.687.0522 E-Mail bhkugler@uncc.edu
Owned By: ☐ City/ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City______ ☐ County______ ■ State

LEAD DESIGN PROFESSIONAL:

DESIGNER	FIRM	NAME	LICENSE#	TELEPHONE#	E-MAIL
Architectural	LS3P Associates, LTD.	William Scott Baker	8326	704.333.6686	scottbaker@ls3p.com
Civil	LandDesign	Marc Momsen	33804	704.376.7777	mmomsen@landdesign.com
Electrical	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Fire Alarm	Optima Engineering	Brandon Miller	028297	704.338.1292	bmiller@optimapa.com
Plumbing	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Mechanical	Optima Engineering	Ronald Almond	17228	704.338.1292	ralmond@optimapa.com
Sprinkler-Standpipe	Optima Engineering	George Fowler	026023	704.338.1292	gfowler@optimapa.com
Structural	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Retaining Walls >5' High	SKA Consulting Engineers	Charles Cardwell	15765	704.424.9663	CECardwell@skaeng.com
Other	LandDesign	Allison Merriman	0797	704.376.7777	AMerriman@landdesign.com

2012 EDITION OF NC CODE FOR: ■ New Construction ☐ Addition ☐ Upfit
EXISTING: ☐ Reconstruction ☐ Alteration ☐ Repair ☐ Renovation
CONSTRUCTED: (date)______ **ORIGINAL USE(S)** (Ch. 3): ______
RENOVATED: (date)______ **CURRENT USE(S)** (Ch. 3): ______
PROPOSED USE(S) (Ch. 3): ______

BASIC BUILDING DATA

Gas Storage Building
Construction Type: (check all that apply) ☐ I-A ☐ II-A ☐ III-A ☐ IV ☐ V-A ☐ I-B ■ II-B ☐ III-B ☐ V-B
Sprinklers: ■ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class: ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ■ No ☐ Yes (Primary) **Flood Hazard Area:** ■ No ☐ Yes
Building Height: (feet) 12'-3"
Gross Building Area:

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
1st Floor		124sf	
TOTAL		124sf	

ALLOWABLE AREA

Occupancy:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ■ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐

Accessory Occupancies:
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
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Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Condition: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-Piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
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Special Uses: ☐ 402 ☐ 403 ☐ 404 ☐ 405 ☐ 406 ☐ 407 ☐ 408 ☐ 409 ☐ 410 ☐ 411 ☐ 412 ☐ 413 ☐ 414 ☐ 415 ☐ 416 ☐ 417 ☐ 418 ☐ 419 ☐ 420 ☐ 421 ☐ 422 ☐ 423 ☐ 424 ☐ 425 ☐ 426 ☐ 427
Special Provisions: ☐ 509.2 ☐ 509.3 ☐ 509.4 ☐ 509.5 ☐ 509.6 ☐ 509.7 ☐ 509.8 ☐ 509.9
Mixed Occupancy: ■ No ☐ Yes Separation:______ Exception:______
☐ Incidental Use Separation (508.2.5)
This separation is not exempt as a Non-Separated Use (see exceptions).
☐ Non-Separated Use (508.3)
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$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$

______ + ______ = ___ + ___ = ___ ≤ 1.00

STORY NO	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 503[5] AREA	(C) AREA FOR OPEN SPACE INCREASE[1]	(D) AREA FOR SPRINKLER INCREASE[2]	(E) ALLOWABLE AREA OR UNLIMITED[3]	(F) MAXIMUM BUILDING AREA[4]
1ST FLOOR	S-1 STORAGE	124sf	17,500sf	13,125sf			30,625sf

[1] Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width. 54 (F).
b. Total Building Perimeter = 54 (P).
c. Ratio (F/P) = 1 (F/P).
d. W = Minimum width of public way = 30 (W).
e. Percent of frontage increase I_f = 100 (F/P - 0.25) x W/30= 75 (%)
[2] The sprinkler increase per Section 506.3 is as follows:
a. Multi-story building I_s = 200 percent
b. Single story building I_s = 300 percent
[3] Unlimited area applicable under conditions of Sections 507.
[4] Maximum Building Area = total number of stories in the building x E (506.4).
[5] The maximum area of open parking garages must comply with Table 406.3.5. The maximum area of air traffic control towers must comply with Table 412.1.2.

ALLOWABLE HEIGHT

	ALLOWABLE (TABLE 503)	INCREASE FOR SPRINKLERS	SHOWN ON PLANS	CODE REFERENCE
Type of Construction	Type IIB		Type IIB	Table 601
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Building Height in Stories	2	N/A	1 story	Table 503

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING Req'd	RATING Provided (w/_____* Reduction)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATION	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses	>30	0	0				
Bearing walls							
Exterior							
North	>30	0	0				
East (1)	10>X>30	0	0				
West	>30	0	0				
South	>30	0	0				
Interior							
Nonbearing walls and partitions		0	0				
Exterior walls		0	0				
North							
East							
West							
South							
Interior walls and partitions		0	0				
Floor Construction Including supporting beams and joists		0	0				
Roof construction Including supporting beams and joists		0	0				
Shaft Enclosures-Exit							
Shaft Enclosures-Other							
Corridor Separation							
Occupancy Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Tenant Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ■ Yes
Exit Signs: ■ No ☐ Yes
Fire Alarm: ■ No ☐ Yes
Smoke Detection Systems: ■ No ☐ Yes ☐ Partial ______
Panic Hardware: ■ No ☐ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: G-005 - G-007
☐ Fire and/or smoke rated wall locations (Chapter 7)
■ Assumed and real property line locations
■ Exterior wall openingwith respect to distance to assumed property lines (705.8)
☐ Existing structures within 30' of the proposed building
■ Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.1)
■ Occupant loads for each area
☐ Exit access travel distance (1016)
☐ Common path of travel distances (1014.3 & 1028.8)
☐ Dead end lengths (1018.4)
■ Clear exit widths for each exit door
■ Maximum calculated occupant load capacity each exit door can accomodate based on egress width (1005.1)
■ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire-rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
☐ Location of doors with panic hardware (1008.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1008.1.9.7)
☐ Location of doors with electromagnetic egress locks (1008.1.9.8)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1029)
☐ The square footage of each fire area (902)
☐ The square footage of each smoke compartment (407.4)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING (SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED: REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
		SEE WAREHOUSE				
TOTAL						

STRUCTURAL DESIGN

DESIGN LOADS:
Importance Factors: Wind (Iw) 1.0; Snow (Is) 1.10; Seismic (Ie) 1.0
Live Loads: Roof 20 psf; Mezzanine ____ psf; Floor 100 psf
Ground Snow Load: 10 psf
Wind Load: Basic Wind Speed 90 mph (ASCE-7)
Exposure Category C
Wind Base Shears (for MWFRS) Vx= 3 KIPS Vy=3 KIPS
SEISMIC DESIGN CATEGORY ☐ A ■ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) ☐ I ■ II ☐ III ☐ IV
Spectral Response Acceleration S_s 0.231 %g S_1 0.101 %g
Site Classification (Table 1613.5.2) ☐ A ☐ B ■ C ☐ D ☐ E ☐ F
Data Source: ■ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system (check one)
☐ Bearing Wall ☐ Dual w/ Special Moment Frame
■ Building Frame ☐ Dual w/ Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Seismic Base Shear Vx=2.6 KIPS Vy=2.6 KIPS
Analysis Procedure ☐ Simplified ■ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ■ No
LATERAL DESIGN CONTROL: Earthquake ☐ Wind ■
SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) 3,000 psf
Presumptive Bearing Capacity ____ psf
Pile size, type, and capacity ______

PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1)

USE		WATERCLOSETS MALE	WATERCLOSETS FEMALE	URINALS	LAVATORIES MALE	LAVATORIES FEMALE	SHOWERS /TUBS	DRINKING FOUNTAINS REGULAR	DRINKING FOUNTAINS ACCESSIBLE
SPACE	EXISTING								
	NEW		SEE WAREHOUSE						
	REQUIRED								

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Climate Zone: ■ 3 ☐ 4 ☐ 5
Method of Compliance:
☐ Prescriptive (Energy Code)
☐ Performance (Energy Code)
☐ Prescriptive (ASHRAE 90.1)
■ Performance (ASHRAE 90.1)

THERMAL ENVELOPE
Roof/Ceiling Assembly (each assembly)
Description of assembly: Standing seam metal roof panels, 15lb felt, 1/2" gypsum sheathing, R 25.5 rigid insulation, on metal deck
U-Value of total assembly: 0.038
R-Value of insulation: 25.5
Skylights in each assembly N/A
U-Value of skylight: N/A
Total square footage of skylight in each assembly N/A
Exterior Walls (each assembly)
Description of assembly: CMU veneer, 1 1/2" air space, R-10 rigid insulation, fluid applied air barrier, 8" CMU
U-Value of total assembly: 0.063
R-Value of insulation: 10
Openings (windows or doors with glazing)
U-Value of assembly: 0.39
Solar heat gain coefficient: .22
Projection Factor: N/A
Door U-values: .50
Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floors over unconditioned space (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floor slabs on grade (each assembly)
Description of assembly: 4" Slab on Grade
U-Value of total assembly: 0.95
R-Value of insulation: 15
Horizontal/Vertical requirement: 24"
Slab Heated: No

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: 21.6°F
summer dry bulb: 94.2°F
Interior design conditions
winter dry bulb: 70°F
summer dry bulb: 78°F
relative humidity: 50%
Building heating load: 8,000 BTU
Building cooling load: 6,000 BTU
Mechanical Spacing Conditioning System
Unitary
description of unit: Refer to Mechanical Drawings
heating efficiency: Refer to Mechanical Drawings
cooling efficiency: Refer to Mechanical Drawings
size category of unit: Refer to Mechanical Drawings
Boiler
Size category. If oversized, state reason. ______
Chiller
Size category. If oversized, state reason. ______
List equipment efficiencies: Refer to Mechanical Drawings

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance:
Energy Code: ☐ Prescriptive ■ Performance
ASHRAE 90.1: ☐ Prescriptive ☐ Performance
Lighting schedule
lamp type required in fixture Refer to Electrical Drawings
number of lamps in fixture Refer to Electrical Drawings
ballast type used in the fixture Refer to Electrical Drawings
number of ballasts in fixture Refer to Electrical Drawings
total wattage per fixture Refer to Electrical Drawings
total interior wattage specified vs. allowed (whole building or space by space) Refer to Electrical Drawings
total exterior wattage specified vs. allowed Refer to Electrical Drawings
Additional Prescriptive Compliance
☐ 506.2.1 More Efficient Mechanical Equipment
■ 506.2.2 Reduced Lighting Power Density
☐ 506.2.3 Energy Recovery Ventilation Systems
☐ 506.2.4 Higher Efficiency Service Water Heating
☐ 506.2.5 On-Site Supply of Renewable Energy
☐ 506.2.6 Automatic Daylighting Control Systems

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

WILLIAM SCOTT BAKER REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 08/28/17

LS3P ASSOCIATES LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 NORTH CAROLINA CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

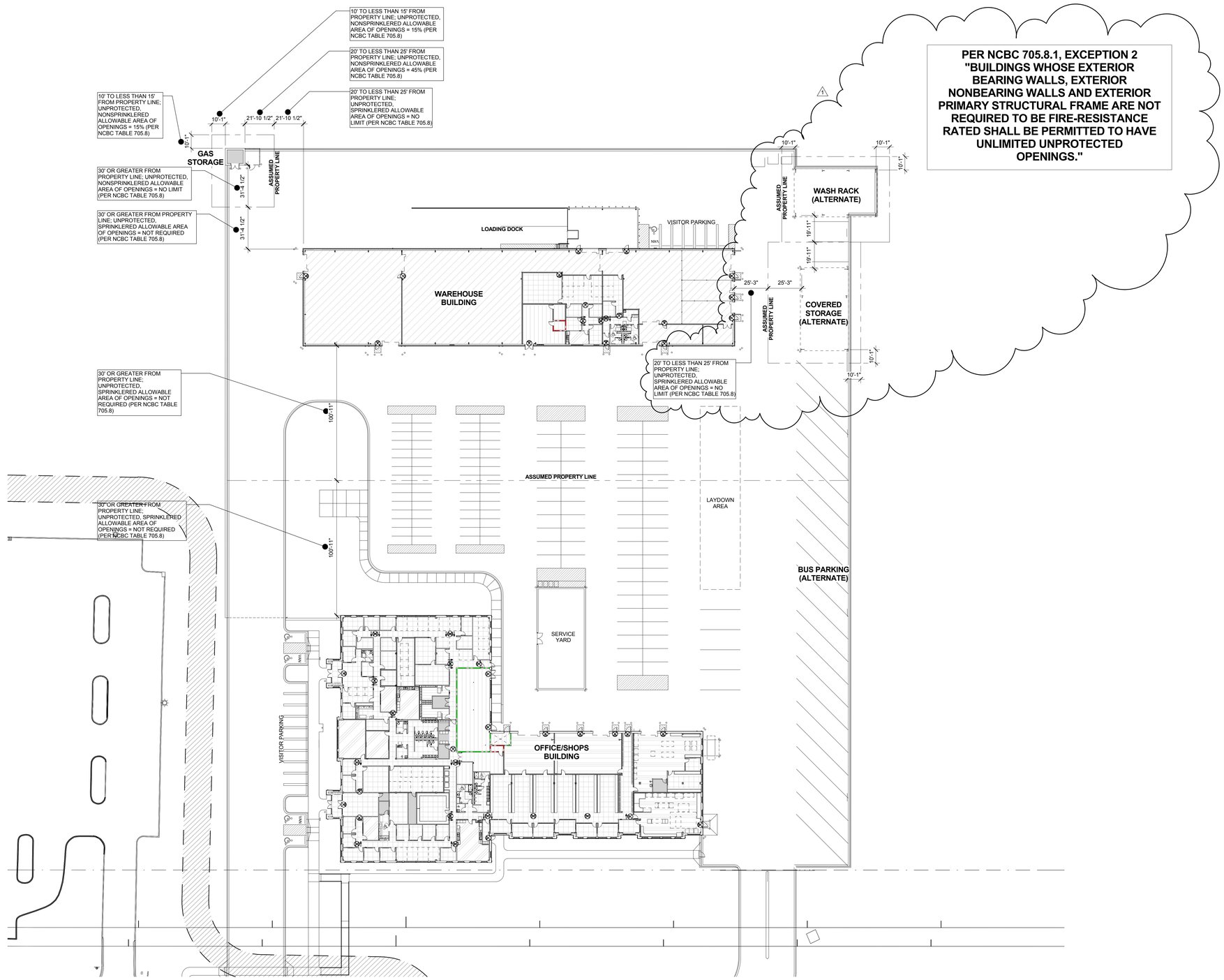
No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

NC BUILDING CODE SUMMARY GAS STORAGE BUILDING AND CANOPIES

G-002

BUILDING BID DOCUMENTS



A2 LIFE SAFETY PLAN - SITE PLAN

1/32" = 1'-0"

PROJECT NORTH TRUE NORTH

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8/30/2017 8:04:55 AM

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

JULIAN SCOTT BAKER REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 08/28/17

LS3P ASSOCIATES LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

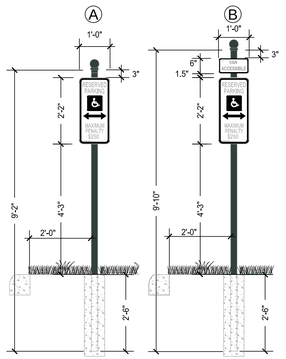
No.	Description	Date
1	Addendum No. 4	08/28/207

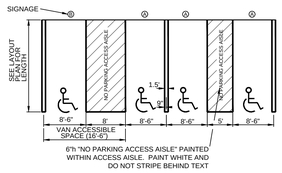
PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

LIFE SAFETY SITE PLAN

G-005

BUILDING BID DOCUMENTS

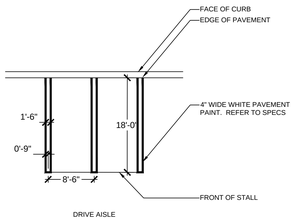




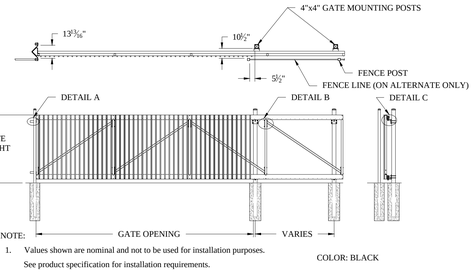
NOTES:
1. ALL ACCESSIBLE SIGNS SHALL BE MOUNTED AT 7 FEET FROM GRADE TO BOTTOM EDGE OF SIGN FACE. MOUNTING HEIGHT CAN BE REDUCED TO 5 FEET IF PLACED IN AN AREA BETWEEN SIDEWALK AND BUILDING FACE IN WHICH PEDESTRIANS ARE NOT EXPECTED TO USE.
2. PROVIDE UNIVERSITY STANDARD 2" ROUND SIGN POST AND MOUNTING BRACKETS.
3. SIGNS AND POSTS TO COMPLY WITH UNC CHARLOTTE DESIGN AND CONSTRUCTION MANUAL.
4. SEE LAYOUT PLAN FOR STRIPING DESIGN.
5. INSTALL PER MANUFACTURERS SPECIFICATION.

KIT COMPONENTS:
(ALL PARTS PAINTED - 'BLACK' GREEN MATTHEWS PAINT CO. MP21337 R91290 SATIN FINISH AND SATIN CLEAR COAT)
1. 2 3/8" POST WITH BALL FINIAL (WELDED). (POST CUT TO LENGTH SHOWN IF GRADE LEVEL)
2. R7-8E - NCDOT ACCESSIBILITY SIGN.
3. R7-8A - NCDOT VAN ACCESSIBLE SIGN.
4. SIGN BRACKETS - (H-1) 2 3/8" (4 PER POST)

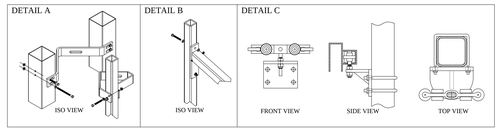
1 C403 ACCESSIBLE PARKING AND SIGNAGE
NOT TO SCALE



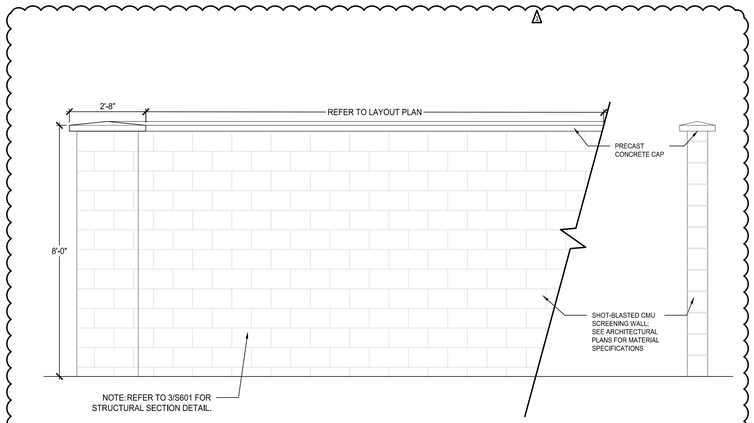
2 C403 PARKING LOT PAVEMENT MARKING
SECTION
SCALE: NTS



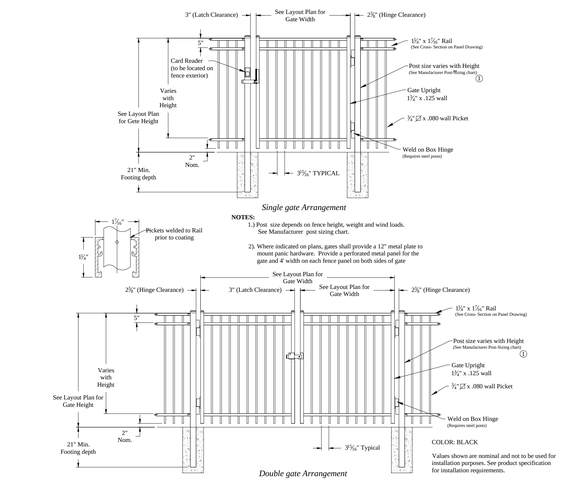
1. Values shown are nominal and not to be used for installation purposes. See product specification for installation requirements.



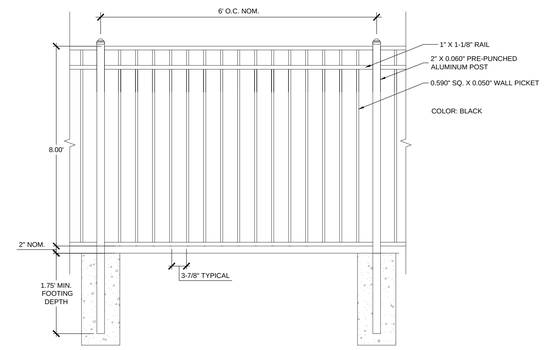
3 C403 CANTILEVER GATE
ELEVATION & DETAILS
SCALE: NTS



6 C403 MASONRY SCREEN WALL (CMU) (ALTERNATE 3 AND 9)
ELEVATION
1' = 1/2"



8 C403 COMMERCIAL STRENGTH ALUMINUM GATES
ELEVATION
NOT TO SCALE



9 C403 FENCE
ELEVATION
NOT TO SCALE

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LandDesign

223 NORTH GRAHAM STREET
CHARLOTTE NC, 28202
(t) 704.333.0325

LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 0797 ALLISON W. MOSS

08/28/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

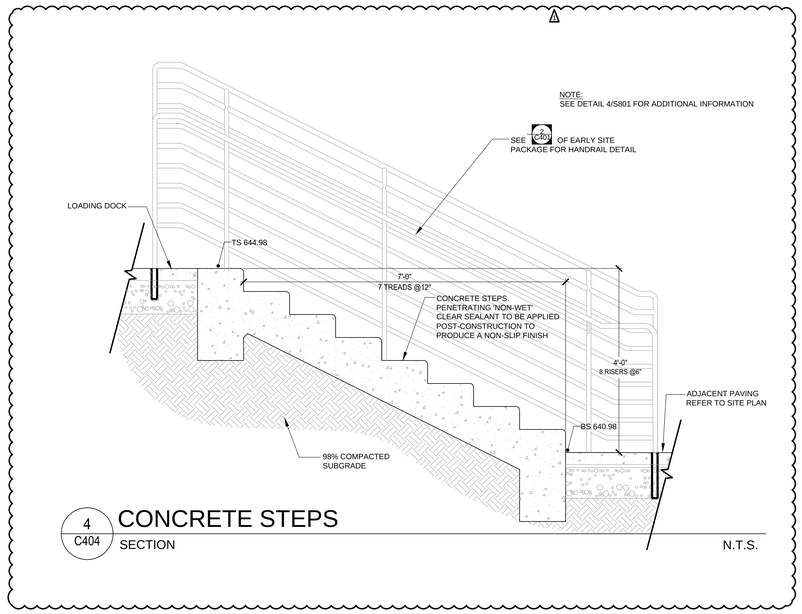
No.	Description	Date
1	Addendum 4	8/28/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AEE
CHECKED BY: AWM

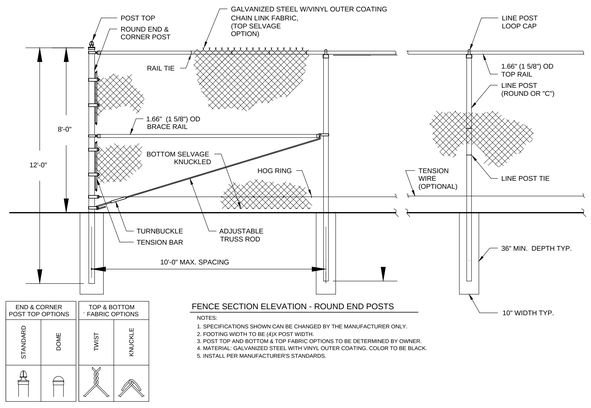
SITE DETAILS

C403

BUILDING BID DOCUMENTS



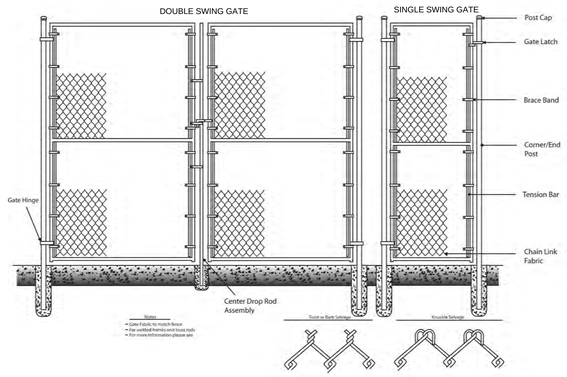
4 C404 CONCRETE STEPS
SECTION N.T.S.



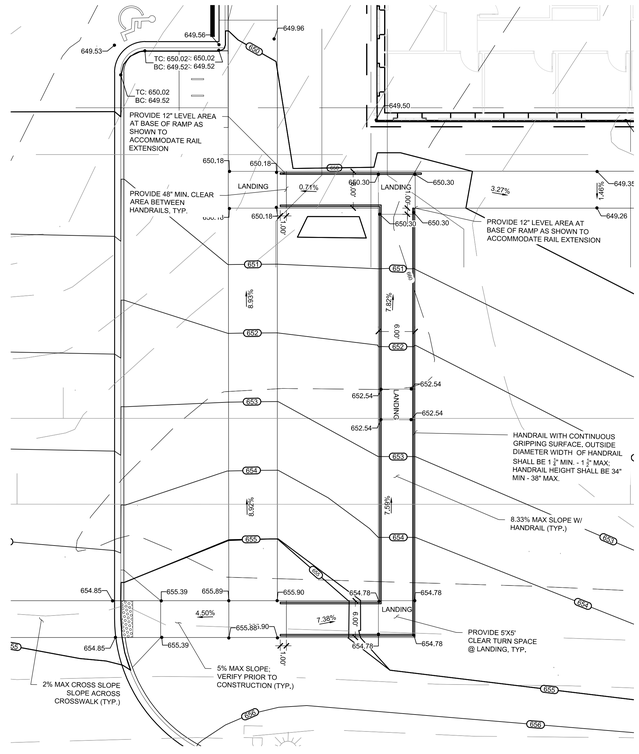
END & CORNER POST TOP OPTIONS		TOP & BOTTOM FABRIC OPTIONS	
STANDARD	DOME	TWIST	KNUCKLE

FENCE SECTION ELEVATION - ROUND END POSTS

NOTES:
1. SPECIFICATIONS SHOWN CAN BE CHANGED BY THE MANUFACTURER ONLY.
2. FOOTING WIDTH TO BE (4)X POST WIDTH.
3. POST TOP AND BOTTOM & TOP FABRIC OPTIONS TO BE DETERMINED BY OWNER.
4. MATERIAL: GALVANIZED STEEL WITH VINYL OUTER COATING. COLOR TO BE BLACK.
5. INSTALL PER MANUFACTURER'S STANDARDS.

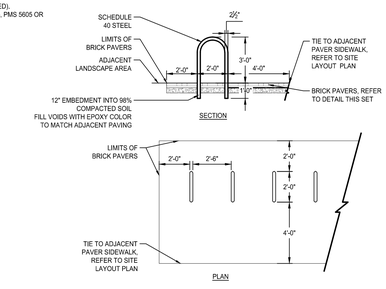


5 C404 VINYL COATED CHAIN LINK FENCE AND GATE
ELEVATION NOT TO SCALE



6 C404 ACCESSIBLE RAMP ENLARGEMENT
PLAN 1" =10'

NOTES:
1. BICYCLE RACKS SHOULD BE EMBEDDED PER MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
2. ALL DIMENSIONS SHOWN ARE MINIMUM. REFER TO CIVIL LAYOUT PLAN AND ARCHITECTURAL DETAILS FOR ADDITIONAL LAYOUT INFORMATION.
3. LOOP TYPE BIKE RACK (2 BIKES PER RACK).
4. BIKE RACK TO BE MOUNTED BELOW GRADE (EMBEDDED).
3. COLOR TO BE MALAGA GREEN FROM DEVOE (1UMM0A). PMS 5605 OR EQUAL SUCH AS TIGER DRYLAC 'RAL 6012'.
4. SPACE BIKE RACKS A MIN. OF 2'-6'.



9 C404 BICYCLE RACK
PLAN AND SECTION NOT TO SCALE

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LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 0797 ALISON W. [illegible]

08/28/17

REVISIONS:

No.	Description	Date
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PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AEE
CHECKED BY: AWM

SITE DETAILS

C404

BUILDING BID DOCUMENTS

TRACER NOTES

1.1 MECHANICAL IDENTIFICATION

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems..

C. 2012 NC Gas Code, section 404.15.3 Tracer: An insulated copper tracer wire or other approved conductor shall be installed adjacent to underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate aboveground at the end of the nonmetallic piping. The tracer wire size shall not be less than 18AWG and the insulation type suitable for direct burial.

D. All pipe, including lawn irrigation lines, and metallic pipe with compression gasket fittings installed underground shall have a tracer wire installed along the length of the pipe. The wire shall be taped to the bottom of the pipe at a maximum of 10' intervals and not allowed to "float freely" within the backfill.

E. TRACER WIRE

1. Tracer wire shall be single-conductor, 12 gauge minimum, copper single-conductor wire with type "UF" (Underground Feeder) insulation, and shall be continuous along the pipeline passing through the inside of each valve box. A #12 AWG or heavier (smaller AWG number), solid, insulated (RHW, THW, or polyethylene insulation is recommended), copper wire shall be taped to pipe at 10 foot intervals. Do not wrap wire around pipe. The wire must be one continuous, unbroken length. Coil tracer wire at meter location and street end with enough wire to extend a minimum of two feet above grade.

F. TRACER WIRE BOXES: Plastic gas and water services longer than 1000 feet in length from curb valve to meter riser must have tracer wire boxes installed in accordance with UNC Charlotte standards.

G. All underground piping and utilities (both metallic and non-metallic), except copper pipe, shall have a separate copper tracer wire and non-metallic warning tape installed above the utility line.

H. The tracer wire shall be traced for continuity prior to backfill, immediately upon completion of backfill and compaction and once again during final utility location/as-built at the end of the project. This also will include landscape irrigation mains to the points of the valves. All above ground utility features such as vaults, manholes, valves, handholds, etc to be properly labeled. Contractor shall provide an inventory of all installed outdoor utility features including type and model.

I. Identification Tape: The 1st stage of identification shall be a buried warning tape. This tape shall provide an early warning at shallow depth excavation. The tape shall be 6" wide, and buried approximately 18" to 30" above the service pipe, but a minimum of 10" below finished grade. It shall consist of multiple layers of polyethylene with an overall thickness of 3 to 5 mils. It shall be installed continuous from valve box to valve box or manhole to manhole, and shall terminate just outside of valve box or manhole wall. The black colored lettering on the warning tape shall be abrasion resistant and be imprinted on a color-coded background that conforms to APWA color code standards. The lettering on the tape should name the utility it is protecting. (i.e. Caution Buried Sewer Line Below).

J. TRACER WIRE: The 2nd stage of identification shall be a buried tracer wire. This tracer wire shall provide pipeline identification, be fully detectable from above grade utility locators, and be able to provide a depth reference point to top of pipe.

INSET
SCALE: 1"=10'

PROP. 2" WL FROM OFFICE BUILDING TO WAREHOUSE
PROP. 3" WL SERVICE TO OFFICE
PROP 6" FIRE SERVICE TO WAREHOUSE BUILDING
PROP. 2" WL OUT TO WAREHOUSE - REFER TO MEP FOR CONT.
PROP. 3" WL IN TO OFFICE BUILDING - REFER TO MEP FOR CONT.
PROP. 2" GAS SERVICE - COORDINATE ROUTING WITH PNG AND UNC CHARLOTTE
OFFICE BUILDING
PROP. 6" FIRE SERVICE OUT TO WAREHOUSE - REFER TO MEP FOR CONT.
PROP. 4" FDC IN TO OFFICE BDG
PROP. 6" FIRE SERVICE IN TO OFFICE BUILDING - REFER TO MEP FOR CONT.

1. THE PIV ON THE SERVICE LINE COMING INTO THE OFFICE / SHOPS SERVES THE CENTRAL FIRE PUMP FOR BOTH THE OFFICE/SHOPS AND THE WAREHOUSE.
2. THE 6" FIRE LINE COMES INTO THE OFFICE / SHOPS FIRE PUMP ROOM (WHICH IS A RATED ROOM), GOES THROUGH THE RPZ BACKFLOW AND FIRE PUMP AND THEN PROCEEDS TO A MANIFOLD INSIDE THE FIRE PUMP ROOM. FROM THIS MANIFOLD, SEPARATE INDIVIDUAL RISERS (WITH INDIVIDUAL CONTROL VALVES AND TAMPER SWITCHES) EXTEND TO THE OFFICE / SHOPS BUILDING AND THE WAREHOUSE BUILDING.
3. THE CONTROL VALVES FOR EACH BUILDING ARE LOCATED INSIDE THE OFFICE / SHOPS FIRE PUMP ROOM. THE FIRE PUMP ROOM IS A FIRE-RATED ROOM, ACCESSIBLE FROM THE EXTERIOR (2013 NFPA 24 6.2.11(6)).

EARLY SITE PACKAGE:

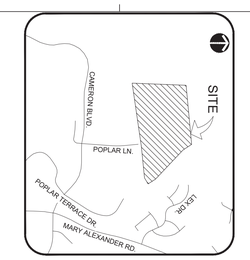
SANITARY SEWER WILL BE INSTALLED WITH THE EARLY SITE PACKAGE.

BUILDING PACKAGE:

PLUMBING CONTRACTOR WILL MAKE CONNECTION TO SITE WATERMAIN, 5' OUTSIDE BUILDING, AND ROUTE TO INTERNAL BACKFLOW AND METER. FIRE PROTECTION MAINS WILL BE INSTALLED INTO THE MECHANICAL ROOM, 1.0' ABOVE FFE BY THE EARLY SITE UTILITY CONTRACTOR

EXIST. 24" SANITARY SEWER TRUNK
FEMA FLOODWAY
FEMA FLOOD FRINGE
SWIM BUFFER
COMMUNITY ENCROACHMENT
COORDINATE SEWER CROSSING WITH GREENWAY PLANNING AND DEVELOPMENT SERVICES
EX SSMH - 1
SSMH-10
BEGIN PRIVATE 8" SANITARY LINE
SSMH - 2
SSMH - 3
APPROXIMATE LOCATION 48" WHITE OAK WITH A 13' CIRCUMFERENCE. NEAREST POINT TO THE TRAIL IS (35.315162,-80.735225). NEAREST SEWER EXCAVATION/TRENCH LIMIT NEEDS TO BE 20' AWAY FROM THE TRUNK, MINUMUM.
SSMH - 5
EX. WOOD LINE
SSMH - 7
EXIST. 12' WIDE ASPHALT TRAIL UNDER CONSTRUCTION BY OTHERS
SSMH - 8
SSMH - 9
SDMH - 3
CB - 8
GI - 8
WASH RACK
SANITARY DUMP STATION ASSOCIATED WITH ALTERNATE 5. REFER TO DETAIL SHEET C603
TRENCH DRAIN - 1
LOADING DOCK
PROP. 1" WL - REFER TO MEP FOR CONTINUATION
CB - 4
PROP. 1" WATER METER
WASH RACK & ALT DUMP STATION CO
CO-1
RIM: 644.84
4" INV. OUT: 639.06 (SSMH - 13)
WAREHOUSE BUILDING
PROP. 6" FIRE SERVICE - REFER TO MEP FOR CONT.
PROP. 2" WL - REFER TO MEP FOR CONT.
COVERED STORAGE
TRENCH DRAIN - 2
TRENCH DRAIN - 3
GI - 7
CB - 5
PROP. FIRE HYDRANT ASSEMBLY
GI - 1
GI - 2
BASE CB - 8
CB - 6
CB - 7
PROP. DOM SERVICE 8" X 6" X 3" TEE 6" GV S OF TEE - 3" GV E OF TEE - 8" X 1" REDUCER N OF TEE -
SSMH - 13
GI - 3
SSMH - 10
PROP. PIV
PROP FDC LINE INTO OFFICE BDG
PROP. 2" IRRIGATION SERVICE - 8" X 6" X 3" TEE - 2" GV, CAP FOR FUTURE CONNECTION BY OTHERS
PROP. FREE STANDING FDC - 4" FIRE MAIN TO FIRE PUMP ROOM (TYP.)
PROP. 6" FIRE SERVICE 8" X 8" X 6" TEE
PROP. 2" WL FROM OFFICE BUILDING TO WAREHOUSE
PROP. 3" WL SERVICE TO OFFICE
PROP 6" FIRE SERVICE TO WAREHOUSE BUILDING
PROP. 4" SANITARY WASTE - REFER TO MEP FOR CONT.
TRUNK LINE INSTALLED WITH EARLY SITE PACKAGE,
BUILDING PACKAGE PLUMBING CONTRACTOR TO MAKE CONNECTION TO CO-1
BASE CB - 13
CB - 14
CB - 11
CB - 10
SERVICE YARD
CB - 9
SEE INSET
CO-2
RIM: 649.46
4" INV. OUT: 644.00 (SSMH - 11)
OFFICE BUILDING
SSMH - 11
PROP. 4" SANITARY WASTE - REFER TO MEP FOR CONT.
TRUNK LINE INSTALLED WITH EARLY SITE PACKAGE,
BUILDING PACKAGE PLUMBING CONTRACTOR TO MAKE CONNECTION TO CO-2
CB - 15
GI - 6
GI - 5
GI - 4
CB - 18
CB - 17
FES - 1
RISER - 1
HW - 1
SDMH - 4
PROP. DRY DETENTION
EX. BLUE LINE EXTENSION - TRACTION POWER SUBSTATION #18
CAMERON BOULEVARD
EX. PARKING LOT
PROP. 2" GAS CONNECTION TO EXISTING MAIN COORDINATE WITH PNG AND UNC CHARLOTTE
PROP. 2" GAS SERVICE COORDINATE ROUTING WITH PNG AND UNC CHARLOTTE
PROP 8"x8"x8" TAPPING SLEEVE AND VALVE
PROP. 8" 45° BENDS WITH BLOCKING
PROP FIRE HYDRANT ASSEMBLY
POPLAR LANE
PROP. 8" DIP WL (TYP.)
PROP 8" WM CAP AND PLUG FOR FUTURE EXTENSION
PROP 6" X 6" X 8" TEE 8" GV W OF TEE 8" GV S OF TEE 8" GV N OF TEE
PATCH EXISTING ROAD ALONG WM INSTALLATION. COORDINATE FINAL LIFT OF ASPHALT WITH CM AND UNC CHARLOTTE CONSTRUCTION MANAGER
EX. NORTH DECK PARKING
UGP AND UGC SHOWN FOR REFERENCE AND COORDINATION ONLY. REFER TO MEP PLANS FOR DESIGN LAYOUT AND DETAILS. UGC LINE IS ALTERNATE #8

VICINITY MAP
NTS



UTILITY LEGEND

PROPERTY LINE	
PROP. WATERMAIN	8W
PROP. SANITARY	SS
PROP. STORM	
PROP. CURB INLET	
PROP. 24" x 24" AREA DRAIN	
PROP. STORM MANHOLE	
PROP. CLEANOUT	
EX. STORM	
EX. WATERMAIN	W
EX. SANITARY	SS
PROP. SANITARY MANHOLE	
EX. GAS	GAS
EX. ELECTRIC	UE
EX. TELECOM	UT
EX. SANITARY MANHOLE	
EX. CURB INLET	
EX. TELECOM MANHOLE	
EX. ELECTRIC MANHOLE	
EX. LIGHT POLE	
EX. WATER VALVE	
EX. FIRE HYDRANT	

GENERAL NOTES:

1. REFER TO NCDEQ DESIGN MANUAL (WATER AND SEWER POLICIES, PROCEDURES, STANDARDS, AND SPECIFICATIONS) FOR ALL NECESSARY DETAILS, MATERIALS, AND SPECIFICATIONS.
2. THE CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. LOCATIONS OF UNIVERSITY OWNED UTILITIES MUST BE COORDINATED WITH THE UNIVERSITY CONSTRUCTION MANAGER AND REQUESTED A MINIMUM 72 HOURS PRIOR TO ON-SITE ACTIVITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR. REPAIRS SHALL BE MADE WITHIN 48 HOURS OF DAMAGE. IF ACTUAL ELEVATIONS ARE DIFFERENT FROM THOSE SHOWN ON THIS PLAN, CONTACT THE ENGINEER (LANDDESIGN, INC. - 704-333-0325) BEFORE COMMENCING WITH CONSTRUCTION.
3. POTABLE DOMESTIC WATER METERING SHALL BE BY TURBINE OR NUTATING DISK METER WITH MAGNETIC DRIVE. METER TO BE LOCATED IN MECHANICAL ROOM, EASILY ACCESSIBLE.READ IN HUNDREDS OF CUBIC FEET, AND PROVIDE OUTPUT TO BUILDING AUTOMATION.
4. NON-SEWERED WATER (CONSUMED BUT NOT RETURNED TO THE SEWER, E.G. IRRIGATION, COOLING TOWER MAKEUP, ETC.) SHOULD BE METERED AT ITS SOURCE.METER SHOULD BE LOCATED IN MECHANICAL ROOM, EASILY ACCESSIBLE, READ IN HUNDREDS OF CUBIC FEET AND PROVIDE OUTPUT TO BUILDING AUTOMATION.
5. NATURAL GAS METERING SHALL COMPLY WITH ALL REQUIREMENTS OF PIEDMONT NATURAL GAS, AND INTERFACE TO THE BUILDING AUTOMATION SYSTEM.
6. ROOF DRAIN LEADERS ABOVE GRADE SHALL BE GALVANIZED STEEL OR CAST IRON PIPING WITH NO-HUB OR BELL AND SPIGOT JOINTS WITH COMPRESSION GASKETS. ALL ROOF DRAIN PIPING BELOW GRADE SHALL BE CAST IRON PIPING WITH BELL AND SPIGOT JOINTS WITH COMPRESSION GASKETS
7. COORDINATION OF DIVISIONS OF WORK: CARE IS REQUIRED IN PREPARATION OF DOCUMENTS TO ASSURE NO OVERLAPPING AND NO GAPS BETWEEN THE WORK FOR THE VARIOUS CONTRACTS. EACH CONTRACTOR SHALL BE REQUIRED TO PERFORM EXCAVATION, TRENCHING, AND BACKFILL FOR HIS INSTALLATIONS. MATERIALS AND COMPACTION OF FILL MATERIALS SHALL MEET THE REQUIREMENTS STIPULATED IN DIVISION 2, REGARDLESS OF WHO PERFORMS THIS WORK; THEREFORE, IN DIVISIONS 15 AND 16 THE REQUIREMENTS OF EARTHWORK MAY BE BEST SPECIFIED BY MAKING REFERENCE TO DIVISION 2.
8. MANHOLES: MANHOLE FRAME, COVER, AND GRATE CASTINGS SHALL INCLUDE THE NAME AND LOCATION OF THE MANUFACTURER, COVERS SHALL HAVE CAST IDENTIFICATION MARKINGS OF "STORM DRAIN", SANITARY, "STEAM", "ELECTRICAL", "TELEPHONE" ETC. AS APPROPRIATE. MASONRY MANHOLES SHALL BE PARGE COATED INSIDE AND OUT. MANHOLES ARE CONSIDERED CONFINED SPACES AND APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN ENTERING THEM.

***9. CONTACT LANDDESIGN INC. AT 704-333-0325 IF ANY PIPE CROSSING VERIFICATION IS DIFFERENT THAN WHAT IS SPECIFIED ON THE PLAN.

BACKFLOW PREVENTION NOTES:

1. THERE SHALL BE NO TAPS, PIPING BRANCHES, UNAPPROVED BYPASS PIPING, HYDRANTS, FIRE DEPARTMENT CONNECTION POINTS, OR OTHER WATER-USING APPURTENANCES CONNECTED TO THE SUPPLY LINE BETWEEN ANY WATER METER AND IT'S REQUIRED BACKFLOW PREVENTER.
2. EACH REQUIRED BPA IS REQUIRED TO BE TESTED BY AN APPROVED CERTIFIED TESTER PRIOR TO PLACING THE WATER SYSTEM IN SERVICE.

WATER NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH NCDEQ STANDARD SPECIFICATIONS.
2. THE CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
3. ALL SHORING SHALL BE IN ACCORDANCE TO OSHA TRENCHING STANDARDS PART 1926, SUBPART P, AS AMENDED TO DATE.
4. ANY NECESSARY LANE CLOSURES SHALL FOLLOW GUIDELINES OUTLINED IN THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND/OR C.D.O.T. WORK AREA TRAFFIC CONTROL HANDBOOK. (WATCH)
5. IF THE PROPOSED WATER MAIN IS INSTALLED WITHIN 12" IN ANY DIRECTION (VERTICALLY OR HORIZONTALLY) FROM A GAS MAIN, THEN THE CONTRACTOR SHALL CALL THE APPROPRIATE GAS COMPANY AND INFORM THEM.
6. WATER MAIN TO BE INSTALLED WITH A MINIMUM OF 36" OF COVER. WATER MAIN TO BE C900 UNLESS SPECIFIED OTHERWISE.
7. RECORD DRAWINGS OF WATER MAIN TO INCLUDE ALL VALVES, TEES, BENDS AND HYDRANTS
8. ALL WATER VALVES TO OPERATE BY TURNING THE SQUARE NUT CLOCKWISE (RIGHT) AND COUNTERCLOCKWISE (LEFT) TO OPEN, AS PER UNC CHARLOTTE REQUIREMENTS.
9. FIRE HYDRANT IS TO BE PLACED A MINIMUM OF 6' BEHIND CURB AND GUTTER OR 4' BEHIND A DITCH LINE IN CUT SECTIONS AND 1' BACK OF THE BEGINNING OF SLOPE IN FILL SECTIONS.
10. AS REQUIRED BY NFPA 13 AND 24, THE SPRINKLER SYSTEM SHALL TYPICALLY INCLUDE THE FOLLOWING:
10.1 AN ALARM CHECK VALVE WITH OUTSIDE WATER MOTOR GONG.
10.2 A POST INDICATOR VALVE LOCATED A MINIMUM 40 FEET FROM BUILDING WALLS.
10.3 A FIRE DEPARTMENT CONNECTION ON THE SYSTEM SIDE OF THE WATER SUPPLY CHECK VALVE.

SEWER NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH NCDEQ GRAVITY SEWER MINIMUM DESIGN CRITERIA.
2. ALL SHORING SHALL BE IN ACCORDANCE TO OSHA TRENCHING STANDARDS PART 1926, SUBPART P, AS AMENDED TO DATE.
3. IF THE PROPOSED SEWER MAIN IS INSTALLED WITHIN 12" IN ANY DIRECTION (VERTICALLY OR HORIZONTALLY) FROM A GAS MAIN, THEN THE CONTRACTOR SHALL CALL THE APPROPRIATE GAS COMPANY AND INFORM THEM.
4. SEWER LATERALS ARE TO HAVE A MINIMUM OF 1.00% SLOPE AND A NO MORE THAN A 10.00% MAXIMUM SLOPE.

(BEFORE YOU DIG!) N.C. ONE-CALL CENTER IT'S THE LAW!

25' 0' 25' 50' 100

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LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

08/28/17

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033804 MARC D. MOHSEN

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REVISIONS:

No.	Description	Date
1	ADDENDUM 4	08/28/17

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: EJL
CHECKED BY: MDM

UTILITY PLAN

C600

BUILDING BID DOCUMENTS

FLOW TEST DATA

DATE	LOCATION	FLOW TEST PERFORMED BY	PRESSURE		FLOW (GPM)	FLOW AT 20 PSI (GPM)
			STATIC (PSI)	RESIDUAL (PSI)		
7/21/2017	HYDRANT #158662 @ NE CORNER OF LOT 26 NEAR MAINTENANCE YARD	CHARLOTTE FIRE DEPARTMENT	74	67	1061	3198
	NC-SCO ADJUSTED FLOW TEST		64	57	955	2878

FLOW TEST NOTES:
1. SEE SITE UTILITY PLANS FOR EXACT LOCATION OF FIRE HYDRANTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A NEW FIRE FLOW TEST ON WHICH TO BASE HIS CALCULATIONS.
3. THE FLOW TEST USED FOR THE WORKING PLAN DESIGN SHOULD BE PERFORMED AS INDICATED IN NFPA 13 WHICH USES TWO HYDRANTS, A PRESSURE HYDRANT AND A FLOW HYDRANT. THE TWO HYDRANTS SHALL BE AS CLOSE TO THE POINT OF CONNECTION AS POSSIBLE. A COPY OF THE FLOW TEST AND TEST HYDRANT LOCATIONS SHALL BE SUBMITTED WITH THE SHOP DRAWING PACKAGE.

TABLE B105.1
MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS[a]

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute)[c]	FLOW DURATION (hours)
Type IA and IB[b]	Type IIA and IIIA[b]	Type IV and V-A[b]	Type IIB and IIIB[b]	Type V-B[b]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.
a. The minimum required fire flow shall be allowed to be reduced by 25 percent for Group R.
b. Types of construction are based on the *International Building Code*.
c. Measured at 20 psi.

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.
a. Reduce by 100 feet for dead-end streets or roads.
b. Where streets are provided with median dividers which can be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.
c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.
d. Reduce by 50 feet for dead-end streets or roads.
e. One hydrant for each 1,000 gallons per minute or fraction thereof.

FIRE FLOW DEVELOPMENT SUMMARY

OFFICE/SHOPES AREA: 34,000 SF (FP-011)
WAREHOUSE AREA: 23,600 SF (FP-012)
TOTAL AREA: 57,600 SF

CONSTRUCTION TYPE: IIB
REQUIRED FIRE FLOW: 5,000 GPM
75% REDUCTION FOR SPRINKLED BUILDINGS: 1,250 GPM

FIRE FLOW ANALYSIS

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LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

Aug 28 2017 1:47 PM

NORTH CAROLINA PROFESSIONAL SEAL 033804 ENGINEER MARC D. MOMSEN

08/28/17

REVISIONS:

No.	Description	Date
1	ADDENDUM 4	08/28/17

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: EJL
CHECKED BY: MDM

UTILITY DETAILS

C603

BUILDING BID DOCUMENTS

COLUMN SCHEDULE

Mark	Type	Base Plate	Cap Plate	Comments
A	W10X33	3/4" x 1'-2"x1'-4"	SEE DETAILS	

NOTE: AT BRACED FRAME COLUMN LOCATIONS USE TYPICAL DETAIL 1/S-801 FOR BASE PLATE AND ANCHOR BOLT REQUIREMENTS. AT ALL OTHER COLUMN LOCATIONS USE DETAIL 6/S-801

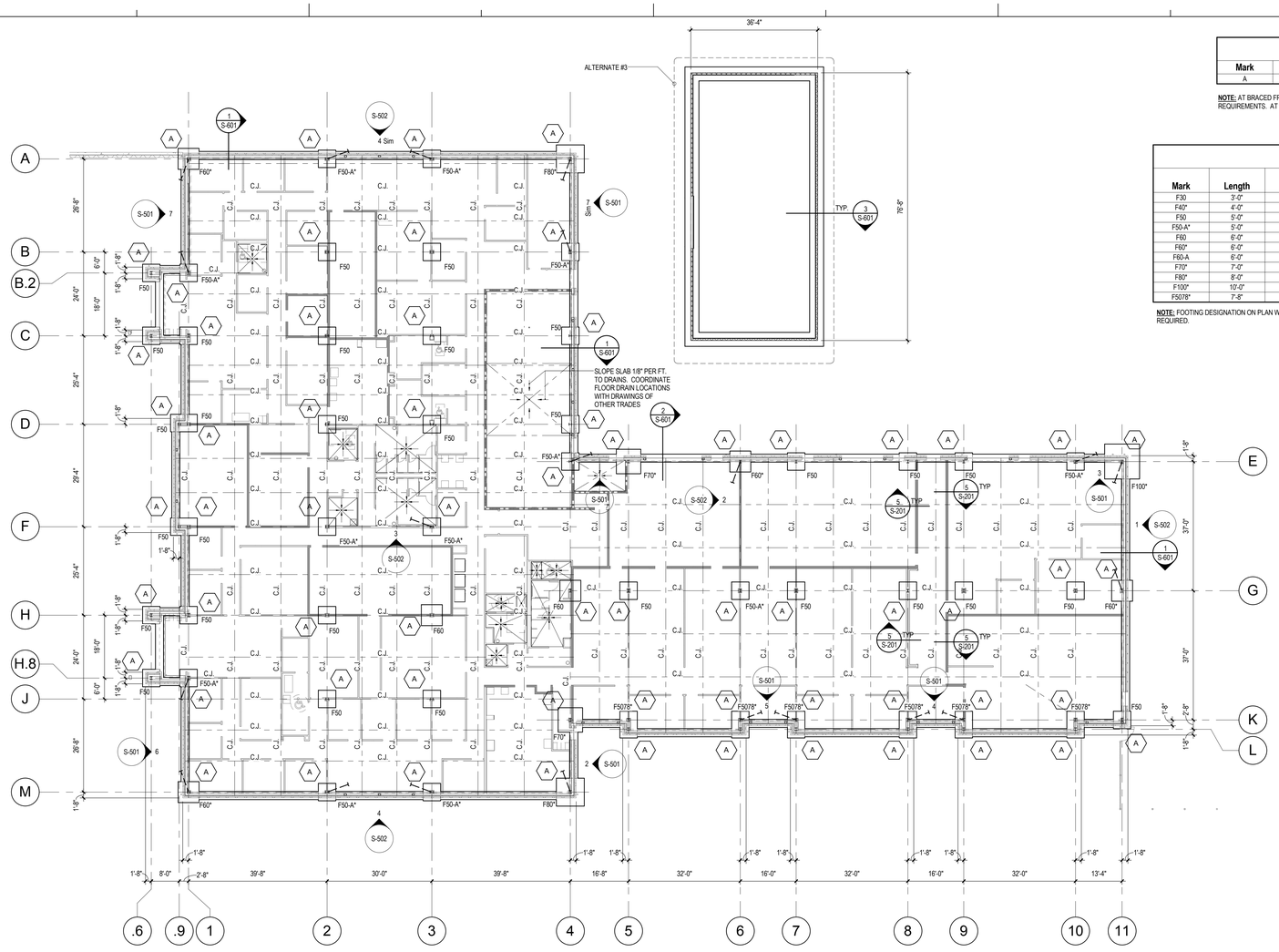
FOOTING SCHEDULE

Mark	Length	Width	Sq Footing Thickness	TOP REINFORCING	BOTTOM REINFORCING	Comments
F30	3'-0"	3'-0"	1'-0"		(4) #4 E.W.	
F40"	4'-0"	4'-0"	1'-0"	(5) #5 E.W.	(5) #5 E.W.	
F50	5'-0"	5'-0"	1'-4"		(8)-#6 E.W.	
F50-A*	5'-0"	5'-0"	1'-6"	(6) #6 E.W.	(6) #6 E.W.	
F60	6'-0"	6'-0"	1'-6"		(7) #6 E.W.	
F60*	6'-0"	6'-0"	1'-6"	(7) #6 E.W.	(7) #6 E.W.	
F60-A	6'-0"	6'-0"	2'-0"	(7) #6 E.W.	(7) #6 E.W.	
F70*	7'-0"	7'-0"	1'-6"	(8) #6 E.W.	(8)-#6 E.W.	
F80*	8'-0"	8'-0"	1'-6"	(9) #6 E.W.	(9) #6 E.W.	
F100*	10'-0"	10'-0"	1'-6"	(11) #6 E.W.	(11) #6 E.W.	
F5078*	7'-8"	5'-0"	1'-8"	#6@6" O/C E.W.	#6@6" O/C E.W.	

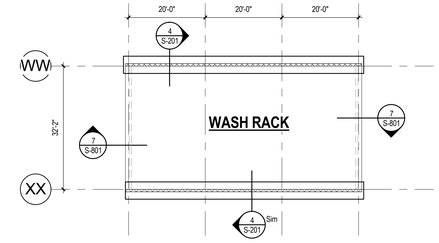
NOTE: FOOTING DESIGNATION ON PLAN WITH " * " SHALL INCLUDE TOP REINFORCING STEEL. ALL OTHER FOOTINGS, TOP REINFORCING NOT REQUIRED.

FOUNDATION PLAN NOTES:

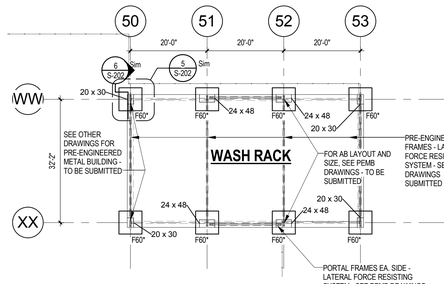
1. SEE ARCHITECTURAL DRAWINGS FOR TOP OF FINISH FLOOR SLAB ELEVATIONS.
2. UNLESS OTHERWISE NOTED, THE SLAB-ON-GRADE IS TO BE 4-INCH THICK CONCRETE SLAB REINFORCED WITH 6x6-W1.4 x W1.4 W.W.F. PLACED 1-INCH CLEAR FROM TOP. PLACE SLAB DIRECTLY ON TOP OF A VAPOR BARRIER AND OVER 4-INCHES OF CLEAN WASHED STONE. VAPOR BARRIER SHALL BE STEGO WRAP 15-MILS THICK AS MANUFACTURED BY STEGO INDUSTRIES (OR EQUAL).
3. SLAB-ON-GRADE CONTROL JOINTS ARE INDICATED ON PLAN WITH THE SYMBOL 'C.J.' THESE JOINTS MAY BE EITHER CONSTRUCTION JOINTS OR SAWCUT JOINTS. SEE TYPICAL DETAILS. COORDINATE ALL SLAB JOINT LOCATIONS WITH JOINTS IN ARCHITECTURAL FLOOR FINISHES TO ASSURE ALIGNMENT IS APPLICABLE.
4. TOP OF ALL EXTERIOR FOOTINGS ARE TO BE A MINIMUM OF 2'-0" BELOW FINISHED EXTERIOR GRADE.
5. SEE SHEET S101 FOR GENERAL NOTES AND NOTES PERTAINING TO FOUNDATION DESIGN AND CONSTRUCTION.
6. SEE SHEET S801 FOR TYPICAL DETAILS.
7. VERIFY LOCATION AND SIZE OF WALLS SHOWN ON THE FOUNDATION PLAN WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.
8. FILL ALL CMU CELLS BELOW GRADE WITH CONCRETE GROUT.
9. UNLESS OTHERWISE INDICATED ON PLAN OR IN DETAILS, ALL WALL FOOTINGS SHALL BE 12" DEEP, PROJECT 6" BEYOND EACH FACE OF THE WALL SUPPORTED AND SHALL BE REINFORCED WITH (3)-#5 BARS CONTINUOUS LONGITUDINALLY.
10. 'F_' INDICATES A CONCRETE FOOTING, SEE FOOTING SCHEDULE.
11. '◇' INDICATES A STEEL COLUMN, SEE COLUMN SCHEDULE.
12. FOUNDATION DESIGN SHOWN FOR PREFABRICATED METAL BUILDING SHALL BE USED FOR BASE BID, FINAL DESIGN OF FOUNDATION WILL BE PROVIDED AFTER RECEIVING COLUMN ANCHOR BOLT SETTING PLAN AND FINAL COLUMN REACTIONS FROM THE CONTRACTED METAL BUILDING SUPPLIER. REFER TO METAL BUILDING SYSTEMS SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.
13. "P_" INDICATES A CONCRETE PIER. SEE DETAILS ON S801.
14. " < ___ > " INDICATES TOP OF CONCRETE PIER ELEVATION.
15. AT SLOPED SLAB-ON-GRADE AREAS, THE MINIMUM SLAB THICKNESS SPECIFIED SHALL BE MAINTAINED. EITHER SLOPE SUBGRADE TO MAINTAIN A CONSTANT THICKNESS OR PROVIDED A THICKER SLAB AT AREAS INDICATED TO BE SLOPED TO ALLOW THE MINIMUM SLAB THICKNESS TO BE MAINTAINED AT LOW POINT.
16. COORDINATE THE ELEVATIONS OF ALL FOOTINGS WITH RESPECT TO UNDERGROUND UTILITIES. STEP AS REQUIRED TO AVOID FOULING WITH UTILITIES AND TO ALLOW UTILITIES TO PASS OVER FOOTINGS. PROVIDE A STEEL SLEEVE THROUGH WALL FOR PIPE TO PASS THROUGH. REFER TO MEP AND FP DRAWINGS FOR UTILITIES AND INVERTS. SEE TYPICAL STEPPED FOOTING DETAIL.



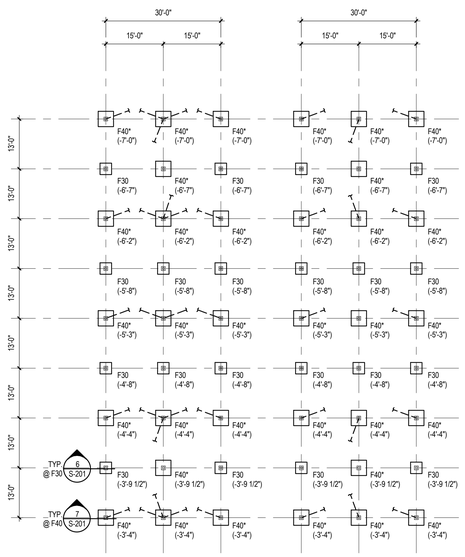
1 S-201 **OFFICE/SHOPS BUILDING FOUNDATION PLAN**
1/16" = 1'-0"



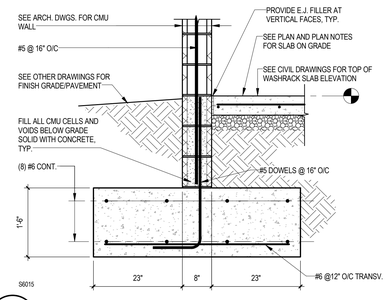
2b S-201 **WASHRACK FOUNDATION - ALTERNATE #2b**
1/16" = 1'-0"



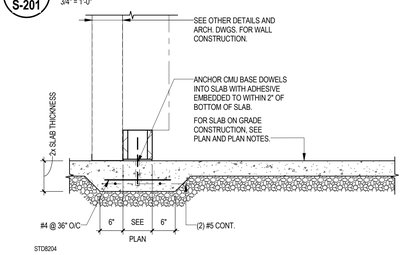
2a S-201 **WASHRACK FOUNDATION - ALTERNATE #2a**
1/16" = 1'-0"



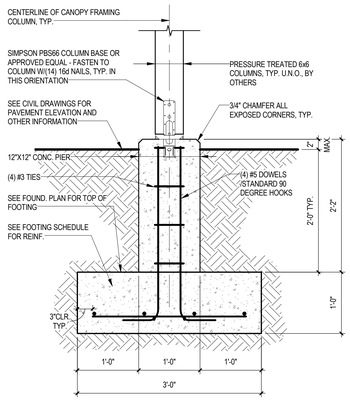
3 S-201 **ELECTRIC CART CHARGING CANOPY FOUNDATION PLAN**
1/16" = 1'-0"



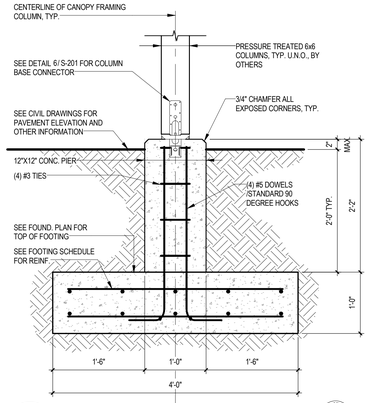
4 S-201 **FOUNDATION SECTION - WASHRACK - ALTERNATE #2b**
3/4" = 1'-0"



5 S-201 **DEEPENED SLAB UNDER CMU LOCKER BASE**
3/4" = 1'-0"



6 S-201 **TYPICAL SECTION AT CANOPY FOOTING F30**
1" = 1'-0"



7 S-201 **TYPICAL SECTION AT CANOPY FOOTING F40**
1" = 1'-0"

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NOTE: BUILDING PACKAGE INCLUDES LIGHT GAUGE METAL FRAMING AND ROOF TRUSSES ONLY.

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SKA Project Number.
Plotted:

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REVISIONS:

No.	Description	Date
1	ADDENDUM NO. 4	08/28/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 **CODE:** 41526
DATE: August 21, 2017
DRAWN BY: WP/APJ
CHECKED BY: CEC

OFFICE/SHOPS BUILDING FOUNDATION PLAN

S-201

BUILDING BID DOCUMENTS

G:\2016 Projects\160379\SKA Drawings\160379-RT16-S.rvt
8/30/2017 9:46:04 AM

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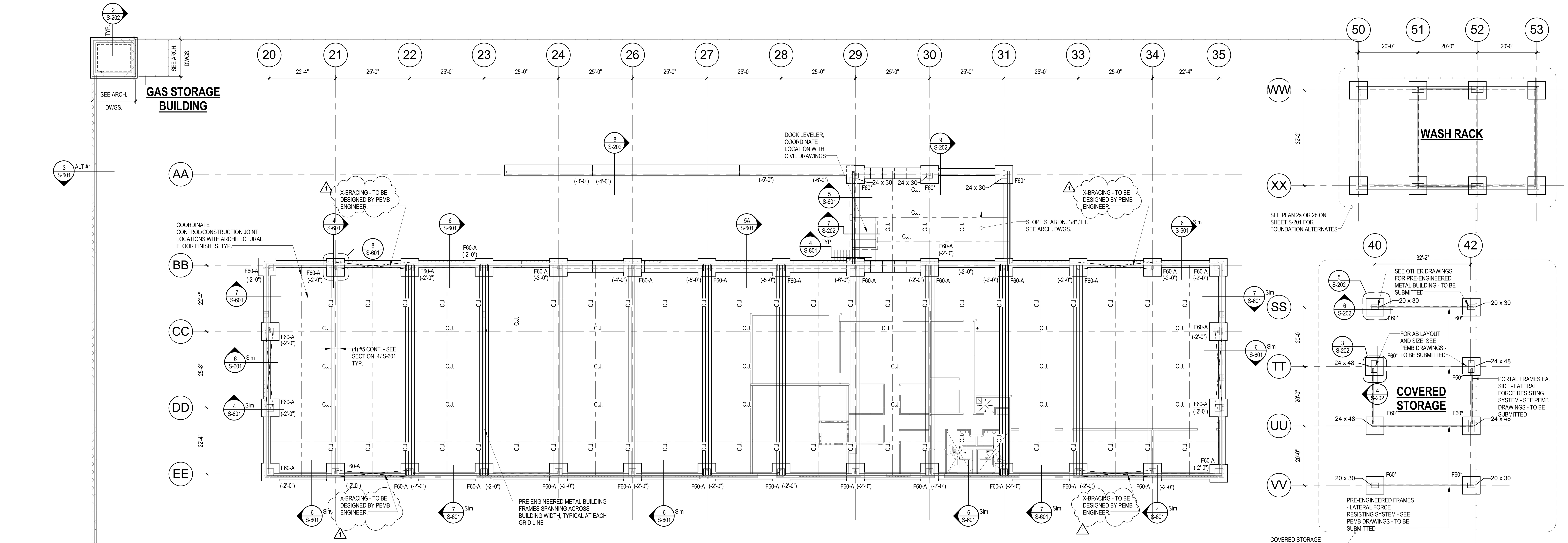
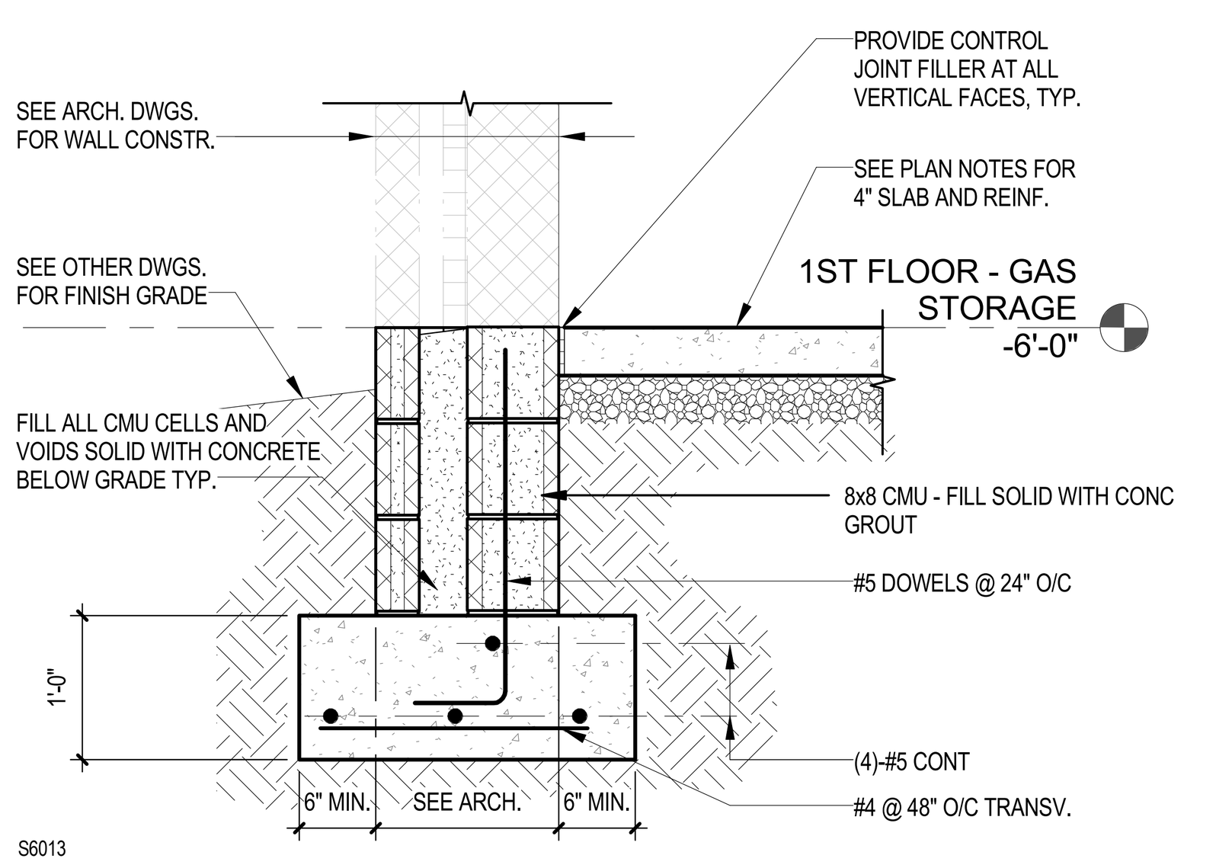
REVISIONS:

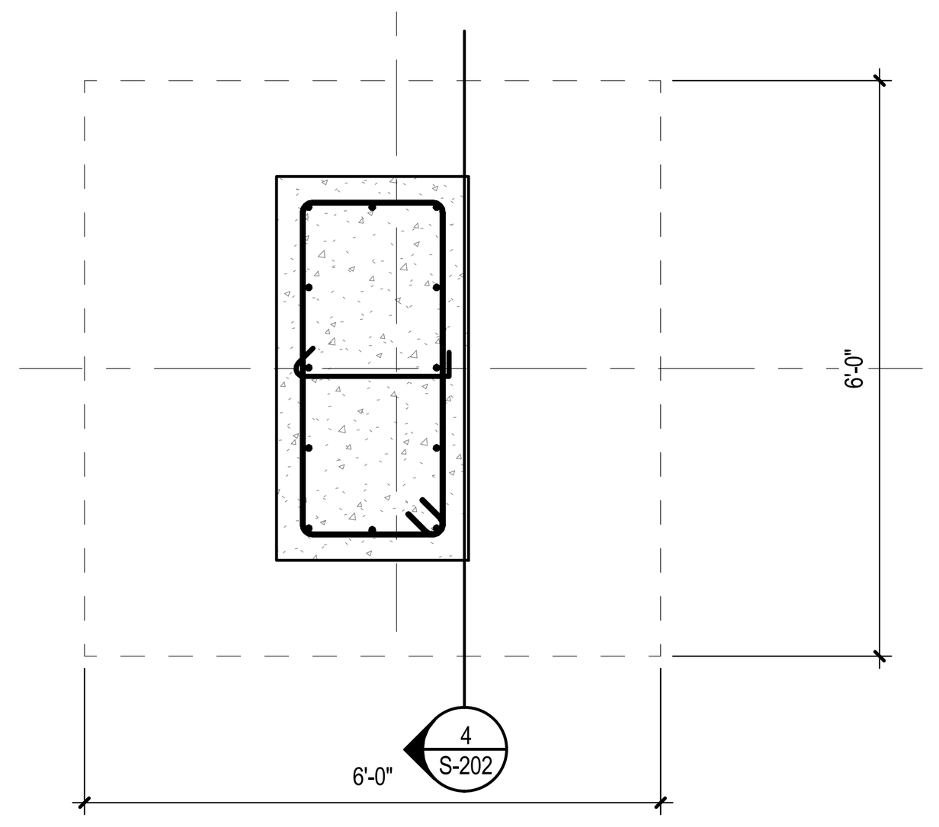
No.	Description	Date
1	ADDENDUM NO. 4	08/28/2017



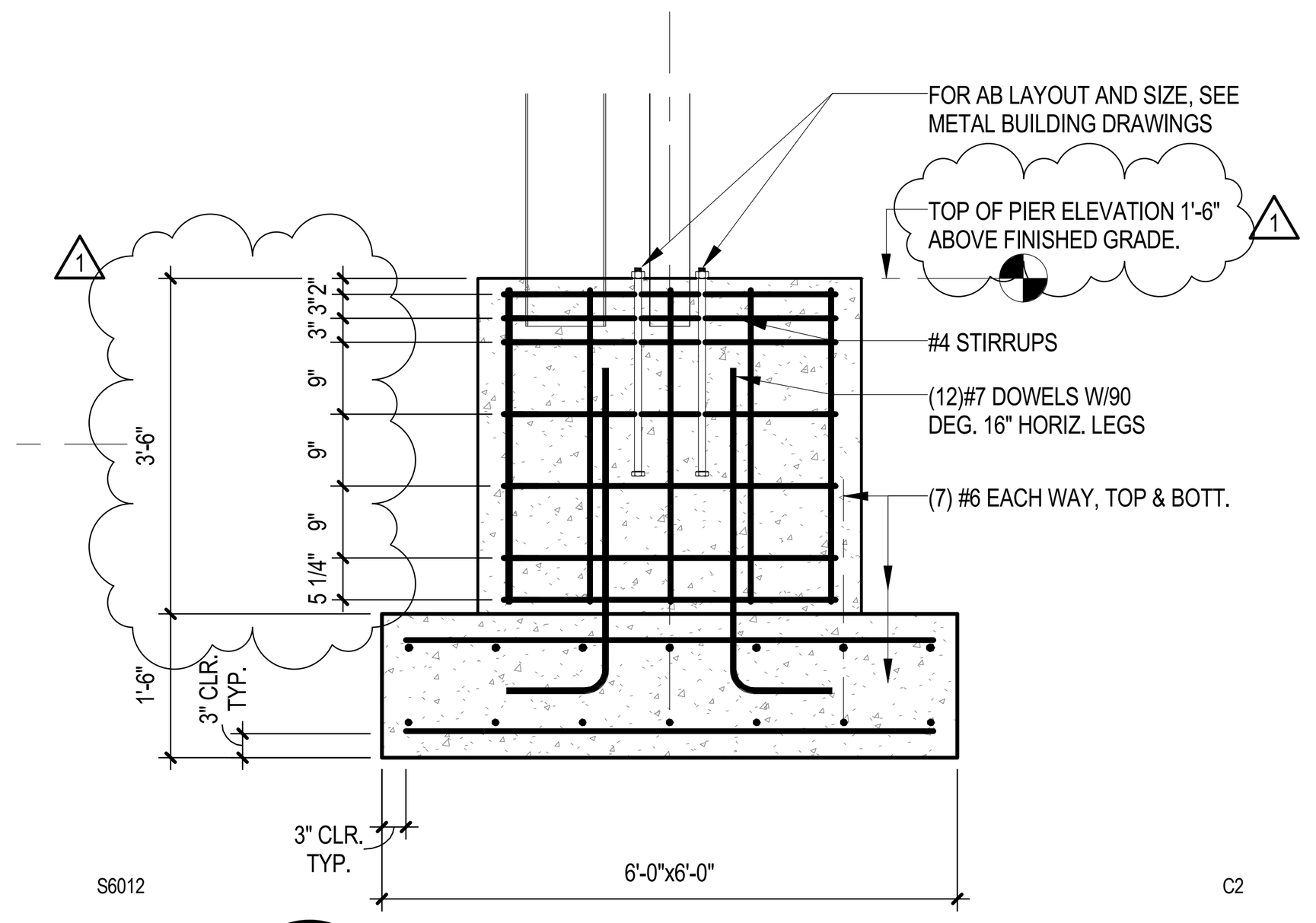
1 / S-202 WAREHOUSE - PRE-ENGINEERED METAL BUILDING FOUNDATION PLAN
1/16" = 1'-0"



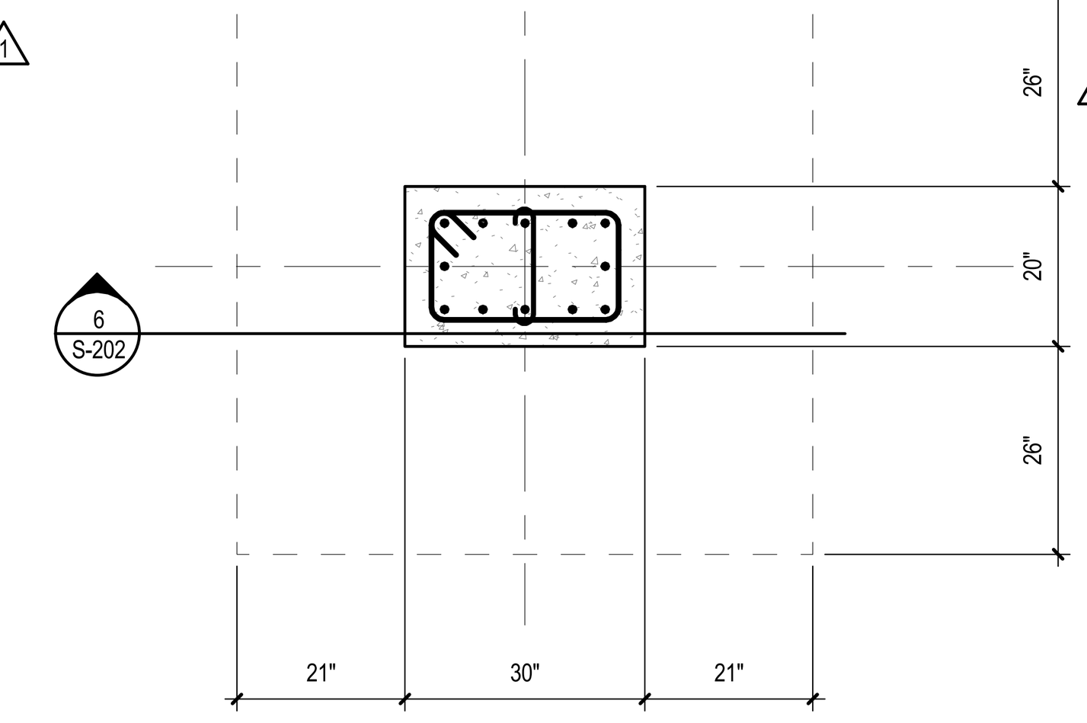
2 / S-202 TYP. SECTION AT GAS STORAGE BLDG.
3/4" = 1'-0"



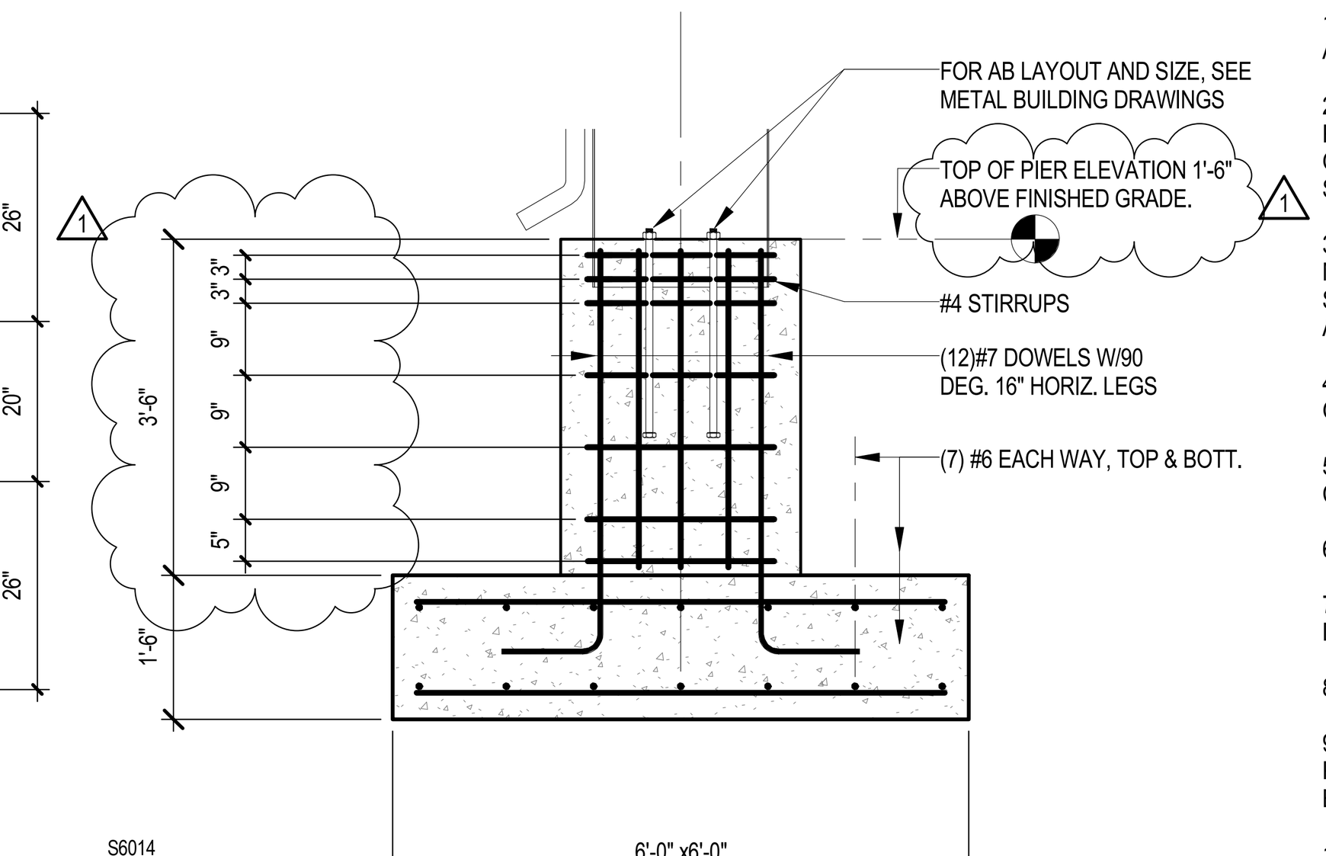
3 / S-202 24"x48" CONCRETE PIER
1/2" = 1'-0"



4 / S-202 SECTION AT CONCRETE PIER
1/2" = 1'-0"



5 / S-202 20"x30" CONCRETE PIER
1/2" = 1'-0"



6 / S-202 SECTION AT CONCRETE PIER
1/2" = 1'-0"

COLUMN SCHEDULE SEE DETAILS				
Mark	Type	Base Plate	Cap Plate	Comments
A	W10X33	3/4" x SIZE TO SUIT		

FOOTING SCHEDULE

Mark	Length	Width	Sq Footing Thickness	TOP REINFORCING	BOTTOM REINFORCING	Comments
F30	3'-0"	3'-0"	1'-0"		(4) #4 E.W.	
F40*	4'-0"	4'-0"	1'-0"	(5) #5 E.W.	(5) #5 E.W.	
F50	5'-0"	5'-0"	1'-4"		(8)-#6 E.W.	
F50-A*	5'-0"	5'-0"	1'-6"	(6) #6 E.W.	(6) #6 E.W.	
F60	6'-0"	6'-0"	1'-6"		(7) #6 E.W.	
F60*	6'-0"	6'-0"	1'-6"	(7) #6 E.W.	(7) #6 E.W.	
F60-A	6'-0"	6'-0"	2'-0"	(7) #6 E.W.	(7) #6 E.W.	
F70*	7'-0"	7'-0"	1'-6"	(8) #6 E.W.	(8)-#6 E.W.	
F80*	8'-0"	8'-0"	1'-6"	(9) #6 E.W.	(9) #6 E.W.	
F100*	10'-0"	10'-0"	1'-6"	(11) #6 E.W.	(11)#6 E.W.	
F5078*	7'-8"	5'-0"	1'-8"	#6@6" O/C E.W.	#6@6" O/C E.W.	

NOTE: FOOTING DESIGNATION ON PLAN WITH " * " SHALL INCLUDE TOP REINFORCING STEEL. ALL OTHER FOOTINGS, TOP REINFORCING NOT REQUIRED.

FOUNDATION PLAN NOTES:

1. THE ELEVATION 0'-0" SHOWN ON PLAN IS FOR REFERENCE ONLY. SEE CIVIL DRAWINGS FOR ACTUAL TOP OF FINISH SLAB ELEVATIONS.

2. UNLESS OTHERWISE NOTED, THE SLAB-ON-GRADE IS TO BE 7-INCH THICK CONCRETE SLAB REINFORCED WITH #4 @ 16" O/C EACH WAY, PLACED 1-INCH CLEAR FROM TOP. PLACE SLAB DIRECTLY ON TOP OF A VAPOR BARRIER AND OVER 4-INCHES OF CLEAN WASHED STONE. VAPOR BARRIER SHALL BE STEGO WRAP 15-MILS THICK AS MANUFACTURED BY STEGO INDUSTRIES (OR EQUAL).

3. SLAB-ON-GRADE CONTROL JOINTS ARE INDICATED ON PLAN WITH THE SYMBOL 'C.J.' THESE JOINTS MAY BE EITHER CONSTRUCTION JOINTS OR SAWCUT JOINTS. SEE TYPICAL DETAILS. COORDINATE ALL SLAB JOINT LOCATIONS WITH JOINTS IN ARCHITECTURAL FLOOR FINISHES TO ASSURE ALIGNMENT IS APPLICABLE.

4. TOP OF ALL EXTERIOR FOOTINGS ARE TO BE A MINIMUM OF 2'-0" BELOW FINISHED EXTERIOR GRADE.

5. SEE SHEET S101 FOR GENERAL NOTES AND NOTES PERTAINING TO FOUNDATION DESIGN AND CONSTRUCTION.

6. SEE SHEET S801 FOR TYPICAL DETAILS.

7. VERIFY LOCATION AND SIZE OF WALLS SHOWN ON THE FOUNDATION PLAN WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.

8. FILL ALL CMU CELLS BELOW GRADE WITH CONCRETE GROUT.

9. UNLESS OTHERWISE INDICATED ON PLAN OR IN DETAILS, ALL WALL FOOTINGS SHALL BE 12" DEEP, PROJECT 6" BEYOND EACH FACE OF THE WALL SUPPORTED AND SHALL BE REINFORCED WITH (3)-#5 BARS CONTINUOUS LONGITUDINALLY.

10. 'F_' INDICATES A CONCRETE FOOTING, SEE FOOTING SCHEDULE.

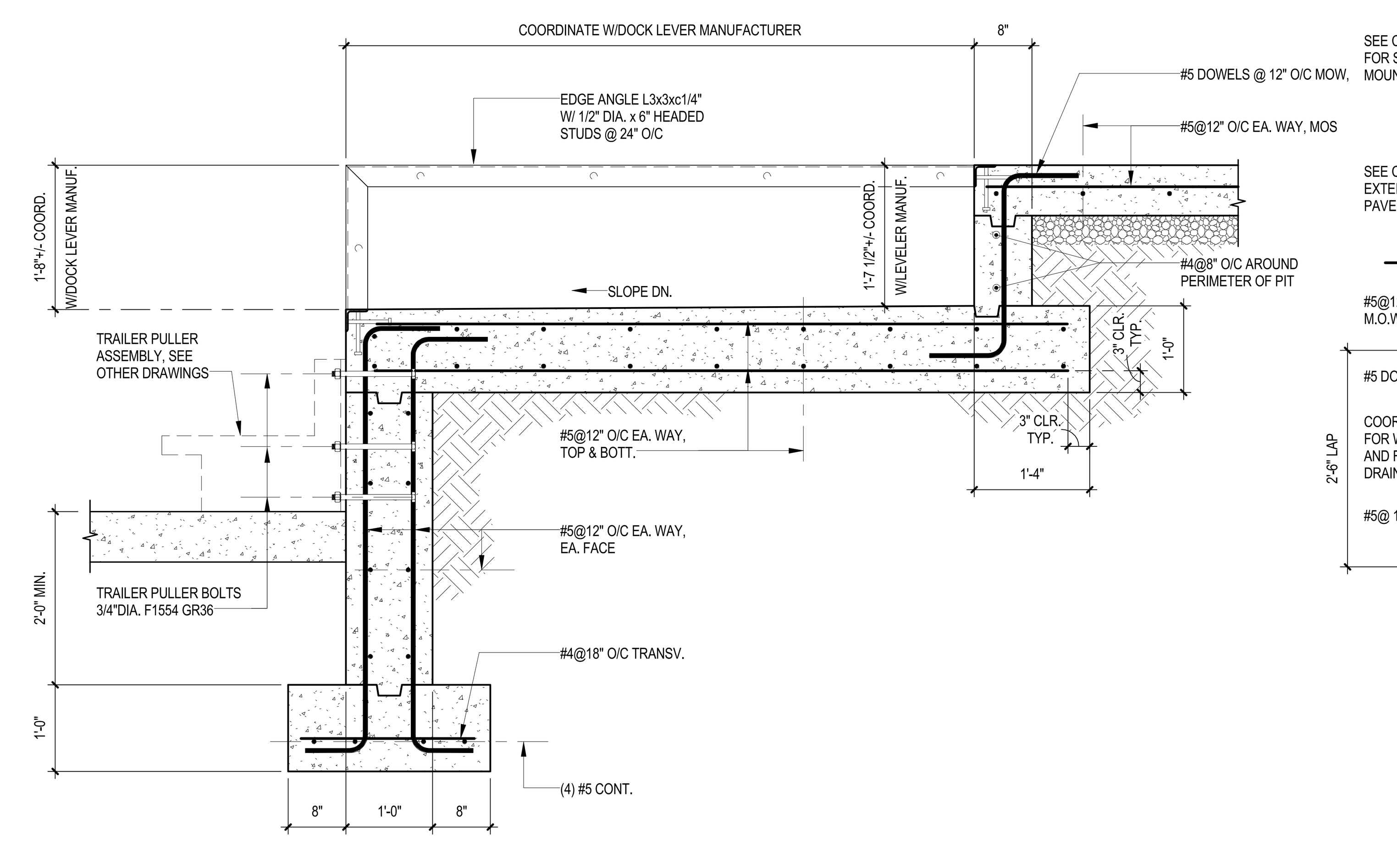
11. ' ___ ' INDICATES A STEEL COLUMN, SEE COLUMN SCHEDULE.

12. FOUNDATION DESIGN SHOWN FOR PREFABRICATED METAL BUILDING SHALL BE USED FOR BASE BID, FINAL DESIGN OF FOUNDATION WILL BE PROVIDED AFTER RECEIVING COLUMN ANCHOR BOLT SETTING PLAN AND FINAL COLUMN REACTIONS FROM THE CONTRACTED METAL BUILDING SUPPLIER. REFER TO METAL BUILDING SYSTEMS SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.

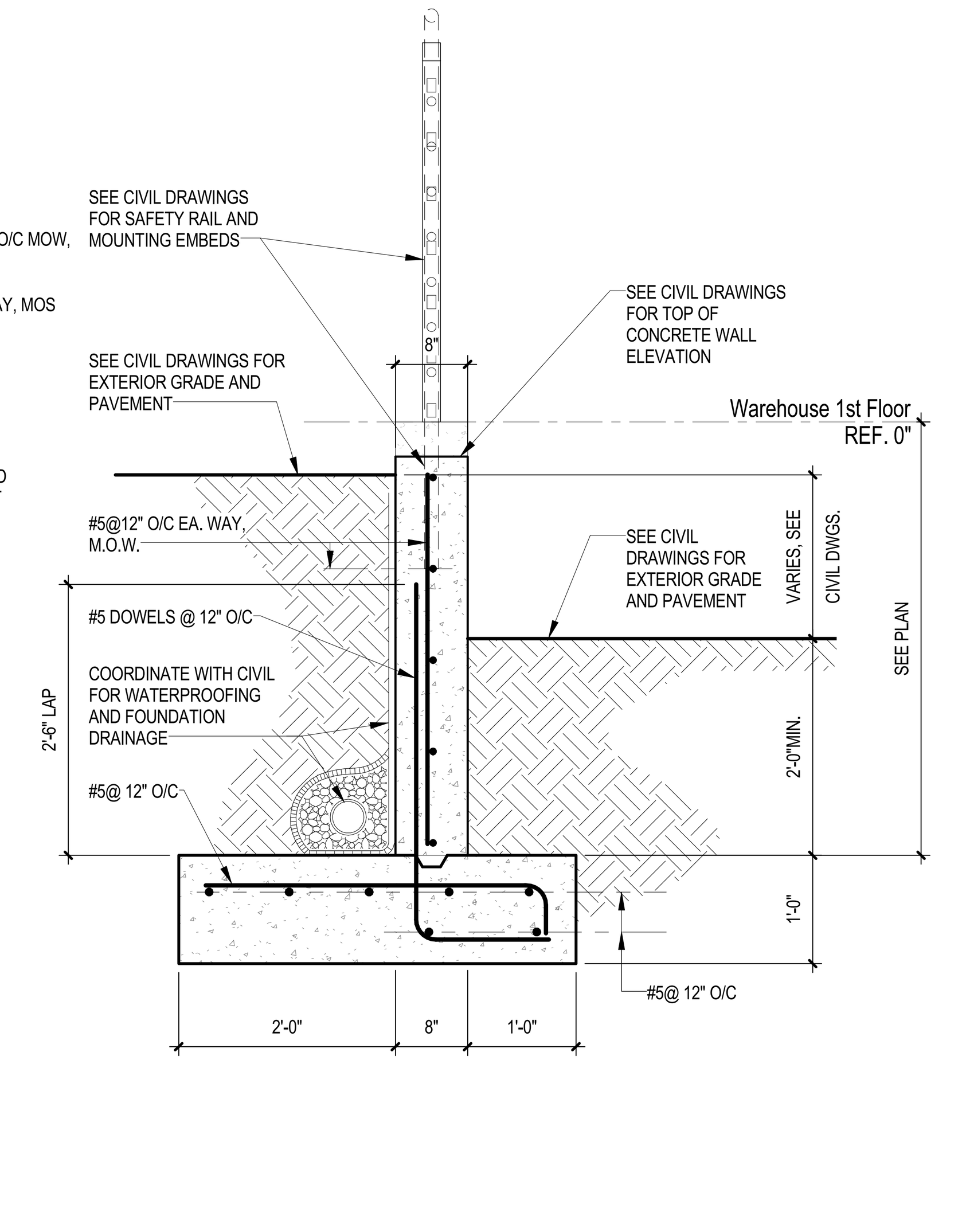
13. "P_" INDICATES A CONCRETE PIER. SEE DETAILS ON S801.

14. " < ___ > " INDICATES TOP OF CONCRETE PIER ELEVATION.

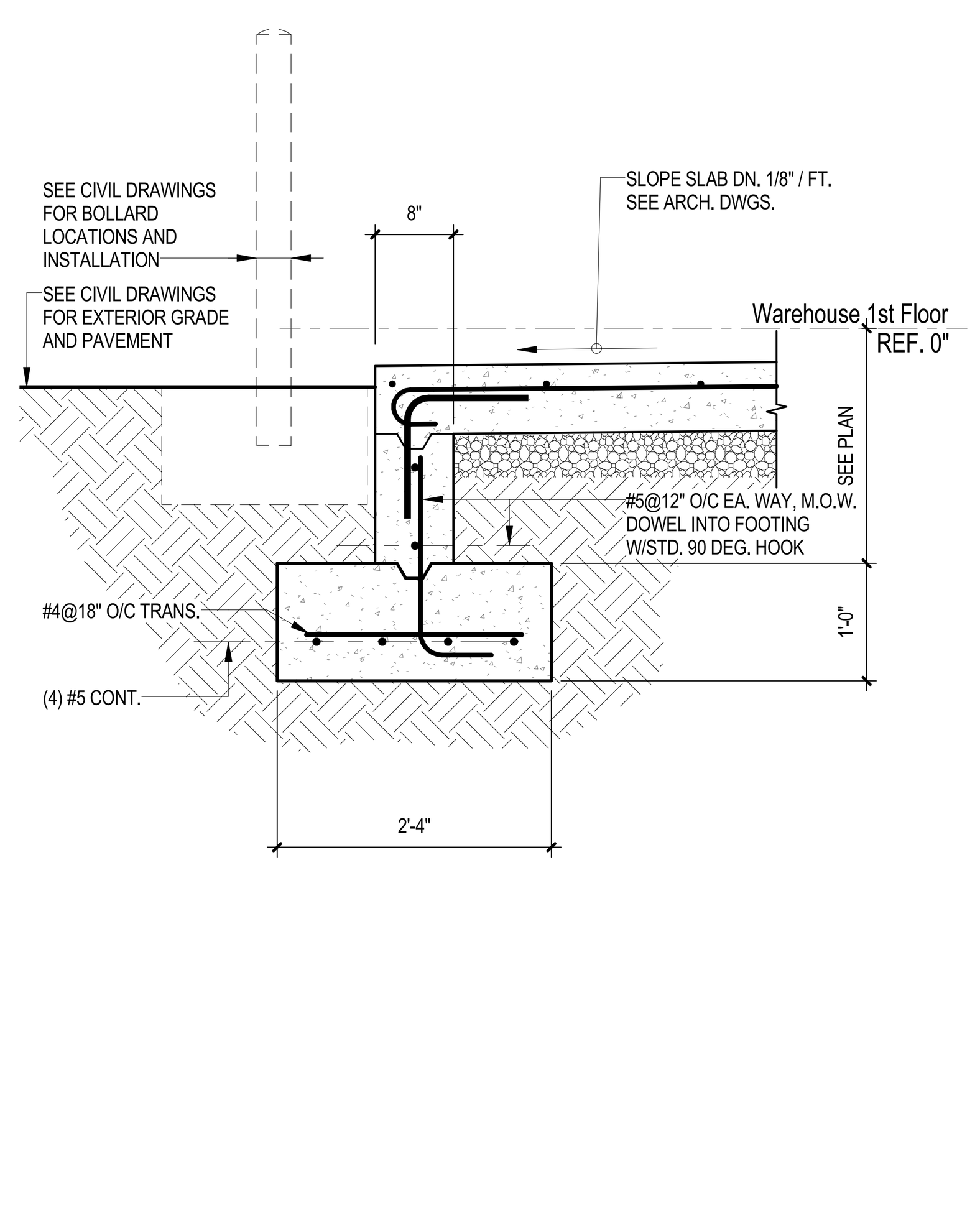
15. COORDINATE THE ELEVATIONS OF ALL FOOTINGS WITH RESPECT TO UNDERGROUND UTILITIES. STEP AS REQUIRED TO AVOID FOULING WITH UTILITIES AND TO ALLOW UTILITIES TO PASS OVER FOOTINGS. PROVIDE A STEEL SLEEVE THROUGH WALL FOR PIPE TO PASS THROUGH. REFER TO MEP AND FP DRAWINGS FOR UTILITIES AND INVERTS. SEE TYPICAL STEPPED FOOTING DETAIL.



7 / S-202 SECTION AT DOCK LEVELER
3/4" = 1'-0"

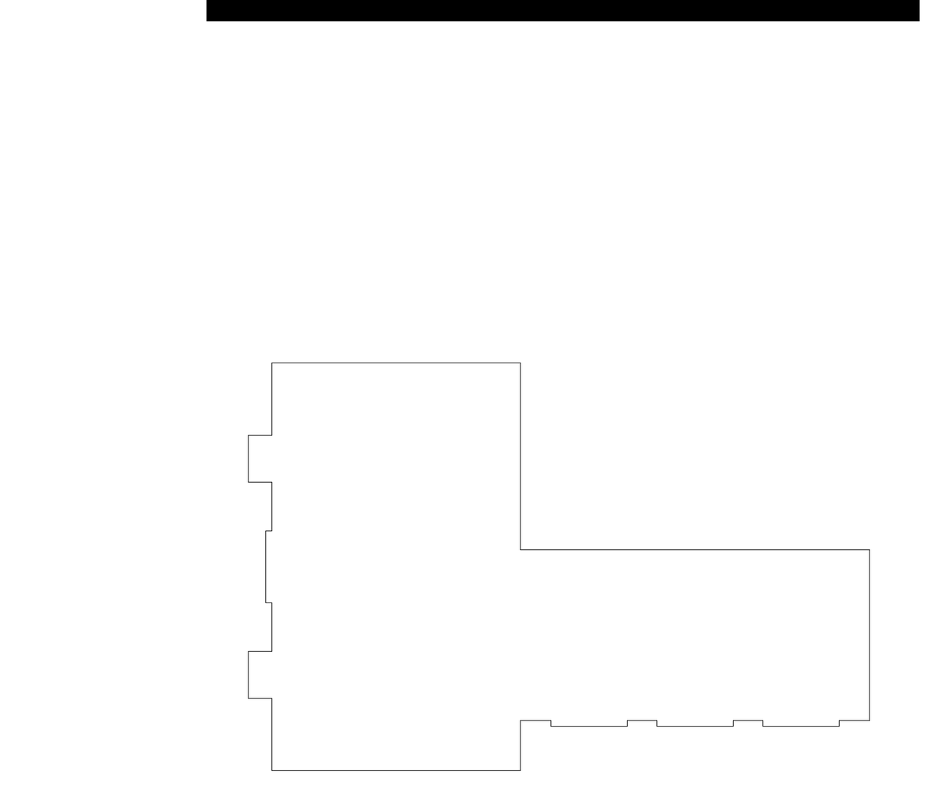


8 / S-202 SECTION AT LOADING DOCK WALL
3/4" = 1'-0"



9 / S-202 SECTION AT LOADING DOCK WALL
3/4" = 1'-0"

KEYPLAN



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PROJECT NORTH TRUE NORTH

PROJECT:	9202-164730
SCO ID:	16-15656-02B
ITEM: 315	CODE: 41526
DATE:	August 21, 2017
DRAWN BY:	WP/APJ
CHECKED BY:	CEC

WAREHOUSE AND GAS STORAGE FOUNDATION PLAN

S-202

[redacted]

BUILDING BID DOCUMENTS

G:\2016 Projects\160379\SKA Drawings\160379-RT16-S.rvt
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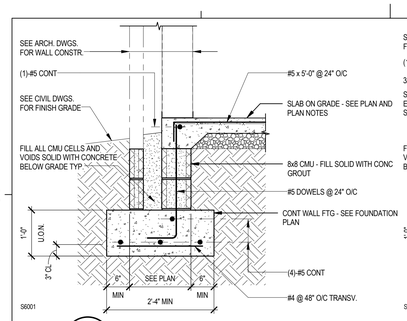

1 S-601 **TYPICAL FOUNDATION SECTION**
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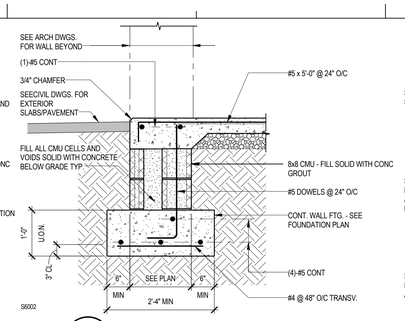
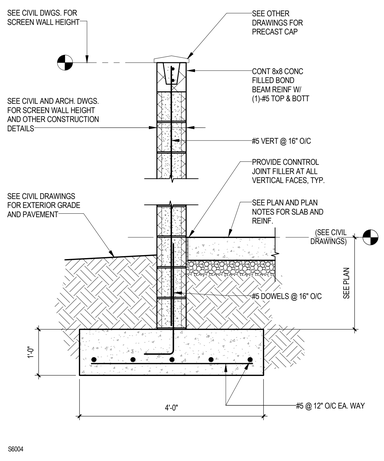
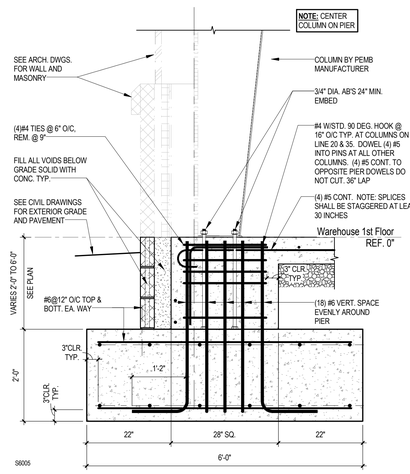


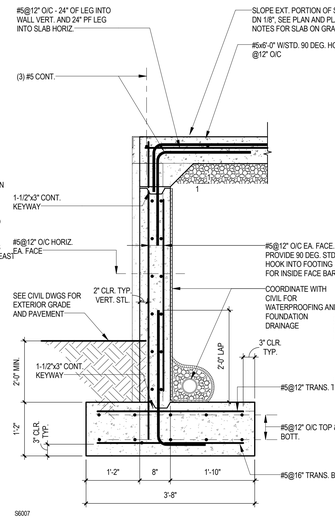
2 S-601 **TYPICAL FOUNDATION SECTION**
3/4" = 1'-0"



3 S-601 **TYP. SECTION @ SCREEN WALL - ALT #3 & 9**
3/4" = 1'-0"

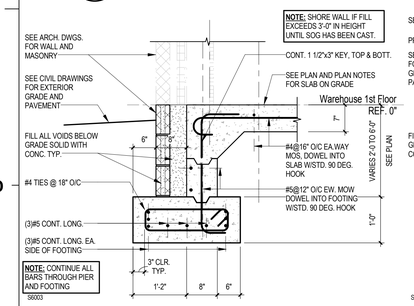


4 S-601 **PRE-ENGINEERED BULDING SECTION AT FRAME**
3/4" = 1'-0"



5 S-601 **SECTION AT LOADING DOCK**
3/4" = 1'-0"

5A S-601 **SECTION AT PRE-ENGINEERED BUILDING**
3/4" = 1'-0"



6 S-601 **TYPICAL PRE-ENGINEERED BUILDING FOUNDATION SECTION**
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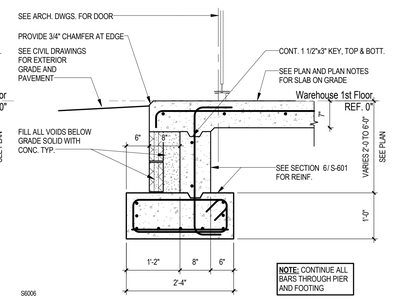
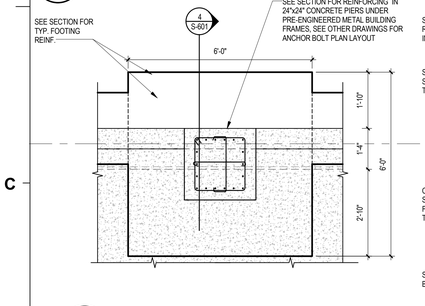
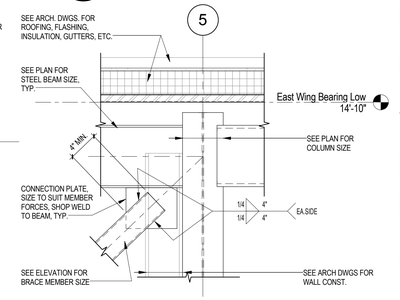


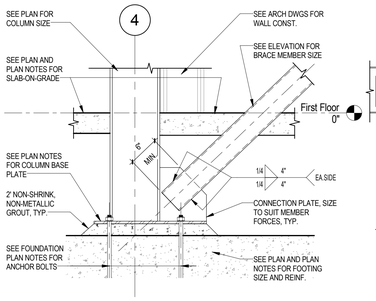
7 S-601 **PRE-ENGINEERED BUILDING SECTION AT OPENINGS**
3/4" = 1'-0"



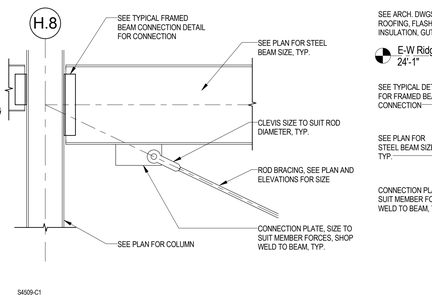
8 S-601 **PLAN DETAIL**
1/2" = 1'-0"



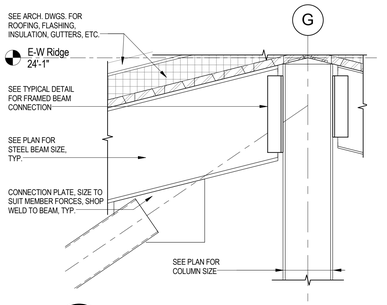
9 S-601 **BRACED FRAME CONNECTION DETAIL**
1" = 1'-0"



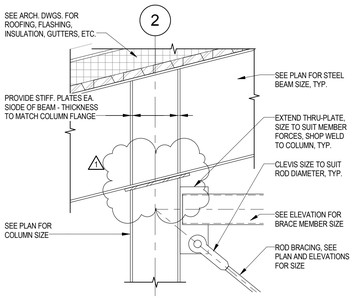
10 S-601 **BRACED FRAME CONNECTION DETAIL**
1" = 1'-0"



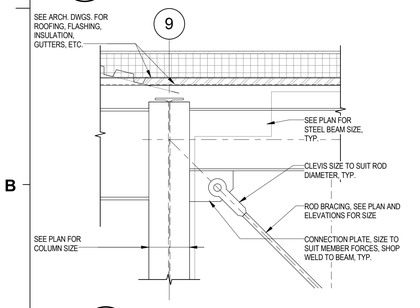
11 S-601 **BRACED FRAME CONNECTION DETAIL**
3/4" = 1'-0"



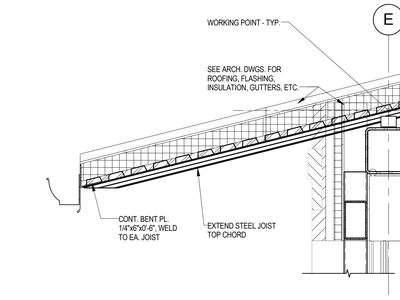
12 S-601 **BRACED FRAME CONNECTION DETAIL**
1" = 1'-0"



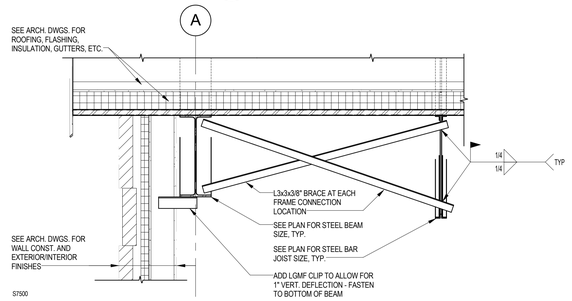
13 S-601 **BRACED FRAME CONNECTION DETAIL**
1" = 1'-0"



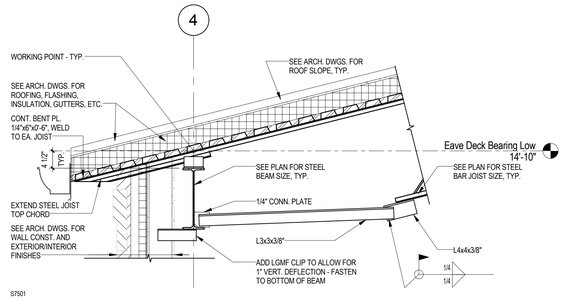
14 S-601 **BRACED FRAME CONNECTION DETAIL**
1" = 1'-0"



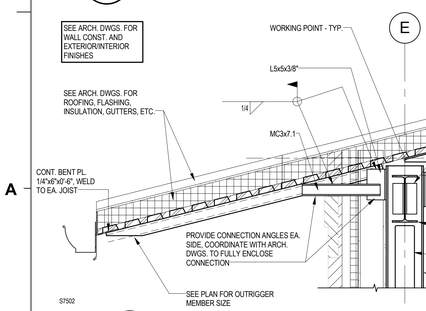
15 S-601 **SECTION AT ROLL UP DOOR LINTEL**
3/4" = 1'-0"



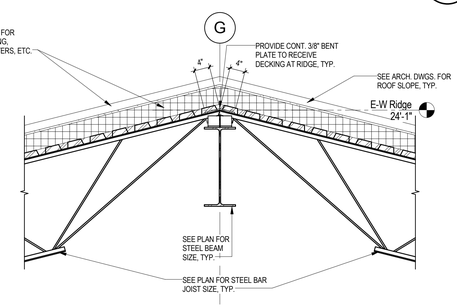
16 S-601 **TYPICAL ROOF SECTION ALONG GABLE ENDS**
3/4" = 1'-0"



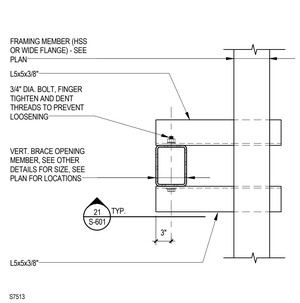
17 S-601 **TYPICAL ROOF SECTION ALONG EAVE ENDS**
3/4" = 1'-0"



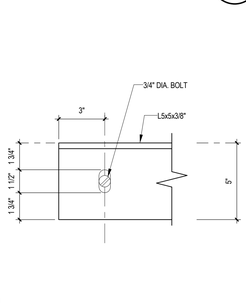
18 S-601 **SECTION AT EXTENDED OVERHANG**
3/4" = 1'-0"



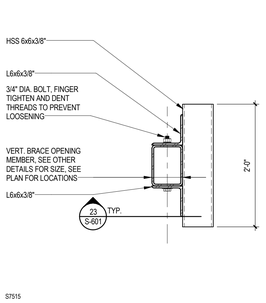
19 S-601 **ROOF SECTION ALONG RIDGE**
3/4" = 1'-0"



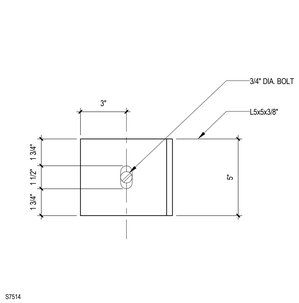
20 S-601 **DETAIL - BRACING AT VERT. HSS**
1" = 1'-0"



21 S-601 **DETAIL - BRACING AT VERT. HSS**
3" = 1'-0"



22 S-601 **DETAIL - BRACING AT VERT. HSS**
1" = 1'-0"



23 S-601 **DETAIL - BRACING AT VERT. HSS**
3" = 1'-0"

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

NOTE: BUILDING PACKAGE INCLUDES LIGHT GAUGE METAL FRAMING AND ROOF TRUSSES ONLY.

SKA CONSULTING ENGINEERS
SKA Consulting Engineers, Inc.
4651 Charlotte Park Dr, Suite 150
Charlotte, NC 28217-1191
t: 704 424 9663 f: 704 424 9665
www.skaeng.com
NC License No. F-0508
SKA Project Number:
Phone#:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15765 CHARLES E. CARROLL

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	ADDENDUM NO. 4	08/28/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 **CODE:** 41526
DATE: August 21, 2017
DRAWN BY: WP/APJ
CHECKED BY: CEC

SECTIONS AND DETAILS

S-601

BUILDING BID DOCUMENTS

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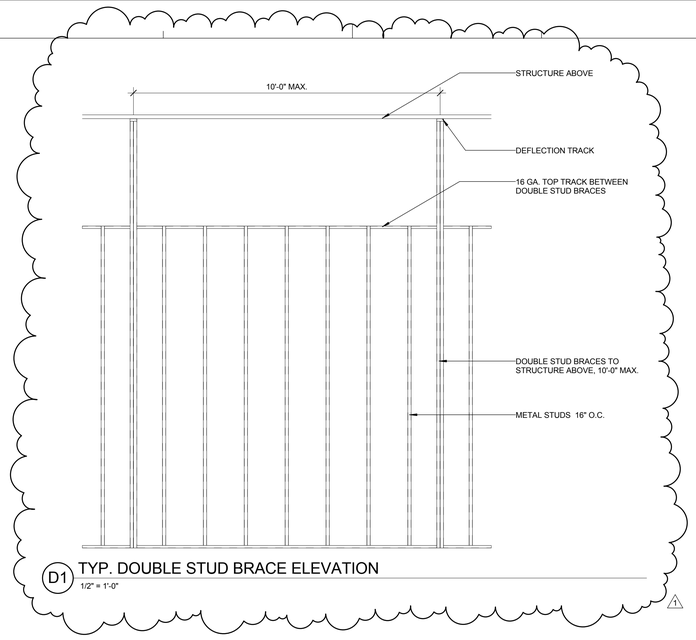
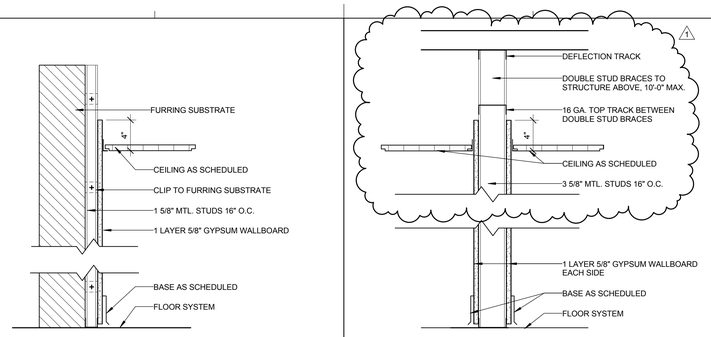
8/28/2017 4:12:29 PM

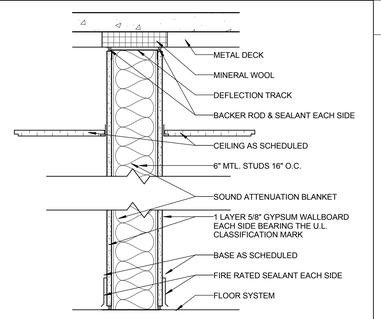


D1 TYP. DOUBLE STUD BRACE ELEVATION
1/2" = 1'-0"

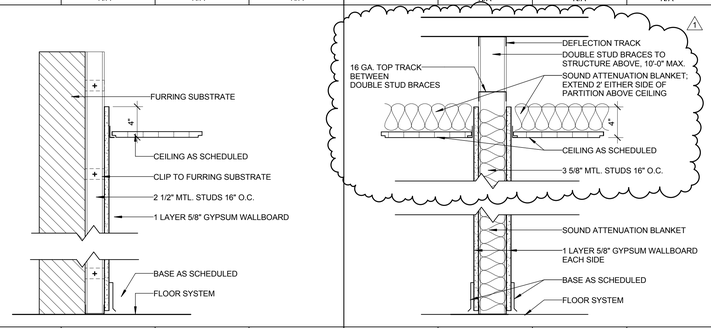


G21	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A

G31	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A

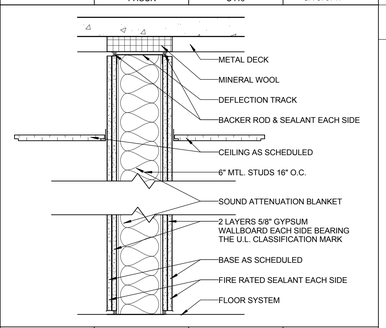


G36b	FIRE RATING	UL TEST NO.	STC RATING - 49
	1 HOUR	U419	SA-870717

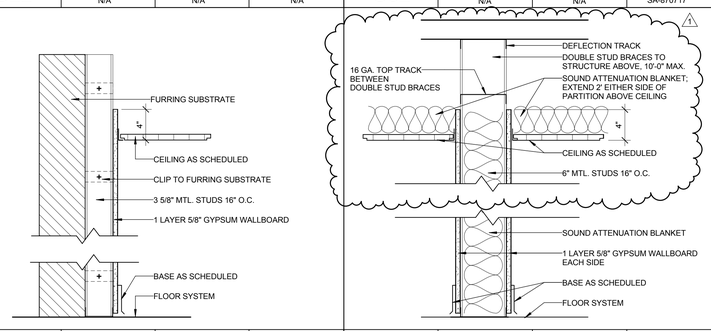


G22	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A

G32	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717

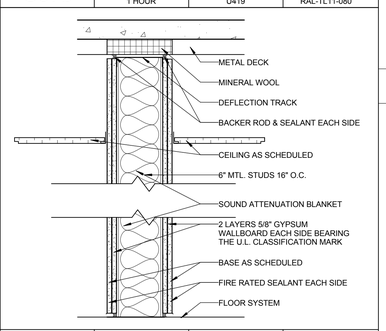


G37b	FIRE RATING	UL TEST NO.	STC RATING - 52
	1 HOUR	U419	RAL-TL11-080

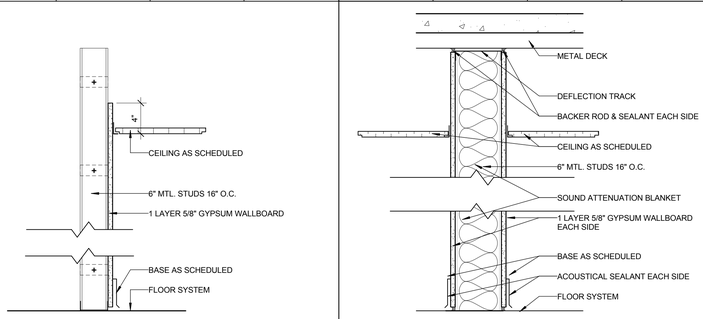


G23	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A

G33	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717

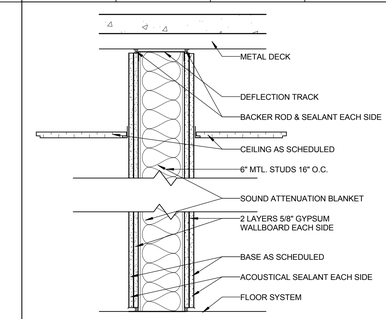


G38d	FIRE RATING	UL TEST NO.	STC RATING - 52
	2 HOUR	U419	RAL-TL11-080



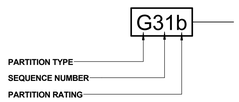
G24	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A

G34	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717



G35	FIRE RATING	UL TEST NO.	STC RATING - 52
	N/A	N/A	RAL-TL11-080

PARTITION DESIGNATION KEY



PARTITION TYPE

C - CONCRETE	F - FURRING
E - EXTERIOR	G - GYPSUM
S - SHAFT	D - DEMOUNTABLE

PARTITION RATING

a - SMOKE RATED
b - 1 HOUR FIRE RATED
c - 1 HOUR FIRE AND SMOKE RATED
d - 2 HOUR FIRE RATED

GENERAL NOTES

A. THE CONSTRUCTION SUBSYSTEMS AND PARTITION TYPES SHOWN, INDICATE THE GENERAL CONSTRUCTION FEATURES OF THE MAJORITY OF THE CONSTRUCTION SYSTEMS TO BE PROVIDED. THEY ARE NOT INTENDED TO REPRESENT A COMPLETE LISTING OF SYSTEMS REQUIRED AND DO NOT NECESSARILY INDICATE ALL OF THE CONSTRUCTION REQUIREMENTS TO BE PROVIDED BY THE CONTRACT DOCUMENTS.

B. SEE REFLECTED CEILING PLANS FOR ADDITIONAL REQUIREMENTS FOR PARTITION TYPES.

C. REFERENCE FOR FIRE RESISTANCE & SOUND RATINGS:

- CCMA: CAROLINAS CONCRETE MASONRY ASSOCIATION, CONCRETE MASONRY HANDBOOK, SOUND CONTROL
- GA: GYPSUM ASSOCIATION, FIRE RESISTANCE DESIGN MANUAL, ELEVENTH EDITION
- NCMA: NATIONAL CONCRETE MASONRY ASSOCIATION, TEK NOTES
- SA: SHINER AND ASSOCIATES
- SBCC: STANDARD BUILDING CODE CONGRESS, LATEST EDITION
- UL: UNDERWRITERS LABORATORY, INC., FIRE RESISTANCE DIRECTORY

D. WHERE FURRED/SINGLE FACED SYSTEMS OCCUR ON CONCRETE MASONRY UNIT WALL OR PARTITION SURFACE, PROVIDE GYPSUM BOARD TO 4" ABOVE CEILING, OR IF NO CEILING OCCURS, PROVIDE GYPSUM BOARD TO UNDERSIDE OF DECK.

NOTES

1. CONCRETE MASONRY UNIT WALLS AND PARTITIONS: PROVIDE HORIZONTAL JOINT REINFORCEMENT, VERTICAL REINFORCEMENT, BOND BEAMS, GROUTING, AND ADDITIONAL REQUIREMENTS AS INDICATED BY STRUCTURAL DRAWINGS AND SPECIFICATIONS.
2. COLOR, TEXTURE AND FACE PATTERN MAY VARY. SEE MISCELLANEOUS AND EXTERIOR COLOR SCHEDULE , SPECIFICATIONS AND DRAWINGS FOR CLARIFICATION.
3. KEEP CAVITY CLEAR OF ALL MORTAR.
4. SEE FINISH SCHEDULE FOR LOCATION OF APPLIED FINISHES (SUCH AS CERAMIC TILE, WALL COVERING, ETC) THAT MAY AFFECT THE PARTITION SURFACE AND CONSTRUCTION REQUIREMENTS.
5. WHERE CERAMIC TILE AND CEMENTITIOUS BACKER UNIT ARE NOT SCHEDULED TO BE FULL HEIGHT OF PARTITION, PROVIDE GYPSUM BOARD (TYPE X @ RATED PARTITIONS) @ THOSE PORTIONS OF THE PARTITION NOT SCHEDULED TO RECEIVE CERAMIC TILE. CEMENTITIOUS BACKER UNIT TO BE SAME THICKNESS AS GYPSUM BOARD.
6. PROVIDE FIRE RATED CMU (OR EQUIVALENT) WHERE PARTITION INDICATED TO BE FIRE RATED ON REFLECTED CEILING PLANS. RATED PARTITION TO MEET CONSTRUCTION REQUIREMENTS OF FIRE RATING REFERENCE LISTED.
7. PROVIDE MANUFACTURER'S PROPRIETARY TYPE 'X' GYPSUM BOARD (MEETING THE DESIGNATED FIRE REFERENCE LISTED) WHERE PARTITION IS INDICATED TO BE FIRE RATED ON REFLECTED CEILING PLANS. RATED PARTITION TO MEET CONSTRUCTION REQUIREMENTS OF FIRE RATING REFERENCE LISTED.
8. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE OF ACOUSTICAL SEALANT. AT PARTITIONS THAT ARE SOUND AND FIRE RATED, PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).
9. PROVIDE MOISTURE RESISTANT GYPSUM BOARD IN ALL TOILET ROOMS, ALL SHOWER ROOMS AND ALL CASEWORK WALLS IN BREAKROOM AREAS. 1

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08/28/17

LS3P ASSOCIATES, LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

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REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

PARTITION TYPES

A-004

BUILDING BID DOCUMENTS

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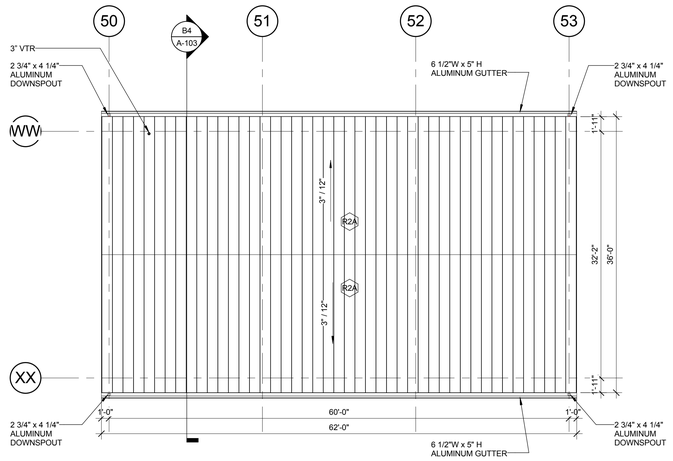
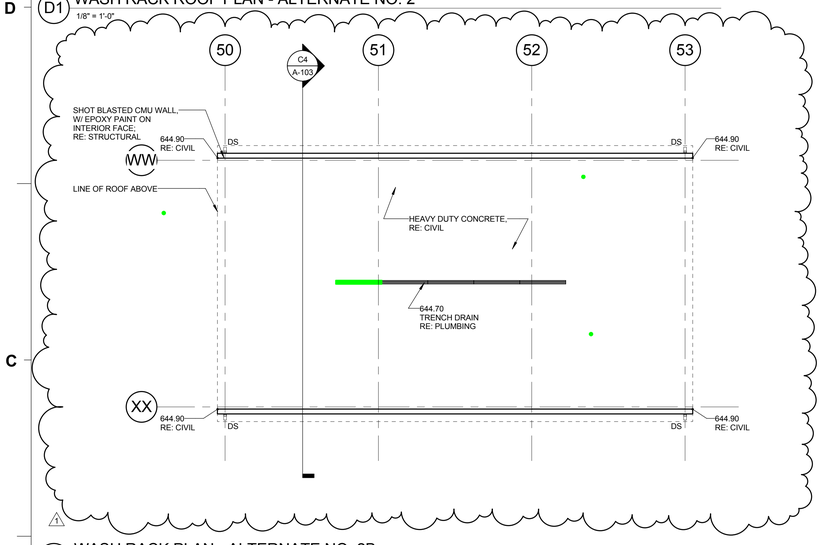
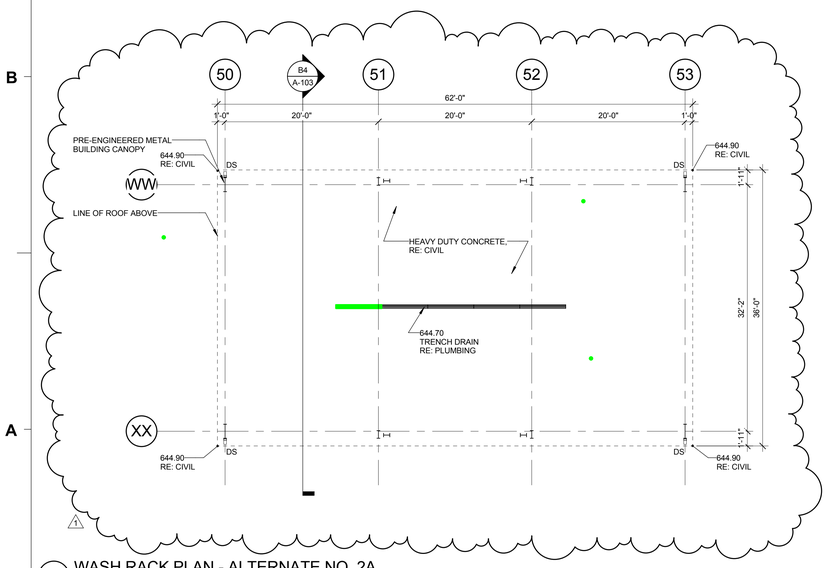


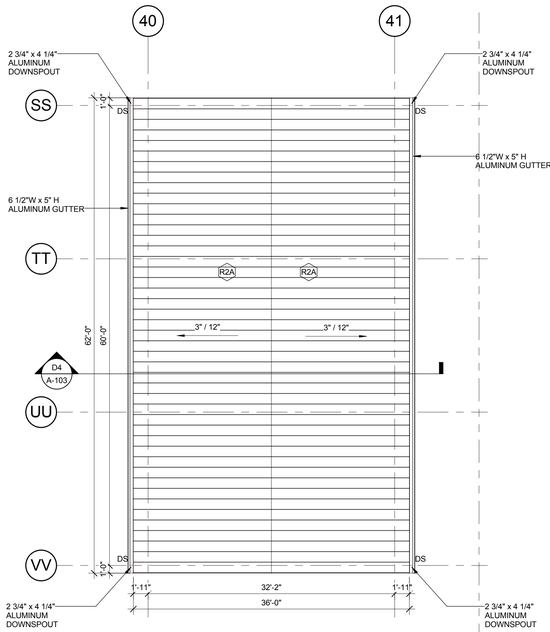
D1 WASH RACK ROOF PLAN - ALTERNATE NO. 2
1/8" = 1'-0"



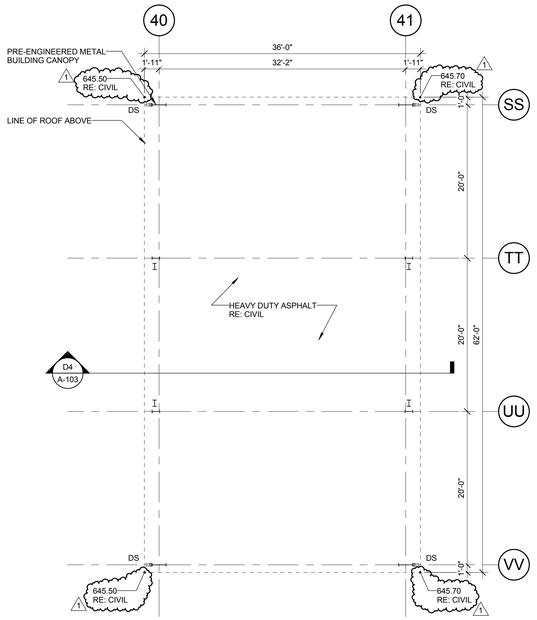
C1 WASH RACK PLAN - ALTERNATE NO. 2B
1/8" = 1'-0"



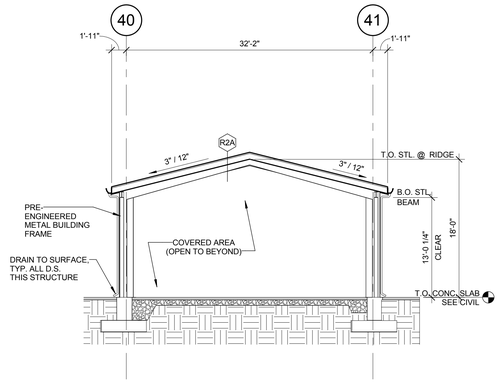
A1 WASH RACK PLAN - ALTERNATE NO. 2A
1/8" = 1'-0"



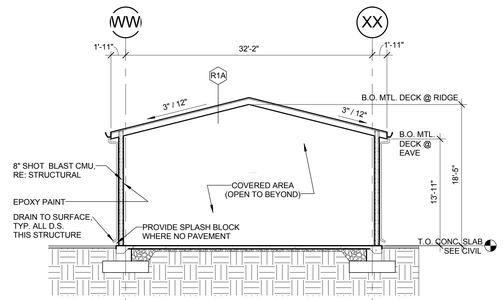
C3 STORAGE CANOPY ROOF PLAN - ALTERNATE NO. 12
1/8" = 1'-0"



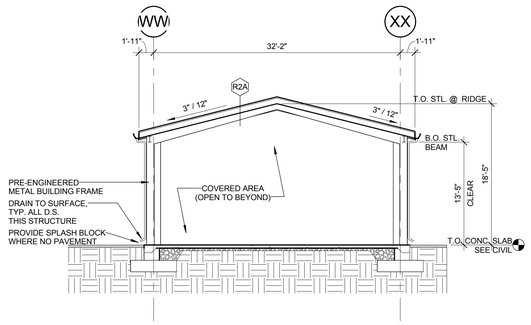
A3 STORAGE CANOPY PLAN - ALTERNATE NO. 12
1/8" = 1'-0"



D4 STORAGE CANOPY SECTION - ALTERNATE NO. 12
1/8" = 1'-0"



C4 WASH RACK SECTION - ALTERNATE NO. 2B
1/8" = 1'-0"



B4 WASH RACK CANOPY SECTION - ALTERNATE NO. 2A
1/8" = 1'-0"

FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
3. LOCATE DOOR OPENINGS 4" FROM NEAREST PERPENDICULAR WALL, UNO.
4. FIRE AND SOUND RATED WALLS/PARTITIONS TO BE CONSTRUCTED TIGHT TO STRUCTURE, PIPING, DUCTWORK AND OTHER PENETRATIONS. ALL WORK IS TO BE BRACED TO STRUCTURE ABOVE.
5. WHERE PARTITIONS OF DIFFERENT FIRE RATINGS INTERSECT, THE HIGHEST RATED PARTITION SHALL CONTINUE THROUGH. MAINTAIN PARTITION FIRE RATING BEHIND RECESSED FIRE EXTINGUISHER CABINETS.
6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
13. SEE SHEETS A-721 THROUGH A-722 FOR FINISH FLOORING, TRANSITIONS, PATTERNS AND WALL PROTECTION.
14. SEE SHEET A-720 FOR FINISH SCHEDULE.
15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
20. ACCESSIBLE AND COMMON FEATURES, E.G., AUTOMATIC DOOR ACTIVATOR, CARD SWIPE, SHALL BE PLACED 34"-36" AFF. DO NOT PLACE ACCESSIBLE OR COMMON USE BUILDING FEATURES WITHIN 24" OF AN INTERIOR CORNER.

PARTITION NOTES

1. ALL NON-DESIGNATED PARTITIONS SHALL BE TYPE G32.
2. ALL PIPE AND CONDUIT PENETRATIONS THRU 1 HR RATED OR MORE PARTITIONS, FLOORS, ROOF, ETC., SHALL BE SEALED WITH A RESPECTIVELY RATED FIRE BARRIER PENETRATION SEALING SYSTEM BY 3M OR U.L. APPROVED EQUAL.
3. TILE BACKER BOARD SHALL BE USED IN ALL LOCATIONS TO RECEIVE TILE FINISHES. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR LOCATIONS.
4. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DUCTWORK PRIOR TO FABRICATION OF PARTITION WALLS.
5. SHOULD CONDITIONS OCCUR WHERE A WALL IS UNABLE TO GO STRAIGHT UP TO STRUCTURE DUE TO PIPING, DUCTWORK, ETC., THE PARTITION (GYPSUM BOARD AND FRAMING) MAY JOG HORIZONTALLY ABOVE THE CEILING TO AVOID THE PROBLEM. RATED WALL INTEGRITY SHALL BE MAINTAINED.
6. WHERE STUDS EXTEND TO STRUCTURE AND GYPSUM WALLBOARD AND SOUND ATTENUATION BLANKETS EXTEND JUST ABOVE THE FINISH CEILING, CAP OFF PARTITION FINISHES WITH A RUNNER CHANNEL WHEN CEILING PLENUM IS USED AS A RETURN AIR PLENUM.
7. DIMENSIONAL CONFLICTS BETWEEN PARTITION TYPES AND THE ARCHITECTURAL FLOOR PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
8. SEE LIFE SAFETY PLANS FOR THE LOCATIONS OF SMOKE BARRIERS, SMOKE PARTITIONS AND FIRE-RATED PARTITIONS.
9. REFER TO UNDERWRITERS LABORATORIES, INC. FIRE RESISTANCE VOLUMES - CURRENT EDITION FOR SPECIFIC CONSTRUCTION REQUIREMENTS OF U.L. LISTED ASSEMBLIES.
10. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR TYPICAL U.L. LISTED PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING APPROPRIATE PROJECT-SPECIFIC U.L. LISTED ASSEMBLIES FOR PENETRATIONS.
11. AT ALL EXISTING AND CONSTRUCTED PARTITIONS THE CONTRACTOR IS TO MAINTAIN THE FIRE-RESISTIVE INTEGRITY
12. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE ACOUSTICAL SEALANT AT PARTITIONS THAT ARE SOUND AND FIRE RATED. PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE TYPE W1 U.N.O. SEE A-003 FOR CONSTRUCTION OF SUBSYSTEMS
2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED WALL, EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.

NON-RATED WALL, EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

1 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

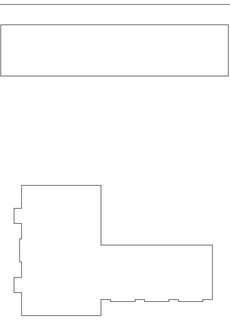
2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

FEC FIRE EXTINGUISHER CABINET

FEB FIRE EXTINGUISHER BRACKET

CG CORNER GUARD

KEYPLAN



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REVISIONS:

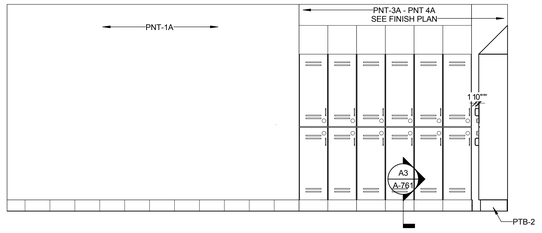
No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: SH
CHECKED BY: SH

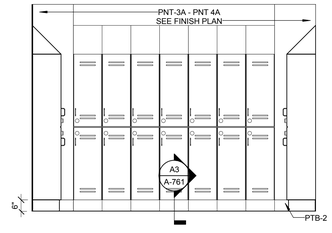
WASH RACK AND COVERED STORAGE CANOPIES (ALTERNATE NO. 2 & 12)

A-103

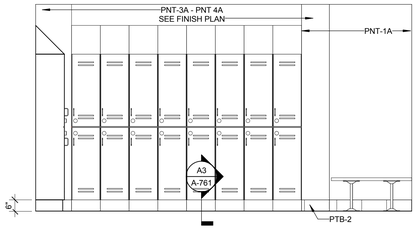
BUILDING BID DOCUMENTS



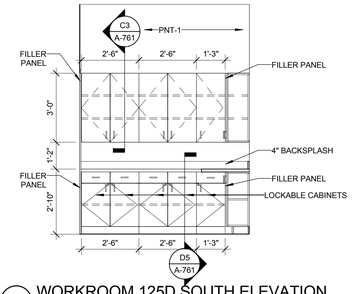
E2 CHANGING LOCKERS 136/140 TYP. WALL
3/8" = 1'-0"



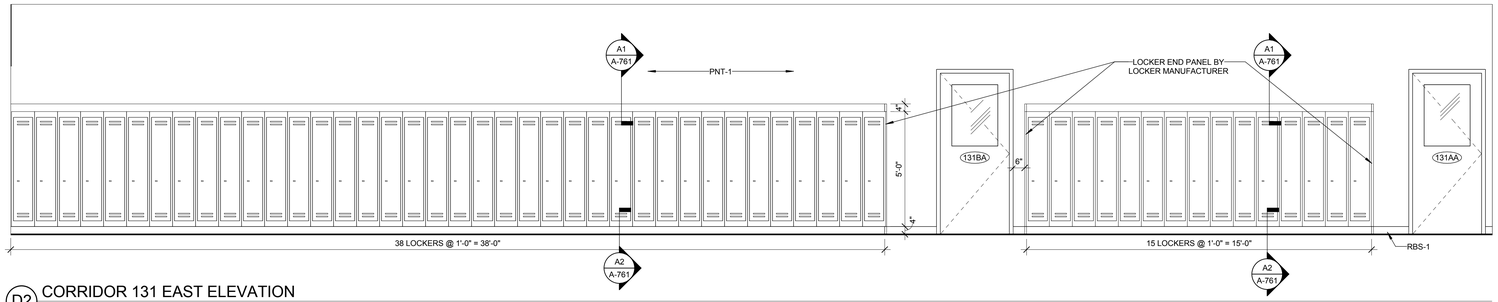
E4 CHANGING LOCKERS 136/140 TYP. WEST WALL
3/8" = 1'-0"



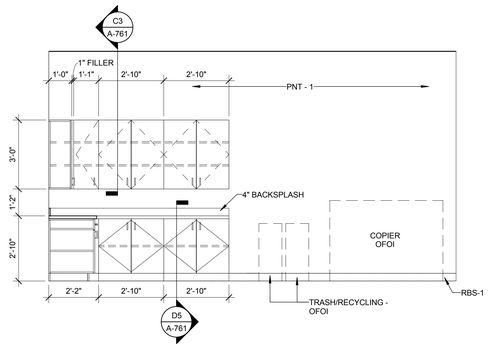
E5 CHANGING LOCKERS 136/140 TYP. BENCH WALL
3/8" = 1'-0"



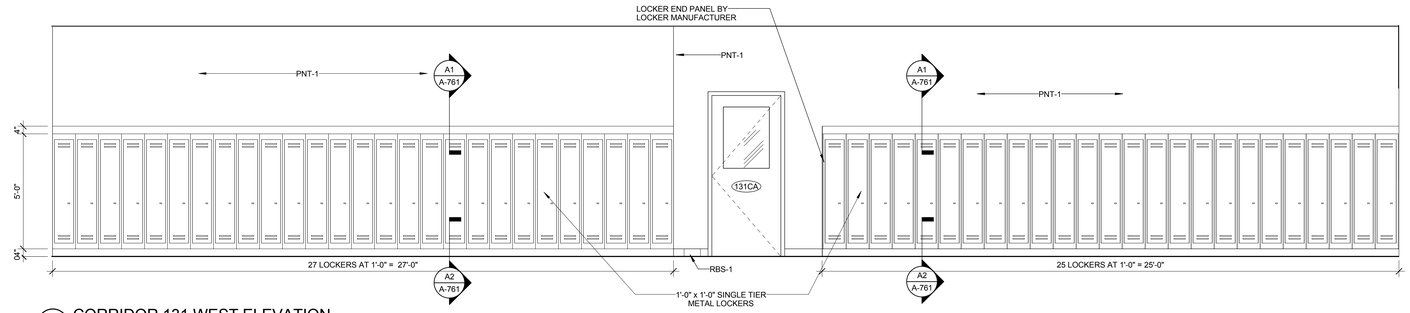
D1 WORKROOM 125D SOUTH ELEVATION
3/8" = 1'-0"



D2 CORRIDOR 131 EAST ELEVATION
3/8" = 1'-0"

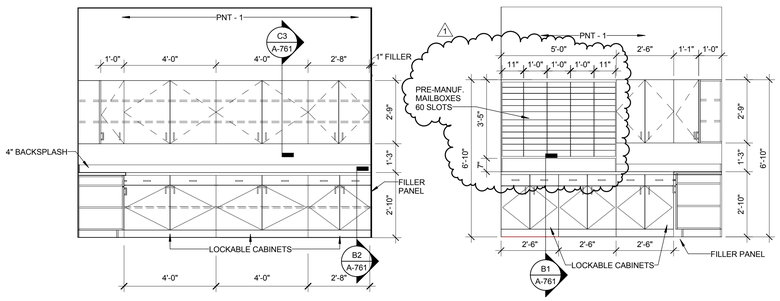


C1 WORKROOM 125D WEST ELEVATION
3/8" = 1'-0"



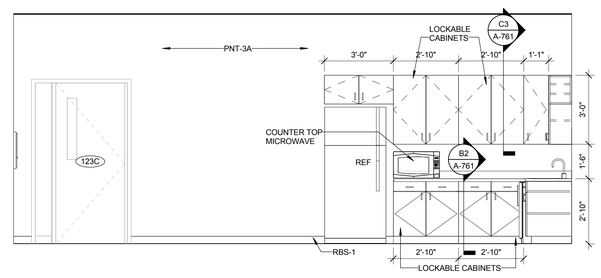
C2 CORRIDOR 131 WEST ELEVATION
3/8" = 1'-0"

SIM

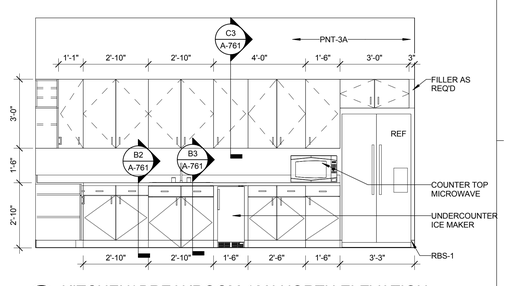


B1 WORKROOM 102A NORTH ELEVATION
3/8" = 1'-0"

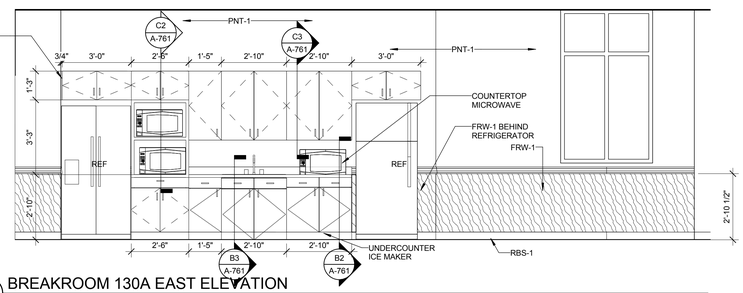
B2 WORKROOM 102A WEST ELEVATION
3/8" = 1'-0"



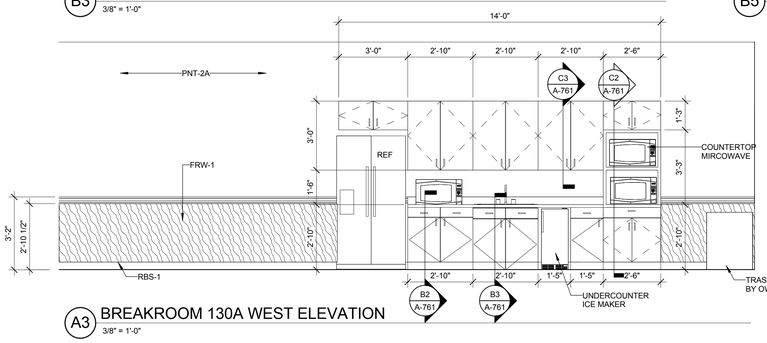
B3 KITCHEN/ BREAKROOM 123I WEST ELEVATION
3/8" = 1'-0"



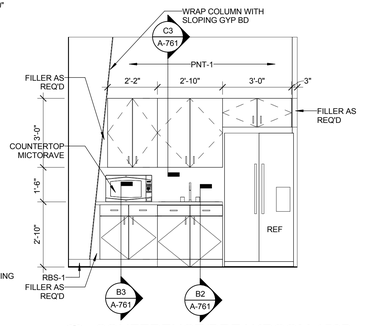
B5 KITCHEN/ BREAKROOM 123I NORTH ELEVATION
3/8" = 1'-0"



A1 BREAKROOM 130A EAST ELEVATION
3/8" = 1'-0"



A3 BREAKROOM 130A WEST ELEVATION
3/8" = 1'-0"



A5 CONFERENCE/BREAKROOM 153B
3/8" = 1'-0"

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CHARLOTTE, N.C.
08/28/17

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REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AR
CHECKED BY: SH

INTERIOR
ELEVATIONS

A-252

BUILDING BID DOCUMENTS

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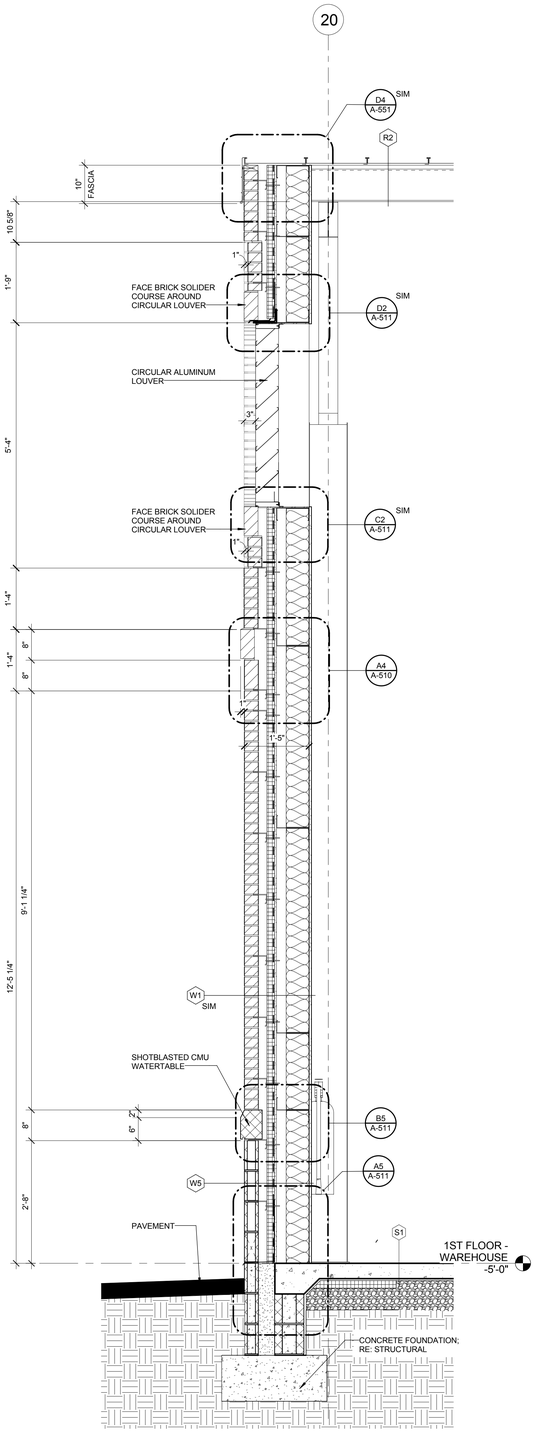
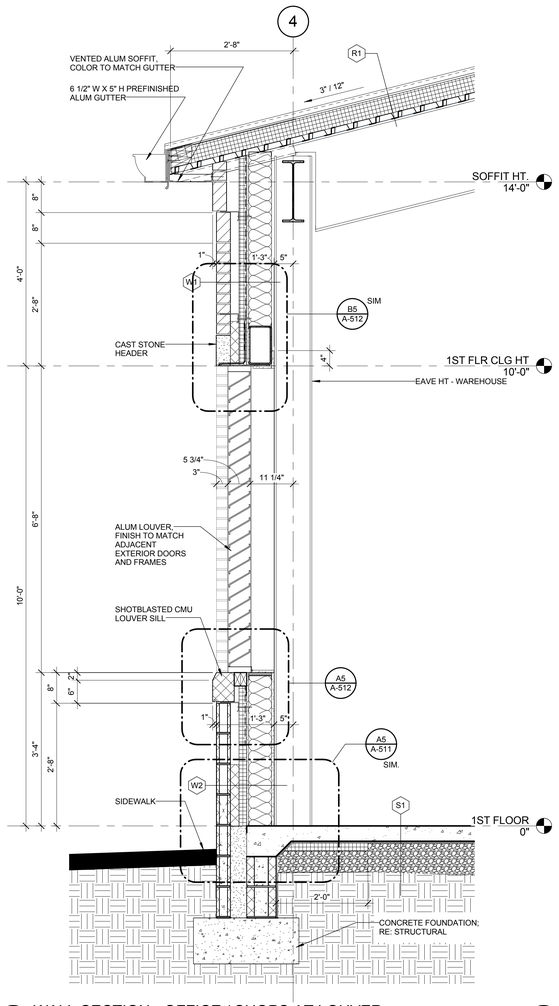
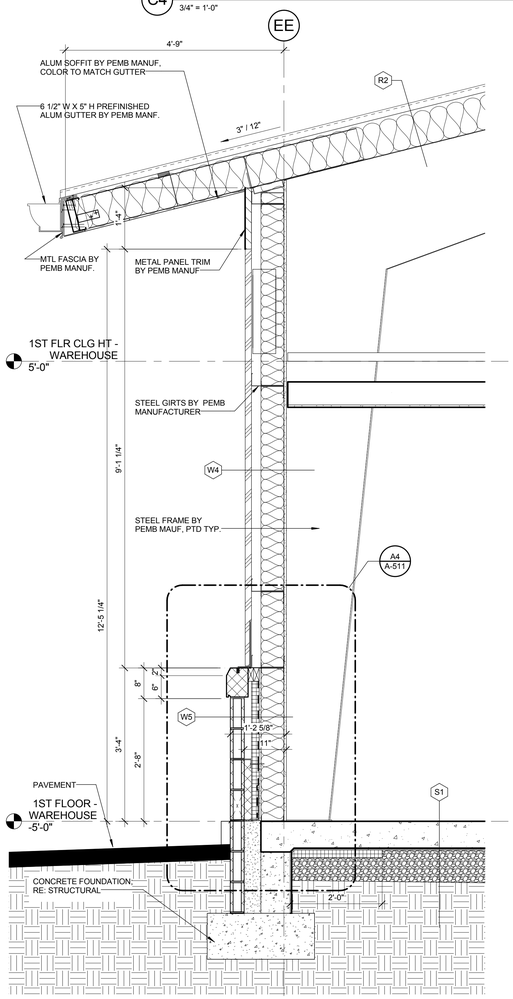


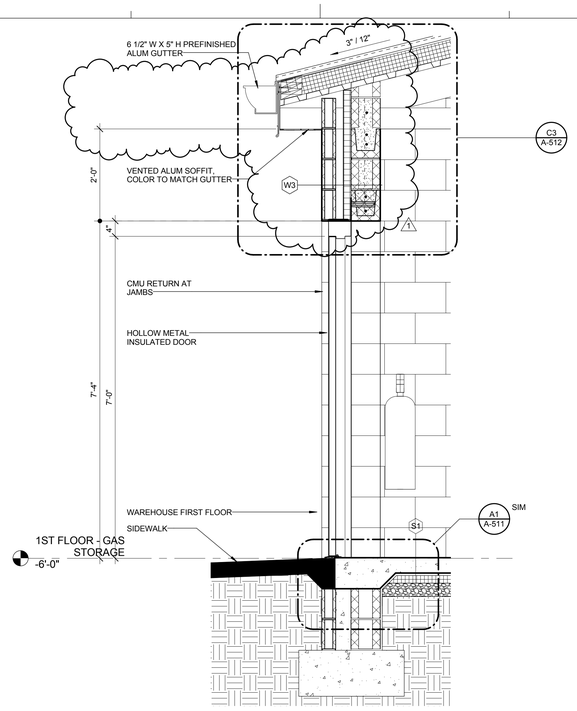
A1 WALL SECTION - WAREHOUSE, ALTERNATE NO. 1
3/4" = 1'-0"



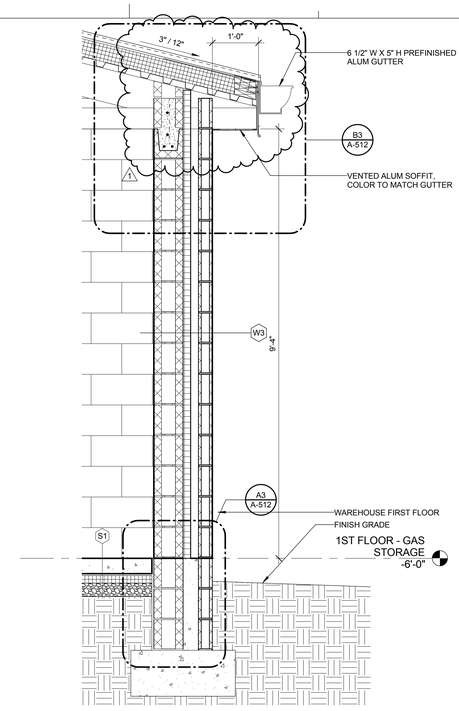
A2 WALL SECTION - OFFICE / SHOPS AT LOUVER
3/4" = 1'-0"



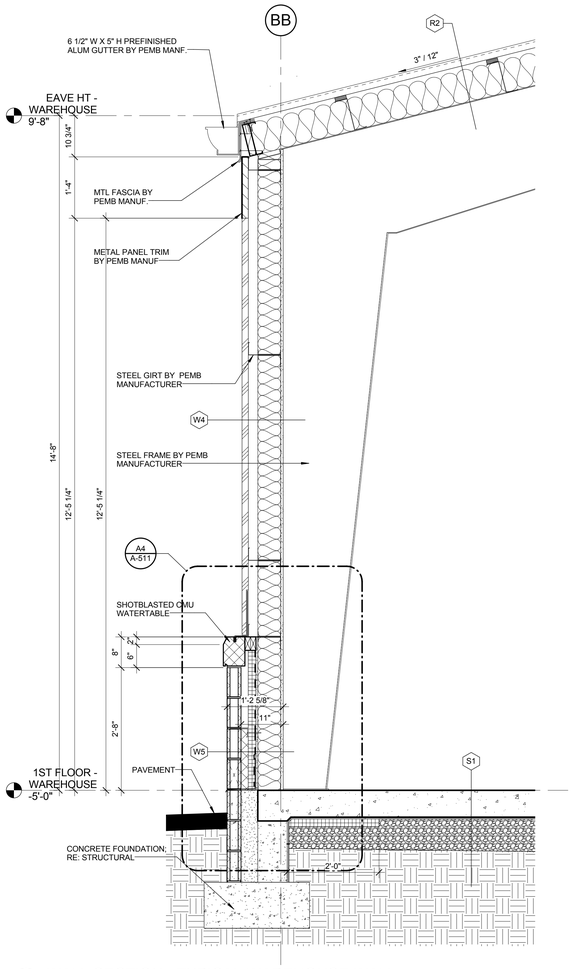
A4 WALL SECTION - WAREHOUSE WALL AT OVERHANG
3/4" = 1'-0"



C4 WALL SECTION - GAS STORAGE AT DOOR
3/4" = 1'-0"



C5 WALL SECTION - TYPICAL GAS STORAGE
3/4" = 1'-0"



A5 WALL SECTION - TYPICAL WAREHOUSE WALL
3/4" = 1'-0"

A-202

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08/28/17

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PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RD
CHECKED BY: SH

WALL SECTIONS - OFFICE / SHOPS, WAREHOUSE AND MISC. BUILDINGS

A-353

BUILDING BID DOCUMENTS

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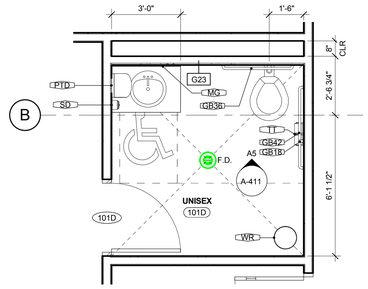
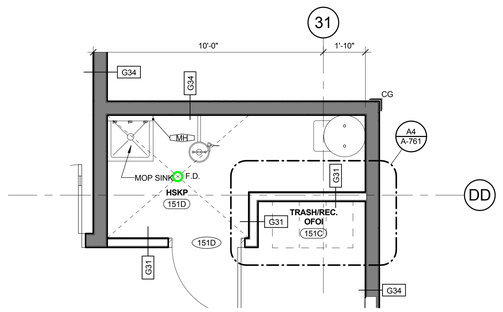
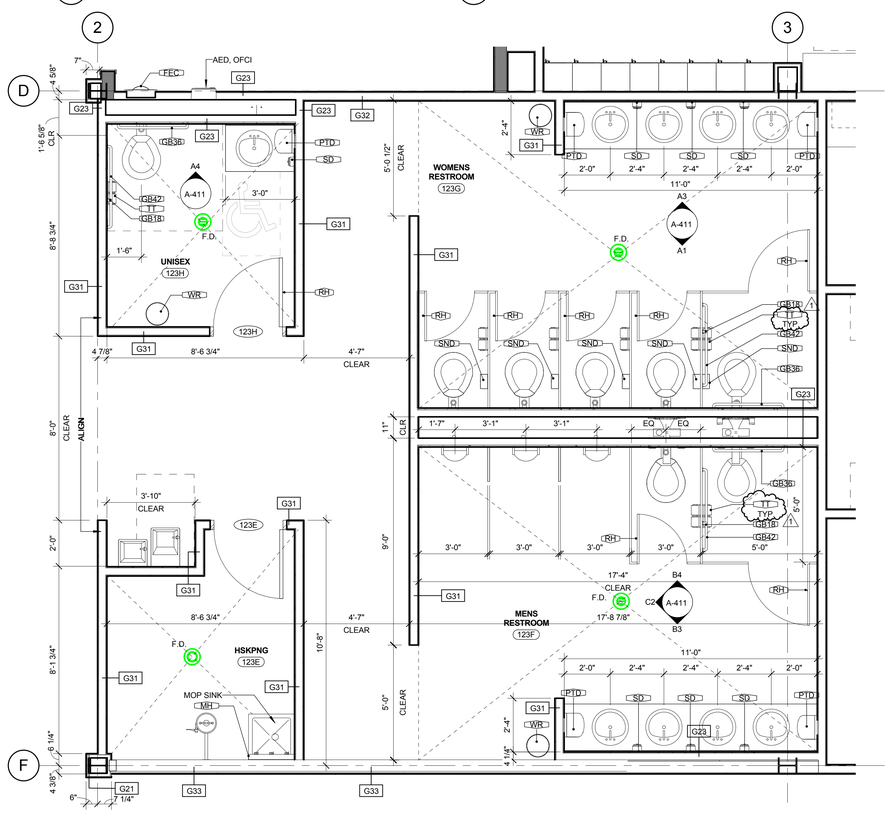


E1 ENLARGED PLAN - UNISEX RESTROOM
3/8" = 1'-0"

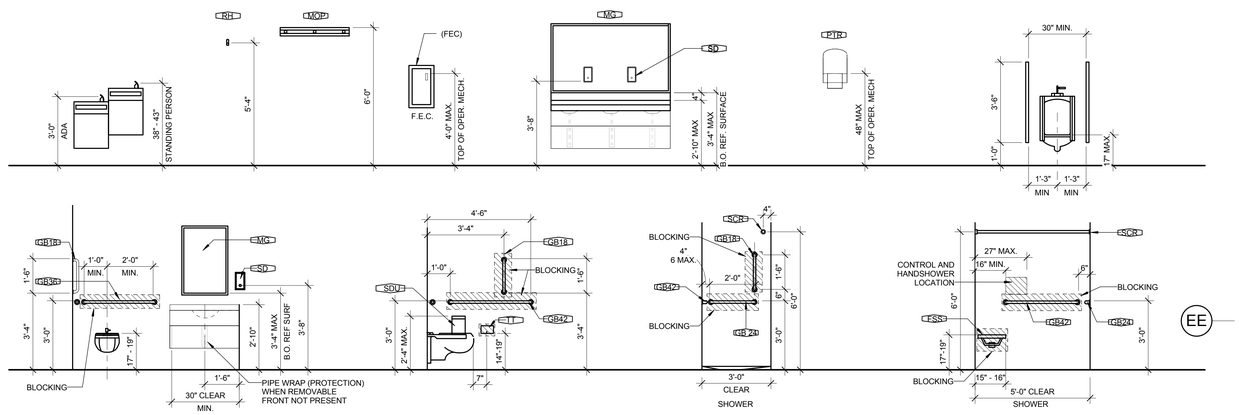


E2 ENLARGED PLAN - WAREHOUSE HSKP AND RECY
3/8" = 1'-0"

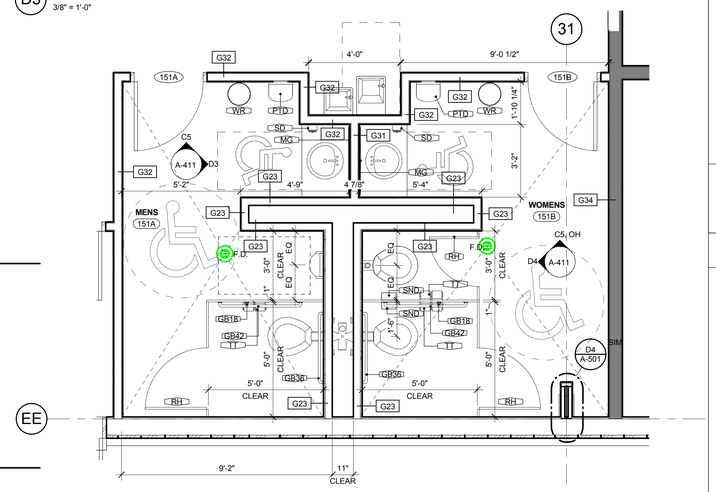


D1 ENLARGED PLAN - OFFICE RESTROOMS
3/8" = 1'-0"

D3 ENLARGED PLAN - FO SHOP RESTROOMS
3/8" = 1'-0"



A1 TYPICAL MOUNTING HEIGHTS
3/8" = 1'-0"



D5 ENLARGED PLAN - WAREHOUSE RESTROOMS
3/8" = 1'-0"

PROJECT NORTH TRUE NORTH

FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
3. LOCATE DOOR OPENINGS 4" FROM NEAREST PERPENDICULAR WALL, UNO.
4. FIRE AND SOUND RATED WALLS/PARTITIONS TO BE CONSTRUCTED TIGHT TO STRUCTURE. PIPING, DUCTWORK AND OTHER PENETRATIONS. ALL WORK IS TO BE BRACED TO STRUCTURE ABOVE.
5. WHERE PARTITIONS OF DIFFERENT FIRE RATINGS INTERSECT, THE HIGHEST RATED PARTITION SHALL CONTINUE THROUGH. MAINTAIN PARTITION FIRE RATING BEHIND RECESSED FIRE EXTINGUISHER CABINETS.
6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR OR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
13. SEE SHEETS A-721 THROUGH A-722 FOR FINISH FLOORING, TRANSITIONS, PATTERNS AND WALL PROTECTION.
14. SEE SHEET A-720 FOR FINISH SCHEDULE.
15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
20. ACCESSIBLE AND COMMON FEATURES, E.G., AUTOMATIC DOOR ACTIVATOR, CARD SWIPE, SHALL BE PLACED 34"-36" AFF. DO NOT PLACE ACCESSIBLE OR COMMON USE BUILDING FEATURES WITHIN 24" OF AN INTERIOR CORNER.

PARTITION NOTES

1. ALL NON-DESIGNATED PARTITIONS SHALL BE TYPE G32.
2. ALL PIPE AND CONDUIT PENETRATIONS THRU 1 HR RATED OR MORE PARTITIONS, FLOORS, ROOF, ETC. SHALL BE SEALED WITH A RESPECTIVELY RATED FIRE BARRIER PENETRATION SEALING SYSTEM BY 3M OR U.L. APPROVED EQUAL.
3. TILE BACKER BOARD SHALL BE USED IN ALL LOCATIONS TO RECEIVE TILE FINISHES. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR LOCATIONS.
4. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DUCTWORK PRIOR TO FABRICATION OF PARTITION WALLS.
5. SHOULD CONDITIONS OCCUR WHERE A WALL IS UNABLE TO GO STRAIGHT UP TO STRUCTURE DUE TO PIPING, DUCTWORK, ETC., THE PARTITION (GYPSUM BOARD AND FRAMING) MAY JOG HORIZONTALLY ABOVE THE CEILING TO AVOID THE PROBLEM. RATED WALL INTEGRITY SHALL BE MAINTAINED.
6. WHERE STUDS EXTEND TO STRUCTURE AND GYPSUM WALLBOARD AND SOUND ATTENUATION BLANKETS EXTEND JUST ABOVE THE FINISH CEILING, CAP OFF PARTITION FINISHES WITH A RUNNER CHANNEL WHEN CEILING PLENUM IS USED AS A RETURN AIR PLENUM.
7. DIMENSIONAL CONFLICTS BETWEEN PARTITION TYPES AND THE ARCHITECTURAL FLOOR PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
8. SEE LIFE SAFETY PLANS FOR THE LOCATIONS OF SMOKE BARRIERS, SMOKE PARTITIONS AND FIRE-RATED PARTITIONS.
9. REFER TO UNDERWRITERS LABORATORIES, INC. FIRE RESISTANCE VOLUMES - CURRENT EDITION FOR SPECIFIC CONSTRUCTION REQUIREMENTS OF U.L. LISTED ASSEMBLIES.
10. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR TYPICAL U.L. LISTED PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING APPROPRIATE PROJECT-SPECIFIC U.L. LISTED ASSEMBLIES FOR PENETRATIONS.
11. AT ALL EXISTING AND CONSTRUCTED PARTITIONS THE CONTRACTOR IS TO MAINTAIN THE FIRE-RESISTIVE INTEGRITY.
12. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE ACOUSTICAL SEALANT AT PARTITIONS THAT ARE SOUND AND FIRE RATED. PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).

TOILET ACCESSORIES LEGEND

	DESCRIPTION	SUPPLIED BY	INSTALLED BY
TT	TOILET TISSUE DISPENSER	OWNER	G.C.
PTR	PAPER TOWEL DISPENSER, ROLL	OWNER	G.C.
WR	WASTE RECEPTACLE	OWNER	OWNER
SD	LIQUID SOAP DISPENSER	OWNER	G.C.
GB18	18" GRAB BAR	G.C.	G.C.
GB28	28" GRAB BAR	G.C.	G.C.
GB36	36" GRAB BAR	G.C.	G.C.
GB42	42" GRAB BAR	G.C.	G.C.
SDU	SANITARY PRODUCT DISPOSAL UNIT	G.C.	G.C.
MG	GLASS MIRROR UNIT	G.C.	G.C.
SCR	SHOWER CURTAIN ROD	G.C.	G.C.
SC	SHOWER CURTAIN	G.C.	G.C.
FSS	FOLDING SHOWER SEAT	G.C.	G.C.
SH	SOAP HOLDER	G.C.	G.C.
RH	ROBE HOOK	G.C.	G.C.
TB	TOWEL BAR	G.C.	G.C.
MH	MOP HOOKS	G.C.	G.C.

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE TYPE W1 U.N.O. SEE A-003 FOR CONSTRUCTION OF SUBSYSTEMS
2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED WALL, EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.

NON-RATED WALL, EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

1 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

FEC FIRE EXTINGUISHER CABINET

FEB FIRE EXTINGUISHER BRACKET

CG CORNER GUARD

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JULIAN SCOTT BAKER REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 08/28/17

LS3P ASSOCIATES, LTD REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

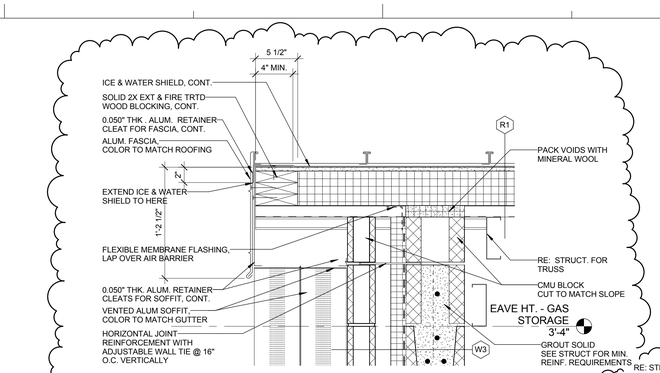
No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: ZS
CHECKED BY: SH

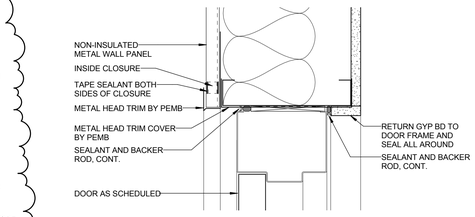
TOILET ROOM PLANS AND SCHEDULE

A-410

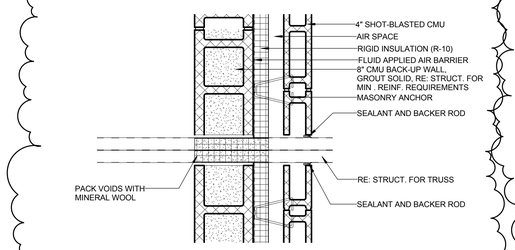
BUILDING BID DOCUMENTS



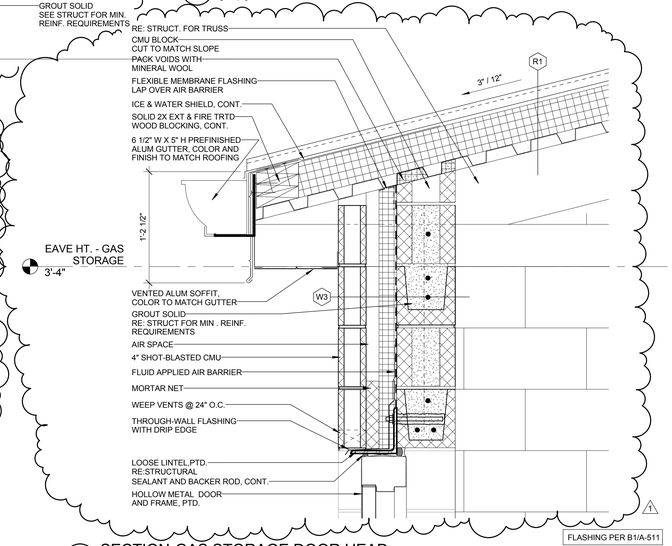
E2 SECTION DETAIL - GAS STORAGE AT GABLE END
1 1/2" = 1'-0"



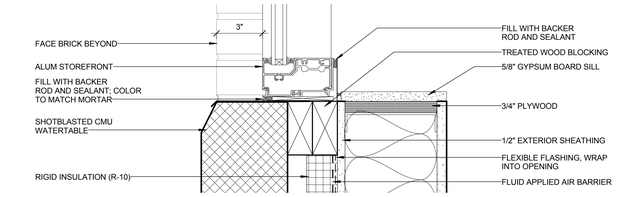
E3 TYPICAL DOOR HEAD @ PEMB
3" = 1'-0"



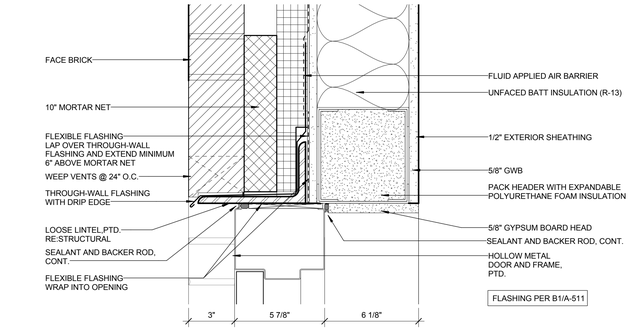
D2 PLAN DETAIL - GAS STORAGE
1 1/2" = 1'-0"



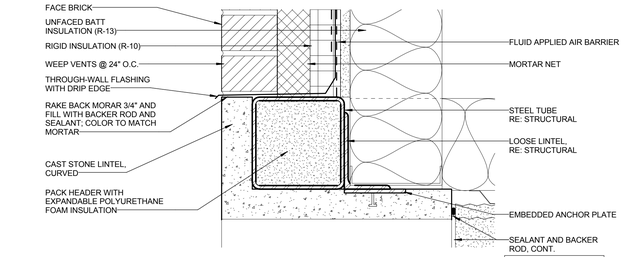
C3 SECTION-GAS STORAGE DOOR HEAD
1 1/2" = 1'-0"



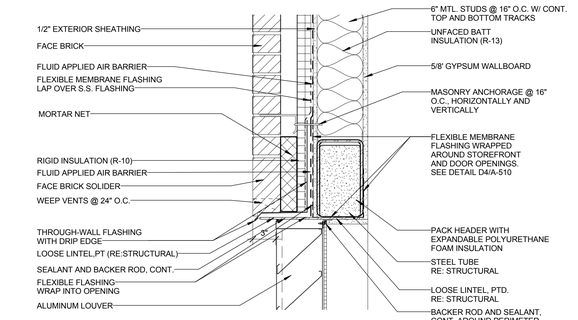
E6 TYPICAL WINDOW SILL
3" = 1'-0"



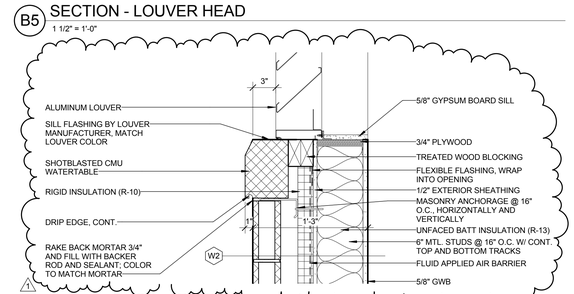
D6 TYPICAL DOOR HEAD
3" = 1'-0"



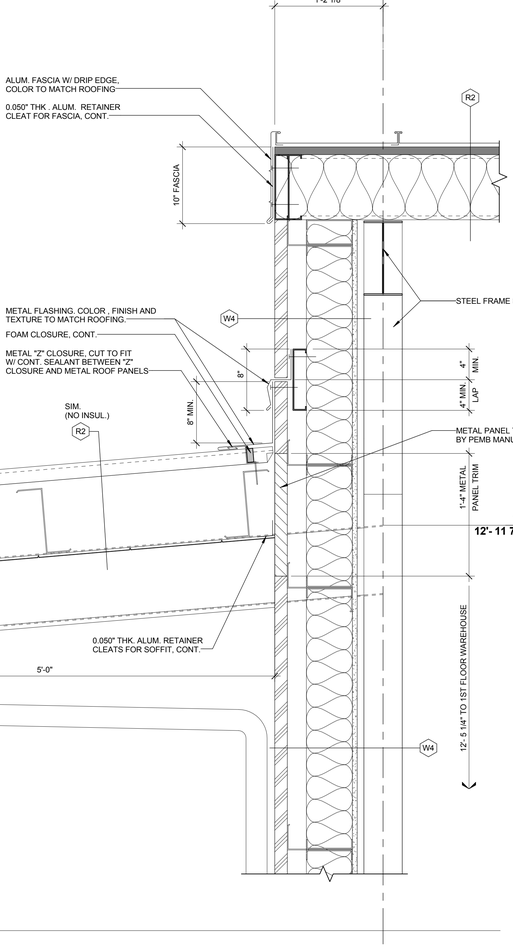
C6 CAST STONE HEAD DETAIL
3" = 1'-0"



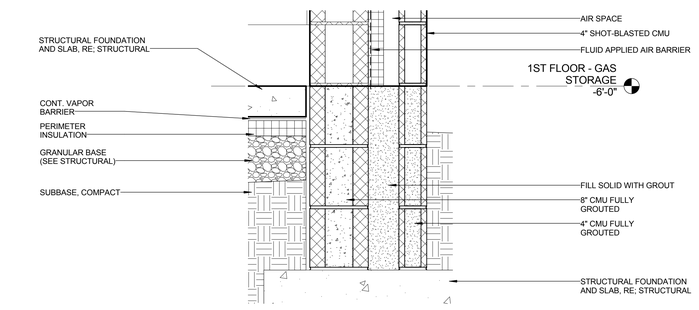
B5 SECTION - LOUVER HEAD
1 1/2" = 1'-0"



B5 SECTION - LOUVER SILL
1 1/2" = 1'-0"



A1 SECTION - WAREHOUSE CANOPY
1 1/2" = 1'-0"



A3 SECTION-GAS STORAGE WALL
1 1/2" = 1'-0"

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08/28/17

LS3P ASSOCIATES LTD REGISTERED ARCHITECTURAL CORPORATION CERT. NO. 50417 NORTH CAROLINA CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

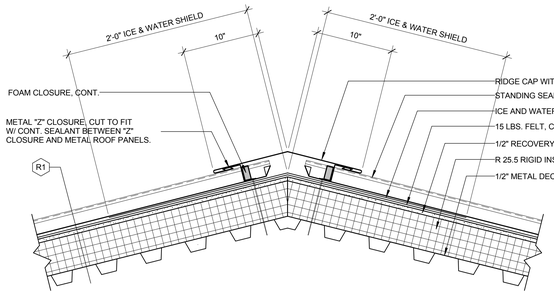
No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RD
CHECKED BY: SH

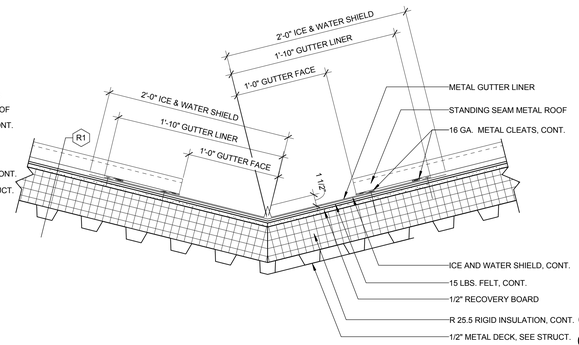
SECTION DETAILS (EXTERIOR)

A-512

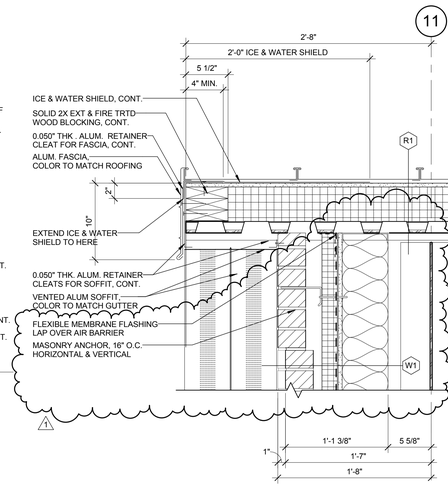
BUILDING BID DOCUMENTS



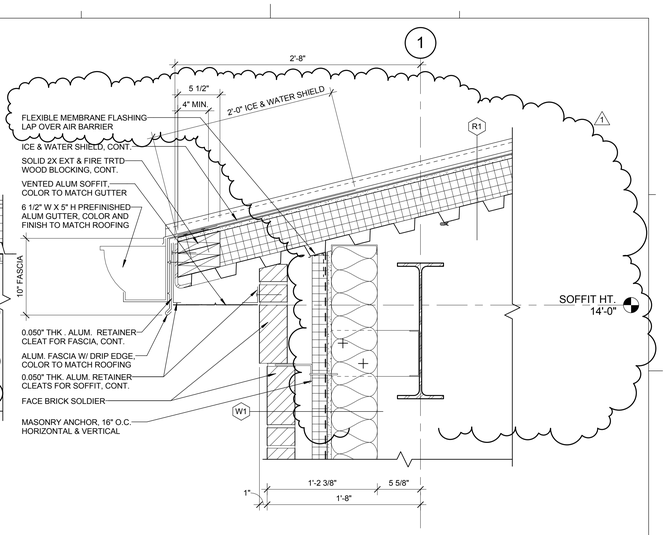
E1 SECTION - TYPICAL RIDGE DETAIL
1 1/2" = 1'-0"



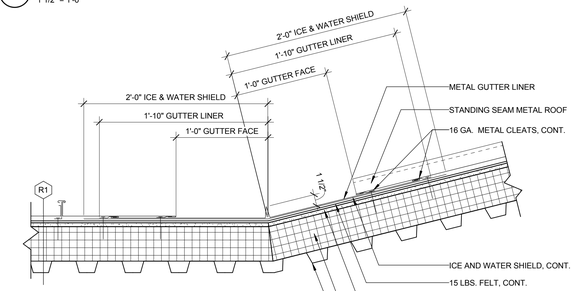
E2 SECTION - TYPICAL VALLEY DETAIL
1 1/2" = 1'-0"



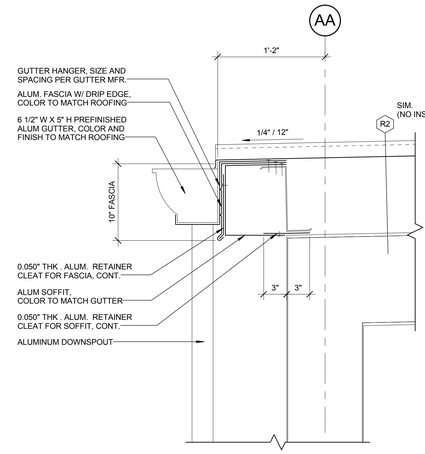
D4 SECTION - ROOF, EAVE ALONG GABLE END
1 1/2" = 1'-0"

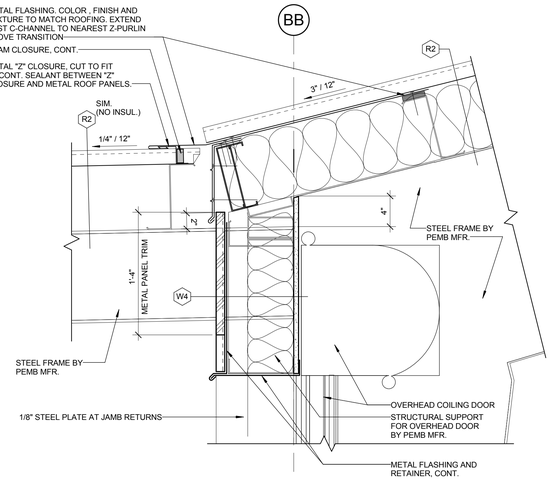


D5 SECTION - TYPICAL ROOF EAVE AT GUTTER
1 1/2" = 1'-0"



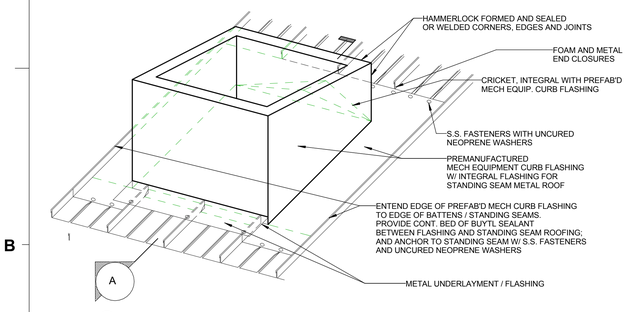
D2 SECTION - VALLEY DETAIL AT RIDGE
1 1/2" = 1'-0"



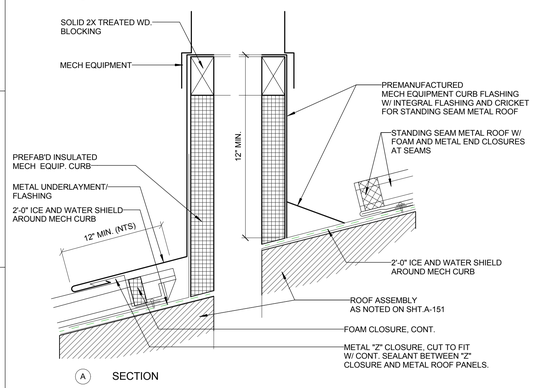


C4 SECTION - EAVE AT LOADING DOCK
1 1/2" = 1'-0"

C5 SECTION - ROOF TRANSITION AT LOADING DOCK
1 1/2" = 1'-0"

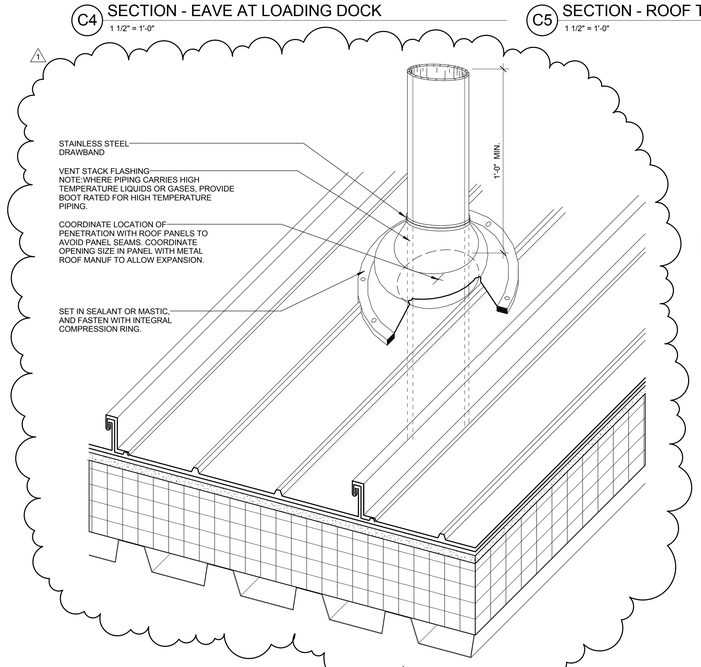


B AXONOMETRIC

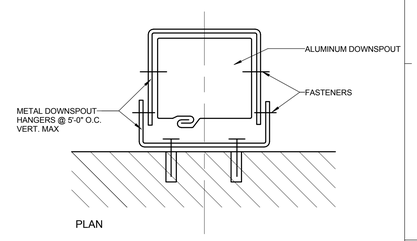


A SECTION

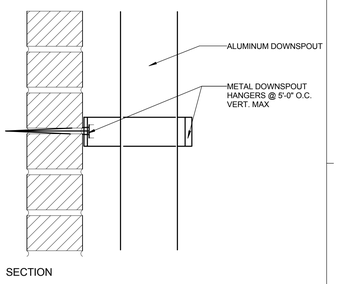
A1 EQUIPMENT CURB DETAIL
NTS



A4 DETAIL - ROOF VENT FLASHING
3" = 1'-0"



PLAN



SECTION

A6 PLAN & SECTION - DOWNSPOUT DETAIL
3" = 1'-0"

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REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT:	9202-164730
SCO ID:	16-15656-02B
ITEM: 315	CODE: 41526
DATE:	AUGUST 21, 2017
DRAWN BY:	KF
CHECKED BY:	SH

ROOF DETAILS

A-551

BUILDING BID DOCUMENTS

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8/30/2017 7:59:07 AM

DOOR AND FRAME SCHEDULE - OFFICE/SHOPS BUILDING

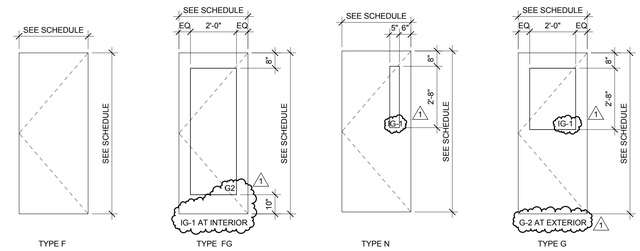
DOOR NUMBER	DOOR								FRAME						REMARKS
	TYPE	MATL	FINISH	WIDTH	HEIGHT	THICKNESS	LABEL	STC	HDWR	TYPE	MATL	FINISH	HEAD	JAMB	SILL	
100A	FG (PAIR)	AL	-	6'-0"	8'-0"	1 3/4"	-		3.0	J	AL	-	D4/A-511	J2	A1/A-511	CARD READER, AUTOMATIC OPERATOR
100B	FG (PAIR)	AL	-	6'-0"	8'-0"	1 3/4"	-		9.0	H	AL	-	H2	J2	S5	CARD READER, AUTOMATIC OPERATOR
101	FG	WD	ST	3'-0"	7'-0"	1 3/4"	-		10.0	F1	HM	PT	H1	J1	S5	CARD READER
101A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	NONE	CARD READER
101B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
101C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	S5	
101D	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		13.0	F1	HM	PT	H1	J1	NONE	
102A	-	-	-	4'-0"	7'-0"	0"	-			F1	HM	PT	H1	J1	S3	CASED OPENING
102B	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	NONE	CARD READER
102C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
102D	F	WD	ST	3'-0"	7'-0"	1 3/4"	-	49	23.3	F1	HM	PT	H1	J1	NONE	CARD READER
102E	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
102F	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	NONE	
103A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103D	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103E	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103F	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
103G	F	WD	ST	3'-0"	7'-0"	1 3/4"	-	49	23.3	F1	HM	PT	H1	J1	NONE	CARD READER
103KA	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	NONE	CARD READER
103KB	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.1	F1	HM	PT	H1	J1	NONE	
103P	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
104A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
104D	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	S3	
104E	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	S3	CARD READER
104F	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		24.0	F1	HM	PT	H1	J1	S3	
104G	F (PAIR)	WD	ST	6'-0"	7'-0"	1 3/4"	-		21.1	F1	HM	PT	H1	J1	S2	
104H	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		24.0	F1	HM	PT	H1	J1	S3	
105A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	S4	CARD READER
106A	FG	AL	-	3'-0"	8'-0"	1 3/4"	-		2.0	G	AL	-	C4/A-511	B6/A-501	A1/A-511	CARD READER
106B	FG	AL	-	3'-0"	8'-0"	1 3/4"	-		9.2	G	AL	-	H1	J1	S3	
120A	FG (PAIR)	AL	-	6'-0"	8'-0"	1 3/4"	-		3.1	J	AL	-	D4/A-511	J2	A1/A-511	CARD READER, AUTOMATIC OPERATOR
120B	FG (PAIR)	AL	-	6'-0"	8'-0"	1 3/4"	-		9.1	H	AL	-	H2	J2	S4	AUTOMATIC OPERATOR
121B	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		21.2	F1	HM	PT	H1	J1	S1	
122	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		17.1	F1	HM	PT	H1	J1	S4	
122A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
122B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
122C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
123A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
123B	F	WD	ST	3'-0"	7'-0"	1 3/4"	-	49	17.1	F1	HM	PT	H1	J1	S4	
123B1	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.0	F1	HM	PT	H1	J1	NONE	
123C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	S4	CARD READER
123D	N	WD	ST	3'-0"	7'-0"	1 3/4"	-	49	23.3	F1	HM	PT	H1	J1	S4	CARD READER
123E	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		21.0	F1	HM	PT	H1	J1	S2	
123H	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		13.0	F1	HM	PT	H1	J1	S3	
123I	-	-	-	4'-0"	7'-0"	0"	-	-		F1	HM	PT	H1	J1	NONE	CASED OPENING
124	N (PAIR)	WD	ST	4'-0"	7'-0"	1 3/4"	-		20.0	F1	HM	PT	H1	J1	NONE	1'-0" LEAF & 3'-0" LEAF, CARD READER
124A	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		21.0	F1	HM	PT	H1	J1	S2	
124C	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.1	F1	HM	PT	H1	J1	NONE	CARD READER
124D	F (PAIR)	WD	ST	6'-0"	7'-0"	1 3/4"	-		11.0	F1	HM	PT	H1	J1	S2	
124D1	F	WD	ST	3'-0"	7'-0"	1 3/4"	120min		10.1	F1	HM	PT	H1	J1	NONE	
124E	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.3	F1	HM	PT	H1	J1	S2	CARD READER
124G	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		18.0	F1	HM	PT	H1	J1	S4	
125A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
125B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
125C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
125D	-	-	-	4'-0"	7'-0"	0"	-	-		F1	HM	PT	H1	J1	S4	CASED OPENING
125D1	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	S2	
125E	N	WD	ST	3'-0"	7'-0"	1 3/4"	-	49	17.0	F1	HM	PT	H1	J1	NONE	
125G	-	-	-	3'-0"	7'-0"	0"	-		-	F1	HM	PT	H1	J1	NONE	CASED OPENING
125H	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
125I	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
125J	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
125K	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
126	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		17.1	F1	HM	PT	H1	J1	S4	
126A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
126B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
126C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
130A	FG	WD	ST	3'-0"	7'-0"	1 3/4"	-		17.1	F1	HM	PT	H1	J1	S2	
130B	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		21.0	F1	HM	PT	H1	J1	S2	
130CA	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		14.0	F1	HM	PT	H1	J1	S3	
130CB	-	-	-	3'-0"	7'-0"	0"	-			F1	HM	PT	H1	J1	NONE	CASED OPENING
130DA	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		24.0	F1	HM	PT	H1	J1	S3	
130DB	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		12.0	F1	HM	PT	H1	J1	NONE	
130EA	FG	AL	-	3'-0"	8'-0"	1 3/4"	-		2.0	F	AL	-	E3/A-420	D3/A-501	A1/A-511	CARD READER
130EB	FG	AL	-	3'-0"	7'-0"	1 3/4"	-		9.2	K	AL	-	H2	J2	-	
130G	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
130I	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
130K	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
130M	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
130P	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
130R	G	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F4	HM	PT	H1	J1	S4	
131	G	HM	PT	3'-8"	7'-0"	1 3/4"	-		4.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED, CARD READER
131A1	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	15.0	F4	HM	PT	H1	J1	S6	
131AA	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	23.3	F1	HM	PT	H1	J1	S2	CARD READER
131AB	FG	AL	-	3'-8"	8'-0"	1 3/4"	-		1.0	F	AL	-	C4/A-511	C6/A-501	A1/A-511	CARD READER
131B1	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	NONE	
131B2	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	NONE	
131B3	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	15.0	F4	HM	PT	H1	J1	NONE	
131BA	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	S2	
131BB	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
131CA	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	21.0	F1	HM	PT	H1	J1	S2	
131CB	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	S6	
131CC	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		5.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
131CD	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
132A	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	S6	
132B	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	S6	
132C	G	HM	PT	3'-0"	7'-0"	1 3/4"	-	52	17.0	F1	HM	PT	H1	J1	S6	
132D	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
133	F	HM	PT	4'-0"	7'-0"	1 3/4"	-		6.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	
134A	F (PAIR)	HM	PT	6'-0"	7'-0"	1 3/4"	-		8.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
134B	F	HM	PT	4'-0"	7'-0"	1 3/4"	-		6.0	F2	HM	PT	D6/A-512	B6/A-501	A1/A-511	INSULATED
OH131B	OH		-	12'-0"	12'-0"		-		27.0	-		-	D1/A-511	C2/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH131C	OH		-	12'-0"	12'-0"		-		27.0	-		-	D1/A-511	C2/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH132	OH		-	16'-0"	12'-0"		-		27.0	-		-	D1/A-511	C2/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED

DOOR AND FRAME SCHEDULE - WAREHOUSE BUILDING

DOOR NUMBER	DOOR								FRAME						REMARKS
	TYPE	MATL	FINISH	WIDTH	HEIGHT	THICKNESS	LABEL	STC	HDWR	TYPE	MATL	FINISH	HEAD	JAMB	SILL	
150A	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		4.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED, CARD READER
150B	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		25.0	F1	HM	PT	H1	J1	S3	
151A	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		24.0	F1	HM	PT	H1	J1	S3	
151B	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		24.0	F1	HM	PT	H1	J1	S3	
151D	F	WD	ST	3'-0"	7'-0"	1 3/4"	-		22.0	F1	HM	PT	H1	J1	NONE	
152	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.1	F1	HM	PT	H1	J1	S4	CARD READER
152A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
152B	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	S6	INSULATED
153	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		23.1	F1	HM	PT	H1	J1	S4	CARD READER
153A	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
153B	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		16.0	F1	HM	PT	H1	J1	S4	
153C	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
153D	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
153E	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		18.0	F1	HM	PT	H1	J1	S6	
153F	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		15.0	F1	HM	PT	H1	J1	NONE	
153RA	G	HM	PT	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	S2	
153RB	N	WD	ST	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	S4	
154A	N	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.1	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED, CARD READER
154AA	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	NONE	INSULATED
154AB	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED
155A	F (PAIR)	HM	PT	6'-0"	7'-0"	1 3/4"	-		21.1	F1	HM	PT	H1	J1	NONE	INSULATED
155B	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED
155C	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED
155D	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED
156	N	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.1	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED, CARD READER
156CA	N	HM	PT	3'-0"	7'-0"	1 3/4"	-		17.0	F1	HM	PT	H1	J1	NONE	INSULATED
156CB	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.0	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED
156CC	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		7.1	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED, CARD READER
157	F (PAIR)	HM	PT	6'-0"	7'-0"	1 3/4"	-		8.1	F2	HM	PT	E3/A-512	A5/A-501	A1/A-511	INSULATED, CARD READER
157A	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		11.1	F1	HM	PT	H1	J1	NONE	
157B	F	HM	PT	3'-0"	7'-0"	1 3/4"	-		23.2	F1	HM	PT	H1	J1	NONE	CARD READER
OH154A	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH154AA	OH		-	12'-0"	12'-0"		-		27.0	-		-	C4/A-602	C4/A-602	NONE	OVERHEAD COILING DOOR, INSULATED
OH154AB	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH155B	OH		-	8'-0"	10'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH155C	OH		-	8'-0"	10'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH155D	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH156A	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH156B	OH		-	12'-0"	12'-0"		-		27.0	-		-	C4/A-602	C4/A-602	NONE	OVERHEAD COILING DOOR, INSULATED
OH156CA	OH		-	12'-0"	12'-0"		-		27.0	-		-	C4/A-602	C4/A-602	NONE	OVERHEAD COILING DOOR, INSULATED
OH156CB	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED
OH156CC	OH		-	12'-0"	12'-0"		-		27.0	-		-	A3/A-354	C1/A-501	C1/A-511	OVERHEAD COILING DOOR, INSULATED

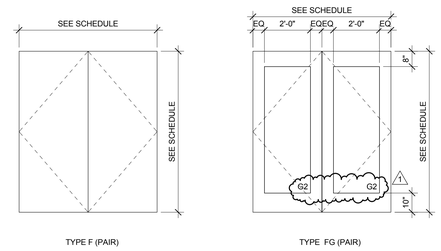
DOOR AND FRAME SCHEDULE - GAS STORAGE BUILDING

DOOR NUMBER	DOOR								FRAME						REMARKS
	TYPE	MATL	FINISH	WIDTH	HEIGHT	THICKNESS	STC	HDWR	TYPE	MATL	FINISH	HEAD	JAMB	SILL	
180	F (PAIR)	HM	PT	6'-0"	7'-0"	1 3/4"		8.0	F2	HM	PT	C3/A-512	A5/A-501	A1/A-511	INSULATED



DOOR TYPE LEGEND

3/8" = 1'-0"



DOUBLE DOOR TYPE LEGEND

3/8" = 1'-0"

GLAZING LEGEND

G1	1" INSULATED LOW-E GLASS, TYPICAL UNO
G2	SAME AS G1 EXCEPT BOTH LITES TEMPERED
IG-1	1/4" MONOLITHIC GLASS, TEMPERED

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
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WILLIAM SCOTT BAKER REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C.
08/28/17

LS3P ASSOCIATES LTD REGISTERED ARCHITECTURAL CORPORATION CERT. NO. 50417 NORTH CAROLINA CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: SH
CHECKED BY: SH

DOOR SCHEDULE & DOOR TYPES

A-601

BUILDING BID DOCUMENTS

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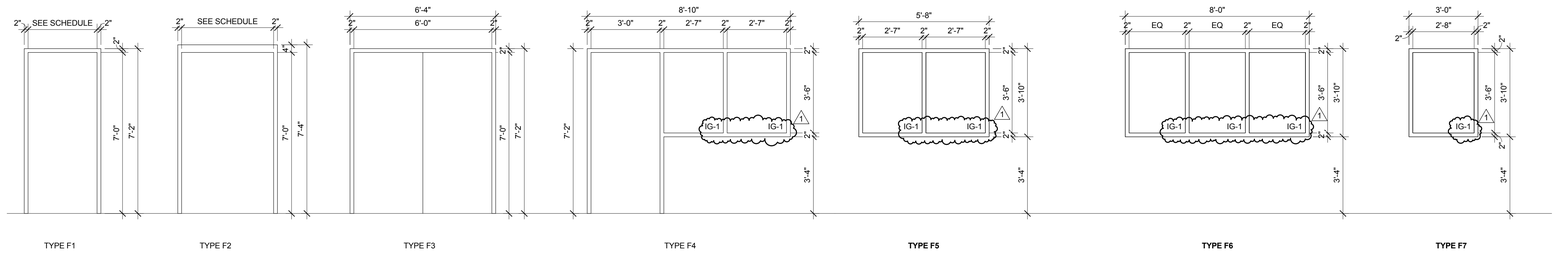
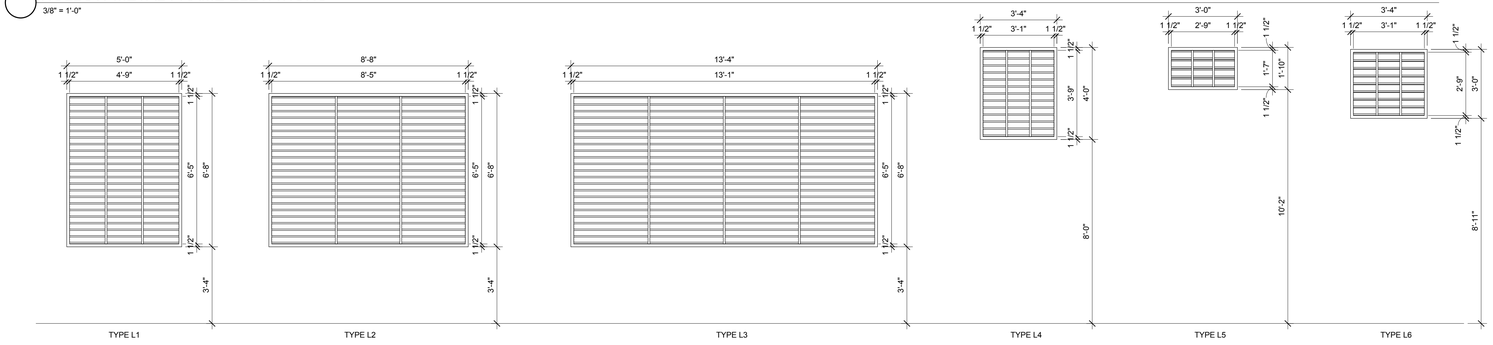


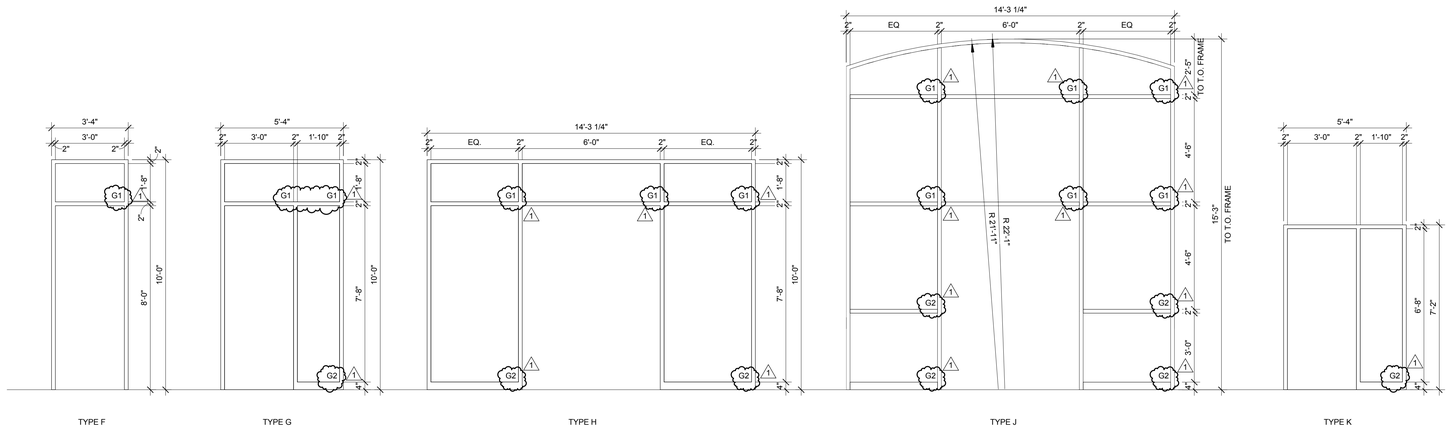
HOLLOW METAL FRAME ELEVATIONS

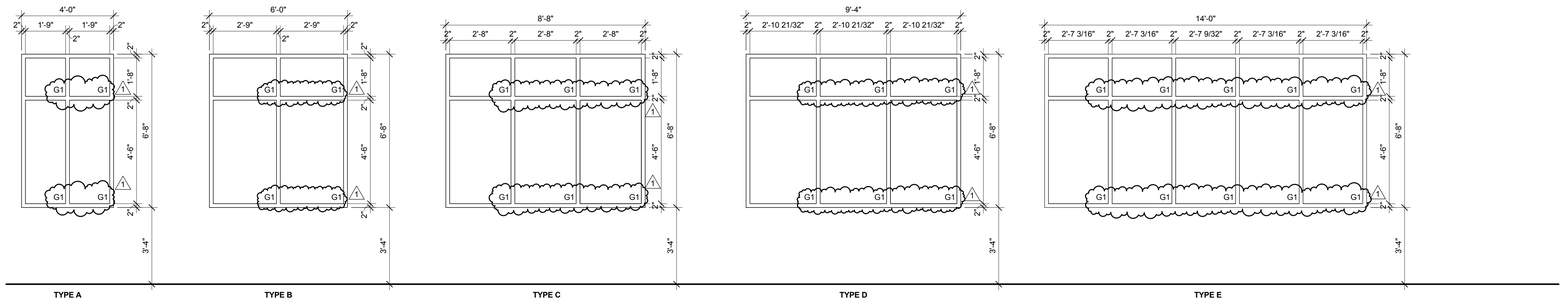
3/8" = 1'-0"



LOUVER ELEVATIONS

3/8" = 1'-0"





ALUMINUM STOREFRONT ELEVATIONS

3/8" = 1'-0"

GLAZING LEGEND

G1	1" INSULATED LOW-E GLASS, TYPICAL UNO
G2	SAME AS G1 EXCEPT BOTH LITES TEMPERED
IG-1	1/4" MONOLITHIC GLASS, TEMPERED

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WILLIAM SCOTT BAKER — 8326 — NORTH CAROLINA — CHARLOTTE, N.C. — 08/28/17

LS3P ASSOCIATES, LTD. — REGISTERED ARCHITECTURAL FIRM — CERT. NO. 50417 — CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

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FRAME, LOUVER, AND STOREFRONT ELEVATIONS

A-603

BUILDING BID DOCUMENTS

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COORDINATION DRAWINGS

PER WRITTEN SPECIFICATION SECTIONS 01 00 00 AND 01 31 00, THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED AT 1/4"= 1'-0" SCALE.
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36".
3. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
4. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

THE USE OF BUILDING INFORMATION MODELING (BIM) THROUGHOUT THE CONSTRUCTION PROCESS IS A REQUIREMENT FOR THIS PROJECT TO HELP REDUCE OR ELIMINATE FIELD DETECTED CONFLICTS, IMPROVE CONSTRUCTION QUALITY AND MAINTAIN AN AGGRESSIVE SCHEDULE. THE CONTRACTOR WILL BE RESPONSIBLE FOR CREATING THE MODEL AND MANAGING THE COORDINATION AND COLLISION DETECTION PROCESS. THE MODEL MUST CONTAIN COMPLETE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION SYSTEMS CONSISTENT WITH THE DESIGN AND FABRICATION DRAWINGS.

FIRE PROTECTION DESIGN CRITERIA

SYMBOL	OCCUPANCY	TYPE	DESIGN DENSITY (GPM/SF)	HYDRAULIC REMOTE AREA (SF)	MAX. COVERAGE PER SPRINKLER HEAD (SF)	HOSE STREAM		AREAS OF COVERAGE
						INSIDE (GPM)	OUTSIDE (GPM)	
LH	LIGHT HAZARD	WET	0.10	1500	225	100	-	OFFICES AREAS, EXCEPT AS NOTED OTHERWISE
OH-1	ORDINARY HAZARD GROUP 1	WET	0.15	1500	130	100	150	MECH. ROOMS, STORAGE ROOMS, ELEC. ROOMS, JANITORS CLOSETS, ETC.
OH-2	ORDINARY HAZARD GROUP 2	WET	0.20	1500	130	100	150	WAREHOUSE, TRASH ROOMS & STORAGE ROOMS WITH SHELVES OVER 8 FT TALL AND LESS THAN 12 FT TALL
OH-2D	ORDINARY HAZARD GROUP 2	DRY	0.20	1950	130	100	150	LOADING DOCK

APPLICABLE PUBLICATIONS:

THE FOLLOWING PUBLICATIONS SHALL BE USED AS A REFERENCE FOR THE DESIGN OF THE FIRE PROTECTION SYSTEM ON THIS PROJECT:

1. NORTH CAROLINA STATE BUILDING CODE - FIRE CODE, 2012 EDITION
2. NFPA 13 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS - 2013 EDITION
3. NFPA 20 - STANDARD FOR THE INSTALLATION OF CENTRIFUGAL FIRE PUMPS - 2013 EDITION
4. NFPA 24 - STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES - 2013 EDITION
5. NORTH CAROLINA STATE CONSTRUCTION OFFICE - WATER BASED FIRE PROTECTION SYSTEMS GUIDELINES AND POLICIES - 2014

NOTES:

1. FIRE PROTECTION WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE ABOVE PUBLICATIONS AS WELL AS WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.
2. SPRINKLER HEADS SHALL BE SPACED IN ACCORDANCE WITH NFPA 13 AND THE MANUFACTURERS APPROVAL LISTING.
3. COORDINATE PIPE ROUTING WITH DUCT ROUTING, EQUIPMENT LOCATIONS, ELECTRICAL INSTALLATIONS, AND BUILDING STRUCTURAL MEMBERS. AVOID PENETRATING ANY MAIN STRUCTURAL BEAM. NOTIFY ARCHITECT OF ANY CONFLICTS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING HIS OWN FIRE PROTECTION SYSTEM DESIGN AND SHOP DRAWINGS. CONTRACTOR SHALL MEET ALL REQUIREMENTS OF THE DATA LISTED ON THIS SHEET AND THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS.
5. SPRINKLERS SHALL BE CENTERED IN CEILING TILES IN AREAS WITH LAY-IN TILES AND VISUALLY ALIGNED IN AREAS WITH SMOOTH CEILINGS. SEE REFLECTED CEILING PLAN FOR PREFERRED LOCATION OF HEADS.
6. PROVIDE CONCEALED TYPE SPRINKLER HEADS FOR AREAS WITH LAY-IN CEILINGS AND GYPBOARD CEILINGS. PROVIDE UPRIGHT SPRINKLER HEADS FOR EXPOSED AREAS. COORDINATE COLOR OF CONCEALED SPRINKLER HEAD COVER-PLATE WITH ARCHITECT.
7. DURING DESIGN CALCULATIONS, AN ALLOWANCE SHALL BE MADE FOR A 250 GPM HOSE STREAM.
8. FIRE PROTECTION CONTRACTOR SHALL TERMINATE THE HYDRAULIC CALCULATIONS AT THE HYDRANT TEST CONNECTION. INDICATE ON DRAWINGS ALL UNDERGROUND PIPE AND FITTINGS BOTH NEW AND EXISTING.
9. PROVIDE SPRINKLER HEADS IN ALL CLOSET AND BATHROOMS.
10. PROVIDE FIRE SPRINKLERS IN ALL ELEVATORS SHAFTS, HOIST WAYS AND PITS AS REQUIRED PER NFPA 13.

FLOW TEST DATA

DATE	LOCATION	FLOW TEST PERFORMED BY	PRESSURE		FLOW (GPM)	FLOW AT 20 PSI (GPM)
			STATIC (PSI)	RESIDUAL (PSI)		
7/21/2017	HYDRANT #158662 @ NE CORNER OF LOT 26 NEAR MAINTENANCE YARD	CHARLOTTE FIRE DEPARTMENT	74	67	1061	3198
	NC-SCO ADJUSTED FLOW TEST		64	57	955	2878

FLOW TEST NOTES:
1. SEE SITE UTILITY PLANS FOR EXACT LOCATION OF FIRE HYDRANTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A NEW FIRE FLOW TEST ON WHICH TO BASE HIS CALCULATIONS.
3. THE FLOW TEST USED FOR THE WORKING PLAN DESIGN SHOULD BE PERFORMED AS INDICATED IN NFPA 13 WHICH USES TWO HYDRANTS; A PRESSURE HYDRANT AND A FLOW HYDRANT. THE TWO HYDRANTS SHALL BE AS CLOSE TO THE POINT OF CONNECTION AS POSSIBLE. A COPY OF THE FLOW TEST AND TEST HYDRANT LOCATIONS SHALL BE SUBMITTED WITH THE SHOP DRAWING PACKAGE.

PUMP SCHEDULE

SYM	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA				SELECTION BASED ON		REMARKS
			GPM	HEAD (FT)	HP	VOLTS	PH	HZ	MANUFACTURER	MODEL	
FP1	ELECTRIC FIRE PUMP	VERTICAL IN-LINE	500	100 ft	25	480	3	60	A-C FIRE PUMP	SERIES 1580 4x4x7F	1
JP1	JOCKEY PUMP	IN-LINE	-	--	5 MAX	480	3	60	GOULDS	--	2

REMARKS:
1. PROVIDE SERVICE ENTRANCE RATED WYE DELTA CLOSED FIRE PUMP CONTROLLER EQUAL TO FIRETROL FTA-1350, WITH SERVICE ENTRANCE RATED AUTOMATIC TRANSFER SWITCH EQUAL TO FIRETROL FTA-950.
2. PROVIDE JOCKEY PUMP CONTROLLER.

BACKFLOW PREVENTER SCHEDULE

SYM.	DESCRIPTION	SYSTEM	DESCRIPTION	MANUF.	MODEL	COMMENTS
BFPI-F	REDUCED PRESSURE PRINCIPLE ASSEMBLE	FIRE SERVICE	REDUCED PRESSURE PRINCIPLE ASSEMBLY 6"	ZURN WILKINS	375V-OSY	1 & 2

NOTES:
1. PROVIDE WITH AIR GAP FITTING.
2. ROUTE 6" MIN. DISCHARGE FROM AIR GAP FITTING DRAIN TO THE NEAREST BUILDING EXTERIOR WALL AND TERMINATE DRAIN PIPING WITH ELBOW TURNED DOWN AT 12" A.F.G.

FIRE PROTECTION LEGEND

SYMBOL	ABBREV.	DESCRIPTION
F	F	FIRE MAIN (ABOVE CEILING)
TS	OS&Y	OS&Y VALVE WITH TAMPER SWITCH
TS	BFY	BUTTERFLY VALVE WITH TAMPER SWITCH
	FDC	FREE STANDING FIRE DEPT. CONNECTION
	EB	ELECTRIC BELL
TS	FCV	FLOOR CONTROL VALVE WITH TAMPER SWITCH
FS	FS	FLOW SWITCH
	TDV	TEST AND DRAIN VALVE WITH SIGHT GLASS
	FHV	FIRE HOSE VALVE WITH CAP

FIRE PROTECTION NOTES

GENERAL REQUIREMENTS:

1. PROVIDE DESIGN, FABRICATION AND INSTALLATION OF A HYDRAULICALLY CALCULATED AUTOMATIC SPRINKLER SYSTEM. INCLUDE ALL SERVICES, MATERIALS, LABOR AND EQUIPMENT REQUIRED FOR A COMPLETE WORKING SYSTEM. DESIGN, AND INSTALL SPRINKLER SYSTEM IN FULL COMPLIANCE WITH THE REQUIREMENTS OF 2012 NCFC, 2013 NFPA-13, THE OWNER'S INSURANCE UNDERWRITER AND THE LOCAL AUTHORITIES.
2. THE FIRE PROTECTION CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DESIGN OF THE FIRE PROTECTION SYSTEM AND SHALL PROVIDE SEALED SHOP DRAWINGS FOR THE SYSTEM. SPRINKLER SYSTEM PLANS AND CALCULATIONS SHALL BE PREPARED BY A NICET LEVEL IV TECHNICIAN. INCLUDE THE DESIGNERS NAME, SIGNATURE AND CERTIFICATE NUMBER ON THE PLANS AND HYDRAULIC CALCULATIONS.
3. DESIGN AND HYDRAULICALLY CALCULATE THE SPRINKLER SYSTEM UTILIZING THE INFORMATION INCLUDED HEREON. MEET ALL NFPA 13 STANDARDS WHETHER OR NOT SPECIFICALLY INDICATED WITHIN THESE DOCUMENTS.
4. OBTAIN CURRENT UP-TO-DATE WATER FLOW TEST INFORMATION BEFORE STARTING THE WORKING PLAN DESIGN. WATER FLOW TEST DATA OLDER THAN 1 YEAR WILL NOT BE ACCEPTED. FLOW TEST DATA NOTED ON THESE PLANS DOES NOT WAIVE THE CONTRACTOR'S RESPONSIBILITY TO MEET THIS REQUIREMENT.
5. THE INTENT OF THESE PLANS IS TO PROVIDE INFORMATION TO THE REVIEWING AUTHORITIES THAT THE BUILDING WILL BE PROTECTED BY A SPRINKLER SYSTEM. SPRINKLER (HEAD) LAYOUT INCLUDED WITH THIS SET OF PLANS IS PROVIDED FOR COORDINATION AND AS A REFERENCE ONLY, AND SHALL NOT BE CONSIDERED AN ACTUAL DESIGN OR CONSTRUCTION DOCUMENT.
6. PRIOR TO THE START OF CONSTRUCTION, SUBMIT EIGHT (8) SETS OF SPRINKLER PLANS, MATERIALS DATA AND HYDRAULIC CALCULATIONS TO THE A/E FOR REVIEW. EACH SET OF PRINTS AND CALCULATIONS SUBMITTED SHALL BEAR APPROVAL STAMPS FROM THE LOCAL FIRE MARSHAL OR FIRE BUREAU CHIEF; THE OWNERS INSURANCE CARRIER REVIEW BOARD AND IF REQUIRED, THE STATE FIRE MARSHAL.
7. EXAMINE THE CONSTRUCTION DOCUMENTS, INCLUDING ANY SPECIFICATIONS OR PROJECT MANUALS. REVIEW THE JOB CONDITIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS, CLEARANCES, PIPE SIZES, ETC. PRIOR TO THE START OF CONSTRUCTION. COORDINATE THE LOCATION OF SPRINKLERS WITH THE ARCHITECTURAL PLANS. ANY CHANGES OR ALTERATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. AT THE COMPLETION OF THE PROJECT, PROVIDE TO THE OWNER TWO SETS OF RECORD DRAWINGS WHICH CLEARLY SHOW ANY CHANGES AND/OR MODIFICATIONS, ADDITIONS OR DELETIONS TO AND FROM THE CONSTRUCTION DOCUMENTS. AND ALL WORK ADDED TO THE CONTRACT DOCUMENTS. THE SETS SHALL BE REVIEWED BY THE A/E BEFORE TURNING THEM OVER TO THE OWNER.
9. PROVIDE ALL NECESSARY OFFSETS, RISES OR DROPS IN THE PIPING AND AUXILIARY DRAINS AS REQUIRED BY BUILDING CODES WHETHER OR NOT SHOWN ON THE PLANS.
10. PROVIDE RECORD DRAWINGS WHICH CLEARLY SHOW ALL UNDERGROUND PIPING DIMENSIONED FROM ANY PERMANENT STRUCTURE, AND ALL WORK ADDED TO THE CONTRACT DOCUMENTS.
11. WARRANT THE SYSTEM LABOR, MATERIALS AND EQUIPMENT FOR THE AMOUNT OF TIME SPECIFIED IN THE PROJECT MANUAL. IF NO WARRANTY SECTION IS PROVIDED, THEN WARRANT THE SYSTEM LABOR, MATERIAL AND EQUIPMENT FOR A MINIMUM OF ONE YEAR AFTER COMPLETION AND ACCEPTANCE. PRIOR TO TURNING THE COMPLETED SYSTEM OVER TO THE OWNER, REVIEW THE INSTALLATION WITH THE A/E AND REPLACE OR REPAIR ANY DEFECTIVE WORKMANSHIP, EQUIPMENT AND MATERIALS AT NO ADDITIONAL COST TO THE OWNER.

MATERIALS:

1. ABOVE GRADE PIPE AND FITTINGS: BLACK STEEL PIPING SHALL BE LISTED FOR FIRE SPRINKLER PIPING USE AND INCLUDE FM APPROVED MIC INHIBITING COATING. PIPING 2" AND SMALLER SHALL BE SCHEDULE 40 BLACK STEEL PIPE THREADED, WELDED OR ROLL GROOVED FOR MECHANICAL FITTINGS. PIPING 2-1/2" AND LARGER SHALL BE SCHEDULE 10 BLACK STEEL PIPE ROLL GROOVED FOR MECHANICAL FITTINGS.
2. PIPE HANGERS:CONFORM TO NFPA 13 AND U.L. STANDARDS FOR SPACING, NUMBER, SIZE, AND TYPE. PIPE SHALL BE GENERALLY SUPPORTED BY CLAMPS AND RODS SECURED TO OVERHEAD CONSTRUCTION.
3. VALVES: OS&Y TYPE, IRON BODY BRONZE MOUNTED, DOUBLE DISC WITH PARALLEL SEATS, OR; BUTTERFLY, LUG TYPE, DUCTILE IRON BODY, STAINLESS STEEL STEM, ALUMINUM BRONZE DISC, PHENOLIC RING AND BUNA N SEAT. VALVES SHALL BE FM/UL LISTED AND APPROVED FOR FIRE PROTECTION SERVICE.
4. ESCUTCHEON PLATES: PROVIDE CHROME PLATED ESCUTCHEON PLATES WHERE PIPES PASS THROUGH FINISHED WALLS, FLOORS, OR CEILING. PROVIDE PRIME COAT PAINTED ESCUTCHEON PLATES WHEREVER PIPES PASS THROUGH THE WALLS, FLOORS, OR CEILINGS IN UNFINISHED EXPOSED AREAS.
5. TESTING AND FLUSHING: OVERHEAD SPRINKLER PIPING: TESTED FOR A PERIOD OF TWO HOURS AT A HYDROSTATIC PRESSURE OF 200 LBS. AND ALL PIPING, VALVES, HEADS,ETC. SHALL BE WATERTIGHT.

DRAWING LIST - FIRE PROTECTION

SHEET #	SHEET NAME
FP-001	FIRE PROTECTION - SPECIFCATIONS, NOTES AND SCHEDULES
FP-002	FIRE PROTECTION - DETAILS
FP-011	FLOOR PLAN - OFFICE/SHOPS - FIRE PROTECTION
FP-012	FLOOR PLAN - WAREHOUSE - FIRE PROTECTION

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NORTH CAROLINA PROFESSIONAL SEAL 26023 ENGINEER GEORGE C. FOWLER III

8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
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DRAWN BY: RPD
CHECKED BY: DAR

FIRE PROTECTION - SPECIFCATIONS, NOTES AND SCHEDULES

FP-001

OPTIMA #: 16-0265 1 OF 4

BUILDING BID DOCUMENTS

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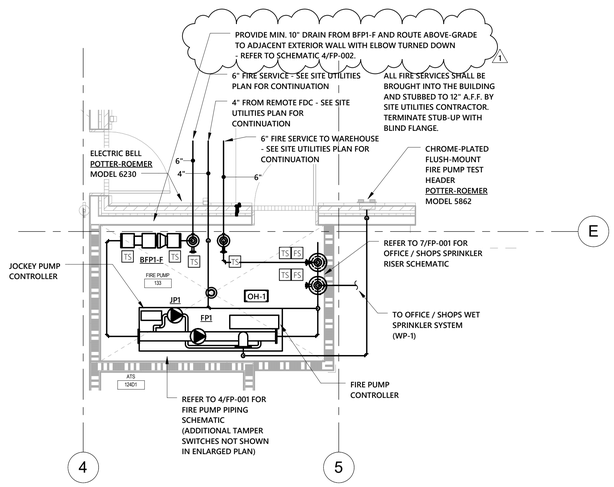
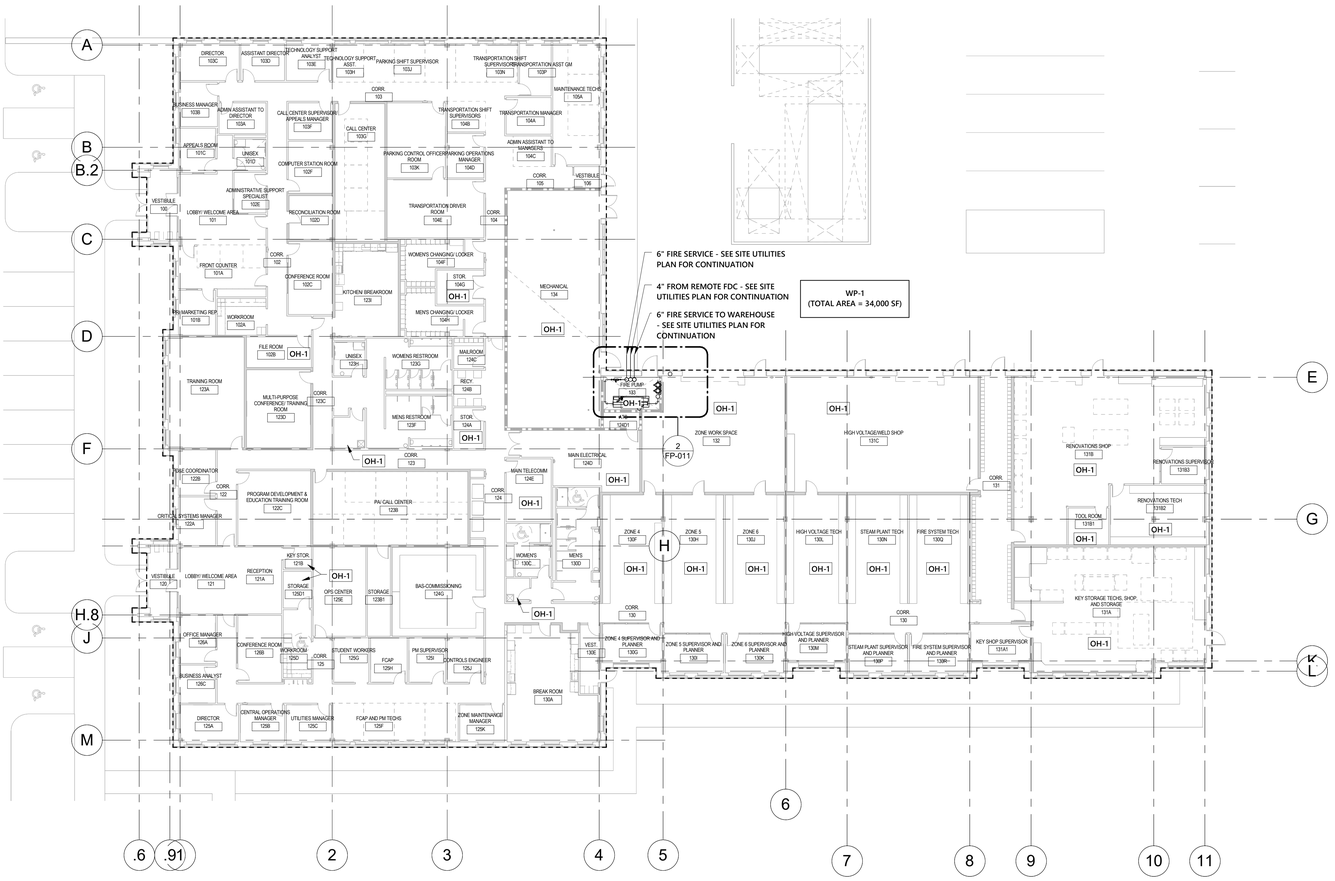


2 ENLARGED PLAN - FIRE PUMP ROOM

4 1/4 = 2-0" 1 0 4 8

SCALE: 1/4"=1'-0"



1 OFFICE/SHOPS FLOOR PLAN - FIRE PROTECTION

1/16" = 1'-0" 16 12 8 4 0 16 32

SCALE: 1/16"=1'-0"

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.
   - NON-RATED PARTITION TO CEILING
   - NON-RATED PARTITION TO DECK
   - 1 HR. RATED PARTITION TO DECK
   - 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN

PROJECT NORTH TRUE NORTH

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FLOOR PLAN - OFFICE/SHOPS - FIRE PROTECTION

FP-011

OPTIMA #: 16-0265 3 OF 4

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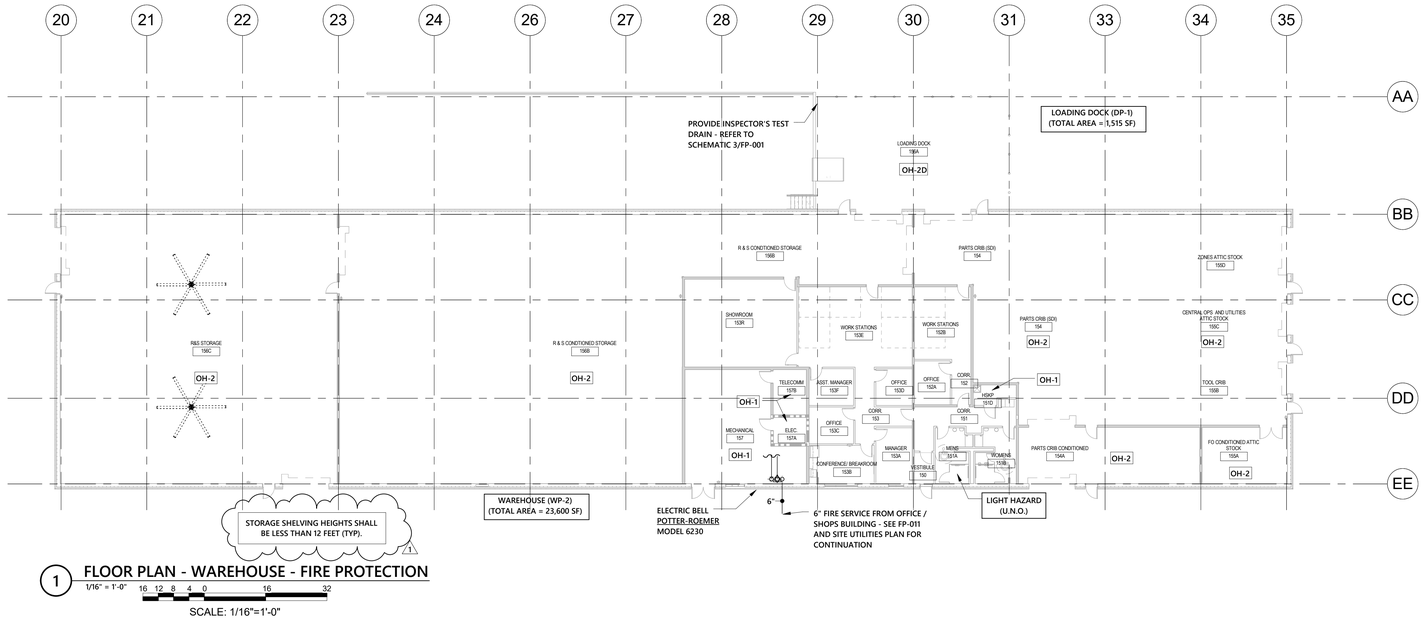


1 FLOOR PLAN - WAREHOUSE - FIRE PROTECTION

1/16" = 1'-0"

16 12 8 4 0 16 32

SCALE: 1/16"=1'-0"

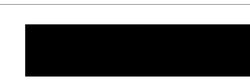
PARTITION LEGEND

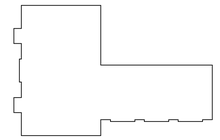
1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

- NON-RATED PARTITION TO CEILING
- NON-RATED PARTITION TO DECK
- 1 HR. RATED PARTITION TO DECK
- 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN





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FLOOR PLAN - WAREHOUSE - FIRE PROTECTION

FP-012

OPTIMA #: 16-0265 4 OF 4

BUILDING BID DOCUMENTS

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GAS-FIRED WATER HEATER SCHEDULE

SYM.	DESCRIPTION	STORAGE (GALLONS)	GAS BURNER DATA			FLUE SIZE	SELECTION BASED ON		REMARKS
			INLET PRESS. (IN. W.C.)	BTU/HR INPUT	GPH RECOVERY @ 80°F RISE		MANUFACTURER	MODEL	
WH1	GAS FIRED WATER HEATER	100	8	150,000	223	4"	A.O. SMITH	BTH-150	1-6

REMARKS:
1. EQUIVALENT MANUFACTURERS: BRADFORD WHITE, LOCHINVAR.
2. ELECTRICAL REQUIREMENTS: 120V, 15 AMP BREAKER.
3. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF ASHRAE 90.1.
4. PROVIDE HEATER WITH ACID NEUTRALIZATION KIT FOR CONDENSATE.
5. INSTALL DIRECT VENT PIPING PER MANUFACTURER'S DIRECTIONS. CPVC PIPING OR STAINLESS STEEL SHALL BE USED FOR VENT PIPING MATERIAL. PVC PIPING IS NOT ACCEPTABLE.
6. PROVIDE CARBON MONOXIDE DETECTOR ADJACENT TO WATER HEATERS. INTERLOCK CARBON MONOXIDE DETECTOR WITH BAS.

ELECTRIC WATER HEATER SCHEDULE

SYM.	DESCRIPTION	STORAGE (GALLONS)	GPH RECOVERY	ELECTRICAL DATA				SELECTION BASED ON		REMARKS
				KW	VOLTS	PHASE	HERTZ	MANUFACTURER	MODEL	
WH2	TANKLESS WATER HEATER	-	61°F RISE @ 1.0 GPM	9.0	277	1	60	EEMAX	EX90T	4
WH3	TANKLESS WATER HEATER	-	56°F RISE @ 0.5 GPM	4.1	277	1	60	EEMAX	EX4277T EE	4
WH4	ELECTRIC WATER HEATER	120	221 GPH @ 100°F RISE	54.0	480	3	60	A.O. SMITH	DRE-120-54.0	1,2,3

REMARKS:
1. EQUIVALENT MANUFACTURERS: BRADFORD WHITE, LOCHINVAR.
2. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF ASHRAE 90.1
3. BASIS-OF-DESIGN WATER HEATER CONTAINS (9) 6.0 KW ELEMENTS, WITH SIMULATNEOUS OPERATION.
4. EQUIVALENT MANUFACTURERS: BOSCH, BRADFORD WHITE, CHRONOMITE.

EXPANSION TANK SCHEDULE

SYM.	DESCRIPTION	VOLUME (GALLONS)	DIAMETER (INCHES)	HEIGHT (INCHES)	SELECTION BASED ON		REMARKS
					MANUFACTURER	MODEL	
ET1	BLADDER TYPE EXPANSION TANK	6.4	12	15.375	AMTROL	ST-12	1, 2
ET4	BLADDER TYPE EXPANSION TANK	6.4	12	15.375	AMTROL	ST-12	1, 2

REMARKS:
1. EQUIVALENT MANUFACTURERS: BELL & GOSSETT, WESSELS COMPANY.
2. EXPANSION TANK SHALL BE CHARGE TO MEET FINAL OPERATING PRESSURE FOR DOMESTIC WATER SYSTEM.

PUMP SCHEDULE

SYM	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA				SELECTION BASED ON		REMARKS
			GPM	HEAD (FT)	HP	VOLTS	PH	HZ	MANUFACTURER	MODEL	
RCP1	HW RECIRC PUMP	IN-LINE	4	6	1/12	120	1	60	BELL & GOSSETT	NBF-9F/LW	1,2,3
RCP4	HW RECIRC PUMP	IN-LINE	4	6	1/12	120	1	60	BELL & GOSSETT	NBF-9F/LW	1,2,3
BP1	DUPLEX VARIABLE SPEED WATER BOOSTER PACKAGE	END SUCTION	60 EACH	104	5 EACH	480	3	60	HY-FAB	MVP-850-460	1,4,5

REMARKS:
1. EQUIVALENT MANUFACTURERS: GRUNDFOS, TACO, PACE
2. PUMP SHALL BE ALL BRONZE CONSTRUCTION.
3. PROVIDE AUTOMATIC TIMER KIT AND AQUASTAT EQUAL TO BELL & GOSSETT MODEL TC-1 AND AQS-3/4
4. PROVIDE BOOSTER PUMP PACKAGE WITH FX-60V HYDRO-PNUEMATIC TANK
5. PROVIDE WITH BACNET MS/TP COMMUNICATION MODULE FOR OUTPUT TO BAS. COORDINATE CONNECTION TO BAS SYSTEM WITH CONTROLS CONTRACTOR.

MIXING VALVE SCHEDULE

SYM.	DESCRIPTION	MAXIMUM GPM	MINIMUM GPM	PRESSURE LOSS (PSI)	LEAVING WATER TEMP. (°F)	SELECTION BASED ON		REMARKS
						MANUFACTURER	MODEL	
MV1	THERMOSTATIC MIXING VALVE CONTROL STATION	115	1	5	115	LEONARD	4NB-LF	1,2
MV2	THERMOSTATIC MIXING VALVE	4.5	0.5	5	110	SYMMONS	7-225-CK SERIES	1

REMARKS:
1. EQUIVALENT MANUFACTURERS: LAWLER, POWERS
2. HIGH-LOW MANIFOLD.

INTERCEPTOR SCHEDULE

SYM.	DESCRIPTION	INLET/ OUTLET SIZE	FLOW RATE (GPM)	CAPACITY		SELECTION BASED ON		REMARKS
				WATER (GALLONS)	OIL (GALLONS)	MANUFACTURER	MODEL	
OIL1	OIL INTERCEPTOR	4	100	300	156	PROCEPTOR	OMC 300	1,2,3

REMARKS:
1. EQUIVALENT MANUFACTURERS: SCHEIB, XERXES, HIGHLAND TANK, ZURN
2. INSTALL BELOW GRADE FOR HEAVY VEHICULAR TRAFFIC
3. PROVIDE MULTI-LEVEL OIL MOINTOR

BACKFLOW PREVENTER SCHEDULE

SYM.	DESCRIPTION	SYSTEM	DESCRIPTION	MANUF.	MODEL	COMMENTS
BFP1	REDUCED PRESSURE PRINCIPLE ASSEMBLE	DOMESTIC WATER	REDUCED PRESSURE PRINCIPLE ASSEMBLY 2"	ZURN WILKINS	375V-OSY	
BFP2	REDUCED PRESSURE PRINCIPLE ASSEMBLE	MAKE-UP WATER	REDUCED PRESSURE PRINCIPLE ASSEMBLY 1"	ZURN WILKINS	975XL	

PLUMBING FIXTURE AND EQUIPMENT SCHEDULE

SYM.	DESCRIPTION	CONNECTIONS (IN.) W	V	CW	HW	SPECIFICATION	REMARKS
P1	WATER CLOSET, HET, ELONGATED BOWL, WALL HUNG, FLUSH VALVE, SENSOR, HARD-WIRED, 1.28 GPF	4"	2"	1-1/2"	-	FIXTURE: ZURN Z5615-BWL SEAT: CHURCH 9500CT FLUSH VALVE: ZURN ZEMS6000PL-HET MATERIAL: VITREOUS CHINA COLOR: WHITE CARRIER: ZURN Z-1203 SERIES	SEAT HEIGHT 15" AFF SEE NOTE 4 BELOW
P1A	WATER CLOSET, HET, ADA COMPLIANT, ELONGATED BOWL, WALL HUNG, FLUSH VALVE, SENSOR, HARD-WIRED, 1.28 GPF	4"	2"	1-1/2"	-	FIXTURE: ZURN Z5615-BWL SEAT: CHURCH 9500CT FLUSH VALVE: ZURN ZEMS6000PL-HET MATERIAL: VITREOUS CHINA COLOR: WHITE CARRIER: ZURN Z-1203 SERIES	PROVIDE LEVER ON WIDE SIDE OF STALL SEAT HEIGHT 17"-19" AFF SEE NOTE 4 BELOW
P2	URINAL, HEU, ADA COMPLIANT, WALL MOUNTED, FLUSH VALVE, SENSOR, HARD-WIRED, 0.125 GPF	2"	1-1/2"	3/4"	-	FIXTURE: ZURN Z5758 FLUSH VALVE: ZURN ZEMS6003PL-ULF COLOR: WHITE MATERIAL: VITREOUS CHINA CARRIER: ZURN FLOOR MOUNTED URINAL CARRIER	FIXTURE LIP HEIGHT 24"AFF SEE NOTE 4 BELOW
P2A	URINAL, HEU, ADA COMPLIANT, WALL MOUNTED, FLUSH VALVE, SENSOR, HARD-WIRED, 0.125 GPF	2"	1-1/2"	3/4"	-	FIXTURE: ZURN Z5758 FLUSH VALVE: ZURN ZEMS6003PL-ULF COLOR: WHITE MATERIAL: VITREOUS CHINA CARRIER: ZURN FLOOR MOUNTED URINAL CARRIER	FIXTURE LIP HEIGHT 17"AFF SEE NOTE 4 BELOW
P3A	LAVATORY, ADA COMPLIANT, SINK UNDER-MOUNTED OVAL BOWL, GRID DRAIN, SENSOR FAUCET, HARD-WIRED, 0.25 GPC	2"	1-1/2"	1/2"	1/2"	FIXTURE: ZURN Z5220 DRAIN: ZURN Z8743 GRID STRAINER FAUCET: ZURN Z6950-XL-IM-S-CWB, 0.25 GPC P-TRAP: ZURN Z-8701 (1-1/4" x 1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK MATERIAL: VITREOUS CHINA	SEE NOTES 1 & 4 BELOW
P4A	ELECTRIC WATER COOLER, ADA WALL MOUNTED, SINGLE COOLER, STAINLESS STEEL FINISH, BOTTLE FILLER, FLEXIBLE BUBBLER	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LZWS-LBP8M28K P-TRAP: ZURN Z-8701 (1-1/4" X 1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK CARRIER: FLOOR MOUNTED CHAIR CARRIER	BUBBLER HEIGHT 34" AFF
P5A	2-COMP, STAINLESS STEEL SINK, ADA COMPLIANT, 42" x 18" x 5.5" (19" x 16" BOWLS), FOUR HOLE PUNCH, KITCHEN FAUCET, 1.5 GPM OUTLET, BASKET STRAINERS	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY ELUHAD4218 DRAIN: ELKAY LK3SL, BASKET STRAINER FAUCET: ZURN Z82300-XL-CP8-HS (1.5 GPM) P-TRAP: ZURN 8703 (1-1/2"X2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK	PROVIDE MINIMUM CLEARANCES BELOW SINK TO MEET ADA REQUIREMENTS. SEE NOTE 1 BELOW
P5B	2-COMP. STAINLESS STEEL SINK, ADA COMPLIANT, 42" x 18" x 5.5" (19" x 16" BOWLS), FOUR HOLE PUNCH, KITCHEN FAUCET, 1.5 GPM OUTLET, BASKET STRAINERS	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY ELUHAD4218 DRAIN: ELKAY LK3SL, BASKET STRAINER FAUCET: ZURN Z82300-XL-CP8-HS (1.5 GPM) P-TRAP: ZURN 8703 (1-1/2"X2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK	PROVIDE MINIMUM CLEARANCES BELOW SINK TO MEET ADA REQUIREMENTS. SEE NOTES 1 & 5 BELOW
P5C	LAUNDRY TUB, MOLDED COMPOSITE 21-1/2"L x 23"W x 13-7/16"D FLOOR MOUNTED PROVIDE (1.5 GPM) AERATOR	2"	1-1/2"	1/2"	1/2"	FIXTURE: FIAT FL-1 FAUCET: ZURN Z812G6-XL (1.5 GPM) DRAIN: 1-1/2" PLUG DRAIN P-TRAP: ZURN 8703 (1-1/2"x2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR	PROVIDE ACCESSORY KIT WITH (4) LEGS
P6A	SHOWER, ROLL-IN ADA COMPLIANT, TRENCH DRAIN, PRESSURE BALANCED SHOWER VALVE, 1.5 GPM WALL SHOWERHEAD AND HAND HELD SHOWER WITH HOSE AND SLIDE BAR.	2"	1-1/2"	1/2"	1/2"	FIXTURE: COMFORT DESIGN XST 6232 TR.75 SHOWER TRIM: LEONARD 4500S-D2L-H14-515P(G)30 DRAIN: ZURN Z5880, STAINLESS STEEL, GRATE TO BE SELECTED BY ARCH. P-TRAP: 2" TRAP	REFER TO ARCHITECTURAL DETAIL FOR ADDITIONAL SURROUND INFORMATION AND SHOWER TRIM HEIGHTS AND LOCATIONS. GROUT BASE SOLID
P7	MOP SINK TERRAZZO 28" x 28" x 12" BUMPER GUARDS	3"	1-1/2"	1/2"	1/2"	BASIN: FIAT TSBCR-1100 DRAIN: FIAT 1453-BB FAUCET: FIAT 830-AA ACCESSORIES: MSG2828 SS WALL GUARDS ACCESSORIES: 832-AA HOSE & BRACKET ACCESSORIES: 889-CC MOP HANGER ACCESSORIES: E-88-AA BUMPERGUARDS	
P8	EMERGENCY EYEWASH / SHOWER POLISHED CHROME FINISH STAINLESS STEEL SHOWERHEAD AND RECEPTOR, WITH MIXING VALVE ADA COMPLIANT	4"	2"	1-1/4"	1"	FIXTURE: GUARDIAN G8F1909SSH-BC-TMV MOUNT PULL ROD AT ADA COMPLIANT HEIGHT TMV: GUARDIAN G3800LF	PROVIDE TEST KIT WITH BUCKET. PROVIDE 2" P-TRAP FOR EYEWASH DRAIN AT BASE OF UNIT.
P9	EMERGENCY EYE WASH WALL MOUNTED, STAINLESS STEEL, STAY-OPEN BALL VALVE, TWO SPRAY HEADS, WITH MIXING VALVE	2"	1-1/2"	1/2"	1/2"	FIXTURE: GUARDIAN G1814BC-TMV MIXING VALVE: GUARDIAN G3600LF P-TRAP: ZURN 8703 (1-1/2" X 2", 17 GA.)	INSTALL PER ANSI Z358.1
P10	EMERGENCY EYE WASH WALL MOUNTED, STAINLESS STEEL, STAY-OPEN BALL VALVE, TWO SPRAY HEADS	2"	1-1/2"	1/2"	1/2"	FIXTURE: GUARDIAN G1814BC P-TRAP: ZURN 8703 (1-1/2" X 2", 17 GA.)	INSTALL PER ANSI Z358.1
SA	SHOCK ARRESTOR	-	-	-	-	EQUIPMENT: SIOUX CHIEF 650 SERIES SIZE PER P.D.I. REQUIREMENTS	SEE SIZING TABLE THIS SHEET.
HB1	WALL HYDRANT AUTOMATIC DRAINING, FREEZELESS, ANTI-SIPHON VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD 65EP	MOUNT 18" AFF.
HB2	HOSE BIBB AUTOMATIC DRAINING, ANTI-SIPHON VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD 24	MOUNT 24" AFF.
HB3	YARD HYDRANT NON-FREEZE, AUTOMATIC DRAINING, VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD Y95 FINISH: BRASS BOX	
FCO	FLOOR CLEANOUT ADJUSTABLE, CAST IRON BODY, COATED CAST IRON TOP	SEE DWG	-	-	-	CLEANOUT: ZURN ZN-1400	GAS / WATER TIGHT ABS PLUG
WCO	WALL CLEANOUT CAST IRON BODY, STAINLESS STEEL WALL PLATE	SEE DWG	-	-	-	CLEANOUT: ZURN ZS-1468	GAS / WATER TIGHT ABS PLUG
YCO	YARD CLEANOUT ADJUSTABLE, CAST IRON BODY, COATED CAST IRON TOP	SEE DWG	-	-	-	CLEANOUT: ZURN ZN-1474 IN AN 18"L x 18"W x 6"D CONCRETE PAD.	GAS / WATER TIGHT ABS PLUG
CO	END OF LINE PLUG CLEANOUT CAST BRONZE	-	-	-	-	CLEANOUT: ZURN Z-1470	
FD1	FLOOR DRAIN CAST IRON BODY	SEE DWG	-	-	-	DRAIN: ZURN ZN-415-VP STRAINER: ZURN 6"Ø TYPE B FINISH: POLISHED NICKEL BRONZE	PROVIDE TRAP PRIMER WITH 1/2" COPPER SUPPLY TO TRAP.
FD2	FLOOR DRAIN, MECHANICAL ROOM CAST IRON BODY SEDIMENT BUCKET	SEE DWG	-	-	-	DRAIN: ZURN Z-556-Y STRAINER: ZURN 8"Ø FINISH: COATED CAST IRON	SEE NOTE 2 BELOW. PROVIDE TRAP PRIMER CONNECTION AS REQUIRED
TD1	TRENCH DRAIN, 6'-8" LONG, INTEGRAL FRAMES, DUCTILE IRON SLOTTED GRATE	4"	2"	-	-	DRAIN: ZURN Z886-HD-DGC, 1 SECTION WITH 2 CLOSED END CAPS AND A 4" BOTTOM OUTLET P-TRAP & DEEP SEAL	
	NOT USED						
TP1	TRAP PRIMER PROVIDE DISTRIBUTION UNIT WHEN SERVING MORE THAN ONE DRAIN	-	-	1/2"	-	PRIMER: PPP "OREGON #1"	PROVIDE TRAP PRIMER WITH 1/2" COPPER SUPPLY TO TRAP.
IMB1	ICE MAKER BOX	-	-	1/2"	-	EQUIPMENT: GUY GRAY BIM-875 MATERIAL: 16 GAUGE STEEL WITH EPOXY FINISH	
IWB	INDIRECT WASTE BOX RECESSED WHITE ABS BOX & FRAME, WITH INTEGRAL SHOCK ARRESTOR	2"	1-1/2"	-	-	FIXTURE: SIOUX CHIEF 696-3 "OX BOX" FUNNEL: SIOUX CHIEF 696-CF, 1-1/2" AIR GAP	
CS1	BALANCING VALVE	-	-	3/4"	-	EQUIPMENT: CIRCUIT SOLVER CS-3/4"-120	PROVIDE 3/4"-120 UNLESS OTHERWISE NOTED ON PLAN.

NOTES:
1. PROVIDE PRE-MANUFACTURED INSULATION KIT FOR EXPOSED TRIM UNDER SINK. COORDINATE WITH ARCHITECT PRIOR TO ORDERING.
2. PROVIDE SURESEAL INLINE FLOOR DRAIN TRAP SEALER IN FLOOR DRAIN FOR WATERLESS TRAP PRIMER.
3. CONTRACTOR SHALL VERIFY IF GFI TYPE ELECTRICAL OUTLET IS REQUIRED WITH ELECTRICAL CONTRACTOR. PROVIDE GFI TYPE OUTLET IF REQUIRED.
4. PROVIDE "-HW6" HARD-WIRED CONVERTER AND "-MJ" MINI JUNCTION BOX IN EACH ROOM AT FIXTURE LOCATION TO POWER UP TO 8 SENSOR FIXTURES. COORDINATE WITH E.C. AND ARCHITECT PRIOR TO PERFORMING ANY WORK.
5. PROVIDE VALUED CW SUPPLY TO ADJACENT ICEMAKER. PROVIDE BACKFLOW PREVENTER EQUAL TO WATTS 5D3 PRIOR TO CONNECTION TO ICEMAKER. DRAIN BACKFLOW PREVENTER AND ICEMAKER TO FLOOR DRAIN WITH AIR GAP. PROVIDE TRAP PRIMER WITH 1/2" CW SUPPLY FOR ICEMAKER FLOOR DRAIN.

APPROVED EQUALS:	SPECIFIED PRODUCT:	ACCEPTED EQUAL:
THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	ZURN (VITREOUS CHINA FIXTURES) ZURN (SENSOR FLUSH VALVES) ZURN (SENSOR FAUCETS) ZURN (MANUAL FAUCETS) ELKAY (S.S. SINKS) ELKAY (WATER COOLERS) ZURN (SUPPLY STOPS) ZURN (DRAINS, CARRIERS) FIAT (UTILITY) LEONARD (SHOWER VALVES)	AMERICAN STANDARD, KOHLER, TOTO KOHLER, SLOAN, TOTO CHICAGO, KOHLER, SLOAN, TOTO CHICAGO, KOHLER ACCORN, JUST HAWS, OASIS BRASSCRAFT, E.B.C., MCGUIRE J.R. SMITH, WADE FLORESTONE, STERN WILLIAMS DELTA, MOEN COMMERCIAL, LAWLER, SYMMONS

SHOCK ARRESTOR SIZING TABLE

DRAWING SYMBOL	FIXTURE UNITS	PDI WH201 STANDARD DESIGNATION	ARRESTOR SIZE	APPROVED MANUFACTURERS
SA-A	1-11	A	1/2"	- SIOUX CHIEF - WATTS - PPP INC.
SA-B	12-32	B	3/4"	
SA-C	33-60	C	1"	
SA-D	61-113	D	1-1/4"	REMARKS
SA-E	114-154	E	1-1/2"	INSTALL SHOCK ARRESTORS PER PDI WH201 GUIDELINES
SA-F	155-330	F	2"	

PLUMBING LOAD SUMMARY

LOAD	FIXTURE UNITS	FLOW
OFFICE: SANITARY WASTE	125 DFU	-
OFFICE: DOMESTIC WATER	263 FU	103 GPM
WAREHOUSE: SANITARY WASTE	30 DFU	-
WAREHOUSE: DOMESTIC WATER	66 FU	56 GPM

GAS LOAD SUMMARY (BASE BID)

LOAD	CONSUMPTION (CFH)
DOMESTIC WATER HEATER: WH1	150
MECHANICAL BOILER: HWB-1	1,250
MECHANICAL BOILER: HWB-2	1,250
RADIANT HEATER: GRH-1	40
RADIANT HEATER: GRH-2	40
RADIANT HEATER: GRH-3	40
RADIANT HEATER: GRH-4	50
TOTAL	2,820

NOTES:
FARTHEST POINT OF DELIVERY FROM GAS METER (TO 2 PSI GAS PRESSURE REGULATOR AT WATER HEATERS IN MECHANICAL ROOM) = ±300 FT.

FUEL GAS CODE TABLE FOR ABOVE GRADE 2 PSI PIPING: 2012 NCFGC - TABLE 402.4(3)
SCHEDULE 40 METALLIC PIPE, 2 PSI INLET PRESSURE, 1 PSI PRESSURE DROP.

FUEL GAS CODE TABLE FOR ABOVE GRADE LOW PRESSURE PIPING: 2012 NCFGC - TABLE 402.4(2)
SCHEDULE 40 METALLIC PIPE, 0.5 PSI INLET PRESSURE, 0.5" W.C. PRESSURE DROP.

*-AVAILABLE AT PRESSURE REGULATOR

GAS LOAD SUMMARY (ALTERNATE #10)

LOAD	CONSUMPTION (CFH)
DOMESTIC WATER HEATER: WH1	150
MECHANICAL BOILER: HWB-1	1,250
MECHANICAL BOILER: HWB-2	1,250
TOTAL	2,650

NOTES:
FARTHEST POINT OF DELIVERY FROM GAS METER (TO 2 PSI GAS PRESSURE REGULATOR AT WATER HEATERS IN MECHANICAL ROOM) = ±100 FT.

FUEL GAS CODE TABLE FOR ABOVE GRADE 2 PSI PIPING: 2012 NCFGC - TABLE 402.4(3)
SCHEDULE 40 METALLIC PIPE, 2 PSI INLET PRESSURE, 1 PSI PRESSURE DROP.

FUEL GAS CODE TABLE FOR ABOVE GRADE LOW PRESSURE PIPING: NCFGC 2012 - TABLE 402.4(2)
SCHEDULE 40 METALLIC PIPE, 0.5 PSI INLET PRESSURE, 0.5" W.C. PRESSURE DROP.

*-AVAILABLE AT PRESSURE REGULATOR

ALTERNATE NOTE AS IT RELATES TO GAS PIPING:
THIS ALTERNATE REFLECTS THE UPDATED GAS LOAD SUMMARY RESULTING FROM THE REMOVED GAS-FIRED RADIANT HEATERS GRH-1 (3 EACH) AND GRH-2 (2 EACH).

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8/28/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RPD
CHECKED BY: DAR

PLUMBING SCHEDULES

P-002

OPTIMA #: 16-0265 2 OF 12

BUILDING BID DOCUMENTS

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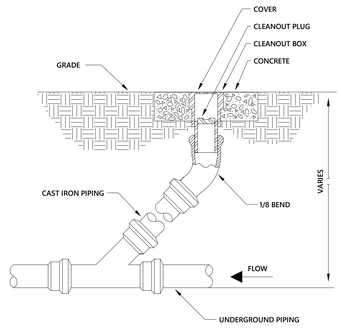
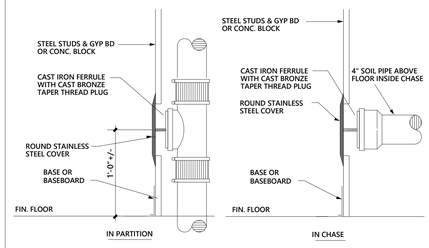
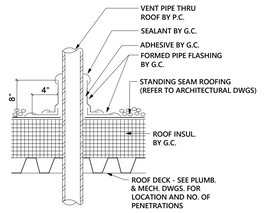
8/29/2017 2:57:07 PM



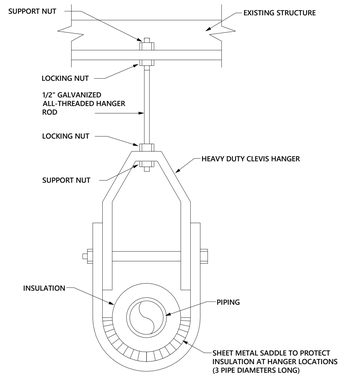
1 YARD CLEANOUT DETAIL
SCALE: NONE



2 WALL CLEANOUT DETAIL
SCALE: NONE



3 VENT THROUGH ROOF SCHEMATIC
NO SCALE



4 PIPE HANGER DETAIL
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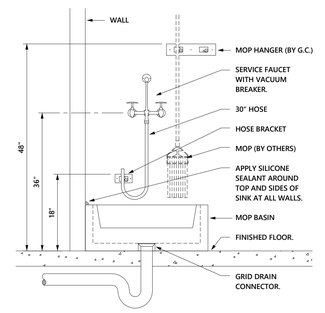
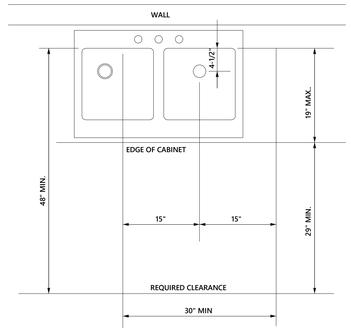
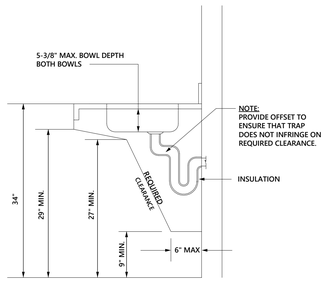
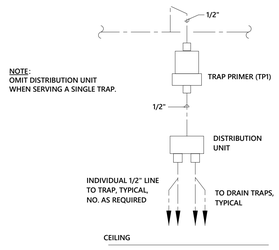


5 MOP BASIN AND ACCESSORIES
NO SCALE





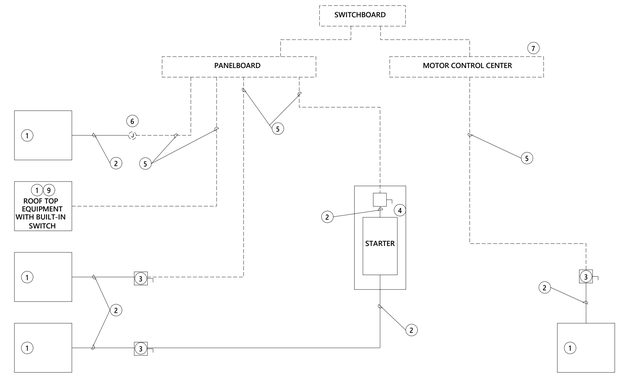
6 ACCESSIBLE KITCHEN SINK DETAIL
NO SCALE



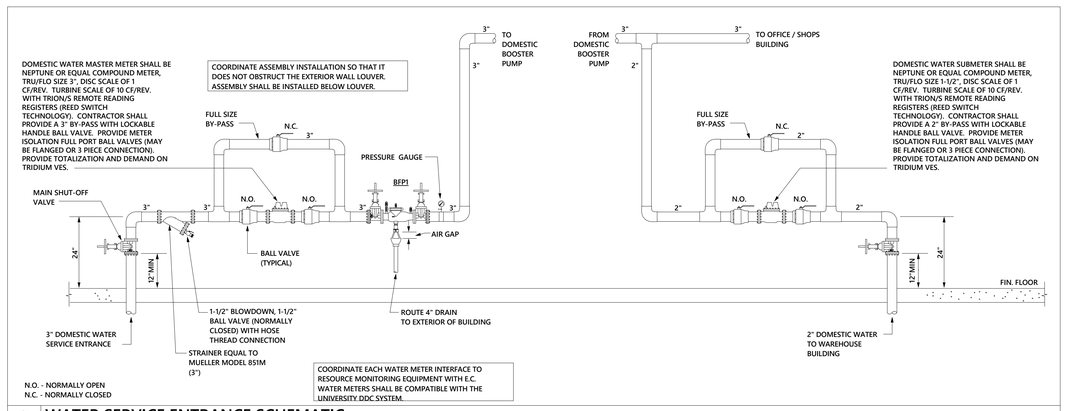
7 TRAP PRIMER DETAIL
NO SCALE

NOTES:

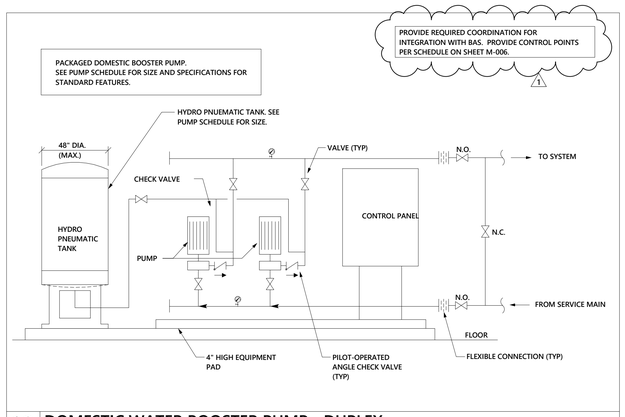
1. EQUIPMENT OF TRADES OTHER THAN ELECTRICAL.
2. CONDUIT AND WIRING BY MECHANICAL, PLUMBING CONTRACTOR OR OTHER TRADES.
3. IF AN ADDITIONAL DISCONNECT IS REQUIRED BY NEC, IT SHALL BE PROVIDED AND INSTALLED BY THE EQUIPMENT CONTRACTOR.
4. A COMBINATION STARTER OR VFD MAY BE USED IN LIEU OF A SEPARATE DISCONNECT SWITCH AND STARTER LOCATE ADJACENT TO EQUIPMENT.
5. FEEDER CIRCUIT WIRING AND CONDUIT IN ELECTRICAL WORK SEE PANELBOARD SCHEDULES FOR WIRE AND BREAKER SIZES.
6. JUNCTION BOX MAY BE SHOWN ON ELECTRICAL PLANS FOR SOME EQUIPMENT. IF NO STARTER OR DISCONNECT IS SUPPLIED, A JUNCTION BOX SHALL BE INSTALLED ADJACENT TO EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LINE SIDE WIRING TO THE JUNCTION BOX. LOAD SIDE WIRING WILL BE PROVIDED BY MECHANICAL CONTRACTOR OR OTHER TRADES.
7. PROJECTS UTILIZING AN MCC. THE STARTER, CB, OR VFD IN THE MCC ARE PROVIDED BY THE ELECTRICAL CONTRACTOR.
8. IN ALL CASES THE EQUIPMENT CONTRACTOR SHALL MAKE FINAL CONNECTIONS STARTUP, AND TEST EQUIPMENT.
9. IF THE ROOF TOP EQUIPMENT IS NOT PROVIDED WITH BUILT IN SWITCH, THE ELECTRICAL CONTRACTOR SHALL PROVIDE A DISCONNECT SWITCH.



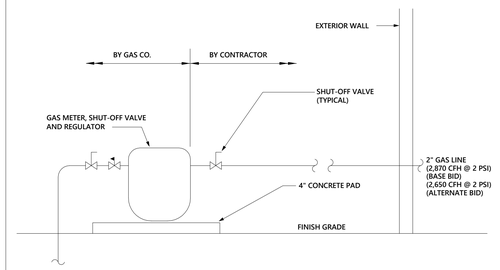
8 ELECTRICAL REQUIREMENTS FOR PLUMBING CONTRACTOR (DIVISION 22/26 DEMARCATION)
NO SCALE



9 WATER SERVICE ENTRANCE SCHEMATIC
NO SCALE



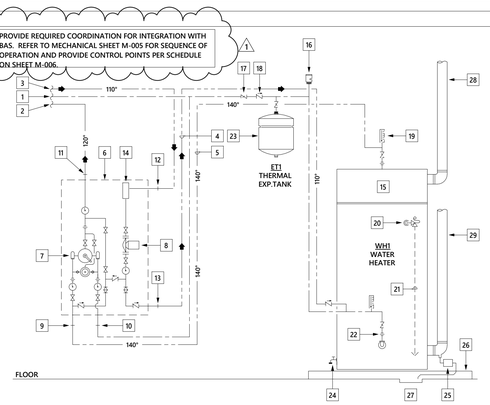
10 DOMESTIC WATER BOOSTER PUMP - DUPLEX
NO SCALE



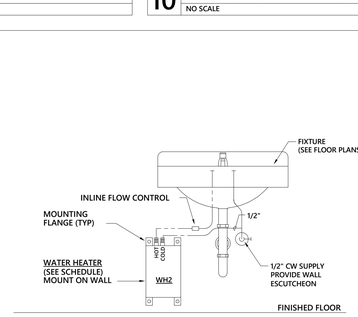
GAS METER WITH DIGITAL PULSE OUTPUT. THE GAS METER SHALL PROVIDE BOTH CUBIC FEET (CF) TOTAL AND CUBIC FEET PER HOUR DEMAND (CFH). TIE METER SIGNALS INTO BUILDING AUTOMATION SYSTEM. COORDINATE WITH CONTROLS CONTRACTOR. COORDINATE METER REQUIREMENTS WITH GAS COMPANY. P.C. SHALL PROVIDE CONDUIT FOR SIGNAL WIRE FROM METER TO BUILDING.

11 GAS SERVICE ENTRANCE
NO SCALE

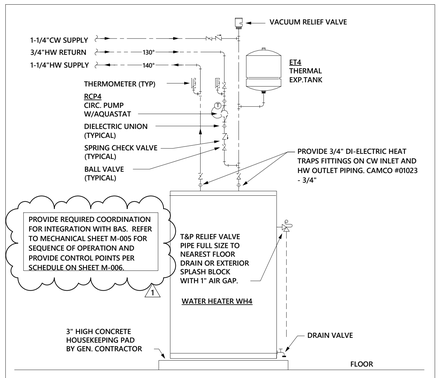
1. CW SUPPLY TO MIXING VALVE AND WATER HEATER
2. HOT WATER SUPPLY TO FIXTURES
3. HOT WATER RETURN FROM FIXTURES
4. HOT WATER RETURN TO WATER HEATER
5. HOT WATER SUPPLY FROM WATER HEATER
6. PRE-FABRICATED MIXING VALVE ASSEMBLY: MV1
7. THERMOSTATIC MIXING VALVE LEONARD TM SERIES MAX. PRESSURE LOSS OF 5 PSI @ 33 GPM
8. ALL BRONZE HOT WATER CIRCULATOR RCP1
9. 1-1/4" HOT WATER INLET CONNECTION
10. 1-1/4" COLD WATER INLET CONNECTION
11. 1-1/2" TEMPERED HOT WATER OUTLET CONNECTION
12. 3/4" HOTWATER RETURN INLET CONNECTION
13. 3/4" HOT WATER RETURN OUTLET CONNECTION
14. PUMP CONTROL AQUASTAT
15. HIGH EFFICIENCY GAS FIRE WATER HEATER
16. VACUUM RELIEF VALVE
17. BALL VALVE (TYPICAL.)
18. CHECK VALVE (TYPICAL)
19. THERMOMETER (TYPICAL)
20. TEMPERATURE AND PRESSURE RELIEF VALVE (T&P VALVE).
21. T&P VALVE RELIEF DISCHARGE. PIPE FULL SIZE TO SPILL OVER FLOOR DRAIN WITH AIR GAP
22. UNION, TYPICAL.
23. THERMAL EXPANSION TANK
24. WATER HEATER DRAIN VALVE
25. CONDENSATE NEUTRALIZATION KIT PROVIDED BY WATER HEATER MANUFACTURER
26. 4" HIGH CONCRETE HOUSEKEEPING PAD PROVIDED BY PLUMBING CONTRACTOR
27. FLOOR DRAIN OR OTHER APPROVED WASTE RECEPTOR
28. EXHAUST PIPE (TYPICAL)
29. AIR INTAKE PIPE (TYPICAL)
30. HOT WATER CIRCULATION PUMP



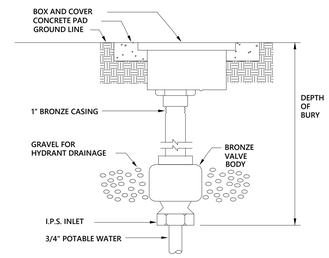
12 GAS FIRED WATER HEATER SCHEMATIC (WH1)
NO SCALE



13 INSTANTANEOUS WATER HEATER (WH2)
NO SCALE



14 ELECTRIC WATER HEATER SCHEMATIC (WH4)
NO SCALE



NOTES: 1. INSTALL COVER AND CONCRETE PAD ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

15 YARD HYDRANT DETAIL
NO SCALE

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

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227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

NORTH CAROLINA PROFESSIONAL SEAL 26023 ENGINEER GEORGE C. FOWLER III

8/28/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT:	9202-164730
SCO ID:	16-15656-02B
ITEM: 315	CODE: 41526
DATE:	AUGUST 21, 2017
DRAWN BY:	RPD
CHECKED BY:	DAR

PLUMBING DETAILS

P-003

OPTIMA #: 16-0265 3 OF 12

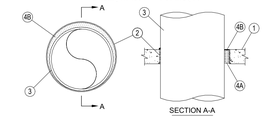
BUILDING BID DOCUMENTS

C:\Users\rdeese\Documents\16-0265_R16_MEP_rpdeese.rvt
8/29/2017 6:46:01 AM

System No. C-AJ-1226

METAL PIPE THROUGH CONCRETE WALL ASSEMBLY

F Rating — 3 Hr
T Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/Sq Ft
L Rating At 400 F — 4 CFM/Sq Ft



SECTION A-A

1. Floor or Wall Assembly -- Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 32 in.

2. Metallic Sleeve -- (Optional) Nom 32 in. diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces or extending a max of 3 in. above floor or beyond both surfaces of wall.

2A. Sheet Metal Sleeve -- (Optional) Max 6 in. diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. below the bottom of the deck and a max of 1 in. above the top surface of the concrete floor.

2B. Sheet Metal Sleeve -- (Optional) - Max 12 in. diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approx mid-height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place and may extend a max of 4 in. below the bottom of the deck and a max of 1 in. above the top surface of the concrete floor.

3. Through-Penetrant -- One metallic pipe, tube or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between penetrant and periphery of opening shall be min 0 in. (point contact) to max 1-7/8 in. Penetrant may be installed with continuous point contact. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic penetrants may be used:
A. Steel Pipe -- Nom 30 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe -- Nom 30 in. diam (or smaller) cast or ductile iron pipe.
C. Copper Pipe -- Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
D. Copper Tubing -- Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
E. Conduit -- Nom 6 in. diam (or smaller) steel conduit.
F. Conduit -- Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT).

4. Firestop System -- The firestop system shall consist of the following:
A. Packing Material -- Min 4 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall or sleeve as required to accommodate the required thickness of fill material.
B. Fill, Void or Cavity Material* -- Sealant -- Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor or sleeve or with both surfaces of wall or sleeve. At the point or continuous contact locations between penetrant and concrete or sleeve, a min 1/4 in. diam bead of fill material shall be applied at the concrete or sleeve/ pipe penetrant interface on the top surface of floor and on both surfaces of wall.

*Bearing the UL Classification Mark

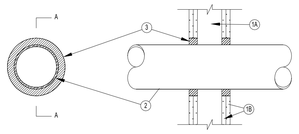
NOTE:
FIRE STOP SYSTEM FOR HORIZONTAL ASSEMBLIES SHALL MEET THE REQUIREMENTS OF NCBC 712.4.1.1.2 WITH A MINIMUM POSITIVE PRESSURE DIFFERENTIAL OF 0.01" WATER, AND F-RATING AND T-RATING OF NOT LESS THAN 1 HOUR.

1 U.L. SYSTEM NO C-AJ-1226 DETAIL
NO SCALE

System No. W-L-1054

METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating At 400 F - 4 CFM/Sq Ft



SECTION A-A

1. Wall Assembly -- The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
B. Gypsum Board* -- 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.
The F Rating of the firestop system is equal to the fire rating of the wall assembly.

2. Through-PenetrantOne metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
A. Steel Pipe –Nom 30 in diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe –Nom 30 in. diam (or smaller) cast or ductile iron pipe.
C. Conduit –Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
D. Copper Tubing Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
E. Copper Pipe –Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.

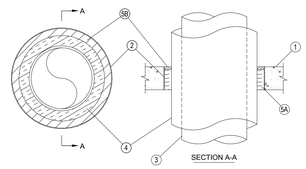
3. Fill, Void or Cavity Material* -- Sealant -- Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall .
*Bearing the UL Classification Mark

2 U.L. SYSTEM NO W-L-1054 DETAIL
NO SCALE

System No. C-AJ-5091

INSULATED METAL PIPE THROUGH CONCRETE WALL ASSEMBLY

F Rating — 2 Hr
T Rating — 1 Hr
L Rating At Ambient — 4 CFM/Sq Ft
L Rating At 400 F — Less Than 1 CFM/Sq Ft



SECTION A-A

1. Floor or Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 19-1/2 in.
See Concrete Blocks (CAZT) category in the Fire Resistance directory for names of manufacturers.

2. Metallic Sleeve — (Optional) — Nom 20 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

2A. Sheet Metal Sleeve — (Optional) - Max 6 in. diam, min 26 ga galv steel provided with a 26 ga galv steel square flange spot welded to the sleeve at approximately mid- height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. above the top surface of the floor.

2B. Sheet Metal Sleeve — (Optional) - Max 12 in. diam, min 24 ga galv steel provided with a 24 ga galv steel square flange spot welded to the sleeve at approximately mid- height, or flush with bottom of sleeve in floors, and sized to be a min of 2 in. larger than the sleeve diam. The sleeve is to be cast in place flush with bottom surface of floor and may extend a max of 1 in. above the top surface of the floor.

3. Through Penetrants — One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A. Steel Pipe — Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe — Nom 12 in. diam (or smaller) cast or ductile iron pipe.
C. Copper Pipe — Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.
D. Copper Tubing — Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

4. Pipe Covering -- Nom 2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all-service jacket. Longitudinal joints sealed with metal fasteners or factory-applied, self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between the insulated pipe and the edge of the periphery of the opening shall be min 1/2 in. to a max 2-1/4 in.
e-017J0.4; See Pipe Equipment Covering -- Materials -- (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4A. Pipe Covering -- (Not Shown) -- As an alternate to Item 4, max 2 in. thick cylindrical calcium silicate (min 14 pcf) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. OC. The annular space shall be min 1/2 in. to max 2-1/4 in.

5. Firestop System -- The firestop system shall consist of the following:
A. Packing Material -- Min 4 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
B. Fill, Void or Cavity Material* -- Sealant -- Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.

*Bearing the UL Classification Mark

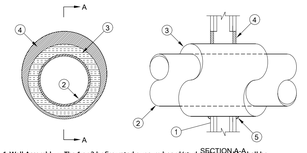
NOTE:
FIRE STOP SYSTEM FOR HORIZONTAL ASSEMBLIES SHALL MEET THE REQUIREMENTS OF NCBC 712.4.1.2 WITH A MINIMUM POSITIVE PRESSURE DIFFERENTIAL OF 0.01" WATER, AND F-RATING AND T-RATING OF NOT LESS THAN 1 HOUR.

3 U.L SYSTEM NO C-AJ-5091 DETAIL
NO SCALE

System No. W-L-5029

INSULATED METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1/2, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating At Ambient — 4 CFM/Sq Ft
L Rating At 400 F — Less Than 1 CFM/Sq Ft



SECTION A-A

1. Wall Assembly -- The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.
B. Gypsum Board* -- 5/8 in. thick, 4 ft wide, with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 18-5/8 in.
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. Through Penetrants -- One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A. Steel Pipe -- Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. Iron Pipe -- Nom 12 in. diam (or smaller) cast or ductile iron pipe.
C. Copper Tubing -- Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
D. Copper Pipe -- Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. Pipe Covering* -- Nom 1, 1-1/2 or 2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product.
See Pipe and Equipment Covering - Materials (BRGU) category in the Building Material Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Incex of 25 or less and a Smoke Developed Index of 50 or less may be used.
The hourly T Rating of the firestop system is dependent on the hourly fire rating of the wall assembly in which it is installed, the size and type of through penetrant and the pipe covering thickness, as shown in the table below:

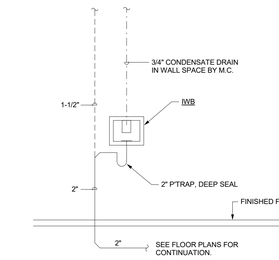
Wall Assembly Rating Hr	Through Penetrant		Pipe Covering Thkns In.	Annular Space		T Rating Hr
	Type +	Max Diam In.		Min In.	Max In.	
1	A	4	1	0	1-1/2	1/2
1	B or C	2	1 or 1-1/2	0	1-1/2	1/2
1	A	4	1-1/2	0	1-1/2	1
1	A	12	2	0	1-7/8	3/4
1	B or C	6	2	0	1-7/8	1
2	A	4	1	0	1-1/2	1
2	B or C	4	1 or 1-1/2	0	1-1/2	1
2	B or C	6	2	0	1-7/8	1
2	A	4	1-1/2	0	1-1/2	1-3/4
2	A	12	2	0	1-7/8	1-1/2
2	B or C	6	2	0	1-7/8	1

+Indicates penetrant type as itemized in Item 2.
3A. Pipe Covering* -- (Not Shown) -- As an alternate to Item 3, max 2 in. thick cylindrical calcium silicate (min 14 pcf) units sized to the outside diam of the pipe or tube may be used. Pipe insulation secured with stainless steel bands or min 8 AWG stainless steel wire spaced max 12 in. OC. When the alternate pipe covering is used, the T Rating shall be determined from the table above.
See Pipe and Equipment Covering -- Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

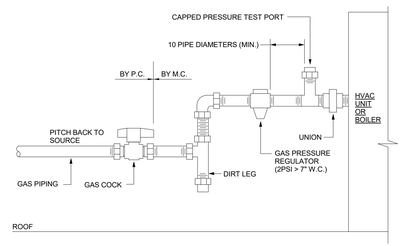
4. Fill, Void or Cavity Material* -- Sealant -- Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall . At the point contact location between pipe covering and gypsum board, a min 1/2 in. diam bead of fill material shall be applied at the pipe covering/gypsum board interface on both surfaces of wall.

*Bearing the UL Classification Mark

4 U.L SYSTEM NO W-L-5029 DETAIL
NO SCALE

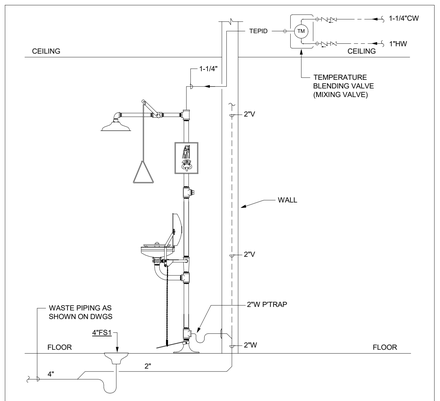


5 CONDENSATE DRAIN, WALL BOX SCHEMATIC
NO SCALE

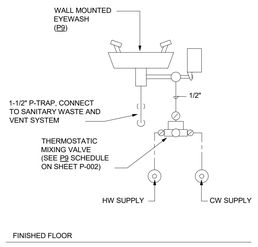


NOTES:
1. PROVIDE DIELECTRIC UNIONS WHERE DISSIMILAR METALS ARE JOINED.
2. GAS PIPING AND SHUT-OFF VALVE SHALL BE BY PLUMBING CONTRACTOR. DIRT LEG, REGULATOR, AND FINAL CONNECTION TO UNIT SHALL BE BY MECHANICAL (HVAC) CONTRACTOR.

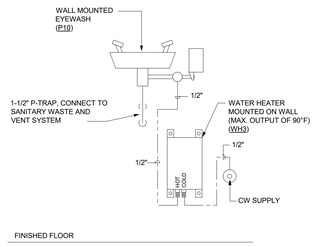
6 GAS CONNECTION DETAIL (TO HVAC EQUIPMENT)
NO SCALE



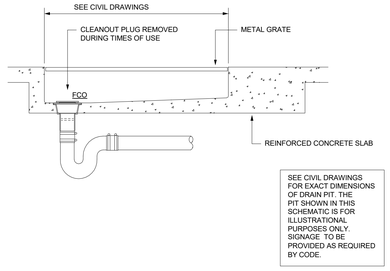
7 EMERGENCY SHOWER PIPING SCHEMATIC (P8)
NO SCALE



8 EMERGENCY EYEWASH & MIXING VALVE (P9)
NO SCALE



9 EMERGENCY EYEWASH & WATER HEATER (P10)
NO SCALE



10 SANITARY DUMP STATION SCHEMATIC
NO SCALE

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NORTH CAROLINA PROFESSIONAL SEAL 26023 ENGINEER GEORGE C. FOWLER, III
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RPD
CHECKED BY: DAR

PLUMBING DETAILS

P-004

OPTIMA #: 16-0265 4 OF 12

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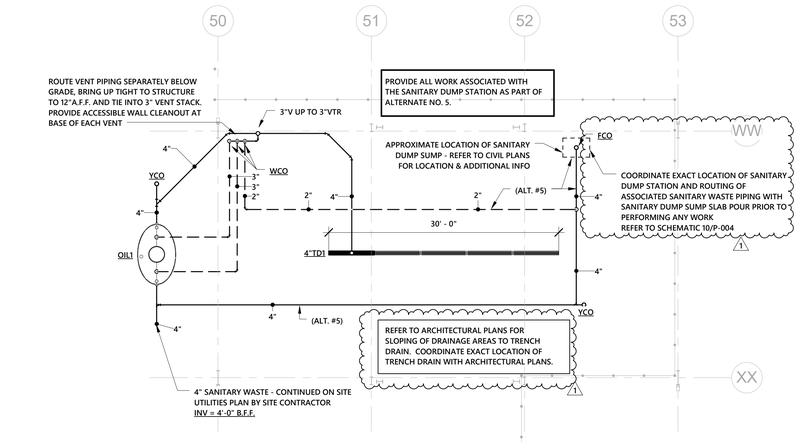
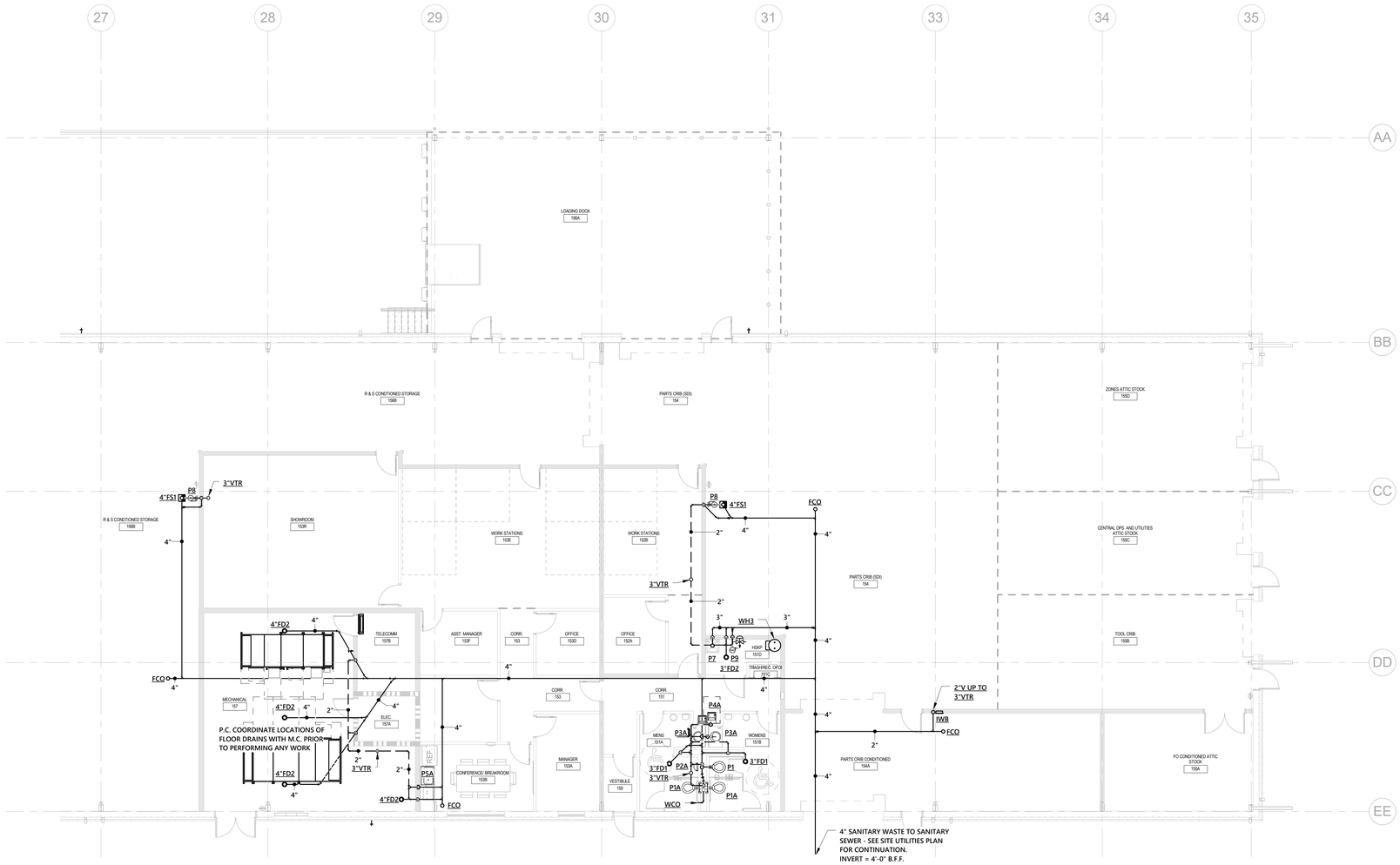
BUILDING BID DOCUMENTS



2 FLOOR PLAN - WASH RACK - WASTE & VENT

1/8" = 1'-0" 8 6 4 2 0 8 16

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



1 WAREHOUSE FLOOR PLAN - WASTE & VENT - WAREHOUSE - EAST

1/8" = 1'-0" 8 6 4 2 0 8 16

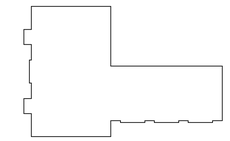
SCALE: 1/8"=1'-0"

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.
   - NON-RATED PARTITION TO CEILING
   - NON-RATED PARTITION TO DECK
   - 1 HR. RATED PARTITION TO DECK
   - 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN



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FLOOR PLAN - WAREHOUSE - WASTE AND VENT - EAST

P-102B

OPTIMA #: 16-0265 8 OF 12

BUILDING BID DOCUMENTS

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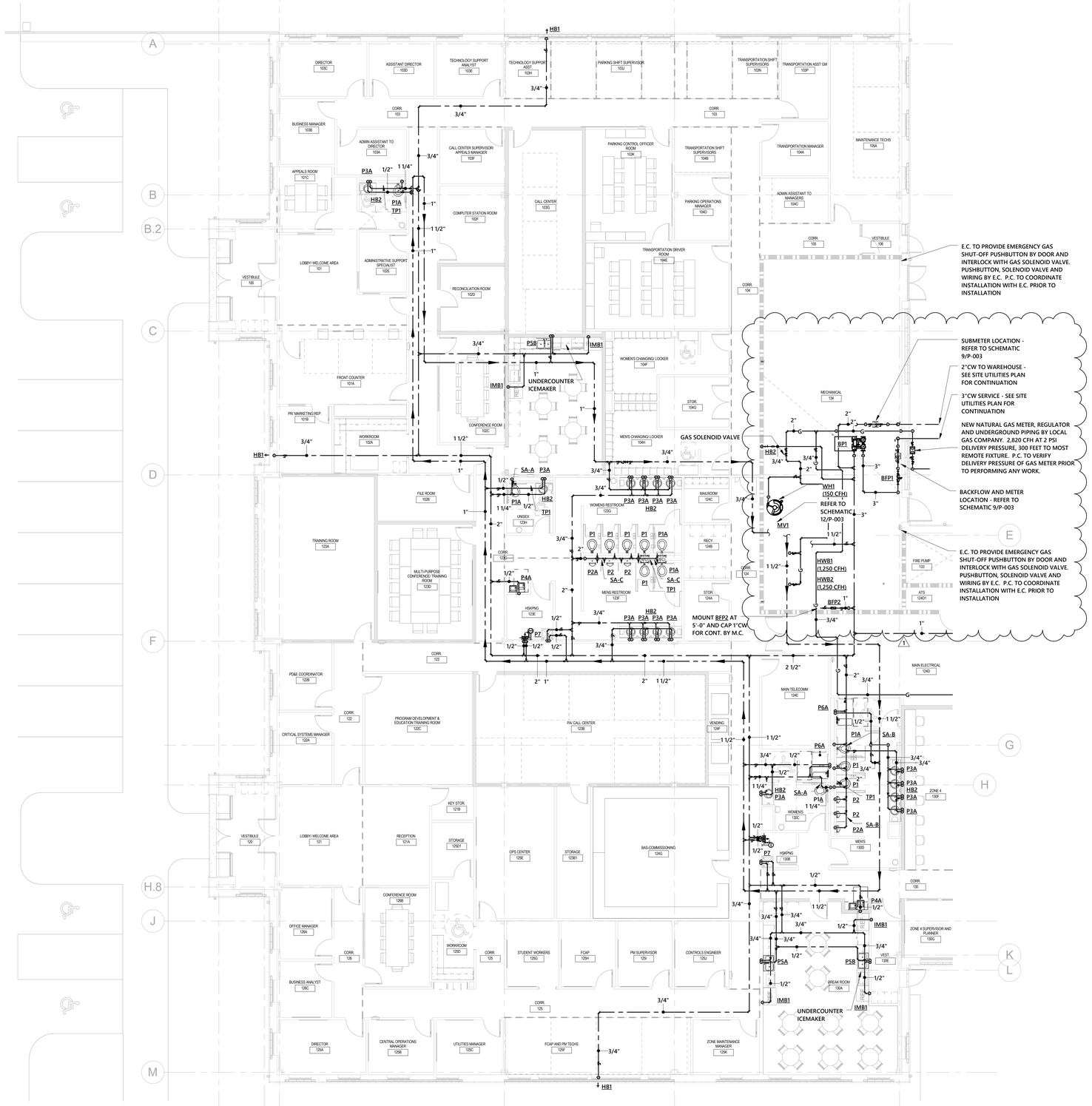

E.C. TO PROVIDE EMERGENCY GAS SHUT-OFF PUSHBUTTON BY DOOR AND INTERLOCK WITH GAS SOLENOID VALVE. PUSHBUTTON, SOLENOID VALVE AND WIRING BY E.C. P.C. TO COORDINATE INSTALLATION WITH E.C. PRIOR TO INSTALLATION

SUBMETER LOCATION - REFER TO SCHEMATIC 9/P-003

2"CW TO WAREHOUSE - SEE SITE UTILITIES PLAN FOR CONTINUATION

3"CW SERVICE - SEE SITE UTILITIES PLAN FOR CONTINUATION

NEW NATURAL GAS METER, REGULATOR AND UNDERGROUND PIPING BY LOCAL GAS COMPANY. 2,820 CFH AT 2 PSI DELIVERY PRESSURE, 300 FEET TO MOST REMOTE FIXTURE. P.C. TO VERIFY DELIVERY PRESSURE OF GAS METER PRIOR TO PERFORMING ANY WORK.

BACKFLOW AND METER LOCATION - REFER TO SCHEMATIC 9/P-003

E.C. TO PROVIDE EMERGENCY GAS SHUT-OFF PUSHBUTTON BY DOOR AND INTERLOCK WITH GAS SOLENOID VALVE. PUSHBUTTON, SOLENOID VALVE AND WIRING BY E.C. P.C. TO COORDINATE INSTALLATION WITH E.C. PRIOR TO INSTALLATION

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.
   - NON-RATED PARTITION TO CEILING
   - NON-RATED PARTITION TO DECK
   - 1 HR. RATED PARTITION TO DECK
   - 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN

1 FLOOR PLAN - PATS/FO - WATER & GAS

1/8" = 1'-0"

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

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FLOOR PLAN - PATS/FO - WATER AND GAS

P-201A

OPTIMA #: 16-0265 9 OF 12

BUILDING BID DOCUMENTS

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SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL DDC CONTROL SYSTEM (BAS) SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 230900) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 230900 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED BEFORE BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

NOTE: NEW BAS SHALL BE INTEGRATED WITH THE OWNER'S EXISTING CAMPUS BAS SYSTEM. BAS CONTRACTOR SHALL INCLUDE ALL NECESSARY HARDWARE AND SOFTWARE TO FULLY INTEGRATE NEW SYSTEM WITH THE EXISTING SYSTEM. MECHANICAL CONTRACTOR SHALL COORDINATE ALL EQUIPMENT COMMUNICATION REQUIREMENTS WITH CONTROLS VENDOR PRIOR TO ORDERING EQUIPMENT.

CHILLER PLANT

CHILLER AND CHILLED WATER PUMPS SHALL BE STOPPED/STARTED BY THE BAS ON A PROGRAMMED BASIS. CHILLERS CH-1, PRIMARY CHILLED WATER PUMPS P-1, P-2, AND SECONDARY CHILLED WATER PUMPS P-3, P-4 SHALL BE CONTROLLED TO PROVIDE CHILLED WATER TO THE SYSTEM. THE OPERATING PRIMARY PUMP AND OPERATING SECONDARY PUMP SHALL BE STARTED WHEN ANY ZONE IS IN THE OCCUPIED MODE AND THE OUTSIDE AIR TEMPERATURE IS ABOVE 50° F. (ADJ) AND ANY CHILLED WATER CONTROL VALVE HAS A CALL/DEMAND FOR CHILLED WATER. PRIMARY PUMPS, P-1, P-2, AND SECONDARY PUMPS, P-3, P-4, SHALL BE CONTROLLED IN A OPERATING/STAND-BY CONFIGURATION. BAS SHALL ALTERNATE OPERATING/STAND-BY EQUIPMENT TO EQUALIZE RUN TIME.

SECONDARY PUMP SPEED SHALL BE CONTROLLED BY DIFFERENTIAL PRESSURE SENSOR IN THE PIPING SYSTEM TO MAINTAIN SYSTEM PRESSURE. AS AIR HANDLING EQUIPMENT 2-WAY CONTROL VALVES OPEN, OPERATING PUMP SPEED SHALL BE INCREASED VIA VARIABLE FREQUENCY DRIVE TO MAINTAIN SYSTEM PRESSURE SETPOINT.

UPON A CALL FOR CHILLED WATER, THE OPERATING PRIMARY PUMP SHALL BE STARTED. THE CHILLER SHALL BE ENABLED. CHILLER FLOW SWITCH SHALL ENERGIZE CHILLER CONTROL CIRCUIT AND START CHILLER. CHILLER FACTORY CONTROLS SHALL OPERATE CHILLER TO MAINTAIN A SECONDARY CHILLED WATER SUPPLY TEMPERATURE OF 45° F. (ADJ). BAS SHALL SEND AN ALARM TO THE CENTRAL STATION IF THE SECONDARY CHILLED WATER SUPPLY TEMPERATURE RISES MORE THAN 3° F. (ADJ.) ABOVE THE SETPOINT CONTINUOUSLY FOR A PERIOD OF 15 MINUTES (ADJ.)

BAS SHALL INTERFACE WITH CHILLER CONTROL PANEL TO ALLOW ALL CHILLER MONITOR, CONTROL AND ALARM FUNCTIONS SPECIFIED WITH THE UNIT TO BE EXECUTED/REPORTED THROUGH THE BAS, INCLUDING SUPPLY AND RETURN TEMPERATURES AND FLOW RATES, CHILLER STATUS AND PUMP STATUS.

CHILLED WATER SUPPLY TEMPERATURE RESET SCHEDULE (ADJ)
45° F. CHS AT 85° F. O.A. TEMP. (OR ABOVE)
50° F. CHS AT 60° F. O.A. TEMP. (OR BELOW)
CHS SHALL VARY LINEARLY BETWEEN THE HIGH AND LOW SETPOINTS.(AS MEASURED IN CHS LOOP)

OPERATING/STANDBY ROTATION:

CHILLERS
ROTATE 168 HOURS (SIMILAR TO BOILERS)

PRIMARY PUMPS
PRIMARY PUMP ROTATION IS PERFORMED ON AN OPERATOR SELECTABLE TIME INTERVAL, WHICH SHOULD BE CHOSEN TO BE DIFFERENT THAN THE CHILLER ROTATION SCHEDULE. WHEN THE ROTATION OCCURS, IF THE PRIMARY OPERATING PUMP IS ENABLED, IT WILL REMAIN ENABLED UNTIL PROOF OF FLOW HAS BEEN PROVEN FROM THE NEW "OPERATING" PUMP. OPERTATING PRIMARY PUMP SHALL BE ROTATED AUTOMATICALLY TO INCLUDE ALL TWO PUMPS ON A ROTATING BASIS AT TIME INTERVALS OF 168 HOURS RUNTIME (ADJ.). SHOULD AN OPERATING PUMP FAIL, THE STAND-BY PUMP SHOULD BE STARTED AUTOMATICALLY AND ALARM SHALL BE SENT TO THE CENTRAL STATION.

SECONDARY PUMPS
SECONDARY PUMP ROTATION IS PERFORMED ON AN OPERATOR SELECTABLE TIME INTERVAL, WHICH SHOULD BE CHOSEN TO BE DIFFERENT THAN THE CHILLER ROTATION SCHEDULE. WHEN THE ROTATION OCCURS, IF THE SECONDARY OPERATING PUMP IS ENABLED, IT WILL REMAIN ENABLED UNTIL PROOF OF FLOW HAS BEEN PROVEN FROM THE NEW "OPERATING" PUMP. DURING PUMP OPERATION, THE SPEED SIGNAL WILL BE SLOWLY DECREASED TO ZERO ON THE OLD "OPERATING" PUMP TO ALLOW THE NEW "OPERATING" PUMP TO SMOOTHLY ACCEPT THE LOAD AND THEN THE OLD "OPERATING" PUMP WILL BE DISABLED. OPERATING SECONDARY CHILLED WATER PUMP SHALL BE ROTATED AUTOMATICALLY TO INCLUDE ALL TWO PUMPS ON A ROTATING BASIS AT TIME INTERVALS OF 168 HOURS RUNTIME (ADJ.). SHOULD AN OPERATING PUMP FAIL, THE STAND-BY PUMP SHOULD BE STARTED AUTOMATICALLY AND ALARM SHALL BE SENT TO THE CENTRAL STATION.

EMERGENCY OPERATION:
UPON RECEIPT OF A STATUS SIGNAL FROM THE GENERATOR/BUILDING ATS; (GENERATOR RUNNING/OPERATIONAL), ONLY (1) CHILLER/ASSOCAITED PUMPS SHALL OPERATE AND THE OTHER CHILLER/ASSOCAITED PUMPS SHALL SHUTDOWN/REMAIN OFF. AFTER RELEASE OF GENERATOR STATUS (OFF) BOTH CHILLERS/ASSOCIATED PUMPS SHALL BE CAPABLE OF OPERATION

HOT WATER PLANT

SYSTEM SHALL BE STOPPED/STARTED BY THE BAS ON A PROGRAMMED BASIS UPON LOSS OF THE HOT WATER SET POINT. BOILERS SHALL BE CYCLED ON AUTOMATICALLY AT TIME INTERVALS OF 168 HOURS RUNTIME TO ALLOW FOR BOILER USE AND OPERATION.

PRIMARY HOT WATER PUMPS (P-5 & P-6) AND SECONDARY HOT WATER PUMPS (P-7 , P-8) SHALL BE ENABLED WITH LEAD BOILER AND ASSOCIATED PRIMARY HOT WATER PUMP AND LEAD SECONDARY HOT WATER PUMP STARTED BY THE BAS WHEN ANY ZONE IS IN THE OCCUPIED MODE AND THE OUTSIDE AIR TEMPERATURE IS BELOW 60° F (ADJ) AND MIN 3 VAV HOT WATER CONTROL VALVE HAS A CALL/DEMAND FOR HOT WATER ZONE HAS A DEMAND FOR HEATING OR THE SYSTEM HAS A CALL FOR DEHUMIDIFICATION. BOILERS AND PRIMARY PUMPS SHALL BE STAGED BY THE BOILERS FACTORY CONTROLS AND CASCADING SEQUENCER AS REQUIRED TO MAINTAIN THE SECONDARY HOT WATER SUPPLY TEMPERATURE PER THE RESET SCHEDULE BELOW. SECONDARY PUMPS SHALL BE CONTROLLED IN A LEAD/LAG/STAND-BY CONFIGURATION.

SECONDARY HOT WATER SUPPLY TEMPERATURE RESET SCHEDULE (ADJ)
160° F. HWS AT 30° F. O.A. TEMP. (OR BELOW)
120° F. HWS AT 60° F. O.A. TEMP. (OR ABOVE)
NOTE: HWS SETPOINT SHALL VARY LINEARLY BETWEEN THE HIGH AND LOW SETPOINTS.

LEAD/LAG ROTATION:
BOILERS
BOILER LEAD/LAG ROTATION IS PERFORMED ON AN OPERATOR SELECTABLE TIME INTERVAL OR BY AN OPERATOR INITIATED MANUAL SWITCH. UPON A CALL FOR A LEAD/LAG ROTATION SWITCH, THE OLD LEAD BOILER WILL REMAIN ENABLED UNTIL THE NEW LEAD BOILER HAS PICKED UP THE LOAD. THE OLD LEAD CHILLER WILL BE DEMAND LIMITED SLOWLY TO ZERO AND THEN DISABLED NORMALLY. LEAD BOILER SHALL BE ROTATED AUTOMATICALLY AT TIME INTERVALS OF 168 HOURS RUNTIME (ADJ.). SHOULD THE LEAD BOILER (OR ASSOCIATED PRIMARY PUMP) FAIL, THE LAG BOILER SHALL BE STARTED AUTOMATICALLY AND AN ALARM SHALL BE SENT TO THE CENTRAL STATION.

PRIMARY PUMPS
PRIMARY PUMPS SHALL BE CONTROLLED BY THEIR ASSOCIATED BOILER TO OPERATE WITH BOILER.

SECONDARY PUMPS
SECONDARY PUMP ROTATION IS PERFORMED ON AN OPERATOR SELECTABLE TIME INTERVAL, WHICH SHOULD BE CHOSEN TO BE DIFFERENT THAN THE BOILER ROTATION SCHEDULE. WHEN THE ROTATION OCCURS, IF THE SECONDARY OPERATING PUMP IS ENABLED, IT WILL REMAIN ENABLED UNTIL PROOF OF FLOW HAS BEEN PROVEN FROM THE NEW OPERATING PUMP. DURING PUMP OPERATION, THE SPEED SIGNAL WILL BE SLOWLY DECREASED TO ZERO ON THE OLD OPERATING PUMP TO ALLOW THE NEW OPERATING PUMP TO SMOOTHLY ACCEPT THE LOAD AND THEN THE OLD OPERATING PUMP WILL BE DISABLED. OPERATING SECONDARY HOT WATER PUMP SHALL BE ROTATED AUTOMATICALLY TO INCLUDE ALL TWO PUMPS ON A ROTATING BASIS AT TIME INTERVALS OF 168 HOURS RUNTIME (ADJ.). SHOULD AN OPERATING PUMP FAIL, THE STAND-BY PUMP SHOULD BE STARTED AUTOMATICALLY AND ALARM SHALL BE SENT TO THE CENTRAL STATION.

A CARBON MONOXIDE/OXYGEN DEPLETION SENSOR SHALL BE PROVIDED IN THE BOILER ROOM AND SHALL SEND AN ALARM TO THE CENTRAL BAS IF ACTIVATED.

EMERGENCY GAS SHUTOFF SWITCH SHALL BE INTERLOCKED WITH ALL THE BOILERS IN THE ASSOCIATED BOILER ROOM AND SHALL SHUT DOWN ALL BOILERS UPON ACTIVATION

VARIABLE VOLUME AIR HANDLING UNITS (AHU-1)

1

ALL UNITS SHALL BE STOPPED/STARTED ON A PROGRAMMED BASIS THROUGH THE BAS.

WHILE IN THE OCCUPIED MODE, THE UNIT SUPPLY FAN(S) (WHERE MULTIPLE FANS ARE PROVIDED FANS SHALL OPERATE TOGETHER, AND UPON LOSS OF A SINGLE FAN, REMAINING FAN OR FANS SHALL CONTINUE TO OPERATE PER THE BELOW SEQUENCE) SHALL OPERATE CONTINUOUSLY. SUPPLY FAN SPEED SHALL BE CONTROLLED BY A VARIABLE FREQUENCY DRIVE AND DUCT MOUNTED STATIC PRESSURE SENSOR. THE STATIC PRESSURE SENSOR SETPOINT SHALL BE RESET USING A TRIM AND RESPOND ALGORITHM BASED ON ZONE AIR FLOW REQUIREMENTS FROM A LOW SETTING OF 0.75" (ADJ.) TO A HIGH SETTING OF 1.50" (ADJ.). ON A CALL FOR MORE AIRFLOW AT THE ZONE LEVEL AND THE SPACE TEMPERATURE ABOVE SETPOINT, THE SETPOINT SHALL BE RESET TO THE HIGHER VALUE. AS ZONE TEMPERATURE SETPOINT IS SATISFIED AND THE AIRFLOW DEMAND DECREASES, THE SETPOINT SHALL RESET TO THE LOWER VALUE. RETURN FAN SHALL BE STARTED AND RELIEF DAMPERS SHALL BE MODULATED AS REQUIRED TO MAINTAIN BUILDING PRESSURIZATION AS OUTSIDE AIR DAMPERS MODULATE OPEN. EACH UNIT SHALL BE PROVIDED WITH A PRESSURIZATION SENSOR LOCATED AS INDICATED ON THE PLANS.

1

RETURN FAN (IF EQUIPPED) SHALL BE STARTED AND STOPPED WITH SUPPLY FAN, AND SHALL BE MODULATED BASED ON TRACKING THE SUPPLY AIR FLOW WITH A CONSTANT DIFFERENTIAL OFFSET UTILIZING THE RETURN AIRFLOW STATION AND SHALL BE EQUAL TO THE BUILDING EXHAUST ASSOCIATED WITH THAT UNIT. THE DIFFERENTIAL SHALL BE ADJUSTED TO ALLOW FOR THE BUILDING PRESSURE TO REMAIN POSITIVE. BUILDING PRESSURE SHALL BE MONITORED AND AT ANY TIME THE RETURN AIR FAN SPEED SHALL BE ADJUSTED TO MAINTAIN A POSITIVE PRESSURE SETPOINT IN THE UNIT OA/RA MIXING SECTION 0.1" WC (ADJ.). THE UNIT RETURN DAMPER AND RELIEF DAMPERS SHALL BE MODULATED TO PROVIDE THE OA AIRFLOW SEQUENCE NOTED BELOW.

A DISCHARGE AIR SENSOR SHALL CONTROL UNIT COOLING AND HEATING CONTROL VALVES TO MAINTAIN THE ROOFTOP UNIT SUPPLY AIR TEMPERATURE PER THE FOLLOWING SUPPLY AIR TEMPERATURE (SAT) RESET SCHEDULE:

SUPPLY AIR TEMPERATURE RESET:
WHEN COOLING IS REQUIRED, CONTROL MODULE SHALL MONITOR ALL VAV TERMINALS AND RECALCULATE SUPPLY AIR TEMPERATURE BASED ON THE MOST DEMANDING ZONE WITHIN THE SETPOINT RANGE (55 °F AND 65 °F, 60 °F INITIAL). FOR EVERY COOLING REQUEST AT THE ZONE LEVEL, SETPOINT WILL BE TRIMMED BY 0.5 ° (ADJUSTABLE) AND WHEN NO REQUESTS ARE PRESENT, 1ºF (ADJUSTABLE) WILL BE ADDED TO THE SETPOINT. SUPPLY AIR TEMPERATURE SETPOINT IS OVERRIDDEN AND SUPPLY AIR TEMPERATURE DEFAULTS TO 55 °F IF THE RETURN AIR RELATIVE HUMIDITY RISES ABOVE 60% RH (ADJUSTABLE). SETPOINT REMAINS 55 °F UNTIL RETURN AIR RELATIVE HUMIDITY FALLS BELOW 55% RH (ADJUSTABLE)

BAS SHALL PROVIDE ECONOMIZER OPERATION TO PROVIDE "FREE COOLING" WHEN OUTDOOR AIR CONDITIONS ALLOW. UPON BAS DETERMINATION THAT OUTSIDE AIR ENTHALPY IS BELOW RETURN AIR ENTHALPY IN COOLING MODE, THE OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS SHALL MODULATE TO MAINTAIN UNIT DISCHARGE AIR TEMPERATURE. IF "ECONOMIZER" CONTROL IS INSUFFICIENT TO MAINTAIN DISCHARGE AIR TEMPERATURE, THE UNIT COOLING CYCLE SHALL FUNCTION AS OUTLINED ABOVE. UPON A DROP IN DISCHARGE AIR TEMPERATURE BELOW SETPOINT, THE OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL MODULATE CLOSED UNTIL THE MINIMUM OUTSIDE AIR POSITION IS REACHED. BUILDING PRESSURE SHALL BE MONITORED AND DAMPERS SHALL BE ADJUSTED TO PREVENT AN OVERPRESSURIZATION OF THE SPACE WHERE THE BUILDING PRESSURE SENSORS ARE LOCATED.

CONTROLS SHALL PROVIDE FOR MORNING WARM-UP AND NIGHT SETBACK DURING UNOCCUPIED TIMES. UPON UNIT START-UP, IF RETURN AIR TEMPERATURE IS BELOW 65° F. (ADJ) OR ABOVE 75° F. (ADJ), THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED AND THE HEATING OR COOLING CONTROL VALVES SHALL OPEN TO THE HEATING OR COOLING COILS AS REQUIRED TO RAISE OR LOWER THE RETURN AIR TEMPERATURE. WHEN RETURN AIR TEMPERATURE RISES ABOVE 62° F. (ADJ) OR FALLS BELOW 78° F. (ADJ), THE UNIT SHALL BE CONTROLLED AS OUTLINED ABOVE.

WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL BE OFF, THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE CLOSED TO THE UNIT AND THE TERMINAL UNIT SPACE TEMPERATURE SETPOINTS SHALL BE SET TO UNOCCUPIED SETTINGS OF 60° FOR HEATING (ADJ) AND 85° FOR COOLING (ADJ). UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN SHALL BE STARTED AND THE HEATING OR CHILLED WATER CONTROL VALVES SHALL BE OPENED TO THE HEATING OR COOLING COIL AS REQUIRED BY THE SPACE TEMPERATURE. THE BOILER PLANT OR CHILLER PLANT SHALL ALSO BE STARTED AS REQUIRED TO SATISFY SETPOINTS. THE UNIT AND ASSOCIATED CENTRAL PLANT SHALL OPERATE FOR A MINIMUM OF 30 MINUTES (OR AS REQUIRED TO SATISFY UNOCCUPIED SETPOINT) AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF 15 MINUTES FOLLOWING SATISFACTION OF UNOCCUPIED SETPOINT AND SYSTEM SHUT-DOWN.

OUTSIDE AIR INTAKE SHALL BE PROVIDED WITH (2) MOTORIZED DAMPERS (1) SIZED FOR MINIMUM OUTSIDE (2-POSITION) AND (1) SIZED FOR THE REMAINING CO2 CONTROL AND ECONOMIZER OUTSIDE AIRFLOW (MODULATING). ON UNIT START UP, THE O.A. DAMPERS SHALL REMAIN CLOSED UNTIL THE RETURN AIR TEMPERATURE RISES ABOVE 65° (ADJ) OR FALLS BELOW 78° (ADJ). ONCE RETURN AIR TEMPERATURE IS SATISFIED, THE MINIMUM O.A. INTAKE DAMPER SHALL BE OPEN WHILE THE AIR HANDLING UNIT IS IN THE OCCUPIED MODE, DAMPER SHALL OPEN TO MAINTAIN THE MINIMUM OUTSIDE AIRFLOW. DAMPER SHALL REMAIN CLOSED WHILE THE UNIT IS IN THE UNOCCUPIED MODE. BAS SHALL BE CAPABLE OF OPENING AND CLOSING OUTSIDE AIR DAMPERS.

CO2 SENSORS MOUNTED IN THE SPACE (RETURN DUCT FOR VERIFICATION ONLY) SHALL MODULATE THE CO2/ECONOMIZER OUTSIDE AIR DAMPER BASED ON CO2 LEVELS IN THE SPACE. DAMPER SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN A SPACE CO2 LEVEL OF 700 PPM ABOVE THE OUTSIDE AIR CO2 LEVEL. AN ALARM SHALL BE ACTIVATED IF THE SPACE CO2 LEVEL RISES ABOVE 1200 PPM.

CO2 CONTROL SHALL APPLY TO AIR HANDLING UNITS - AHU 1,2

SMOKE DETECTOR SHALL BE PROVIDED IN THE RETURN DUCT (UPSTREAM OF THE OUTSIDE AIR DUCT CONNECTION). DETECTOR SHALL SHUT DOWN SUPPLY AND RELIEF FAN UPON ACTIVATION.

A FREEZE-STAT SHALL BE LOCATED IN THE MIXED AIR STREAM TO SHUT-DOWN SUPPLY FAN IF THE MIXED AIR TEMPERATURE FALLS BELOW 40° F. FREEZE-STAT SHALL HAVE MANUAL RESET ONLY. (FREEZESTAT SHALL BE LOCATED DOWNSTREAM OF PREHEAT COIL.)

STATIC PRESSURE RESET SHALL BE PROVIDED TO POLL ALL BOXES AND ADJUST STATIC PRESSURE SETPOINT DOWN UNTIL (1) BOX IS IN FULL COOLING

THE ASSOCIATED HOT WATER PUMP (P-9) SERVING THE HOT WATER PREHEAT COIL SHALL BE ACTIVATED WHEN THE OAT DROPS TO 45°F (ADJ.) AND THE PREHEAT COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN A MINIMUM COIL DISCHARGE AIR TEMPERATURE PER THE RESET SCHEDULE..

UNIT HEATERS

A SPACE TEMPERATURE SENSOR SHALL CONTROL UNIT HEATER FAN AND HOT WATER CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE, 65° F. (ADJ) WITH SPACE TEMPERATURE ABOVE SETPOINT, FAN SHALL REMAIN OFF AND CONTROL VALVE SHALL REMAIN CLOSED. AS SPACE TEMPERATURE FALLS BELOW SETPOINT, THE FAN SHALL BE STARTED AND THE HOT WATER VALVE SHALL OPEN TO THE UNIT TO SATISFY SETPOINT.

MISC. EXHAUST FANS

PROVIDE WALL SWITCHES, WALL THERMOSTATS, INTERLOCKS, ETC. AS INDICATED ON THE FAN SCHEDULE TO CONTROL FANS AS INDICATED ON PLANS.

TOILET EXHAUST FANS

BAS SHALL OPERATE EXHAUST FANS ON A PROGRAMMED SCHEDULE.

WELDING AREA GENERAL EXHAUST FAN

FAN SHALL BE PROVIDED WITH HAND-OFF-AUTO SWITCH. FAN SHALL BE CAPABLE OF BEING OPERATED IN MANUAL MODE (ON OR OFF), AND IN AUTOMATIC MODE, UPON SENSING OF CURRENT (BY CURRENT SENSORS) ON ASSOCIATED DEDICATED WELDER CIRCUIT FAN AND ASSOCIATED MOTOR OPERATED DAMPER ON OUTSIDE AIR HOOD SHALL OPEN/TURN ON. AFTER NO CURRENT IS SENSED ON ASSOCIATED WELDER CIRCUITS, FAN AND DAMPER SHALL OPERATE FOR 10 MINS (ADJ.), THEN CLOSE/TURN OFF. ALL DIGITAL/ANALOG RELAYS TO PULL SIGNAL FROM CT PROVIDED IN ELECTRICAL PANEL (BY EC), SHALL BE BY CONTROLS CONTRACTOR

VARIABLE VOLUME AIR HANDLING UNITS (AHU-2&3)

1

ALL UNITS SHALL BE STOPPED/STARTED ON A PROGRAMMED BASIS THROUGH THE BAS.

WHILE IN THE OCCUPIED MODE, THE UNIT SUPPLY FAN(S) (WHERE MULTIPLE FANS ARE PROVIDED FANS SHALL OPERATE TOGETHER, AND UPON LOSS OF A SINGLE FAN, REMAINING FAN OR FANS SHALL CONTINUE TO OPERATE PER THE BELOW SEQUENCE) SHALL OPERATE CONTINUOUSLY. SUPPLY FAN SPEED SHALL BE CONTROLLED BY A VARIABLE FREQUENCY DRIVE AND DUCT MOUNTED STATIC PRESSURE SENSOR. THE STATIC PRESSURE SENSOR SETPOINT SHALL BE RESET USING A TRIM AND RESPOND ALGORITHM BASED ON ZONE AIR FLOW REQUIREMENTS FROM A LOW SETTING OF 0.75" (ADJ.) TO A HIGH SETTING OF 1.50" (ADJ.). ON A CALL FOR MORE AIRFLOW AT THE ZONE LEVEL AND THE SPACE TEMPERATURE ABOVE SETPOINT, THE SETPOINT SHALL BE RESET TO THE HIGHER VALUE. AS ZONE TEMPERATURE SETPOINT IS SATISFIED AND THE AIRFLOW DEMAND DECREASES, THE SETPOINT SHALL RESET TO THE LOWER VALUE. EACH UNIT SHALL BE PROVIDED WITH A PRESSURIZATION SENSOR LOCATED AS INDICATED ON THE PLANS.

A DISCHARGE AIR SENSOR SHALL CONTROL UNIT COOLING AND HEATING CONTROL VALVES TO MAINTAIN THE ROOFTOP UNIT SUPPLY AIR TEMPERATURE PER THE FOLLOWING SUPPLY AIR TEMPERATURE (SAT) RESET SCHEDULE:

SUPPLY AIR TEMPERATURE RESET:
WHEN COOLING IS REQUIRED, CONTROL MODULE SHALL MONITOR ALL VAV TERMINALS AND RECALCULATE SUPPLY AIR TEMPERATURE BASED ON THE MOST DEMANDING ZONE WITHIN THE SETPOINT RANGE (55 °F AND 65 °F, 60 °F INITIAL). FOR EVERY COOLING REQUEST AT THE ZONE LEVEL, SETPOINT WILL BE TRIMMED BY 0.5 ° (ADJUSTABLE) AND WHEN NO REQUESTS ARE PRESENT, 1ºF (ADJUSTABLE) WILL BE ADDED TO THE SETPOINT. SUPPLY AIR TEMPERATURE SETPOINT IS OVERRIDDEN AND SUPPLY AIR TEMPERATURE DEFAULTS TO 55 °F IF THE RETURN AIR RELATIVE HUMIDITY RISES ABOVE 60% RH (ADJUSTABLE). SETPOINT REMAINS 55 °F UNTIL RETURN AIR RELATIVE HUMIDITY FALLS BELOW 55% RH (ADJUSTABLE)

BAS SHALL PROVIDE ECONOMIZER OPERATION TO PROVIDE "FREE COOLING" WHEN OUTDOOR AIR CONDITIONS ALLOW. UPON BAS DETERMINATION THAT OUTSIDE AIR ENTHALPY IS BELOW RETURN AIR ENTHALPY IN COOLING MODE, THE OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS SHALL MODULATE TO MAINTAIN UNIT DISCHARGE AIR TEMPERATURE. IF "ECONOMIZER" CONTROL IS INSUFFICIENT TO MAINTAIN DISCHARGE AIR TEMPERATURE, THE UNIT COOLING CYCLE SHALL FUNCTION AS OUTLINED ABOVE. UPON A DROP IN DISCHARGE AIR TEMPERATURE BELOW SETPOINT, THE OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL MODULATE CLOSED UNTIL THE MINIMUM OUTSIDE AIR POSITION IS REACHED. BUILDING PRESSURE SHALL BE MONITORED AND DAMPERS SHALL BE ADJUSTED TO PREVENT AN OVERPRESSURIZATION OF THE SPACE WHERE THE BUILDING PRESSURE SENSORS ARE LOCATED.

CONTROLS SHALL PROVIDE FOR MORNING WARM-UP AND NIGHT SETBACK DURING UNOCCUPIED TIMES. UPON UNIT START-UP, IF RETURN AIR TEMPERATURE IS BELOW 65° F. (ADJ) OR ABOVE 75° F. (ADJ), THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED AND THE HEATING OR COOLING CONTROL VALVES SHALL OPEN TO THE HEATING OR COOLING COILS AS REQUIRED TO RAISE OR LOWER THE RETURN AIR TEMPERATURE. WHEN RETURN AIR TEMPERATURE RISES ABOVE 62° F. (ADJ) OR FALLS BELOW 78° F. (ADJ), THE UNIT SHALL BE CONTROLLED AS OUTLINED ABOVE.

WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL BE OFF, THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE CLOSED TO THE UNIT AND THE TERMINAL UNIT SPACE TEMPERATURE SETPOINTS SHALL BE SET TO UNOCCUPIED SETTINGS OF 60° FOR HEATING (ADJ) AND 85° FOR COOLING (ADJ). UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN SHALL BE STARTED AND THE HEATING OR CHILLED WATER CONTROL VALVES SHALL BE OPENED TO THE HEATING OR COOLING COIL AS REQUIRED BY THE SPACE TEMPERATURE. THE BOILER PLANT OR CHILLER PLANT SHALL ALSO BE STARTED AS REQUIRED TO SATISFY SETPOINTS. THE UNIT AND ASSOCIATED CENTRAL PLANT SHALL OPERATE FOR A MINIMUM OF 30 MINUTES (OR AS REQUIRED TO SATISFY UNOCCUPIED SETPOINT) AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF 15 MINUTES FOLLOWING SATISFACTION OF UNOCCUPIED SETPOINT AND SYSTEM SHUT-DOWN.

OUTSIDE AIR INTAKE SHALL BE PROVIDED WITH (2) MOTORIZED DAMPERS (1) SIZED FOR MINIMUM OUTSIDE (2-POSITION) AND (1) SIZED FOR THE REMAINING CO2 CONTROL AND ECONOMIZER OUTSIDE AIRFLOW (MODULATING). ON UNIT START UP, THE O.A. DAMPERS SHALL REMAIN CLOSED UNTIL THE RETURN AIR TEMPERATURE RISES ABOVE 65° (ADJ) OR FALLS BELOW 78° (ADJ). ONCE RETURN AIR TEMPERATURE IS SATISFIED, THE MINIMUM O.A. INTAKE DAMPER SHALL BE OPEN WHILE THE AIR HANDLING UNIT IS IN THE OCCUPIED MODE, DAMPER SHALL OPEN TO MAINTAIN THE MINIMUM OUTSIDE AIRFLOW. DAMPER SHALL REMAIN CLOSED WHILE THE UNIT IS IN THE UNOCCUPIED MODE. BAS SHALL BE CAPABLE OF OPENING AND CLOSING OUTSIDE AIR DAMPERS.

SMOKE DETECTOR SHALL BE PROVIDED IN THE RETURN DUCT (UPSTREAM OF THE OUTSIDE AIR DUCT CONNECTION). DETECTOR SHALL SHUT DOWN SUPPLY FAN UPON ACTIVATION.

A FREEZE-STAT SHALL BE LOCATED IN THE MIXED AIR STREAM TO SHUT-DOWN SUPPLY FAN IF THE MIXED AIR TEMPERATURE FALLS BELOW 40° F. FREEZE-STAT SHALL HAVE MANUAL RESET ONLY. (FREEZESTAT SHALL BE LOCATED DOWNSTREAM OF PREHEAT COIL.)

FAN COIL UNITS

FAN COIL UNITS SHALL BE STOPPED/STARTED ON A PROGRAMMED BASIS THROUGH THE BAS.

WHILE IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY. A WALL MOUNTED TEMPERATURE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE OF 72° (ADJ). CHILLED WATER CONTROL VALVE SHALL MODULATE OPEN TO THE COIL ON A RISE IN TEMPERATURE ABOVE SENSOR SETPOINT. AS THE TEMPERATURE SPACE FALLS BELOW SETPOINT, CHILLED WATER CONTROL VALVE SHALL CLOSE AND HOT WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE.

WHERE NOTED ON FCU SCHEDULE THE MINIMUM OA AIRFLOW SHALL BE PROVIDED VIA INTERLOCKED OA-MOTOR OPERATED DAMPER, OUTSIDE AIR ROOF HOOD, AND REILEF AIR-MOTOR OPERATED DAMPER, AND RELIEF HOOD. DAMPERS SHALL BE OPEN DURING ALL TIMES FCU IS IN OPERATION. BALANCING DAMPER IN OA DUCT SHALL BE BALANCED TO PROVIDE MIN. OUTSIDE AIR LISTED IN SCHEDULE.

WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL BE OFF, THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE CLOSED TO THE UNIT AND THE SPACE TEMPERATURE SETPOINTS SHALL BE SET TO UNOCCUPIED SETTINGS OF 60° FOR HEATING (ADJ) AND 85° FOR COOLING (ADJ). UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN SHALL BE STARTED AND THE HEATING OR CHILLED WATER CONTROL VALVES SHALL BE OPENED TO THE HEATING OR COOLING COIL AS REQUIRED BY THE SPACE TEMPERATURE. THE BOILER PLANT OR CHILLER PLANT SHALL ALSO BE STARTED AS REQUIRED TO SATISFY SETPOINTS. THE UNIT AND ASSOCIATED CENTRAL PLANT SHALL OPERATE FOR A MINIMUM OF 30 MINUTES (OR AS REQUIRED TO SATISFY UNOCCUPIED SETPOINT) AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF 15 MINUTES (ADJ.) FOLLOWING SATISFACTION OF UNOCCUPIED SETPOINT AND SYSTEM SHUT-DOWN.

DRAIN PAN FLOAT ALARM SHALL BE INTERLOCKED WITH UNIT OPERATION, AND SHALL SHUTDOWN UNIT UPON BEING ACTIVATED.

HEAT TAPE

HEAT TAPE FOR ABOVE GRADE EXTERIOR PIPING AND CHILLER HEATER SHALL PROVIDE FREEZE PROTECTION FOR EXTERIOR CHILLED WATER SYSTEMS, THESE SYSTEM SHALL BE PROVIDED WITH EMERGENCY POWER TO CONTINUE FREEZE PROTECTION DURING A POWER OUTAGE. A TEMPERATURE SENSOR SHALL BE PROVIDED WITHIN THE INSULATION ON ALL EXTERIOR PIPING WITH HEAT TAPE TO VERIFY HEAT TAPE OPERATION. IF TEMPERATURE FALLS BELOW 35° F. (ADJ), AN ALARM SHALL BE SENT AND THE PRIMARY CHILLED WATER PUMPS (P-1, P-2,) SHALL BE STARTED.

WATER HEATER

BAS SHALL HAVE GLOBAL CONTROL OVER DOMESTIC WATER HEATING SYSTEM.

OFFICE / SHOPS:
- WH1: HEATER SET TO 140 DEGREES, WITH MIXING VALVE DELIVERING 120-DEGREE SUPPLY
- RCP1: SUPPLY AT 120 DEGREES AND RETURN AT 110 DEGREES
- HIGH TEMP ALARM AT 125 DEGREES

WAREHOUSE:
- WH4: HEATER SET TO 140 DEGREES (NO MAIN MIXING VALVE)
- RCP4: SUPPLY AT 140 DEGREES AND RETURN AT 130 DEGREES (DUE TO EMERGENCY SHOWERS)
- HIGH TEMP ALARM AT 150 DEGREES

WATER HEATER SHALL CYCLE ON AND OFF BASED ON TANK TEMPERATURE, TO MAINTAN NOTED TEMPERATURES. AN ALARM SHALL BE GENERATED SHOULD TANK DEVIATE FROM SETPOINT BY 10° EITHER HIGH OR LOW. AN ALARM SHALL ALSO BE GENERATED SHOULD THE DOMESTIC HWS TEMPERATURE DEVIATE FROM SETPOINT BY 10° EITHER HIGH OR LOW. CIRCULATION PUMPS SHALL OPERATE BASED ON THE AQUASTAT TEMPERATURE SETTINGS. A TEMPERATURE SENSOR SHALL BE MOUNTED IN THE END OF THE LINE CAPABLE OF OVERRIDING THE PUMP SHOULD THE LOOP TEMPERATURE FALL BELOW NOTED TEMPERATURES FOR RCP-1 & 4. BAS SHALL ALSO MONITOR BOTH DOMESTIC HWR TEMPERATURES AND DOMESTIC WATER SUPPLY TEMPERATURE FOR TRACKING PURPOSES. COORDINATE ALL TEMPERATURE SENSOR LOCATIONS WITH PLUMBING CONTRACTOR.

DUCTLESS SPLIT SYSTEMS:

UNITS SHALL PROVIDE COOLING ON A CONTINUOUS BASIS. SUPPLY FAN SHALL RUN CONTINUOUSLY AND COOLING CYCLE SHALL CYCLE WITH A CALL FOR COOLING TO MAINTAIN ROOM TEMPERATURE SETPOINT OF 75° F. (ADJ.). UNITS SHALL BE PROVIDED WITH STANDALONE FACTORY CONTROLS. BAS SHALL MONITOR SYSTEM STATUS AND SHALL ALSO MONITOR ROOM TEMPERATURE WITH A WALL MOUNTED TEMPERATURE SENSOR. AN ALARM SHALL BE GENERATED UPON AN EQUIPMENT FAILURE OR IF THE ROOM TEMPERATURE RISES ABOVE 85° F. (ADJ.)

DUCT MOUNTED SMOKE DETECTORS:

SMOKE DETECTOR SHALL BE PROVIDED IN THE RETURN DUCT PRIOR TO THE OUTSIDE AIR DUCT CONNECTION. DETECTOR SHALL INTERFACE WITH FIRE ALARM SYSTEM AND SHUT-DOWN UNIT FANS UPON ACTIVATION. A NOTIFICATION ALARM SHALL BE GENERATED WHEN A SMOKE DETECTOR IS ACTIVATED. SMOKE DETECTORS SHALL BE INDICATED ON EQUIPMENT GRAPHICS WITH WHICH DETECTOR IS ASSOCIATED.

VARIABLE AIR VOLUME BOXES

A TEMPERATURE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE SETPOINT OF 72° (ADJ). ON RISE IN SPACE TEMPERATURE ABOVE SETPOINT, THE VOLUME DAMPER SHALL OPEN AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. ON DROP IN SPACE TEMPERATURE BELOW SETPOINT, THE VOLUME DAMPER SHALL CLOSE UNTIL THE MINIMUM DAMPER POSITION IS REACHED. THE HOT WATER CONTROL VALVE SHALL BE MODULATED OPEN TO THE HEATING COIL AND THE TERMINAL UNIT DAMPER SHALL OPEN TO THE MIN CFM AS INDICATED IN THE SCHEDULE. AS THE TEMPERATURE RISES ABOVE SET POINT THE HOT WATER CONTROL VALVE SHALL CLOSE AND THE DAMPER SHALL RETURN TO THE MINIMUM POSITION.

WHEN WARM AIR IS SENSED BY THE TERMINAL UNIT DURING MORNING WARM-UP, THE DAMPER SHALL RESPOND TO THE SPACE TEMPERATURE. THE TERMINAL UNIT DAMPER SHALL OPEN ON A CALL FOR HEATING AND SHALL REMAIN CLOSED IF THE SPACE TEMPERATURE IS AT OR ABOVE OCCUPIED SETPOINT.

THE TEMPERATURE SENSOR SHALL BE PROVIDED WITH AN OVERRIDE FUNCTION THAT WILL PLACE THE SYSTEM IN THE OCCUPIED MODE FOR A PERIOD OF UP TO 2 HOURS. THE OVERRIDE SHALL ACTIVATE THE SYSTEM AHU AND THE HEATING OR COOLING CENTRAL PLANT AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. TEMPERATURE SENSORS SHALL HAVE A MIN 5°F DEADBAND

FREEZE PROTECTION (LOSS OF POWER)

HEAT TAPE FOR EXTERIOR PIPING AT CHILLER SHALL BE PROVIDED WITH EMRGENCY POWER TO PROVIDE FREEZE PROTECTION. A TEMPERATURE SENSOR SHALL BE PROVIDED WITHIN THE INSULATION ON ALL EXTERIOR PIPING WITH HEAT TAPE TO VERIFY HEAT TAPE OPERATION. IF TEMPERATURE FALLS BELOW 35° F. (ADJ), AN ALARM SHALL BE SENT.

DUST COLLECTOR

PROVIDE CONTROL RELAY FOR AUTOMATIC SHUTDOWN WHEN SIGNAL RECEIVED FROM (FA/EPO) SYSTEM

OPERATION SHALL BE VIA A WALL MOUNTED CONTROL BOX WITH PUSH BUTTON MAGNETIC STARTER PROGRAMMED TO RUN DUST COLLECTOR FOR 4 HOURS (ADJ), THEN SHUT OFF,

ASSOCIATED MOTOR OPERATED DAMPER IN OA PLENUM SHALL BE OPEN WHENEVER DUST COLLECTOR IS IN OPERATION, AND CLOSED WHEN NOT IN OPERATION.

PROVIDE WITH MANUAL OVERRIDE FOR ON/OFF OPERATION

UTILITY MONITORING:
THE INTENT OF THE SYSTEM IS TO CONSTANTLY MEASURE THE NOTED UTILITIES. THE CONTROLS CONTRACTOR (SYSTEM INTEGRATOR) WILL PROVIDE THE DATA LOGGING DEVICES AS REQUIRED TO MONITOR THE BUILDING UTILITIES FOR THIS PROJECT.

UTILITY MONITORING NOTES:
1. DOMESTIC WATER AND NATURAL GAS PULSE METERS SHALL BE PROVIDED AND INSTALLED BY THE PLUMBING CONTRACTOR. METERS SHALL PROVIDE BOTH CUBIC FEET (CF) TOTAL USAGE AND CUBIC FEET PER HOUR (CFH) DEMAND.
2. ELECTRICAL CIRCUITS AND CT'S FOR MONITORING POWER SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL ALSO PROVIDE AND INSTALL 3-PHASE AND MULTI-CIRCUIT METERS.
3. THE CONTROLS CONTRACTOR (SYSTEM INTEGRATOR) SHALL COORDINATE COMMUNICATION PROTOCOL REQUIREMENTS FOR ALL METERS AND MONITORING DEVICES WITH ALL OTHER DIVISIONS TO ENSURE SYSTEM COMPATIBILITY.
4. DATA LOGGER SHALL BE EQUAL TO TRIDIUM JACE

CONTROL SYSTEM NOTES

1. SEE SPECIFICATIONS (SECTION 230900) FOR ADDITIONAL REQUIREMENTS.
2. THE SEQUENCE OF OPERATION OF OPERATION AND POINTS LIST IS INTENDED TO COMMUNICATE THE MINIMUM REQUIREMENTS AND GENERAL DESIGN INTENT TO THE CONTROLS CONTRACTOR AND IS NOT INTENDED TO BE A FULLY DEVELOPED OR COMPLETE SEQUENCE OF OPEARTION. IN THE CONTROLS SUBMITTAL THE CONTROLS CONTRACTOR SHALL FULLY DEVELOP THE SEQUENCE OF OPERATIONS FOR ALL SYSTEMS IDENTIFIED AN SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, TIME DELAYS, ALARM POINTS, ETC. AS REQUIRED TO COMPLY WITH THE DESIGN INTENT. THE CONTROLS CONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS TO PREVENT SHORT CYCLING. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO REQUIRED CORRECTIVE ACTIONS OR UNIT SHUT-DOWNS. CONTROL CONTRACTOR SHALL SPECIFY IN THE CONTROL SUBMITTAL FAIL SAFE POSITION FOR OUT OF RANGE, FAIL SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION.
3. SYSTEM SHALL USE CAMPUS SYSTEM GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS FOR PRIMARY SYSTEM OPERATION. LOCAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS SHALL BE PROVIDED FOR SYSTEM OPERATION UPON LOSS OF NETWORK COMMUNICATION.
4. ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE AND TRENDABLE. INDICATED TEMPERATURE SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET-UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE NOTED ON AS-BUILT CONTROL DRAWINGS.
5. FLOW SWITCHES OR ADJUSTABLE TYPE CURRENT SWITCHES SHALL BE PROVIDED IN THE PIPING OF EACH PUMP TO VERIFY PUMP STATUS.
6. IONIZATION TYPE DUCT SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL INSTALL DETECTORS IN THE DUCT AND WIRE UNIT FROM FIRE ALARM SYSTEM (DRY CONTACTS) FOR UNIT SHUT-DOWN UPON ACTIVATION.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE DEDICATED 120V CIRCUIT(S) IN A J-BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J-BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR OPERATION OF CONTROL SYSTEM.
8. BAS SHALL ALLOW GLOBAL OPERATION OF VAV HOT WATER CONTROL VALVES.
9. SYSTEM GRAPHICS SHALL INCLUDE ALL SMOKE DAMPER LOCATIONS AND SHALL PROVIDE STATUS AND GENERATE AN ALARM UPON ACTIVATION.
10. LOCATE MAIN DDC CONTROL PANEL(S) IN MECHANICAL ROOM. COORDINATE EXACT LOCATION PANEL WITH ALL OTHER TRADES PRIOR TO INSTALLATION.
11. PER NORTH CAROLINA STATE CONSTRUCTION REQUIREMENTS FOR MAJOR FACILITIES, THIS PROJECT WILL MEASURE AND TRACK ALL ELECTRICAL, GAS AND WATER CONSUMPTION. REFER TO 'MEASUREMENT AND VERIFICATION' NOTE ON DRAWING M001 AND SPECIFICATION SECTION 230900 FOR ADDITIONAL REQUIREMENTS.
12. PROVIDE EXPORT TAGGING AND CONTROLS PROGRAMMING AS REQUIRED TO FULLY INTEGRATE WITH THE UNIVERSITY BAS SERVER PLATFORM TO SIMPLIFY IMPORTING TO EXISTING ALC PLATFORM, POINTS LIST, AND GRAPHIC CONTROL SCREENS. TAGGING REQUIRED ON ALL PROJECTS. POINTS SHALL BE TAGGED APPROPRIATELY WITH HAYSTACK, NIAGARA, AND UNCC TAG LIBRARIES. EQUIPMENT SHALL BE TAGGED WITH THE SAME NAME AS ON THE DRAWINGS
13. PROVIDE ALL CONTROL PANELS WITH 3RD PARTY U.L. LISTING

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 17228 RONALD V. ALMOND
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: CAH
CHECKED BY: RVA

MECHANICAL SEQUENCE OF OPERATIONS

M-005

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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INPUT/OUTPUT SUMMARY

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS: ANALOG: MEASURED: TEMPERATURE	PRESSURE	RH	AIR FLOW	WATER FLOW	CO2	HERTZ	KG-FLOW (CFH), KG-FLOW (LBS)	AMPS	ENTHALPY	BTU, BTUH	EFFICIENCY	INPUTS: ANALOG: CALC.	INPUTS: BINARY: STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	OVER-RIDE	OUTPUTS: DIGITAL: OFF-ON	OFF-HI-LO	OPEN-CLOSE	OUTPUTS: ANALOG: DMPR. POS.	VALVE POS.	VFD SPEED, HZ, ETC.	STEP CONTROL	SYSTEM FEATURES: ALARMS: HI ANALOG	LO ANALOG	HI BINARY	LO BINARY	PROOF	SYSTEM FEATURES: PROGRAMS: TIME SCHEDULING	DEMAND LIMITING	DUTY CYCLE	SHED/RESET OPT.	ENTHALPY OPT.	SMOKE CNT.	TREND	ALARM INSTRUCT	MAIN. WK. ORD.	GENERAL: COLOR GRAPHIC	SUPPLEMENTAL NOTES
Chiller Plant																																	X	X	X			X		X		
CHLR On/off																				X																						
CHLR Status				X										X																X											
CHLR Panel Interface	X	X		X						X		X	X	X		X		X			X	X		X	X	X	X														
CHLR CHS Temp	X																								X																
CHLR CHR Temp	X																																							
VFD on/off																				X																					
VFD Speed																									X															
VFD Status														X																X										
Pump P-1														X						X										X										
Pump P-2														X						X										X										
Pump P-3														X						X										X									VFD	
Pump P-4														X						X										X									VFD	
BLDG CHWS Temp	X																																						BUILDING LOOP	
BLDG CHWR Temp	X																																						BUILDING LOOP	
Diff Press		X																							X					X									BUILDING LOOP	
AHU-1,2,3																																	X		X				X		
Return & Supply Fan														X							X				X																
VFD on/off																				X																			VFD by Unit Mfr	
VFD Speed																									X														VFD by Unit Mfr	
VFD Status														X																X									VFD by Unit Mfr	
Supply Static Pressure		X																																						
HW Valve (Preheat)																									X																
Preheat Coil Disch. Temp	X																																							
CHW Valve																									X																
Cooling Coil Disch. Temp	X																																							
Supply Temp	X																																							
Return Temp	X																																							
Return CO2					X																								X											
Return RH		X																																						
Mixed Air Temp	X																																							
OA Damper																								X																
SA/RA Airflow Mon.				X																																				
Return Damper				X																				X																
Smoke Detector																X																									
Freezestat																	X																								
Filter Status															X																										
Over-ride																			X																						
Space Humidity		X																										X												
Pump P-9,10,11														X							X				X																
Fans																																	X								
Toilet Fans														X																					X						
Electrical Room Fans														X																											
Welding Gen Fan														X																											
Hot Water Boilers																																	X								
Boiler On/Off														X																										TYPICAL FOR 2 BOILERS	
Boiler Status																														X										TYPICAL FOR 2 BOILERS	
HWS Temp	X																																							TYPICAL FOR 2 BOILERS	
HWR Temp	X																																							TYPICAL FOR 2 BOILERS	
Pump P-5,6														X							X				X																
Pump P-7,8														X							X				X																
HWS Temp	X																																						BUILDING LOOP	
HWR Temp	X																																						BUILDING LOOP	
Diff Press.		X																							X					X									BUILDING LOOP	
Boiler Rm Oxygen Depletion																										X															
Boiler Rm Solenoid Valve																														X										
Boiler Rm CO Dectector																														X										
Fan Coil Unit & CUH																																	X						X		
Supply Fan														X							X																				
CHW Valve																									X																
HW Valve																									X																
Space Temp	X																																								
Supply Temp	X																																							
Setpoint Adjust																									X																
Drain Pan Float Alarm																											X														

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS: ANALOG: MEASURED: TEMPERATURE	PRESSURE	RH	AIR FLOW	WATER FLOW	CO2	HERTZ	AMPS	VOLTZ	ENTHALPY	BTU, BTUH	EFFICIENCY	INPUTS: ANALOG: CALC.	INPUTS: BINARY: STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	OVER-RIDE	OUTPUTS: DIGITAL: OFF-ON	OFF-HI-LO	OPEN-CLOSE	OUTPUTS: ANALOG: DMPR. POS.	VALVE POS.	VFD SPEED, HZ, ETC.	STEP CONTROL	SYSTEM FEATURES: ALARMS: HI ANALOG	LO ANALOG	HI BINARY	LO BINARY	PROOF	SYSTEM FEATURES: PROGRAMS: TIME SCHEDULING	DEMAND LIMITING	DUTY CYCLE	SHED/RESET OPT.	ENTHALPY OPT.	SMOKE CNT.	TREND	ALARM INSTRUCT	MAIN. WK. ORD.	GENERAL: COLOR GRAPHIC	SUPPLEMENTAL NOTES
VAV Boxes																																									
HOT WATER HEAT																																		X							
SPACE TEMP					X																																			
SUPPLY TEMP					X																																			Mount 48" downstream of outlet
OVER-RIDE																						X																		
DAMPER POSITION																																			X					
Misc. Points																																								
Ductless Split Systems	X																																X							Typical of 2
OA Temp	X									X																							X							
Dew Point	X									X																													VFD	
Elec Demand																			X																X				VFD	
Domestic Water Meter																						X																		
Gas Meter																						X																		
Fire Alarm Status										X																														FACP by Division 26
Heat Tape	X																																X							
OA CO2					X																																			
OA RH		X																																						
Building Pressure Sensors	X																																							
Generator																		X															X						X	
CO Detectors																																	X							
Motor Operated Dampers																																								
CHW & HW BTU Meters													X																											
Emergency Gas Solenoid																							X																	MER
Dust Collection System																		X															X							Control Relay for Shutdown
Domestic Booster Pump																		X																	X					1
DX SPLIT SYSTEM																																		X				X		
Indoor AC Unit																		X				X											X							
Outdoor Unit																		X				X											X							
Space Temp	X																																							
Supply Temp	X																																							
Setpoint Adjust																							X																	
DOMESTIC H.W.			X				X																											X				X		ALL SYSTEMS
Recirculation pump																		X				X																		
Domestic CW temp	X																																							
Domestic HWS temp	X																																							
Domestic HWR temp	X																																							
Storage Tank(s)	X																																							
ELECTRICAL SYSTEMS																																						X		BY E.C.
TOTAL ELECT DEMAND										X									X															X						
TOTAL DEMAND										X									X																					
TOTAL KWH			X							X																														
CONSUMPTION			X							X																														
PHASE AMPS									X																															
PHASE VOLTS										X																														
AVG VOLTS										X																														
PHASE DEMAND																																								
EXTERIOR LIGHTING																		X				X													X					

GENERAL NOTE:
INPUT/OUTPUT SUMMARY IS A GENERAL LIST OF CONTROL POINTS REQUIRED FOR THE OPERATION OF THE MECHANICAL SYSTEM. IN ADDITION TO CONTROL POINTS INDICATED, THE CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL POINTS AS REQUIRED FOR OPERATION OF THE MECHANICAL SYSTEM AS SPECIFIED AND OUTLINED IN THE SEQUENCE OF OPERATION AND TO COMPLY WITH THE SPECIFICATIONS/PLANS.

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NORTH CAROLINA PROFESSIONAL 17228 ENGINEER RONALD V. ALVARINO

8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: CAH
CHECKED BY: RVA

MECHANICAL POINTS LIST

M-006

OPTIMA #: 16-0265 [redacted]

BUILDING BID DOCUMENTS

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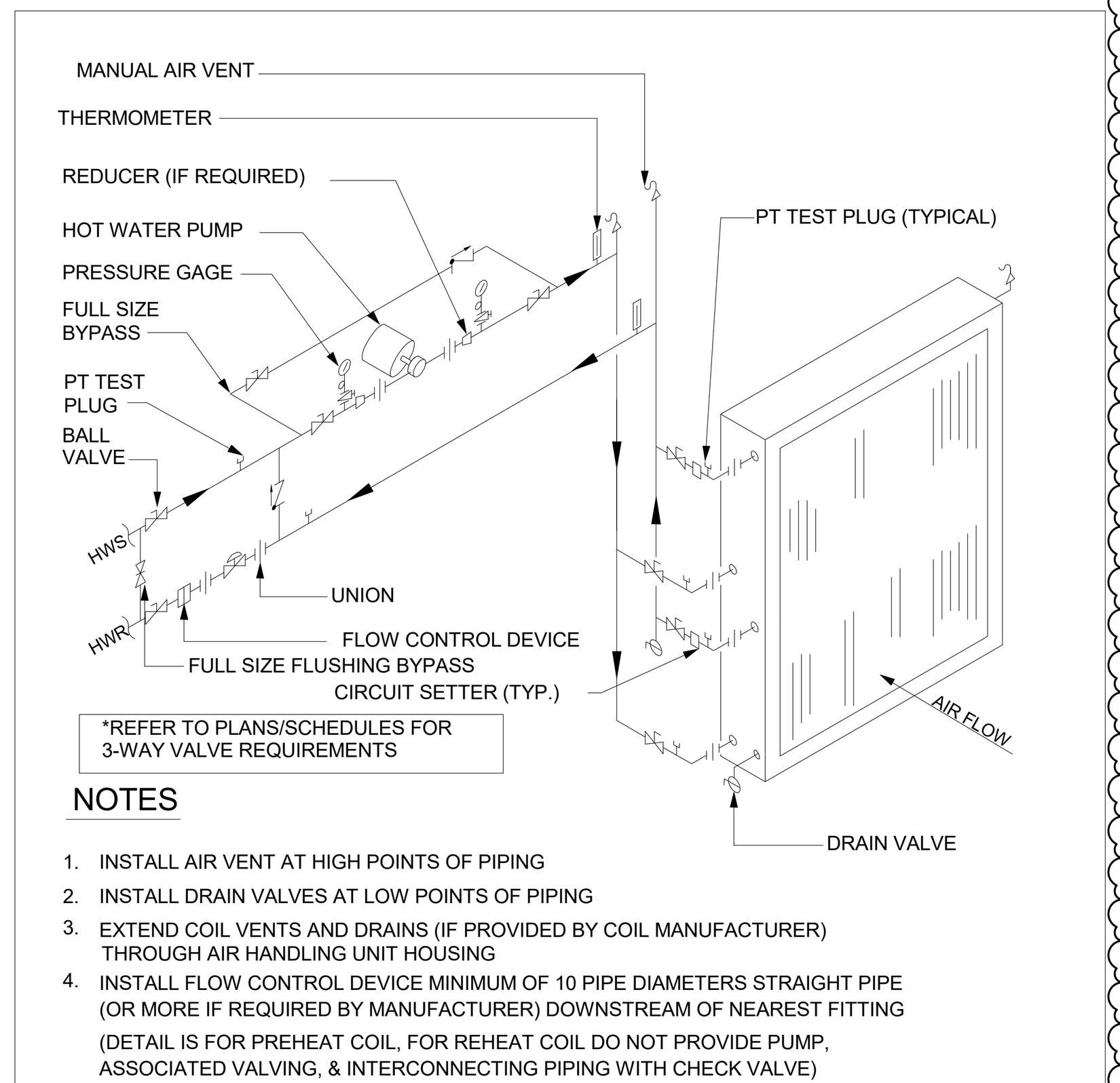
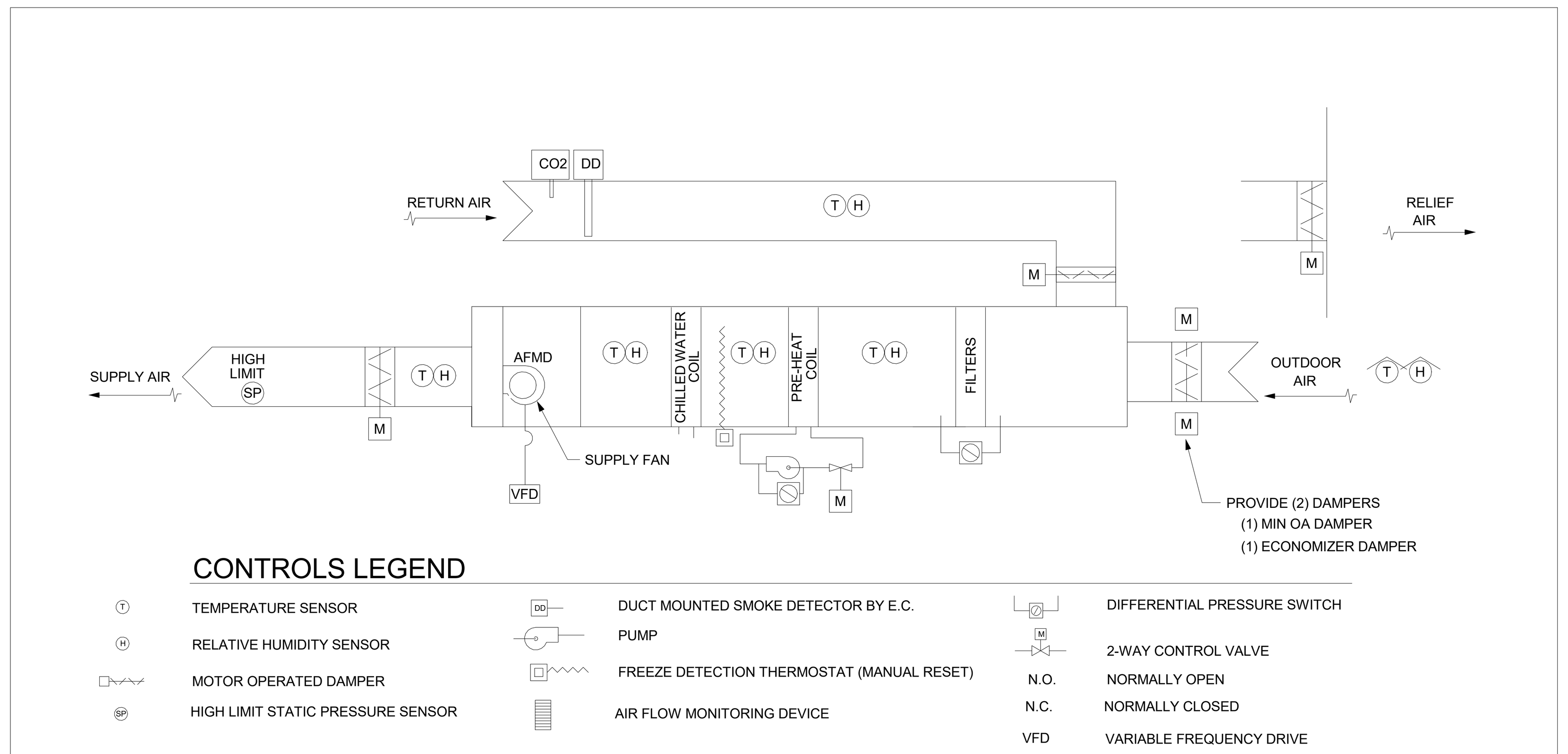


NOTES

1. INSTALL AIR VENT AT HIGH POINTS OF PIPING
2. INSTALL DRAIN VALVES AT LOW POINTS OF PIPING
3. EXTEND COIL VENTS AND DRAINS (IF PROVIDED BY COIL MANUFACTURER) THROUGH AIR HANDLING UNIT HOUSING
4. INSTALL FLOW CONTROL DEVICE MINIMUM OF 10 PIPE DIAMETERS STRAIGHT PIPE (OR MORE IF REQUIRED BY MANUFACTURER) DOWNSTREAM OF NEAREST FITTING (DETAIL IS FOR PREHEAT COIL, FOR REHEAT COIL DO NOT PROVIDE PUMP, ASSOCIATED VALVING, & INTERCONNECTING PIPING WITH CHECK VALVE)

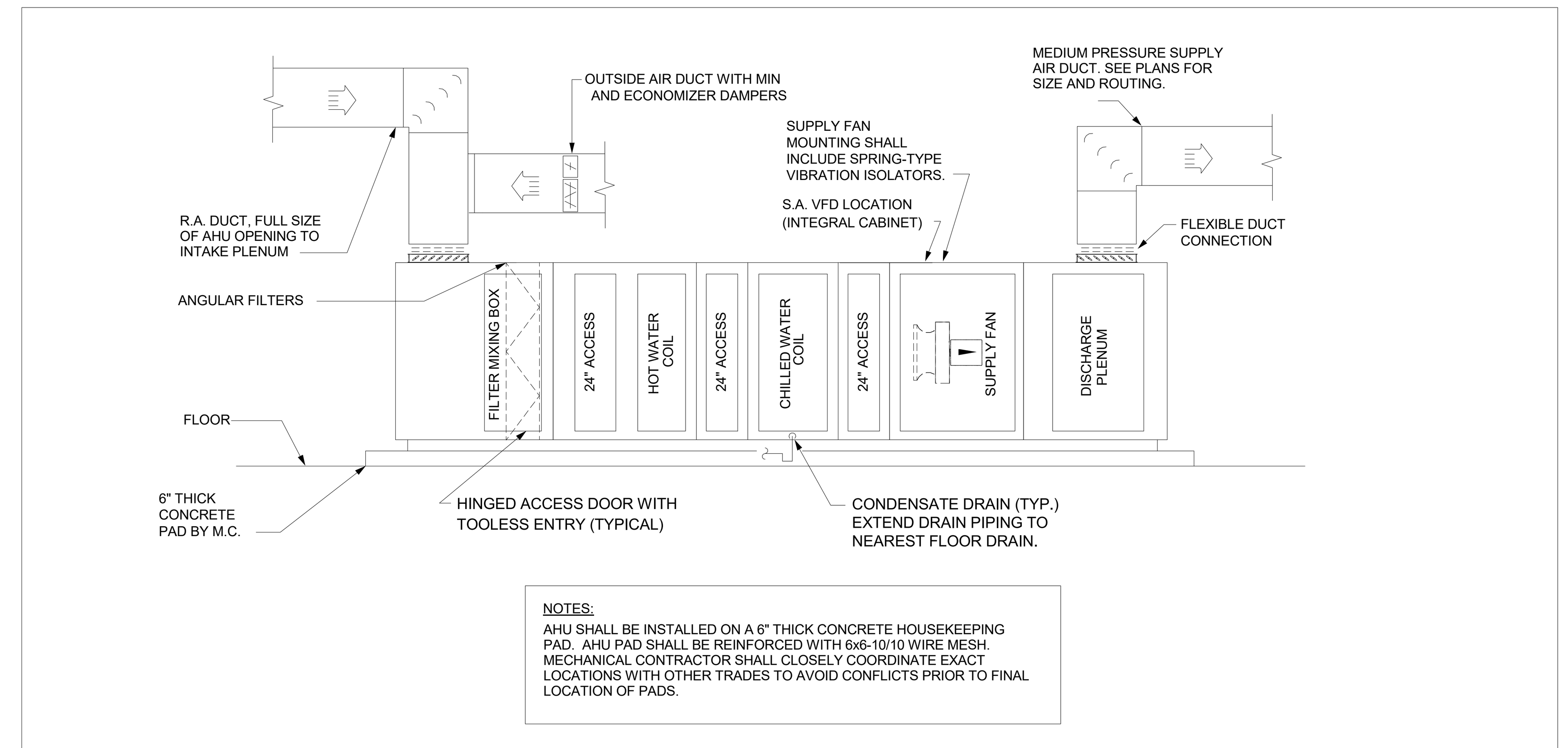
1 HOT WATER COIL W/ PUMP DETAIL
NO SCALE



CONTROLS LEGEND

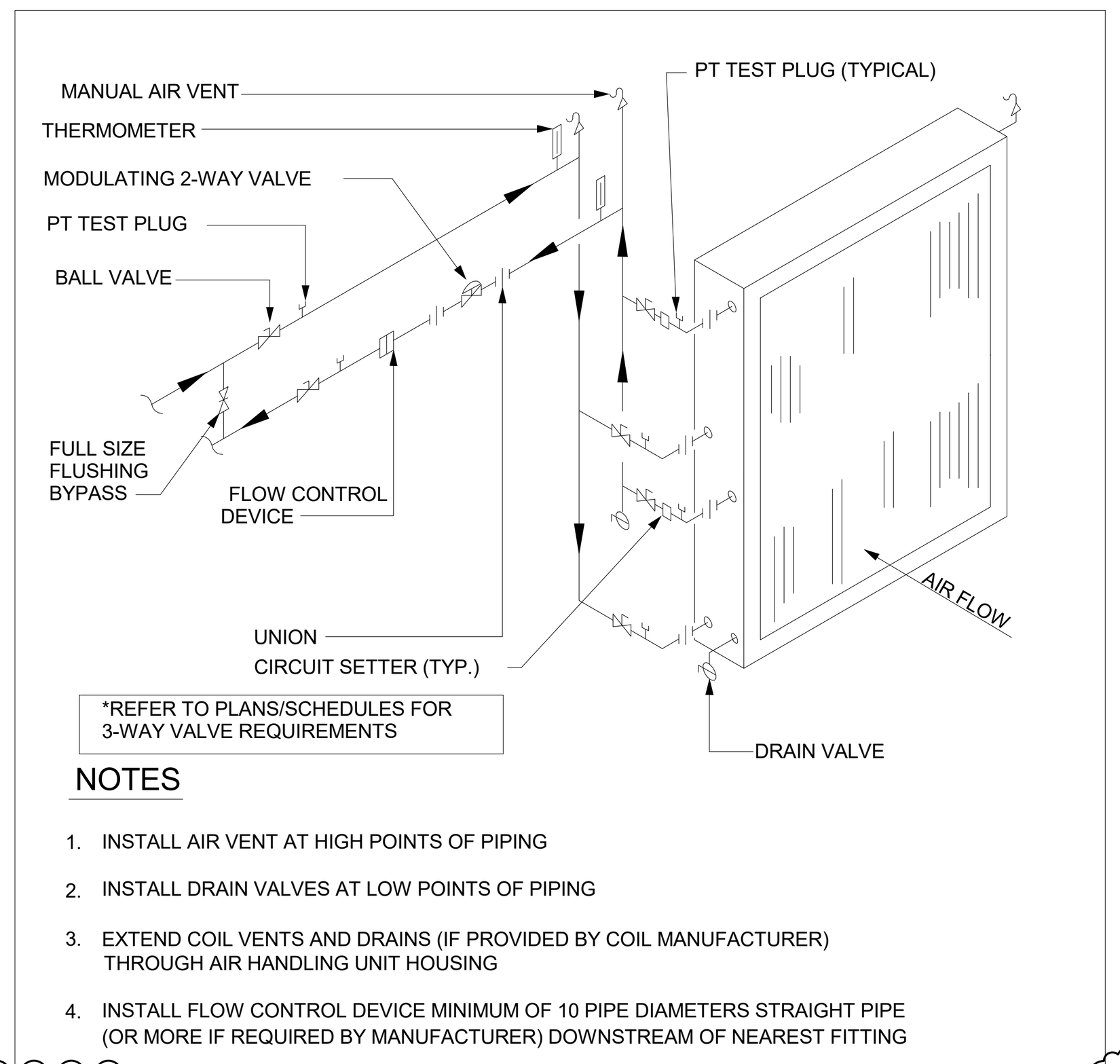
T	TEMPERATURE SENSOR	DD	DUCT MOUNTED SMOKE DETECTOR BY E.C.		DIFFERENTIAL PRESSURE SWITCH
H	RELATIVE HUMIDITY SENSOR		PUMP		2-WAY CONTROL VALVE
	MOTOR OPERATED DAMPER		FREEZE DETECTION THERMOSTAT (MANUAL RESET)	N.O.	NORMALLY OPEN
SP	HIGH LIMIT STATIC PRESSURE SENSOR		AIR FLOW MONITORING DEVICE	N.C.	NORMALLY CLOSED
				VFD	VARIABLE FREQUENCY DRIVE

2 AHU (2 & 3) CONTROL DIAGRAM
NO SCALE



NOTES:
AHU SHALL BE INSTALLED ON A 6" THICK CONCRETE HOUSEKEEPING PAD. AHU PAD SHALL BE REINFORCED WITH 6x6-10/10 WIRE MESH. MECHANICAL CONTRACTOR SHALL CLOSELY COORDINATE EXACT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS PRIOR TO FINAL LOCATION OF PADS.

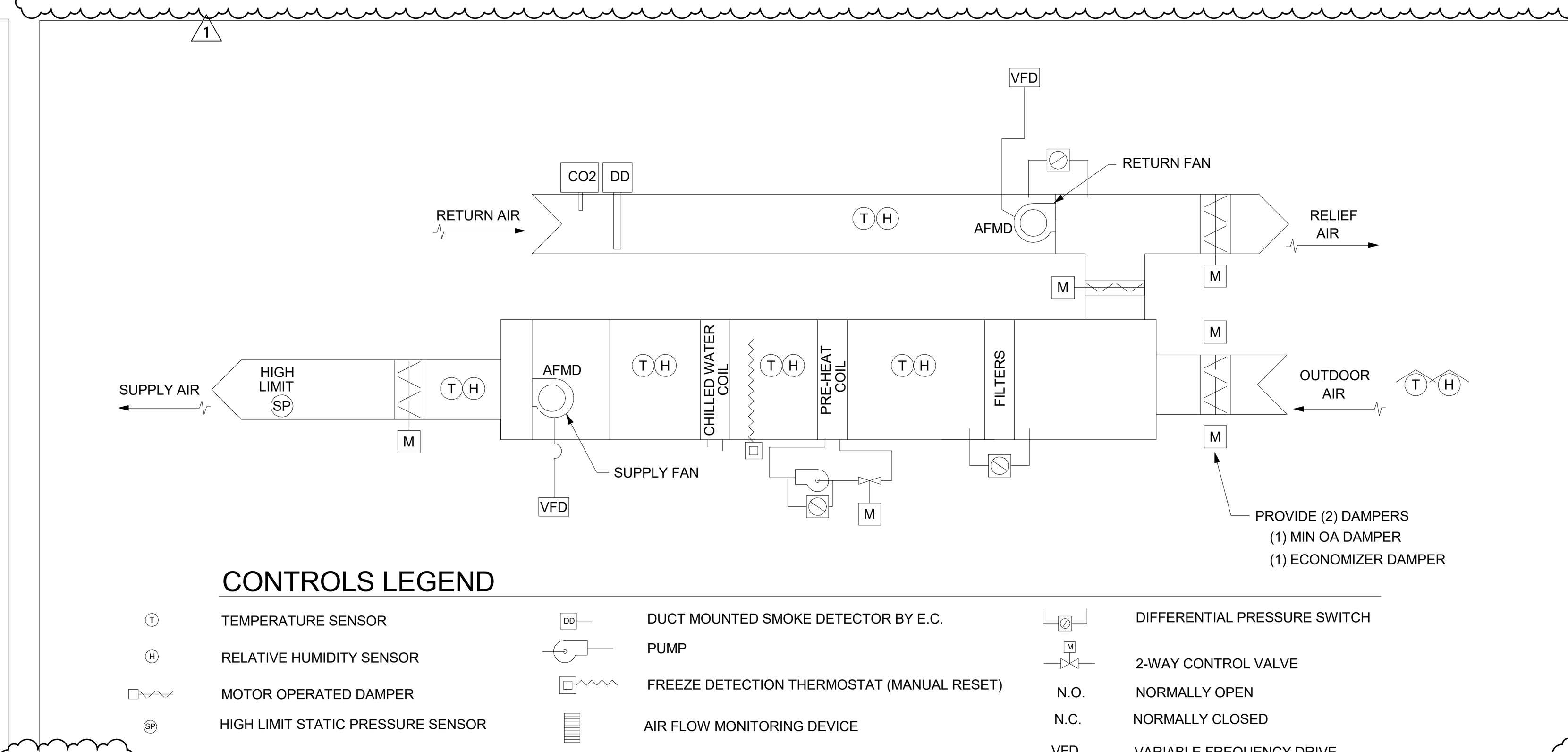
3 AIR HANDLER (2&3) DETAIL
NO SCALE



NOTES

1. INSTALL AIR VENT AT HIGH POINTS OF PIPING
2. INSTALL DRAIN VALVES AT LOW POINTS OF PIPING
3. EXTEND COIL VENTS AND DRAINS (IF PROVIDED BY COIL MANUFACTURER) THROUGH AIR HANDLING UNIT HOUSING
4. INSTALL FLOW CONTROL DEVICE MINIMUM OF 10 PIPE DIAMETERS STRAIGHT PIPE (OR MORE IF REQUIRED BY MANUFACTURER) DOWNSTREAM OF NEAREST FITTING

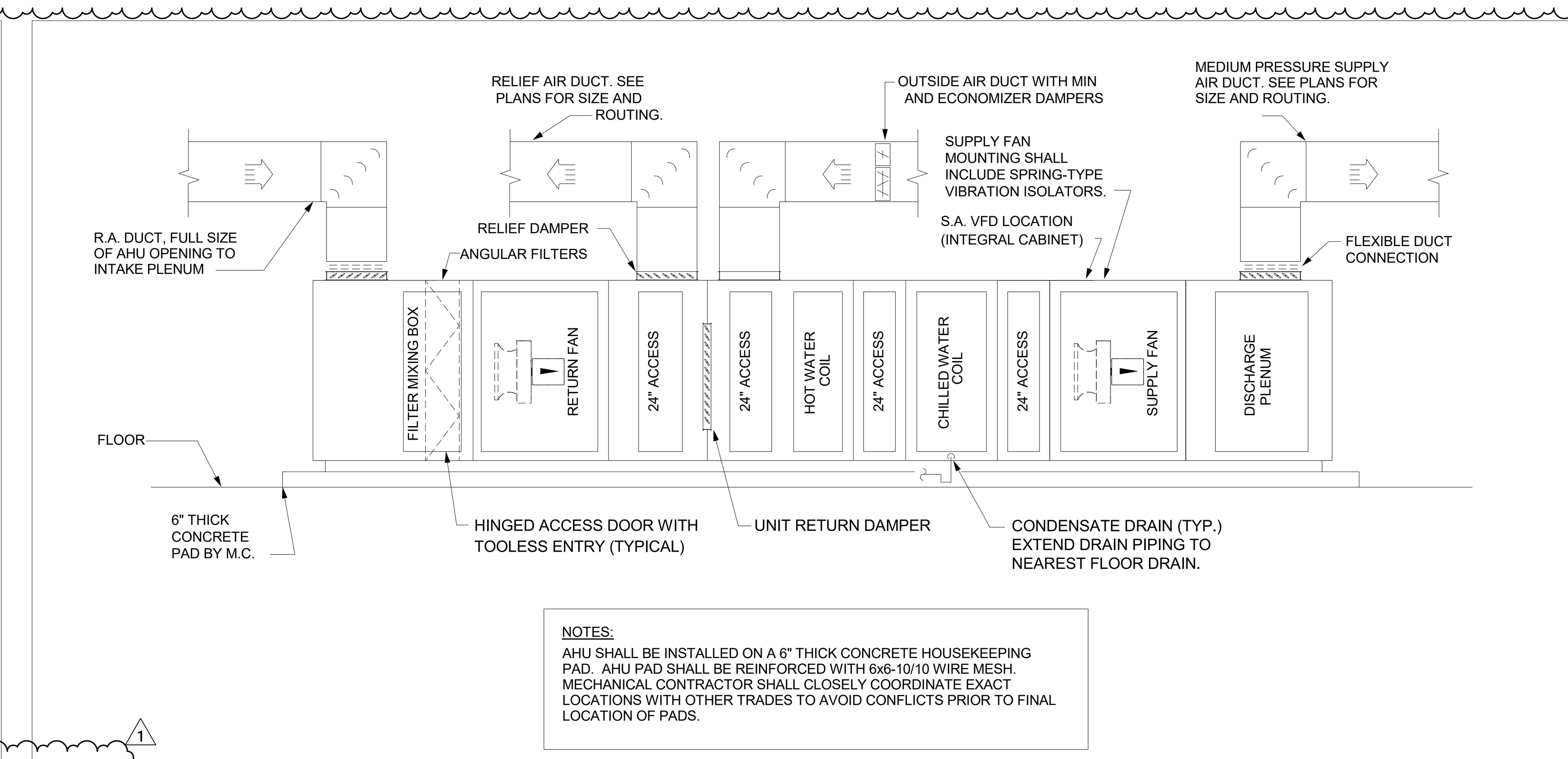
4 CHILLED WATER COIL DETAIL
NO SCALE



CONTROLS LEGEND

T	TEMPERATURE SENSOR	DD	DUCT MOUNTED SMOKE DETECTOR BY E.C.		DIFFERENTIAL PRESSURE SWITCH
H	RELATIVE HUMIDITY SENSOR		PUMP		2-WAY CONTROL VALVE
	MOTOR OPERATED DAMPER		FREEZE DETECTION THERMOSTAT (MANUAL RESET)	N.O.	NORMALLY OPEN
SP	HIGH LIMIT STATIC PRESSURE SENSOR		AIR FLOW MONITORING DEVICE	N.C.	NORMALLY CLOSED
				VFD	VARIABLE FREQUENCY DRIVE

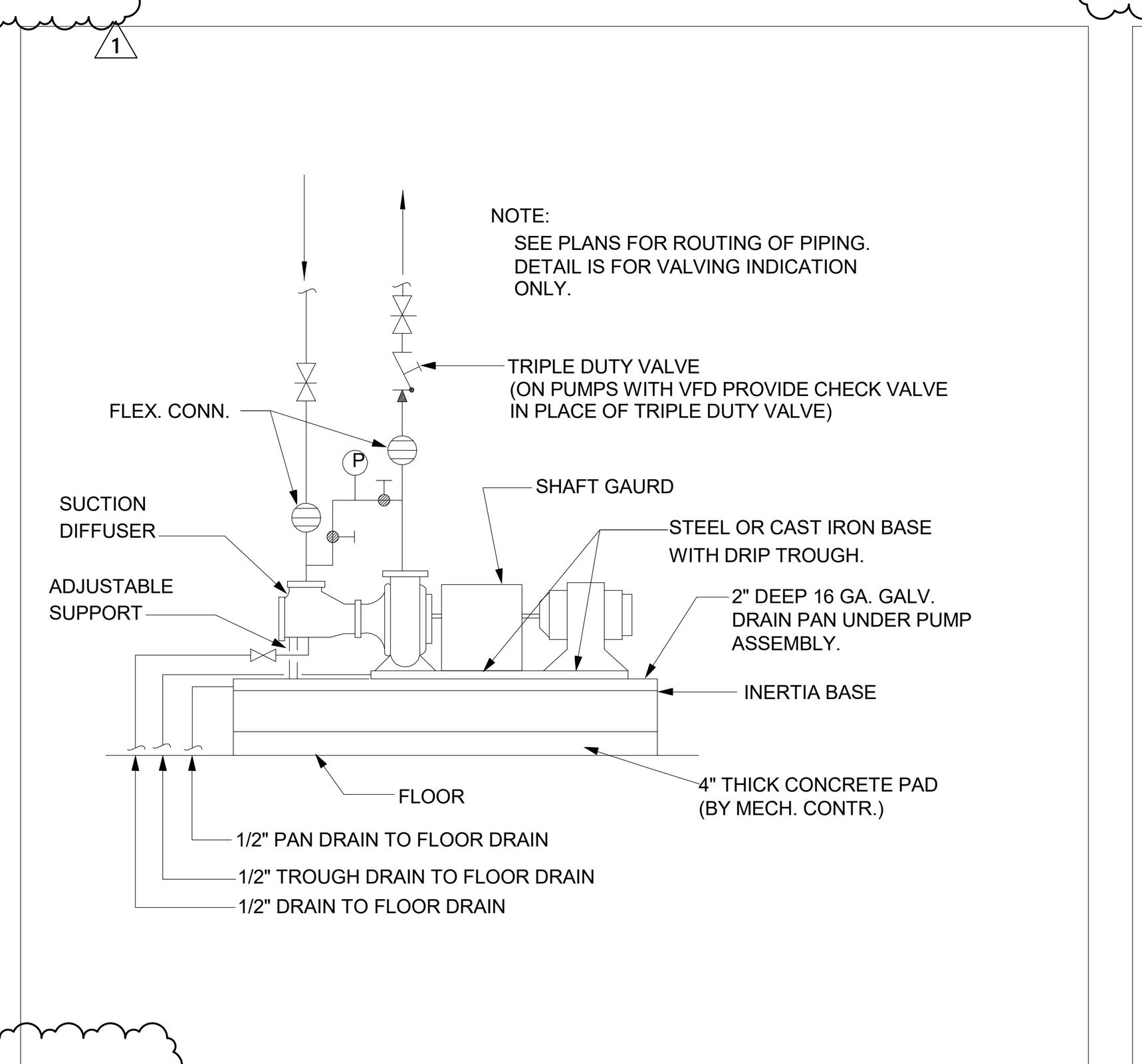
5 AHU-1 CONTROL DIAGRAM
NO SCALE



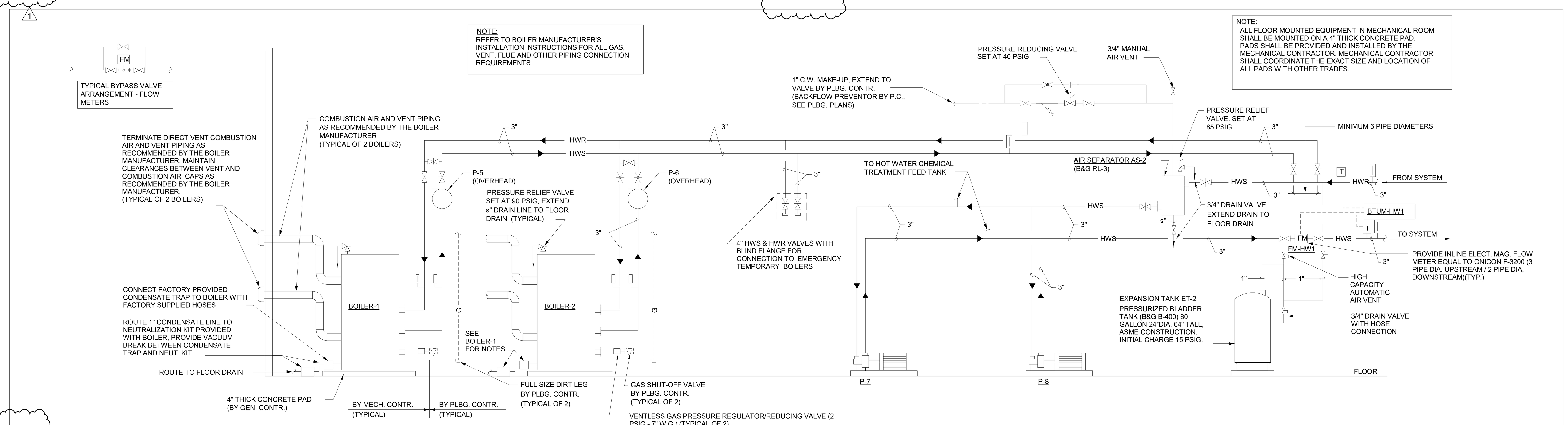
NOTES:
AHU SHALL BE INSTALLED ON A 6" THICK CONCRETE HOUSEKEEPING PAD. AHU PAD SHALL BE REINFORCED WITH 6x6-10/10 WIRE MESH. MECHANICAL CONTRACTOR SHALL CLOSELY COORDINATE EXACT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS PRIOR TO FINAL LOCATION OF PADS.

6 AIR HANDLER-1 DETAIL
NO SCALE

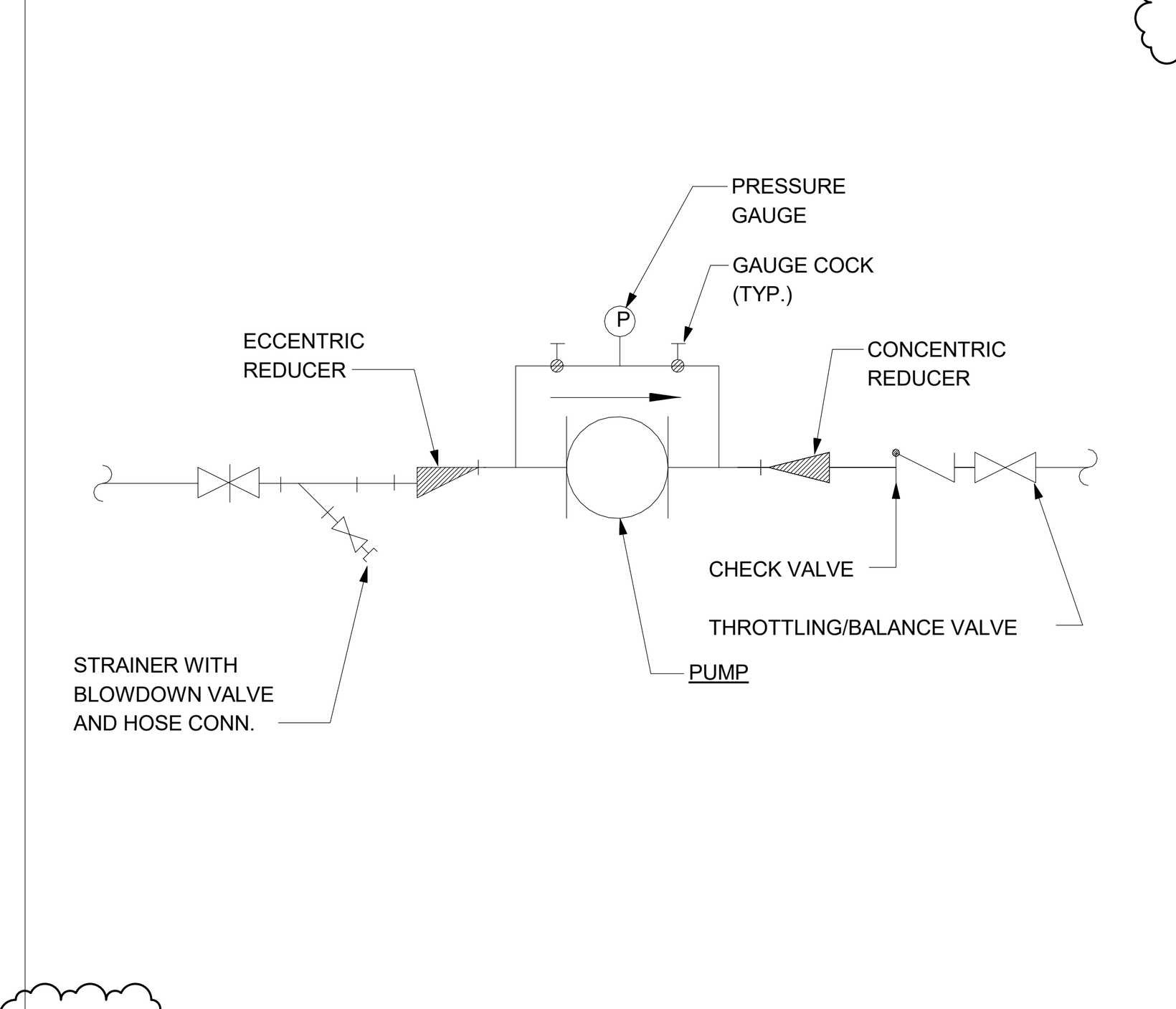
8/28/17



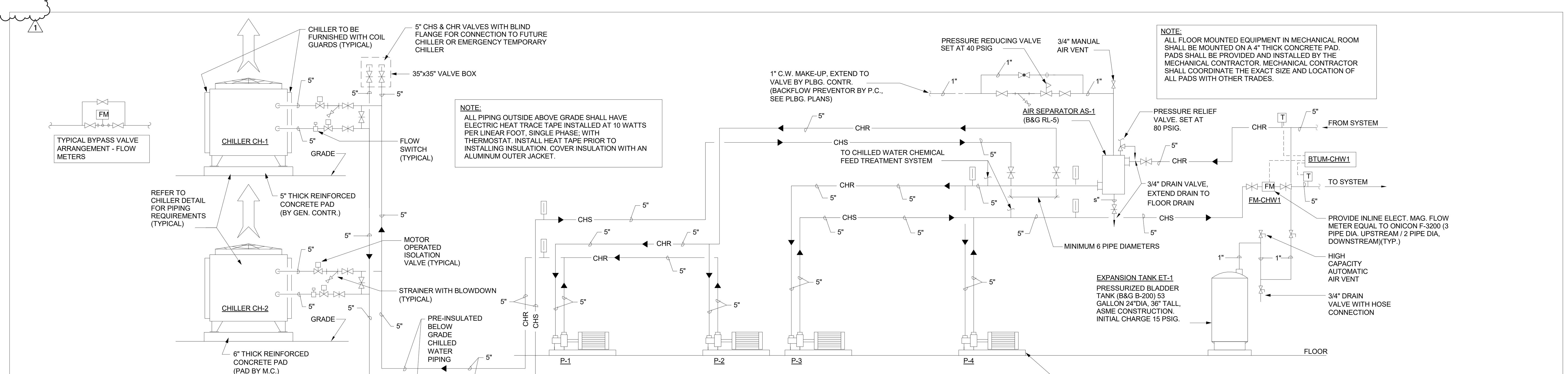
7 PUMP PIPING DETAIL
NO SCALE



8 HOT WATER PIPING SCHEMATIC
NO SCALE



9 INLINE PUMP DETAIL
NO SCALE



10 CHILLED WATER PIPING SCHEMATIC
NO SCALE

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: CAH
CHECKED BY: RVA

ENLARGED MECHANICAL ROOM DETAILS

M-403

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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WAREHOUSE BUILDING

2012 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

501.1 METHOD OF COMPLIANCE
- [ ] NC SPECIFIC COMCHECK PROVIDED
- [ ] 2012 NCECC CHAPTER 5
- [x] 20% IMPROVEMENT OVER ASHRAE 90.1-2007
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE

501.2 APPLICATION COMPLIANCE
- [ ] 506.2.1 EFFICIENT MECH EQUIPMENT
- [x] 506.2.2 REDUCED LTG DENSITY
- [ ] 506.2.3 ENERGY RECOVERY SYSTEMS
- [ ] 506.2.4 HI EFFICIENCY DOMESTIC HW
- [ ] 506.2.5 ONSITE RENEWABLE ENERGY
- [ ] 506.2.6 DAYLIGHTING CONTROLS
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE

505.2 - INTERIOR LIGHTING CONTROLS (MANDATORY REQUIREMENTS):
- [x] INTERIOR LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION 505.2, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.3 - TANDEM WIRING (MANDATORY REQUIREMENTS):
- [x] FLUORESCENT LUMINARIES LOCATED WITHIN THE SAME AREA ARE TANDEM WIRED AS REQUIRED PER SECTION 505.3, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.4 - EXIT SIGNS (MANDATORY REQUIREMENTS):
- [x] INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.
- [ ] NOT APPLICABLE

505.5 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):
- [ ] NOT APPLICABLE PER 2012 NCECC 101.4.3, EXCEPTION 1.G.

505.5.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:

16,100 WATTS SPECIFIED

22 % REDUCTION OF SPECIFIED VS. ALLOWED (APPLICABLE IF 506.2.2 IS SELECTED)

505.5.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:
- [x] BUILDING AREA METHOD
- [ ] SPACE-BY-SPACE METHOD

21,845 WATTS ALLOWED

505.6.1 - EXTERIOR BUILDING GROUNDS LIGHTING:
- [x] LAMPS OPERATING AT GREATER THAN 100 WATTS FOR EXTERIOR BUILDING GROUNDS LUMINARIES HAVE A MINIMUM EFFICACY OF 60 LUMENS PER WATT, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.6.2 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):
- [ ] NOT APPLICABLE

TOTAL CONNECTED EXTERIOR LIGHTING POWER:

2,100 *WATTS SPECIFIED*

TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

4,250 WATTS ALLOWED

505.6.3 - SHIELDING OF EXTERIOR BUILDING LIGHTING FIXTURES:
- [x] ONLY FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED, EXCEPT WHERE EXEMPT.
- [ ] ALTERNATIVE EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED FOR GREATER ENERGY EFFICIENCY OVER FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES.
- [ ] NOT APPLICABLE

505.7 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):
- [ ] SEPARATE TENANT METERING TO DETERMINE ELECTRICAL ENERGY CONSUMPTION HAS BEEN PROVIDED FOR BUILDINGS HAVING INDIVIDUAL DWELLING UNITS.
- [x] NOT APPLICABLE

OFFICE/SHOPS BUILDING

2012 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

501.1 METHOD OF COMPLIANCE
- [ ] NC SPECIFIC COMCHECK PROVIDED
- [ ] 2012 NCECC CHAPTER 5
- [x] 20% IMPROVEMENT OVER ASHRAE 90.1-2007
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE

501.2 APPLICATION COMPLIANCE
- [ ] 506.2.1 EFFICIENT MECH EQUIPMENT
- [x] 506.2.2 REDUCED LTG DENSITY
- [ ] 506.2.3 ENERGY RECOVERY SYSTEMS
- [ ] 506.2.4 HI EFFICIENCY DOMESTIC HW
- [ ] 506.2.5 ONSITE RENEWABLE ENERGY
- [ ] 506.2.6 DAYLIGHTING CONTROLS
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE

505.2 - INTERIOR LIGHTING CONTROLS (MANDATORY REQUIREMENTS):
- [x] INTERIOR LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION 505.2, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.3 - TANDEM WIRING (MANDATORY REQUIREMENTS):
- [x] FLUORESCENT LUMINARIES LOCATED WITHIN THE SAME AREA ARE TANDEM WIRED AS REQUIRED PER SECTION 505.3, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.4 - EXIT SIGNS (MANDATORY REQUIREMENTS):
- [x] INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.
- [ ] NOT APPLICABLE

505.5 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):
- [ ] NOT APPLICABLE PER 2012 NCECC 101.4.3, EXCEPTION 1.G.

505.5.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:

21,296 WATTS SPECIFIED

20 % REDUCTION OF SPECIFIED VS. ALLOWED (APPLICABLE IF 506.2.2 IS SELECTED)

505.5.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:
- [x] BUILDING AREA METHOD
- [ ] SPACE-BY-SPACE METHOD

26,687 WATTS ALLOWED

505.6.1 - EXTERIOR BUILDING GROUNDS LIGHTING:
- [x] LAMPS OPERATING AT GREATER THAN 100 WATTS FOR EXTERIOR BUILDING GROUNDS LUMINARIES HAVE A MINIMUM EFFICACY OF 60 LUMENS PER WATT, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

505.6.2 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):
- [ ] NOT APPLICABLE

TOTAL CONNECTED EXTERIOR LIGHTING POWER:

7,200 *WATTS SPECIFIED*

TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

15,350 WATTS ALLOWED

505.6.3 - SHIELDING OF EXTERIOR BUILDING LIGHTING FIXTURES:
- [x] ONLY FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED, EXCEPT WHERE EXEMPT.
- [ ] ALTERNATIVE EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED FOR GREATER ENERGY EFFICIENCY OVER FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES.
- [ ] NOT APPLICABLE

505.7 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):
- [ ] SEPARATE TENANT METERING TO DETERMINE ELECTRICAL ENERGY CONSUMPTION HAS BEEN PROVIDED FOR BUILDINGS HAVING INDIVIDUAL DWELLING UNITS.
- [x] NOT APPLICABLE

LOAD TABULATION - OFFICE AND SHOPS BUILDING

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			28.0		125	35.0	0.0	35.0
HVAC			62.0	301.0	100	62.0	301.0	363.0
MOTORS			27.0	96.0	100	27.0	96.0	123.0
KITCHEN			10.3		65	6.7	0.0	6.7
RECEPTACLES			151.0		NEC	80.5	0.0	80.5
WATER HEATER			21.4		125	26.7	0.0	26.7
MISC			106.0		100	106.0	0.0	106.0
FUTURE ALLOWANCE				213.0	100	0.0	213.0	213.0
TOTAL						343.9	610.0	953.9

LOAD TABULATION - WAREHOUSE

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			19.3		125	24.1		24.1
VENTILATION				4.1	100	0.0	4.1	4.1
MOTORS				42.0	100	0.0	42.0	42.0
KITCHEN			1.2		0.6	0.0	0.0	0.0
RECEPTACLES			27.5		NEC	18.7	0.0	18.7
WATER HEATER				54.0	125	0.0	54.0	54.0
MISC.			17.4		100	17.4	0.0	17.4
FUTURE ALLOWANCE				75.0	100	0.0	75.0	75.0
TOTAL						60.2	175.1	235.3

DRAWING LIST - ELECTRICAL

Sheet Number	Sheet Name
E-001	ELECTRICAL NOTES
E-002	ELECTRICAL DETAILS
E-003	ELECTRICAL DETAILS
E-004	ELECTRICAL DETAILS
E-005	ELECTRICAL DETAILS
E-006	ELECTRICAL DETAILS
E-007	ELECTRICAL DETAILS
E-008	ELECTRICAL DETAILS
E-009	ELECTRICAL SITE PLAN - OVERALL
E-010	ELECTRICAL SITE PLAN - ELECTRICAL
E-011	ELECTRICAL SITE PLAN - LIGHTING
E-101A	FLOOR PLAN - PATS/FO - POWER
E-101C	FLOOR PLAN - FO SHOPS - POWER
E-102A	FLOOR PLAN - WAREHOUSE - POWER - WEST
E-102B	FLOOR PLAN - WAREHOUSE - POWER - EAST
E-201A	REFLECTED CEILING PLAN - PATS/FO - LIGHTING
E-201C	REFLECTED CEILING PLAN - FO SHOPS - LIGHTING
E-202A	REFLECTED CEILING PLAN - WAREHOUSE - WEST - LIGHTING
E-202B	REFLECTED CEILING PLAN - WAREHOUSE - EAST - LIGHTING
E-301A	REFLECTED CEILING PLAN - PATS/FO - SPECIAL SYSTEMS
E-301C	REFLECTED CEILING PLAN - FO SHOPS - SPECIAL SYSTEMS
E-303A	REFLECTED CEILING PLAN - WAREHOUSE - SPECIAL SYSTEMS - WEST
E-303B	REFLECTED CEILING PLAN - WAREHOUSE - SPECIAL SYSTEMS - EAST
E-401A	FLOOR PLAN - PATS/FO - POWER/HVAC
E-401C	FLOOR PLAN - FO SHOPS - POWER/HVAC
E-402A	FLOOR PLAN - WAREHOUSE - POWER/HVAC - WEST
E-402B	FLOOR PLAN - WAREHOUSE - POWER/HVAC - EAST
E-501	POWER RISER
E-502	MEDIUM VOLTAGE POWER RISER
E-601	LIGHTING SCHEDULE
E-602	PANEL SCHEDULES
E-603	PANEL SCHEDULES
E-604	PANEL SCHEDULES
E-605	PANEL SCHEDULES

OFFICE SHOPS OVERALL BUILDING

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			28.0		125	35.0	0.0	35.0
HVAC			62.0	150.0	100	62.0	150.0	212.0
MOTORS			27.0	96.0	100	27.0	96.0	123.0
KITCHEN			10.3		65	6.7	0.0	6.7
RECEPTACLES			151.0		NEC	80.5	0.0	80.5
WATER HEATER			21.4		125	26.7	0.0	26.7
MISC.			106.0		100	106.0	0.0	106.0
FUTURE ALLOWANCE				60.0	100	0.0	60.0	60.0
TOTAL						343.9	306.0	649.9

OFFICE SHOPS LIFE SAFETY

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			6.0		125	7.5	0.0	7.5
HEATING					100			
COOLING					100			
VENTILATION					100			
MOTORS					100			
KITCHEN					65			
RECEPTACLES			3.2		NEC	6.6	0.0	6.6
WATER HEATER					125			
MISC.					100			
FUTURE ALLOWANCE				10.0	100	0.0	10.0	10.0
TOTAL						14.1	10.0	24.1

WAREHOUSE LIFE SAFETY

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			8.5		125	10.6	0.0	10.6
HEATING					100			
COOLING					100			
VENTILATION					100			
MOTORS					100			
KITCHEN					65			
RECEPTACLES			2.0		NEC	6.0	0.0	6.0
WATER HEATER					125			
MISC.					100			
FUTURE ALLOWANCE				10.0	100	0.0	10.0	10.0
TOTAL						16.6	10.0	26.6

TOTAL GENERATOR LOAD

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR (%)	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING AND NEW DEMAND
LIGHTS			42.5	0.0	125	53.1		53.1
HEATING			0.0	0.0	100			0.0
COOLING			0.0	0.0	100			0.0
VENTILATION			62.0	150.0	100	62.0	150.0	212.0
MOTORS			27.0	96.0	100	27.0	96.0	123.0
KITCHEN			10.3	0.0	65	6.7		6.7
RECEPTACLES			156.2	0.0	NEC	83.1		83.1
WATER HEATER			21.4	0.0	125	26.7		26.7
MISC.			106.0	0.0	100	106.0		106.0
FUTURE ALLOWANCE			0.0	80.0	100	0.0	80.0	80.0
TOTAL						364.6	326.0	690.6

DEVICES AND PATHWAYS

WIRING SYSTEM CONCEALED IN WALL OR CEILING.

WIRING SYSTEM CONCEALED IN OR UNDER SLAB OR UNDERGROUND.

WIRING SYSTEM EXPOSED

CONDUIT TURNED UP TO FLOOR ABOVE.

CONDUIT TURNED DOWN TO FLOOR BELOW.

BRANCH CIRCUIT HOMERUN TO PANEL.

JUNCTION BOX WITH CONNECTION TO EQUIPMENT SERVED. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.

HD — JUNCTION BOX FOR HAND DRYER CONNECTION; SEE MOUNTING HEIGHTS DETAIL FOR EXACT HEIGHT; SEE ARCH. SHEETS FOR COORDINATION 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.

"AV" — JUNCTION BOX FOR AV CONNECTION, COORDINATE REQUIRMENTS WITH AV PLANS.

DUPLEX RECEPTACLE, 20 AMP, 120 VOLT (USE 20 AMP FOR SINGLE RECEPTACLE ON A CIRCUIT.) HUBBELL 5352, OR EQUAL.

DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER BACKSPLASH, OR AT HEIGHT NOTED. THESE ARE TO BE MOUNTED HORIZONTALLY.

QUAD RECEPTACLE. TWO NEMA 5-20R DUPLEX RECEPTACLES.

QUAD RECEPTACLE ABOVE COUNTER BACKSPLASH. TWO NEMA 5-20R DUPLEX RECEPTACLES.

EWC — STANDARD NEMA 5-20R GFI DUPLEX RECEPTACLE FOR ELECTRIC WATER COOLER. COORDINATE LOCATION WITH PLUMBING CONTRACTOR.

GFI — GROUND FAULT RECEPTACLE. NEMA 5-20R DUPLEX. ALL RECEPTACLES INSTALLED OUTSIDE, WITHIN 6' OF A SINK OR IN A KITCHEN SHALL BE GFCI.

IG — ISOLATED GROUND RECEPTACLE. NEMA 5-20R DUPLEX.

WP — WEATHERPROOF RECEPTACLE. NEMA 5-20R GFI DUPLEX. COVER SHALL BE INTERMATIC #WP1020 (CLEAR) OR EQUAL.

S — DUPLEX SWITCHED TAMPER RESISTANT RECEPTACLE, 20 AMP, 120 VOLT.

SPD — SURGE PROTECTION DEVICE (SPD); SEE DETAIL

WIREMOLD 2400 PLUGMOLD. NEMA 5-15R RECEPTACLES ON 12" CENTERS. ALTERNATE CIRCUITS.

KITCHEN RECEPTACLE. SEE KITCHEN EQUIPMENT SCHEDULE.

SPECIAL OUTLET. SEE PLANS.

FC — MODULAR FURNITURE CONNECTION. PROVIDE DOUBLE-GANG BARRIERED J-BOX FOR POWER & TELE/DATA. EXTEND 2" EC TO ABOVE ACCESSIBLE CEILING FOR TELE/DATA. CONNECT POWER AS INDICATED.

M — MOTOR OPERATED DAMPER (DAMPER BY M.C.) COORDINATE CIRCUIT NUMBER WITH PLANS.

G — GROUNDING BAR PER DIAGRAM.

VAV — VAV JUNCTION BOX FOR CONTROL POWER TRANSFORMER. PROVIDE SINGLE POLE TOGGLE DISCONNECT.

EPO — EMERGENCY SHUTDOWN PUSHBUTTON, SEE PLANS. SEE DETAIL #3/E-002.

P — PROJECTOR RECEPTACLE. MOUNT AT LOCAL CEILING/DECKING. WHERE A LAY-IN CEILING IS PROVIDED MOUNT IN PROJECT PLATE OR FLUSH IN CEILING TILE. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.

FB1 — TWO GANG FLUSH MOUNTED FLOOR BOX WITH ACCESSIBLE COVER FOR COMMUNICATIONS. PROVIDE COMMUNICATION PLATES FOR FOUR RJ45 CAT6E JACKS ON EACH PLATE. EQUAL TO WIREMOLD RFB2-OG-FPBT. ARCHITECT TO SELECT FINISH. STUB FROM BOX ONE CONCEALED 2"C ROUTED TO CABLE TRAY.

FB2 — FOUR GANG FLUSH MOUNTED FLOOR BOX WITH ACCESSIBLE COVER FOR POWER. PROVIDE TWO NEMA 5-20R DUPLEX RECEPTACLES. EQUAL TO WIREMOLD RFB4-OG-FPBT. ARCHITECT TO SELECT FINISH.

FB4 — FOUR GANG FLUSH MOUNTED FLOOR BOX WITH ACCESSIBLE COVER FOR POWER AND COMMUNICATIONS. PROVIDE TWO NEMA 5-20R DUPLEX RECEPTACLES AND TWO COMMUNICATION PLATES FOR TWO RJ45 CAT6E JACKS ON EACH PLATE AND CAT6E CABLE TO MATCH. EQUAL TO WIREMOLD RFB4-OG-FPBT. ARCHITECT TO SELECT FINISH. STUB FROM BOX ONE CONCEALED 1"C ROUTED TO CABLE TRAY.

FB6 — SIX GANG FLUSH MOUNTED FLOOR BOX WITH ACCESSIBLE COVER FOR POWER AND COMMUNICATIONS. PROVIDE TWO NEMA 5-20 DUPLEX RECEPTACLES AND TWO COMMUNICATION PLATES FOR TWO RJ45 CAT6E JACKS ON EACH PLATE AND CAT6E CABLE TO MATCH AND 2 BLANK PLATES FOR A/V USE. EQUAL TO WIREMOLD RFB6-OG-FPBT. ARCHITECT TO SELECT FINISH. STUB FROM BOX ONE CONCEALED 2"C ROUTED TO CABLE TRAY FOR DATA AND ONE 2"C ROUTE ABOVE CEILING FOR OWNER USE.

FB10 — TEN GANG FLUSH MOUNTED FLOOR BOX WITH ACCESSIBLE COVER FOR POWER AND COMMUNICATIONS. PROVIDE SIX NEMA 5-20R DUPLEX RECEPTACLES AND THREE COMM. PLATE WITH FOUR RJ45 CAT6E JACKS AND (12) CAT6E CABLES TO LOCAL DATA CLOSET VIA . EQUAL TO WIREMOLD EFB10 WITH MODULES AND PLATES FPR SPECIFIED DEVICES. PROVIDE (1) DECORA A/V PLATE. ARCHITECT TO SELECT FINISH. STUB FROM BOX ONE CONCEALED (1)-2"C AND (1)-1 1/4"C ROUTED TO CABLE TRAY. (1) 1" CONDUIT FOR POWER.

AV1 — JUNCTION BOX, 18" AFF, FOR A/V CABLES, STUB 1.25" CONDUIT TO ABOVE ACCESSIBLE CEILING IN THIS ROOM. 5"x 5"X 3" DEEP SQUARE BOX WITH A TWO-GANG PLASTER RING. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

AV2 — JUNCTION BOX, AT 18"AFF, FOR A/V CABLES, STUB 1.25" CONDUIT FROM BOX UP TO TV LOCATION5"x 5"X 3" DEEP SQUARE BOX WITH A TWO-GANG PLASTER RING. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

AV3 — JUNCTION BOX, AT 18"AFF, FOR A/V CABLES, STUB 1.25" CONDUIT FROM BOX TO RECESSED FLOOR BOX IN THIS ROOM.5"x 5"X 3" DEEP SQUARE BOX WITH A TWO-GANG PLASTER RING. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

AV4 — JUNCTION BOX, AT 18"AFF, FOR A/V CABLES, STUB 1.25" CONDUIT FROM BOX TO RECESSED FLOOR BOX IN THIS ROOM. STUB AN ADDITIONAL 1.25" CONDUIT FROM BOX TO CEILING MOUNTED PLENUM BOX. 5"x 5"X 3" DEEP SQUARE BOX WITH A TWO-GANG PLASTER RING. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

AVP — CEILING MOUNTED PLENUM BOX. LEGRAND EVOLUTION ECB2S-CR OR APPROVED EQUAL. PLENUM BOX SHALL HAVE INTERNAL FAN, POWER STRIP AND SOLID LOCKABLE COVER. PROVIDE (1) 1.25" CONDUIT TO FLOOR BOX, (1) 1.25" CONDUIT TO ACCESSIBLE CEILING SPACE IN CORRIDOR, AND (1) 1.25" CONDUIT TO DISPLAY.

P — JUNCTION BOX FOR HARDWIRED PLUMBING FIXTURES, COORDINATE WITH P.C.

C — WHITE CORD REEL WITH 50' CABLE AND OUTLETS. REELCRAFT 4545 123 7A, OR APPROVED EQUAL BY INSUL8 OR HUBBLE.

PANELS, DISCONNECTS

S_M — FRACTIONAL HORSEPOWER MANUAL MOTOR STARTER, WITH OVERLOAD PROTECTION

NON-FUSED HEAVY DUTY DISCONNECT SWITCH. NUMERALS INDICATE SWITCH RATING. NEMA 1 ENCLOSURE, UNLESS OTHERWISE NOTED.

FUSED HEAVY DUTY DISCONNECT SWITCH. NUMERALS INDICATE SWITCH RATING/FUSE SIZE. NEMA 1 ENCLOSURE, UNLESS OTHERWISE NOTED.

CIRCUIT BREAKER. NUMERALS INDICATE RATING. NEMA 1 ENCLOSURE, UNLESS OTHERWISE NOTED.

PLYWOOD TELEPHONE BACKBOARD. SIZE AS INDICATED ON RISER.

PANELBOARD. SEE SCHEDULE FOR MOUNTING. TOP OF PANEL AT 6'-6" AFF.

DOOR MOTOR CONTROL. MOUNT +48" AFF, CONTROLS SHALL BE UP, DOWN, AND STOP MOUNTED ON 4" SQUARE BOX (FLUSH BOX)

CONNECTION TO MOTOR. STARTER PROVIDED BY OTHERS UNLESS OTHERWISE NOTED.

SECURITY

CEILING MOUNTED SECURITY CAMERA LOCATION. PROVIDE JUNCTION BOX AND 1"C TO CABLE TRAY SYSTEM ABOVE ACCESSIBLE CORRIDOR CEILING. CLOSELY REVIEW VENDOR REQUIREMENTS FOR COMPLETE INFRASTRUCTURE REQUIREMENTS. SUBSCRIPT "WP" INDICATES WEATHERPROOF, PROVIDE WATER TIGHT JUNCTION BOX.

WALL MOUNTED SECURITY CAMERA LOCATION. PROVIDE JUNCTION BOX AND 1"C TO CABLE TRAY SYSTEM ABOVE ACCESSIBLE CORRIDOR CEILING. CLOSELY REVIEW VENDOR REQUIREMENTS FOR COMPLETE INFRASTRUCTURE REQUIREMENTS. SUBSCRIPT "WP" INDICATES WEATHERPROOF, PROVIDE WATER TIGHT JUNCTION BOX.

1

CR — CARD READER, MINIMUM 1/2" CONDUIT. PROVIDE SINGLE GANG JUNCTION BOX AND PULL STRING. SEE CARD READER DETAIL FOR ADDITIONAL REQUIREMENTS OF PATHWAYS AND CABLING.

DC — DOOR CONTACT, MINIMUM 1/2" CONDUIT. PROVIDE SINGLE GANG JUNCTION BOX AND PULL STRING. SEE CARD READER DETAIL FOR ADDITIONAL REQUIREMENTS OF PATHWAYS AND CABLING.

SYMBOL SCHEDULE

FIRE ALARM

F — FIRE ALARM MANUAL STATION WITH CLEAR POLYCARBONATE PROTECTIVE COVER. COVER SHALL HAVE INTEGRAL BATTERY BACKED UP AUDIBLE ALARM.

SP — ADA COMPLIANT FIRE ALARM SPEAKER WITH STROBE LIGHT, 75cd, UNLESS OTHERWISE NOTED. WHITE FINISH.

S — ADA COMPLIANT FIRE ALARM STROBE LIGHT, 75cd, UNLESS OTHERWISE NOTED. WHITE FINISH.

SD — CEILING MOUNTED SMOKE DETECTOR.

DD — DUCT MOUNTED SMOKE DETECTOR. FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR. CUTTING OF DUCT, INSTALLATION OF DETECTOR. AND DETERMINATION OF SAMPLING TUBE LENGTH SHALL BE THE MECHANICAL CONTRACTOR. PROVIDE REMOTE INDICATING LIGHT WITH EACH DETECTOR.

HD — CEILING MOUNTED HEAT DETECTOR.

RA — FIRE ALARM REMOTE GRAPHIC ANNUNCIATOR.

SP — ADA COMPLIANT FIRE ALARM SPEAKER STROBE LIGHT, 75cd, UNLESS OTHERWISE NOTED. WHITE FINISH. (CEILING MOUNTED)

S — ADA COMPLIANT FIRE ALARM STROBE LIGHT, 75cd, UNLESS OTHERWISE NOTED. WHITE FINISH. (CEILING MOUNTED)

FACP SD — FIRE ALARM CONTROL PANEL WITH LOCAL SMOKE DETECTOR

BD — BEAM TYPE SMOKE DETECTOR

R — DUCT DETECTOR REMOTE INDICATING LIGHT, WITH TEST SWITCH.

CO — CEILING MOUNTED CARBON MONOXIDE DETECTOR (CENTRAL SYSTEM CONNECTED)

R — DUCT DETECTOR REMOTE INDICATING LIGHT WITH TEST SWITCH. 24VDC WITH SUPERVISION BY FIRE ALARM SYSTEM.

MD — MULTI-SENSOR DETECTOR. SMOKE, HEAT AND CO.

SPECIAL SYSTEMS

S — FLUSH-MOUNTED CEILING SPEAKER. E.C. IS TO PROVIDE EPISODE KIT-ECS-650-IC-4, VERIFY FINISH PRIOR TO ORDERING.

WP — EXTERIOR WEATHERPROOF SPEAKER;3/4" CONDUIT TO LOCAL CABLE TRAY PROVIDE WEATHERPROOF J-BOX. E.C. IS TO PROVIDE EPISODE ECS-AW70V-4-WHT, VERIFY FINISH PRIOR TO ORDERING.

V — VOLUME CONTROL; SINGLE GANG BOX AND 3/4"C CONDUIT TO ABOVE CEILING WITH PULL STRING. SEE APPLICABLE DETAIL AND/OR SPECIFICATIONS FOR ADDITIONAL CONDUIT AND CABLING REQUIREMENTS.

TV — SEE TV DETAIL FOR TYPE AND REQUIREMENTS. STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR, AND 3/4" CONDUIT FOR POWER. PROVIDE PULL STRING FOR LOW VOLTAGE CABLE. SEE ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHTS.

TV/L — SEE TV DETAIL FOR TYPE AND REQUIREMENTS. STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR, 1.25" CONDUIT TO ABOVE ACCESSIBLE CEILING IN THIS ROOM AND 3/4" CONDUIT FOR POWER. PROVIDE PULL STRING FOR LOW VOLTAGE CABLE. SEE ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHTS.

GA — GENERATOR ANNUNCIATOR PANEL; 3/4" CONDUIT TO ATS. PROVIDE BOX AS REQUIRED PER MANUFACTURER RECOMMENDATION PROVIDE CABLING PER MANUFACTURER RECOMMENDATIONS

DRC — ACCESSIBLE DOOR OPENER PUSH BUTTON. PROVIDE MINIMUM (2) GANG BOX WITH SINGLE GANG OPENING. 3/4"C TO DOOR OPERATOR. COORDINATE WITH EQUIPMENT PROVIDED. SEE DETAIL.

TELECOMMUNICATIONS

VOICE AND DATA OUTLET. 42"AFF. 5"x 5" SQUARE BOX WITH A TWO-GANG PLASTER RING. STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

VOICE AND DATA OUTLET. 18"AFF. 5"x 5" SQUARE BOX WITH A TWO-GANG PLASTER RING. STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR. MATCH HEIGHT OF RECEPTACLES LOCATED ON THE SAME WALL. PROVIDE AND INSTALL FIRE RATED "PUTTY PACK" WHERE LOCATED IN FIRE RATED WALLS.

WAP — WIRELESS ACCESS POINT. ABOVE CEILING, SURFACE MOUNTED TERMINATION BOX. FOR LOCATIONS NOT LOCATED WITHIN A CORRIDOR, STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR.

WAP WP — EXTERIOR WIRELESS ACCESS POINT. STUB 1.25" CONDUIT FROM BOX TO CABLE TRAY ABOVE ACCESSIBLE CEILING IN CORRIDOR.

SCHEDULE NOTES:
1. SEE DETAIL FOR STANDARD MOUNTING HEIGHTS OF ALL DEVICES, UNLESS OTHERWISE NOTED.
2. ALL DEVICES (SWITCHES AND RECEPTACLES) SHALL BE GRAY AND EMERGENCY SHALL BE RED. COVER PLATE SHALL BE 302 STAINLESS STEEL. ALL COVER PLATES IN MASONRY WALLS SHALL BE JUMBO PLATES.
3. DEVICE BOXES SHALL NOT BE MOUNTED BACK TO BACK IN COMMON WALLS UNLESS OTHERWISE NOTED.
4. ALL FIRE ALARM SHALL BE IN CONDUIT.
5. ALL LOW VOLTAGE CABLING SHALL BE PLENUM RATED.
6. MC CABLE SHALL NOT BE PERMITTED.
7. ALL PLAN DRAWINGS SHALL SUPERCEDE SPECIFICATIONS WHEN PLANS AND SPECIFICATIONS ARE IN CONFLICT.
8. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, CONDUIT, WIRE, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
9. SHARED NEUTRAL OR "SUPER NEUTRAL" CONDUCTORS SHALL NOT BE PERMITTED UNLESS SPECIFICALLY SHOWN ON THESE DRAWINGS.
10. ALL WALL MOUNTED OCCUPANCY/VACANCY SENSOR SWITCH OUTLETS SHALL BE BE PROVIDED WITH A GROUNDED CONDUCTOR AS PART OF THE WIRING SYSTEM.

LIGHTING (SEE FIXTURE SCH.)

FLUORESCENT OR LED LIGHTING FIXTURE. SEE FIXTURE SCHEDULE. SUSPEND FOUR CORNERS WITH WIRE TO STRUCTURE. DO NOT ALLOW GRID ALONE TO SUPPORT FIXTURE.

FLUORESCENT OR LED STRIP FIXTURE.

FLUOR., LED OR H.I.D. LIGHTING FIXTURE.

WALL MOUNTED INCANDESCENT, FLUOR., LED OR H.I.D. LIGHTING FIXTURE.

LED OR FLUORESCENT FIXTURE, GENERATOR CONNECTED (UNLESS OTHERWISE NOTED). SEE LIGHTING FIXTURE SCHEDULE

FLUORESCENT OR LED DOWNLIGHT GENERATOR CONNECTED. SEE LIGHTING FIXTURE SCHEDULE.

EXIT LIGHT WITH ARROWS AND NUMBERS OF FACES AS INDICATED ON PLANS. GENERATOR CONNECTED. SEE LIGHTING FIXTURE SCHEDULE

EMERGENCY BATTERY PACK FIXTURE. 90 MINUTE EMERGENCY INTEGRAL BATTERY. SEE LIGHTING FIXTURE SCHEDULE

EMERGENCY BATTERY PACK/EXIT COMBO FIXTURE WITH 90 MINUTE BATTERY BACKUP, SEE FIXTURE SCHEDULE.

EXTERIOR EMERGENCY FIXTURE.

SINGLE HEAD POLE FIXTURE.

DOUBLE HEAD POLE FIXTURE.

S — SINGLE POLE SWITCH, 20 AMP, 120/277 VOLT, COOPER AH 1221, OR EQUAL BY HUBBELL, LEVITON, AND PASS & SEYMOUR.

S_3 — THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, OR EQUAL BY HUBBELL, LEVITON, AND PASS & SEYMOUR.

S_4 — FOUR WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1224, OR EQUAL.

S S — INDICATES TWO LEVEL SWITCHING. SWITCH SO THAT THERE IS 0 - 50 - 100% LIGHT OUTPUT FROM FIXTURES.

S_{VS} — WALL MOUNTED VACANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY, WATT STOPPER #CS-50 OR EQUAL.

OC DT — CEILING MOUNTED OCCUPANCY SENSOR, DUAL TECHNOLOGY. SENSOR SWITCH CM PDT 10, WATT STOPPER #DT-300, COOPER OAC-DT OR EQUAL.

W OC — WALL MOUNTED OCCUPANCY SENSOR, DUAL TECHNOLOGY. SENSOR SWITCH WV-PDT, WATT STOPPER #DT-200, LEVITON, GREENGATE OR EQUAL. CONICAL PATTERN, MOUNT AS CLOSE TO CORNER OF ROOM AS POSSIBLE. MOUNT 10' AFF OR 6" BELOW CEILING (IF LOWER THAN 10'.)

S_D — WALL MOUNTED 0-10V DIMMER

S_{OC} — WALL MOUNTED OCCUPANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY WITH NEUTRAL, WATT STOPPER #WS-250, OR EQUAL BY SENSOR SWITCH, AND LEVITON.

S_{OC2} — WALL MOUNTED OCCUPANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY, WATT STOPPER #PW-200 OR EQUAL. FOR INBOARD/OUTBOARD SWITCHING OR STEP BALLAST. SWITCH SHALL BE INSTALLED IN SINGLE GANG BOX.

S_{DOC} — WALL MOUNTED DIMMER, OCCUPANCY SENSOR AND SWITCH. PIR TECHNOLOGY, HUBBLE LIGHTHAWK2 DIMMING OR EQUAL BY WATTSTOPPER OR LUTRON. 0-10V DIMMING. SWITCH SHALL BE INSTALLED IN SINGLE GANG BOX.

PC — PHOTO CONTROL, EXTERIOR, MOUNT FACING NORTH.

PP — CEILING MOUNTED OCCUPANCY SENSOR POWER PACK. SENSOR SWITCH PP-20, WATT STOPPER #BZ-100, COOPER SP-20, OR EQUAL.

PP D — CEILING MOUNTED OCCUPANCY SENSOR 0-10V DIMMING POWER PACK.

1 — SWITCHING DEVICE INDICATOR;INDICATES SWITCH AND ASSOCIATED FIXTURES CONTROLLED BY DEVICE

S_L — LOW VOLTAGE WALL SWITCH WITH 2 BUTTONS, SEE LIGHTING CONTROL DIAGRAM.**

S_{L4} — LOW VOLTAGE WALL SWITCH WITH 4 BUTTONS, SEE LIGHTING CONTROL DIAGRAM.**

S_{L8} — LOW VOLTAGE WALL SWITCH WITH 8 BUTTONS, SEE LIGHTING CONTROL DIAGRAM.**

**WHEN SHOWN, SUBSCRIPTS SHOWN ADJACENT TO SWITCHES INDICATES THE RELAY IT SHALL CONTROL. PROGRAM ACCORDINGLY.

1 — GENERATOR TRANSFER DEVICE FOR NORMAL LIGHTING CONTROL, SEE EMERG. LTG RELAY DETAIL. CONNECT TO LOCAL LIFE SAFETY BRANCH LIGHTING CIRCUIT. WHERE BI-LEVEL SWITCH CIRCUITING IS SHOWN FOR LIGHTING FIXTURE, PROVIDE A MINIMUM OF TWO GTD'S FOR LIGHTING FIXTURE(S). EQUAL TO BODINE GTD OR EQUALS BY IOTA AND PHILIPS.

2 — GENERATOR TRANSFER DEVICE FOR NORMAL LIGHTING CONTROL, SEE EMERG. LTG RELAY DETAIL. CONNECT TO LOCAL LIFE SAFETY BRANCH LIGHTING CIRCUIT. EQUAL TO BODINE GTD20A OR EQUALS BY IOTA AND PHILIPS.

1

VS — WALL MOUNTED VACANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY, WATT STOPPER #CS-50 OR EQUAL.

ABBREVIATIONS

+42"	DIMENSION INDICATES HEIGHT ABOVE FINISHED FLOOR AT WHICH CENTER OF DEVICE IS TO MOUNTED. SEE PLANS.
3R	NEMA 3R
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLER UNIT
C	CONDUIT WITH PULL CORD
C.B.	CIRCUIT BREAKER
EC	EMPTY CONDUIT WITH PULL CORD
E.C.	ELECTRICAL CONTRACTOR
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
FACP	FIRE ALARM CONTROL PANEL
FPN	FUSE PER NAMEPLATE
LC	LIGHTING CONTACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
U.G.	UNDERGROUND
WP	WEATHERPROOF
S.E.	SERVICE ENTRANCE
EM	EMERGENCY FIXTURE WITH BATTERY OR GEN. BACK-UP
ER	EXISTING ITEM RELOCATED TO THIS LOCATION.
RL	EXISTING ITEM TO BE RELOCATED.
RM	EXISTING ITEM TO REMAIN.
RP	EXISTING ITEM TO BE REPLACED.
RV	EXISTING ITEM TO BE REMOVED.
Isc	RMS SYMMETRICAL SHORT CIRCUIT CURRENT
AIC	AMPERE INTERRUPTING CAPACITY (EQUIPMENT RATING)

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8/28/17

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REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL NOTES

E-001

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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8/29/2017 10:10:32 AM

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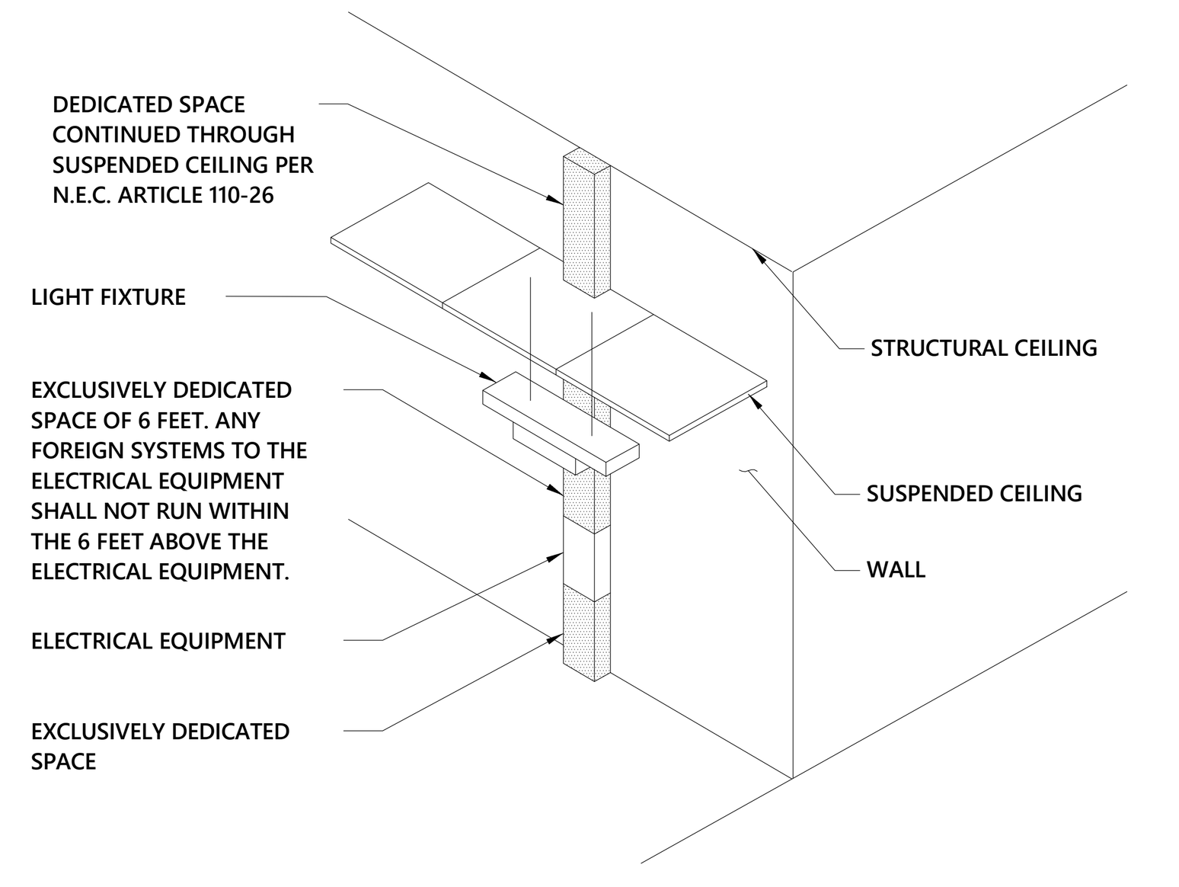
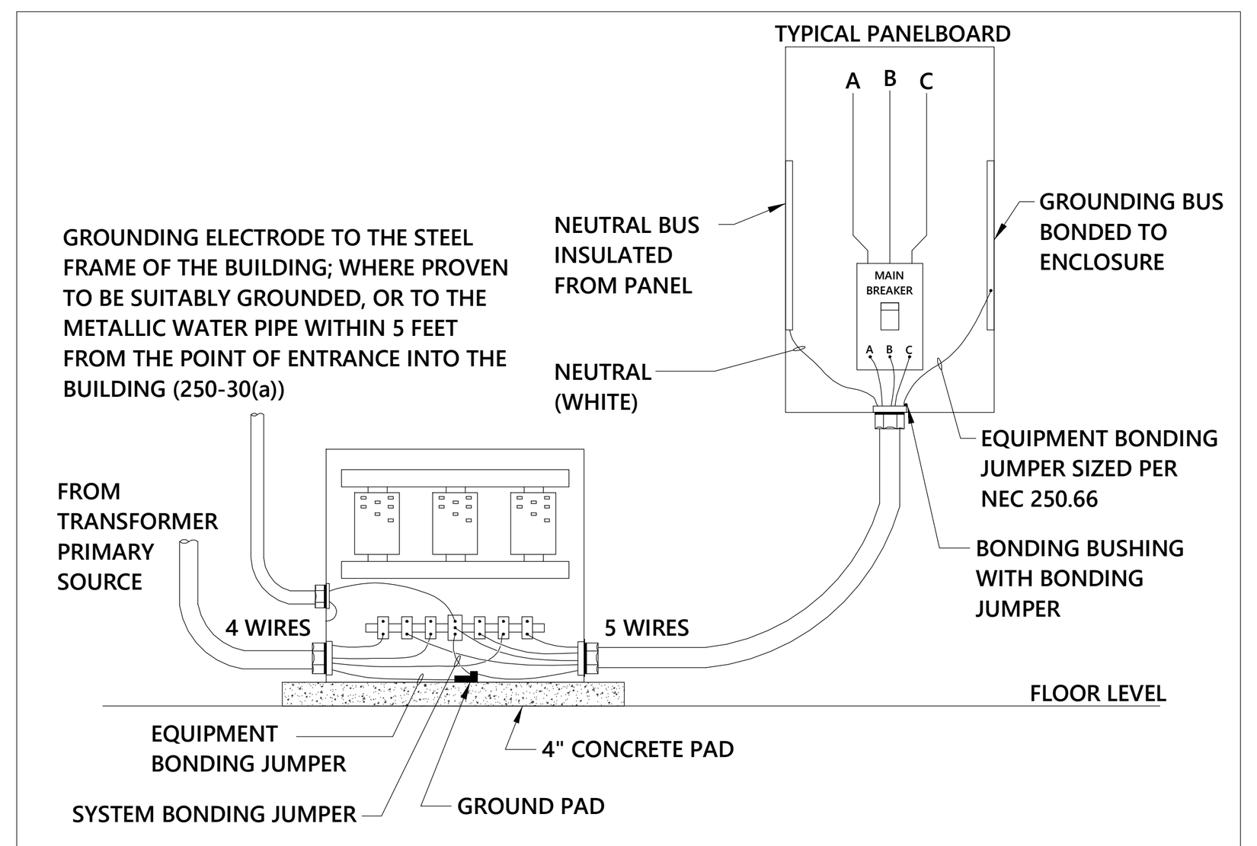


NOTES:

THIS FIGURE ILLUSTRATES THE ADDITIONAL EXCLUSIVELY DEDICATED SPACE REQUIRED OVER AND UNDER THE ELECTRICAL EQUIPMENT FOR THE CABLES, RACEWAYS, ETC.. TO AND FROM THE ELECTRICAL EQUIPMENT REQUIRED BY SECTION 11-26 OF THE NATIONAL ELECTRICAL CODE.

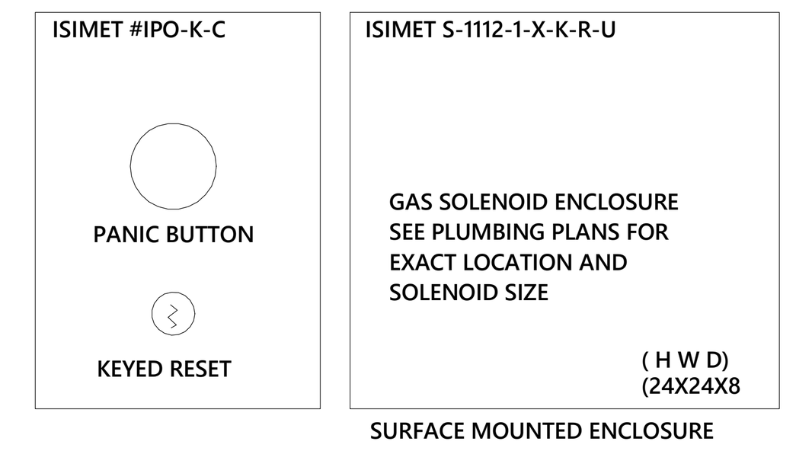
1 DEDICATED SPACE FOR ELECTRICAL EQUIPMENT
NO SCALE



NOTES:

1. TRANSFORMER BONDING STRAP. IF NOT PROVIDED BY THE TRANSFORMER MANUFACTURER THIS STRAP SHOULD BE THE SAME SIZE AS THE SYSTEM BONDING JUMPER. (250.30).
2. USE A BONDING BUSHING AND EQUIPMENT BONDING JUMPER AT THE CONDUIT TERMINATION. JUMPER SHOULD BE THE SAME SIZE AS THE GROUNDING ELECTRODE CONDUCTOR CONTAINED IN THE CONDUIT..
3. USE A BONDING CLAMP AT THE TERMINATION OF THE GROUNDING ELECTRODE CONDUCTOR TO THE ELECTRODE.
4. IF STRUCTURAL STEEL OR WATER PIPE IS NOT AVAILABLE, CONNECT GROUND TO ALTERNATIVE GROUNDING ELECTRODE PER NEC 250.52A.

2 DRY-TYPE TRANSFORMER GROUNDING DIAGRAM
NO SCALE



NOTE:
1. PROVIDE PHENOLIC LABEL ABOVE PUSH BUTTON: EMERGENCY BOILER SHUT-OFF

2. PROVIDE REMOTE PANIC ASSEMBLY IPO-K-C WITH OPTION "C", PANIC BUTTON COVER.
3. CONNECT TO LOCAL 120V CIRCUIT FOR CONTROLLER.
4. SEE PLUMBING PLANS FOR EXACT SOLENOID SIZE REQUIREMENT.
5. 3/4" CONDUIT FROM PANIC BUTTON TO SOLENOID ENCLOSURE.

EQUALS: JOHNSON CONTROLS, EATON CUTLER HAMMER

3 EMERG. SHUT OFF CONTROL DETAIL (ISIMET)
NO SCALE

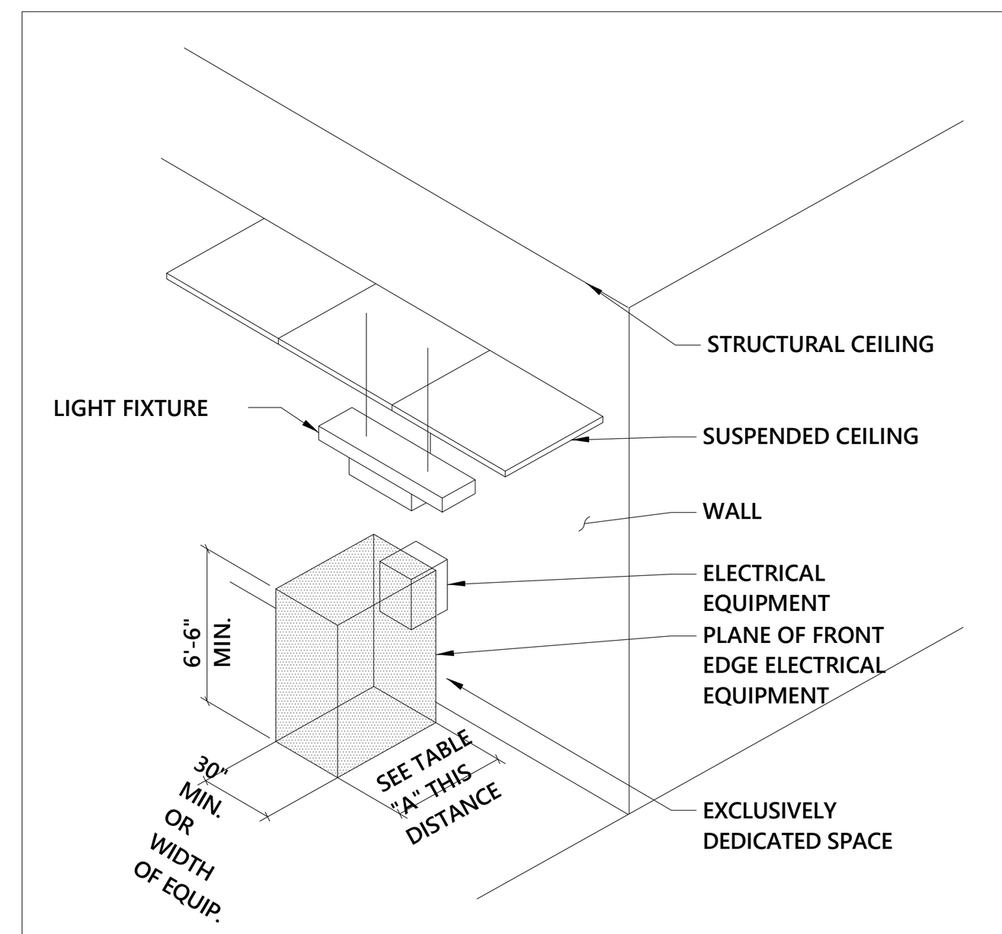


TABLE A - WORKING CLEARANCES

VOLTAGE TO GROUND NOMINAL	MINIMUM CLEAR DISTANCE (FEET) CONDITION: 1	2	3
0 - 150	3	3	3
151 - 600	3	3 1/2	4

WHERE THE "CONDITIONS" ARE AS FOLLOWS:

1. EXPOSED LIVE PARTS ON ONE SIDE AND NO LIVE OR GROUNDED PARTS ON THE OTHER SIDE OF THE WORKING SPACE, OR EXPOSED PARTS ON BOTH SIDES EFFECTIVELY GUARDED BY SUITABLE WOOD OR OTHER INSULATING MATERIALS. INSULATED WIRE OR INSULATED BUSBARS OPERATING AT NOT OVER 300V SHALL NOT BE CONSIDERED LIVE PARTS.
2. EXPOSED LIVE PARTS ON ONE SIDE AND GROUNDED PARTS ON THE OTHER SIDE.
3. EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORK SPACE (NOT GUARDED AS PROVIDED IN CONDITION 1) WITH THE OPERATOR BETWEEN.

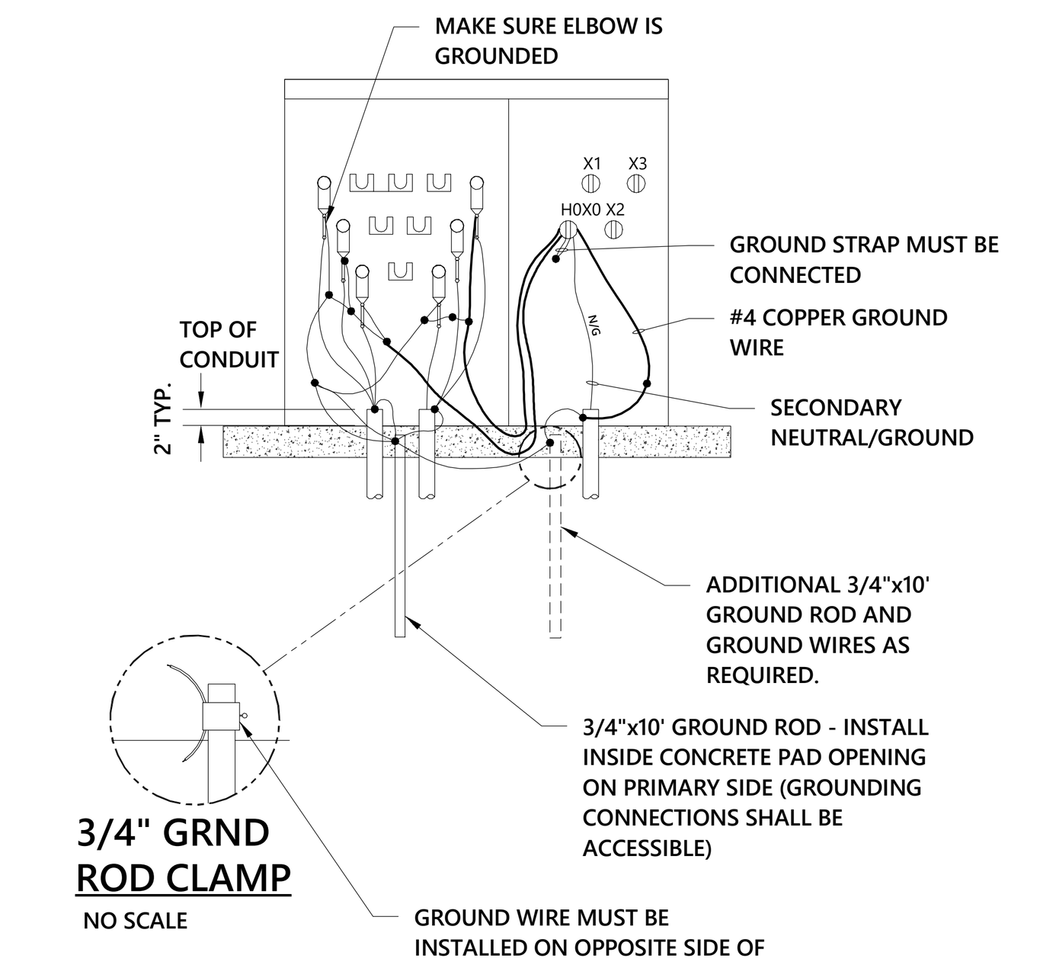
NOTES:

THIS FIGURE ILLUSTRATES THE WORKING SPACE IN FRONT OF THE ELECTRICAL EQUIPMENT REQUIRED BY SECTION 110-26 OF THE NATIONAL ELECTRICAL CODE.

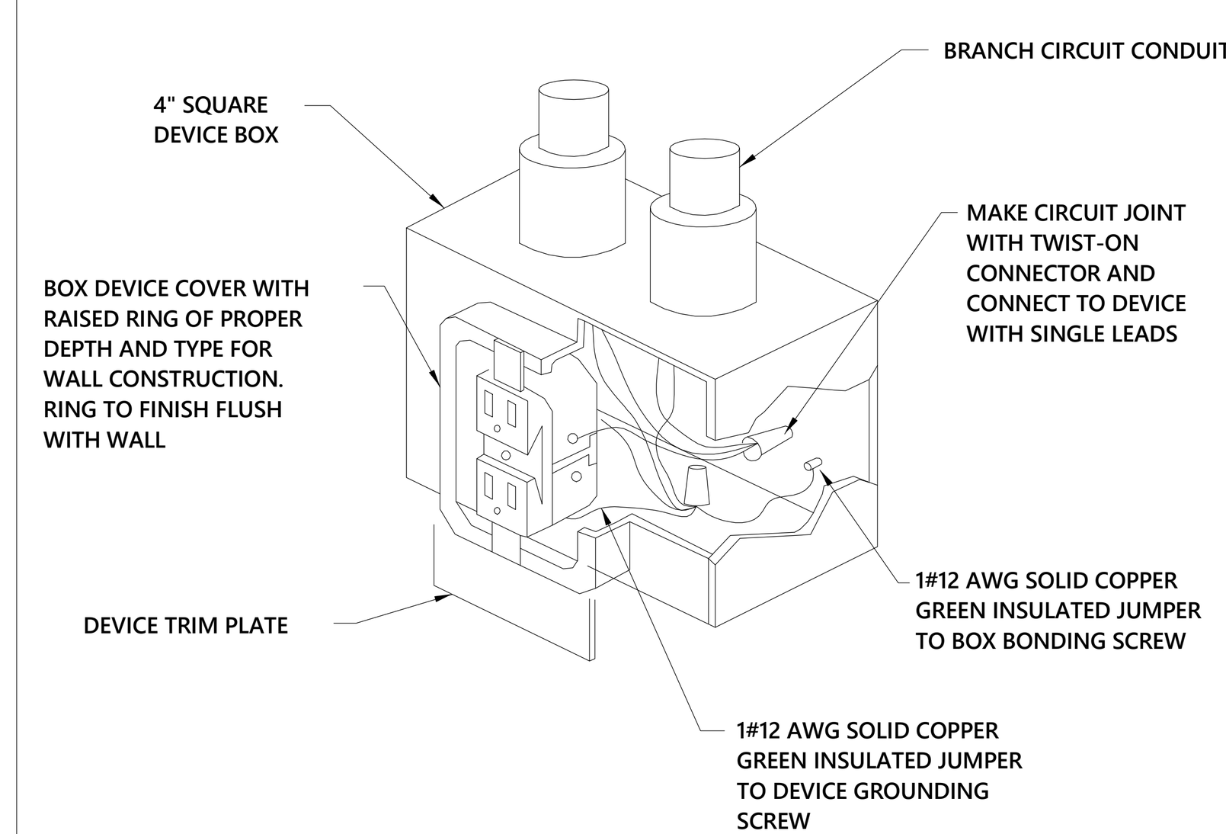
4 WORKING CLEARANCE FOR ELECTRICAL EQUIPMENT
NO SCALE

NOTES:

1. THE PRIMARY NEUTRAL CONDUCTOR MUST BE BONDED CONTINUOUSLY TO THE PRIMARY CONDUIT (IF METALLIC), THE GROUND ROD, THE TRANSFORMER TANK GROUND PAD IN THE PRIMARY COMPARTMENT, AND THE H0/X0 NEUTRAL BUSHING. THIS STEP SHALL BE REPEATED IF LOOP FEED TRANSFORMER.
2. THE STRESS CONES AND THE PRIMARY CABLE SHIELD MUST BE GROUNDED TO THE NEUTRAL CONDUCTOR. THIS STEP SHALL BE REPEATED IF LOOP FEED TRANSFORMER.
3. A #4 COPPER GROUND WIRE IS TO BE BONDED TO THE H0/X0 BUSHING, TO THE GROUND PAD IN SECONDARY COMPARTMENT, TO THE SECONDARY CONDUIT (IF METALLIC), AND TO THE GROUND ROD.
4. GROUND STRAP MUST CONNECT THE H0/X0 BUSHING TO THE TRANSFORMER TANK.
5. A SUITABLE FLEXIBLE #6 COPPER ARRESTER LEAD SHALL BE INSTALLED FROM EACH ARRESTER DIRECTLY TO THE GROUND ROD (NOT SHOWN).
6. THE PRIMARY AND SECONDARY CONDUIT SHALL EXTEND TWO INCHES ABOVE THE CONCRETE PAD.
7. IF THE RESISTANCE OF THE GROUND ROD EXCEEDS 25 OHMS, INSTALL AN ADDITIONAL GROUND ROD AT LEAST 10' AWAY. INTER-CONNECT THE TWO USING #4 COPPER GROUND WIRE.
8. COMPLETE INSTALLATION MUST BE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL SAFETY CODE, ANSI C2.



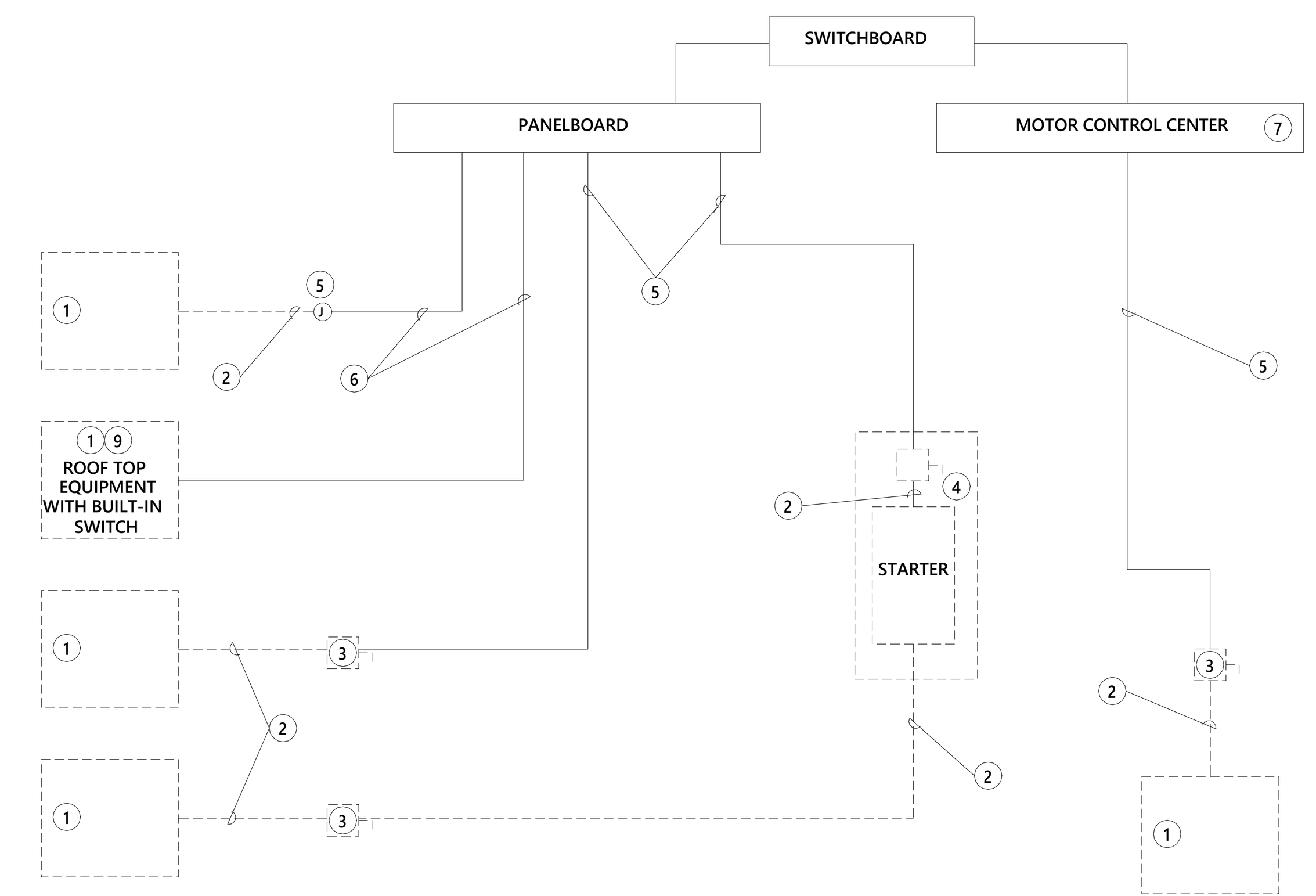
5 TYPICAL GROUNDING DETAILS FOR THREE PHASE TRANSFORMERS
NO SCALE



6 RECEPTACLE GROUNDING DETAIL
NO SCALE

ELECTRICAL NOTES:

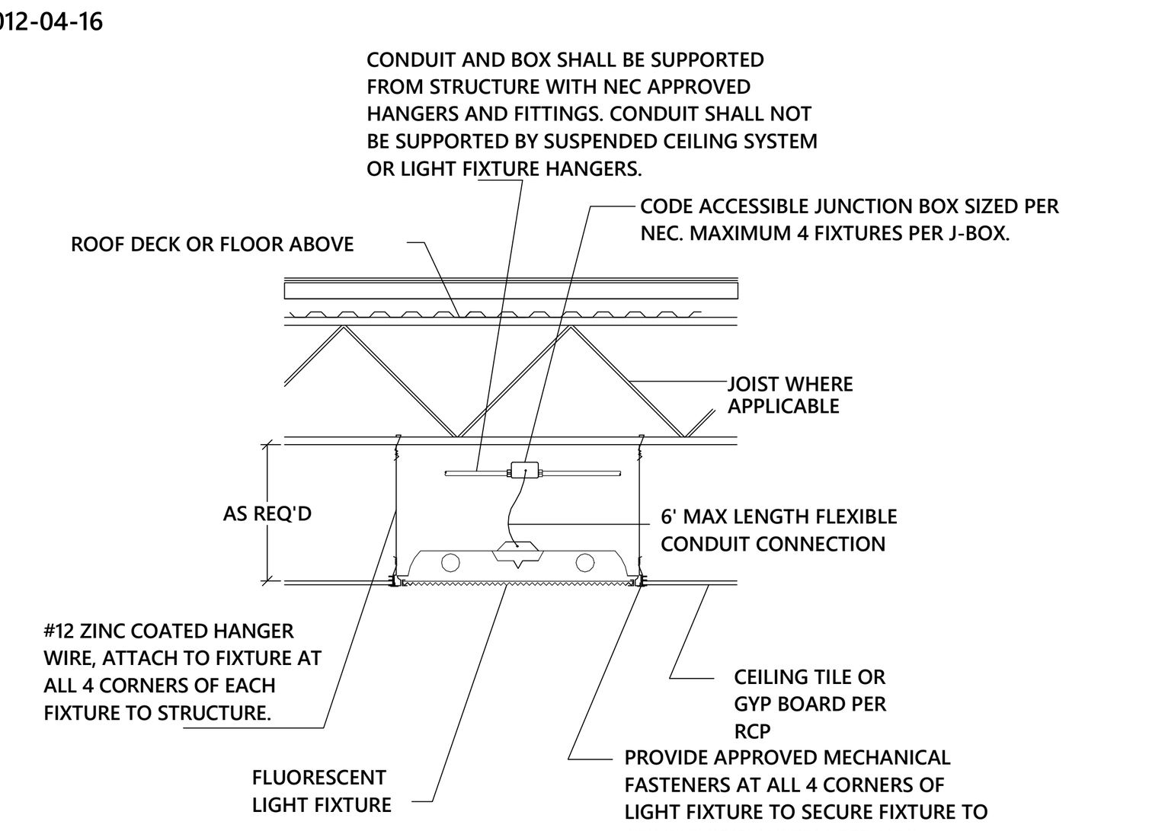
1. EQUIPMENT OF TRADES OTHER THAN ELECTRICAL.
2. CONDUIT AND WIRING BY HVAC PLUMBING CONTRACTOR OR OTHER TRADES.
3. IF AN ADDITIONAL DISCONNECT IS REQUIRED BY NEC, IT SHALL BE PROVIDED AND INSTALLED BY THE EQUIPMENT CONTRACTOR.
4. A COMBINATION STARTER OR VFD MAY BE USED IN LIEU OF A SEPARATE DISCONNECT SWITCH AND STARTER LOCATE ADJACENT TO EQUIPMENT.
5. FEEDER CIRCUIT WIRING AND CONDUIT IN ELECTRICAL WORK SEE PANELBOARD SCHEDULES FOR WIRE AND BREAKER SIZES.
6. JUNCTION BOX MAY BE SHOWN ON ELECTRICAL PLANS FOR SOME EQUIPMENT. IF NO STARTER OR DISCONNECT IS SUPPLIED, A JUNCTION BOX SHALL BE INSTALLED ADJACENT TO EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LINE SIDE WIRING TO THE JUNCTION BOX. LOAD SIDE WIRING WILL BE PROVIDED BY MECHANICAL CONTRACTOR OR OTHER TRADES.
7. PROJECTS UTILIZING AN MCC. THE STARTER, CB, OR VFD IN THE MCC ARE PROVIDED BY THE ELECTRICAL CONTRACTOR.
8. IN ALL CASES THE EQUIPMENT CONTRACTOR SHALL MAKE FINAL CONNECTIONS STARTUP, AND TEST EQUIPMENT.
9. IF THE ROOF TOP EQUIPMENT IS NOT PROVIDED WITH BUILT IN SWITCH, THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL DISCONNECT SWITCH.



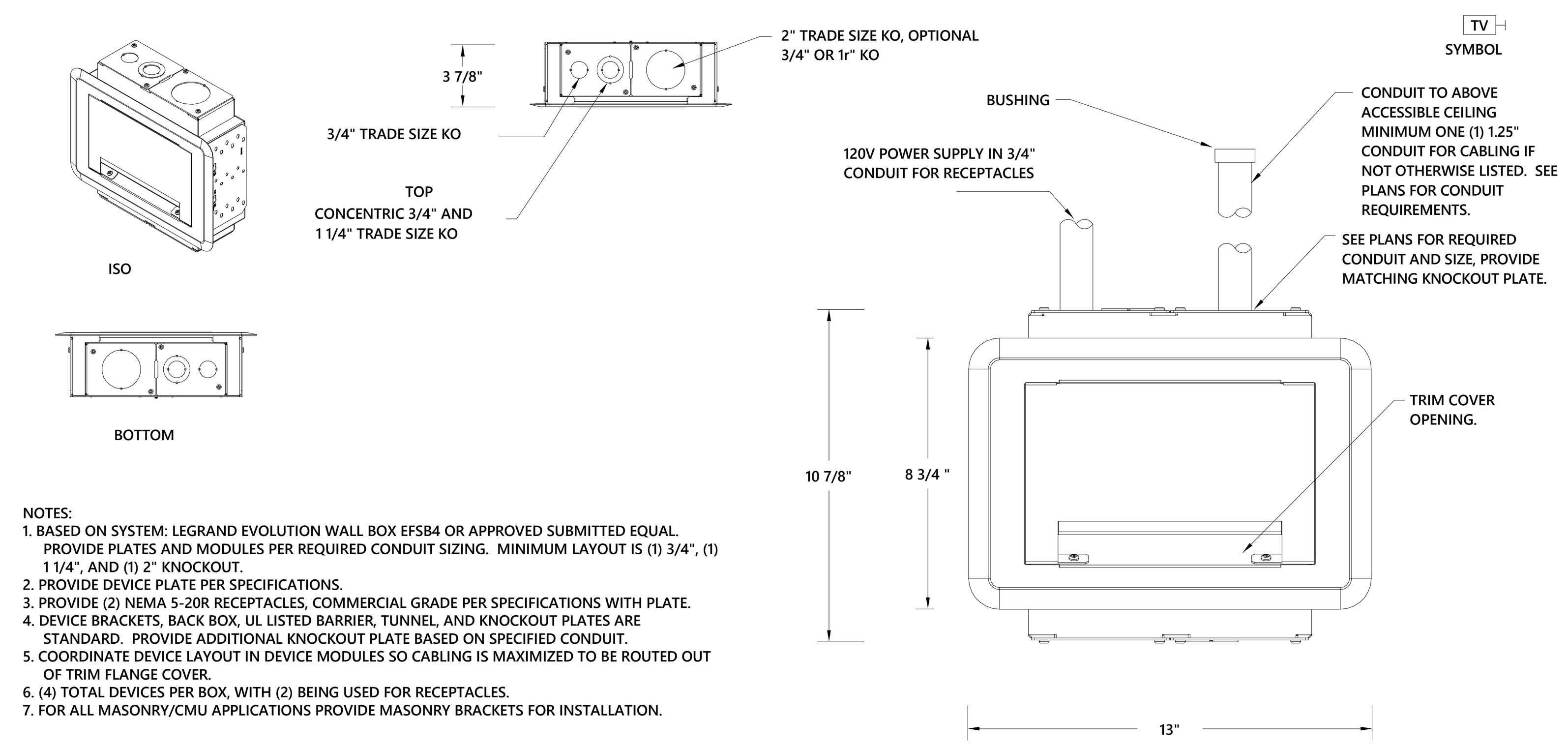
7 ELECTRICAL EQUIPMENT CONNECTION
NO SCALE

8/28/17

2012-04-16

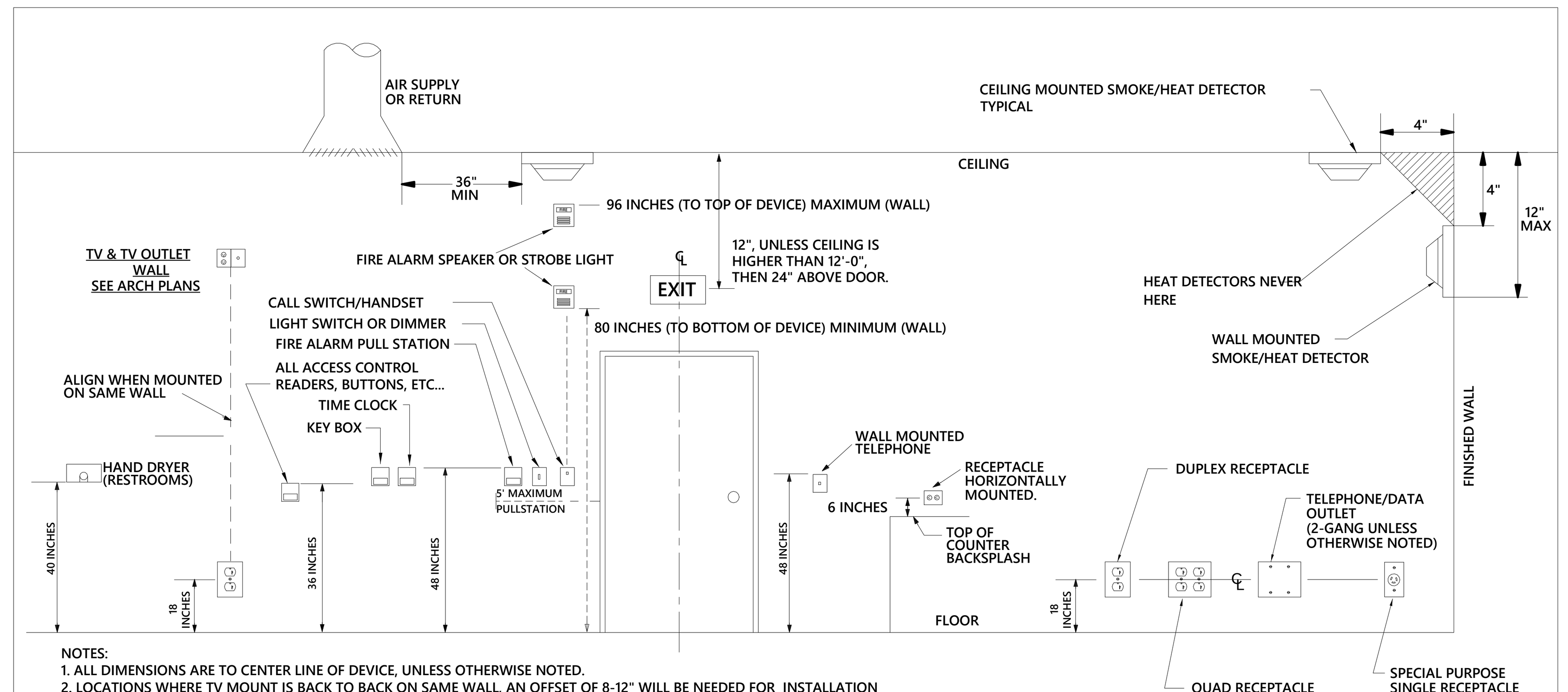


8 TYPICAL LAY-IN FIXTURE DIAGRAM
NO SCALE



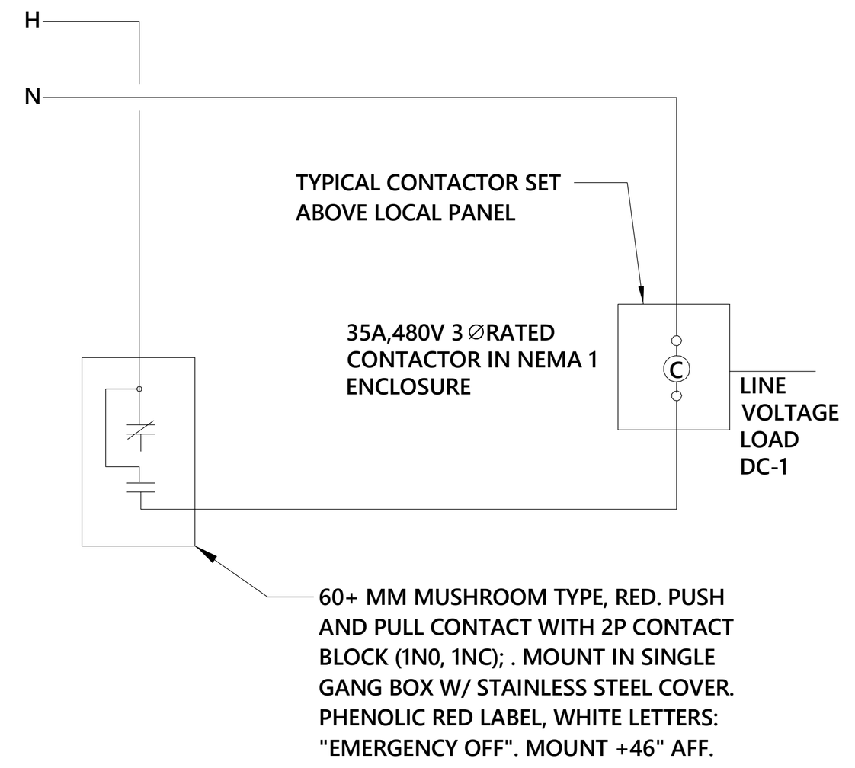
NOTES:
1. BASED ON SYSTEM: LEGRAND EVOLUTION WALL BOX EFSB4 OR APPROVED SUBMITTED EQUAL. PROVIDE PLATES AND MODULES PER REQUIRED CONDUIT SIZING. MINIMUM LAYOUT IS (1) 3/4", (1) 1 1/4", AND (1) 2" KNOCKOUT.
2. PROVIDE DEVICE PLATE PER SPECIFICATIONS.
3. PROVIDE (2) NEMA 5-20R RECEPTACLES, COMMERCIAL GRADE PER SPECIFICATIONS WITH PLATE.
4. DEVICE BRACKETS, BACK BOX, UL LISTED BARRIER, TUNNEL, AND KNOCKOUT PLATES ARE STANDARD. PROVIDE ADDITIONAL KNOCKOUT PLATE BASED ON SPECIFIED CONDUIT.
5. COORDINATE DEVICE LAYOUT IN DEVICE MODULES SO CABLING IS MAXIMIZED TO BE ROUTED OUT OF TRIM FLANGE COVER.
6. (4) TOTAL DEVICES PER BOX, WITH (2) BEING USED FOR RECEPTACLES.
7. FOR ALL MASONRY/CMU APPLICATIONS PROVIDE MASONRY BRACKETS FOR INSTALLATION.

9 TYPICAL TV/MONITOR AND POWER BACK BOX DIAGRAM FOR WALL MOUNTED FLAT SCREEN
NO SCALE



NOTES:
1. ALL DIMENSIONS ARE TO CENTER LINE OF DEVICE, UNLESS OTHERWISE NOTED.
2. LOCATIONS WHERE TV MOUNT IS BACK TO BACK ON SAME WALL, AN OFFSET OF 8-12" WILL BE NEEDED FOR INSTALLATION OF JACK/RECEPTACLE.
3. DEVICES ABOVE COUNTER TOPS SHALL BE A MAXIMUM OF 44" TO TOP OF DEVICE FOR ADA ACCESS.

10 MOUNTING HEIGHTS OF DEVICES - ELEVATION
NO SCALE



NOTES:
1. CIRCUIT NEAREST RECEPT CIRCUIT FOR CONTROL VOLTAGE OF PUSHBUTTON CONTACTOR. LABEL SCHEDULE : "EMERGENCY CONTACTOR CONTROL VOLTAGE".
2. PROVIDE PROTECTIVE CLEAR COVER OVER PUSHBUTTON.
3. PROVIDE PHENOLIC EMERGENCY LABEL: "EMERGENCY SHUTDOWN FOR DUST COLLECTOR POWER".

11 EPO WIRING DETAIL - DUST COLLECTOR
NO SCALE

ELECTRICAL/MECHANICAL DEMARCATION

REFER TO DETAIL 7/E-002 FOR MECHANICAL CONTRACTOR'S RESPONSIBILITIES RELATED TO ELECTRICAL DISCONNECTS, STARTERS AND WIRING OF MECHANICAL EQUIPMENT. ALL DISCONNECTS, STARTERS AND WIRING (LOAD SIDE OF DISCONNECTS) SHALL BE FURNISHED AND INSTALLED BY M.C. UNLESS OTHERWISE NOTED IN DETAIL 13/M-502. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH E.C. PRIOR TO ASSEMBLING SHOP DRAWING SUBMITTALS OR ORDERING EQUIPMENT.

MEASUREMENT & VERIFICATION NOTE

THIS IS A NORTH CAROLINA STATE CONSTRUCTION PROJECT WITH MANDATED MEASUREMENT AND VERIFICATION OF POST-OCCUPANCY WATER, AND ELECTRIC CONSUMPTION. DESIGN ANALYSIS AND PROJECTED CONSUMPTION WILL BE COMPARED TO ACTUAL USAGE AT BOTH 10 MONTH AND 12 MONTH POST-OCCUPANCY INTERVALS.

THE COMMISSIONING AGENT AND OWNER WILL PROVIDE WATER AND ELECTRIC CONSUMPTION AND TRENDING DATA FROM THE MEASUREMENT AND VERIFICATION SYSTEM AT THE 10 MONTH AND 12 MONTH INTERVALS. THIS INFORMATION WILL BE PROVIDED TO THE ENGINEER FOR EVALUATION AND COMPARISON TO THE DESIGN ANALYSIS, ENERGY MODEL SIMULATION AND CONSUMPTION GOALS OF THE PROJECT.

RESULTS DEVIATING BY GREATER THAN 15% FROM PROJECTIONS WILL BE FURTHER ANALYZED AND A SYSTEM ADJUSTMENT REPORT PROVIDED FROM THE ENGINEER TO THE OWNER FOR SUGGESTED OPERATIONAL MODIFICATIONS.

COMMISSIONING NOTE

ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

COORDINATION DRAWINGS

PER SPECIFICATION SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION, THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED AT 1/4"= 1'-0" SCALE
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36"
4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL DETAILS

E-002

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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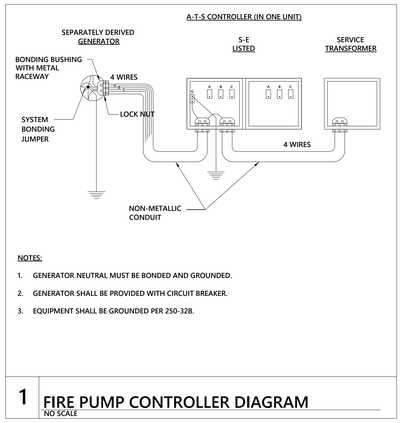
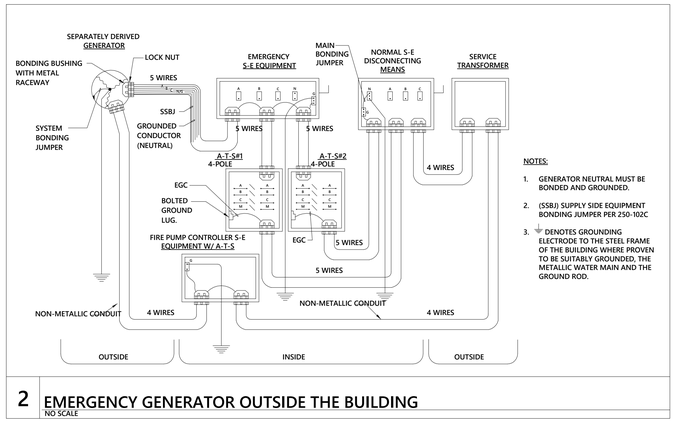


NOTES:

1. GENERATOR NEUTRAL MUST BE BONDED AND GROUNDED.
2. GENERATOR SHALL BE PROVIDED WITH CIRCUIT BREAKER.
3. EQUIPMENT SHALL BE GROUNDED PER 250-32B.

1 FIRE PUMP CONTROLLER DIAGRAM
NO SCALE



NOTES:

1. GENERATOR NEUTRAL MUST BE BONDED AND GROUNDED.
2. (S)SBJ SUPPLY SIDE EQUIPMENT BONDING JUMPER PER 250-102C
3. ⏚ DENOTES GROUNDING ELECTRODE TO THE STEEL FRAME OF THE BUILDING WHERE PROVEN TO BE SUITABLY GROUNDED, THE METALLIC WATER MAIN AND THE GROUND ROD.

2 EMERGENCY GENERATOR OUTSIDE THE BUILDING
NO SCALE

GAS STORAGE BUILDING

2012 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

501.1 METHOD OF COMPLIANCE
- ☐ NC SPECIFIC COMCHECK PROVIDED
- ☐ 2012 NCECC CHAPTER 5
- ■ 20% IMPROVEMENT OVER ASHRAE 90.1-2007
- ☐ NOT APPLICABLE BASED ON PROJECT SCOPE

501.2 APPLICATION COMPLIANCE
- ☐ 506.2.1 EFFICIENT MECH EQUIPMENT
- ☐ 506.2.4 HI EFFICIENCY DOMESTIC HW
- ■ 506.2.2 REDUCED LTG DENSITY
- ☐ 506.2.5 ONSITE RENEWABLE ENERGY
- ☐ 506.2.3 ENERGY RECOVERY SYSTEMS
- ☐ 506.2.6 DAYLIGHTING CONTROLS
- ☐ NOT APPLICABLE BASED ON PROJECT SCOPE

505.2 - INTERIOR LIGHTING CONTROLS (MANDATORY REQUIREMENTS):
- ■ INTERIOR LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION 505.2, EXCEPT WHERE EXEMPT.
- ☐ NOT APPLICABLE

505.3 - TANDEM WIRING (MANDATORY REQUIREMENTS):
- ■ FLUORESCENT LUMINARIES LOCATED WITHIN THE SAME AREA ARE TANDEM WIRED AS REQUIRED PER SECTION 505.3, EXCEPT WHERE EXEMPT.
- ☐ NOT APPLICABLE

505.4 - EXIT SIGNS (MANDATORY REQUIREMENTS):
- ■ INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.
- ☐ NOT APPLICABLE

505.5 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):
- ☐ NOT APPLICABLE PER 2012 NCECC 101.4.3, EXCEPTION 1.G.

505.5.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:
- 36 WATTS SPECIFIED
- 38 % REDUCTION OF SPECIFIED VS. ALLOWED (APPLICABLE IF 506.2.2 IS SELECTED)

505.5.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:
- ■ BUILDING AREA METHOD
- ☐ SPACE-BY-SPACE METHOD

58 WATTS ALLOWED

505.6.1 - EXTERIOR BUILDING GROUNDS LIGHTING:
- ■ LAMPS OPERATING AT GREATER THAN 100 WATTS FOR EXTERIOR BUILDING GROUNDS LUMINARIES HAVE A MINIMUM EFFICACY OF 60 LUMENS PER WATT, EXCEPT WHERE EXEMPT.
- ☐ NOT APPLICABLE

505.6.2 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):
- ☐ NOT APPLICABLE

TOTAL CONNECTED EXTERIOR LIGHTING POWER:

32 *WATTS SPECIFIED*

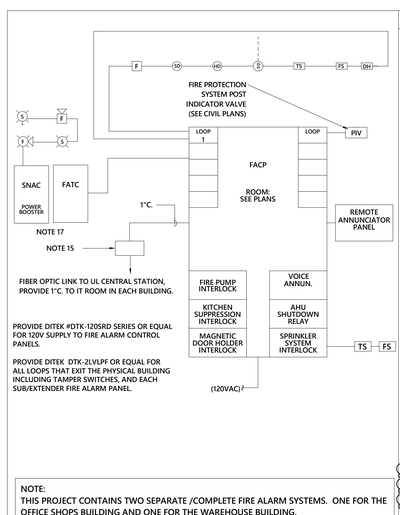
TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

120 WATTS ALLOWED

505.6.3 - SHIELDING OF EXTERIOR BUILDING LIGHTING FIXTURES:
- ■ ONLY FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED, EXCEPT WHERE EXEMPT.
- ☐ ALTERNATIVE EXTERIOR BUILDING LIGHTING FIXTURES ARE PROVIDED FOR GREATER ENERGY EFFICIENCY OVER FULLY SHIELDED EXTERIOR BUILDING LIGHTING FIXTURES.
- ☐ NOT APPLICABLE

505.7 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):
- ☐ SEPARATE TENANT METERING TO DETERMINE ELECTRICAL ENERGY CONSUMPTION HAS BEEN PROVIDED FOR BUILDINGS HAVING INDIVIDUAL DWELLING UNITS.
- ■ NOT APPLICABLE

1



NOTE:
THIS PROJECT CONTAINS TWO SEPARATE /COMPLETE FIRE ALARM SYSTEMS. ONE FOR THE OFFICE SHOPS BUILDING AND ONE FOR THE WAREHOUSE BUILDING.

FIRE ALARM NOTES

1. FACP SHALL HAVE A MINIMUM 60HR. BATTERY BACKUP.
2. FACP SHALL BE FULLY DIGITAL ADDRESSABLE.
3. FACP SHALL BE CONNECTED TO A UL APPROVED CENTRAL STATION.
4. ZONE PER NFPA 72, 2013 AND MANUFACTURER'S RECOMMENDATIONS WITH NO ONE ZONE EXCEEDING 15,000 S.F. PER FLOOR.
5. COORDINATE QUANTITY AND LOCATIONS OF DEVICES WITH CONTRACT DRAWINGS.
6. LOCATE SMOKE DETECTOR WITHIN 5' OF THE MAGNETIC HOLD OPEN DOORS. (TYPICAL)
7. LOCATE FIRE ALARM PULL STATION WITHIN 5' OF THE EXIT DOOR.
8. LOCATE SMOKE/HEAT DETECTOR WITHIN 5' OF THE FA EQUIPMENT (FACP, FATC).
9. LOCATION OF CEILING MOUNTED SMOKE/HEAT DETECTOR SHALL BE FIELD COORDINATED PRIOR TO ROUGH IN. THE DETECTOR SHALL BE A MINIMUM OF 2' AWAY FROM LIGHT FIXTURE AND A MINIMUM OF 3' AWAY FROM AIR DISTRIBUTION DEVICES.
10. AUTOMATIC DOOR CLOSING SHALL BE ACCOMPLISHED BY THE ACTIVATION OF THE LOCAL SMOKE DETECTORS AT THAT DOOR. SMOKE DETECTOR ACTIVATION SHALL ALERT THE BUILDING FIRE ALARM SYSTEM. THE FIRE ALARM SYSTEM SHALL CAUSE ALL HOLD OPEN DOORS TO CLOSE UPON ALARM ACTIVATION IN THE BUILDING.
11. ACTIVATION OF AN ALARM ZONE SHALL CAUSE ALL AIR HANDLING EQUIPMENT TO SHUT DOWN (ALL DAMPERS, AIR HANDLERS AND EXHAUST FANS MUST STOP).
12. ACTIVATION OF KITCHEN HOOD SUPPRESSION SYSTEM PROVIDES SIGNAL TO FACP WHICH IN TURN ACTIVATES ALL ANNUNCIATING ZONES & CUTS OFF AHU SUPPLY AIR.
13. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF ALL FLOW, PRESSURE, & TAMPER SWITCHES WITH FIRE PROTECTION CONTRACTOR PRIOR TO INSTALLATION.
14. ALL VISUAL DEVICES WITHIN THE SAME AREA SHALL BE SYNCHRONIZED. IT SHALL BE A THREE BEAT TEMPORAL PATTERN.
15. PROVIDE 12X12X4" JUNCTION BOX AT FACP
16. PROVIDE MULTI-TEMPORAL SOUNDING CAPABILITY AT ALL AUDIO DEVICES FOR EMERGENCY NOTIFICATION.
17. THE FIRE ALARM SYSTEM MANUFACTURER SHALL PROVIDE NOTIFICATION APPLIANCE CIRCUIT (NAC) POWER EXTENDERS AS REQUIRED. PROVIDE 120V CIRCUITS FROM SPARE BREAKERS IN PANEL 1LE AS REQUIRED.
18. THE DUCT SMOKE DETECTORS SHALL COMPLY WITH IFC 907.12.
19. PROVIDE CONTACT ON SURGE SUPRESSION THAT IS MONITORED BY BAS. PROVIDE ¾"C CONDUIT TO BAS PANEL WITH CABLING.
20. THE CIRCUIT FEEDING THE FIRE ALARM PANEL IS DEDICATED FOR THE FIRE ALARM ONLY.
21. PROVIDE REMOTE LIGHT FOR DUCT SMOKE DETECTOR ON CEILING WHERE UNIT IS ABOVE CEILING.
22. CONTRACTOR SHALL INCLUDE IN BID LABOR TO RE-LOCATE UP TO 5 DEVICES UP TO 30' FROM EXISTING LOCATION.
23. CONTRACTOR SHALL INCLUDE IN BID LABOR AND MATERIAL FOR UP TO (2) DUCT DETECTORS. (5) ANNUNCIATION DEVICES, (3) SMOKE DETECTORS AND (2) PULL STATIONS 100' FROM LOCAL PANEL (IN WALL NOT SURFACE MOUNTED) AS REQUIRED BY LOCAL AHJ/ENGINEER.
24. CONTRACTOR RESPONSIBLE FOR SHOP DRAWINGS AS REQUIRED BY LOCAL AHJ.
25. DUCT DETECTORS SHALL BE VERIFIED WITH THE MECHANICAL DRAWINGS FOR QUANTITY AND LOCATION. TOTAL QUANTITY MINIMUM SHALL BE BASED ON BOTH MECHANICAL SCHEDULES AND MECHANICAL PLAN LOCATIONS AND ELECTRICAL PLANS. WHEN DEVICE QUANTITIES (ELECTRICAL VS. MECHANICAL) ARE IN CONFLICT, PROVIDE THE GREATER QUANTITY OF DETECTORS.
26. A SUPERVISED "AHU SHUTDOWN DEFEAT" SWITCH MUST BE PROVIDED IN/ADJACENT TO THE FACP. PROVIDE AN INFORMATIVE ENGRAVED LABEL AT THE FACP ABOUT THIS FUNCTION. THE SWITCH MUST CAUSE A SYSTEM "SUPERVISORY" INDICATION WHEN IT'S PLACED IN THE OFF-NORMAL ("SHUTDOWN DEFEATED") POSITION. THIS IS TO PROVIDE THE OWNER WITH A CONVENIENT MEANS TO TEMPORARILY RESUME HVAC OPERATION IN THE EVENT AN UNWANTED ALARM WILL NOT CLEAR, PRIOR TO ARRIVAL OF THE FIRE ALARM SERVICE TECHNICIAN.
27. ISOLATION MODULES SHALL BE PROVIDED FOR EVERY 20 INITIATION DEVICES. LOOP ISOLATION MODULES F OR FACP SHALL BE MOUNTED IN NEMA 1 ENCLOSURE, OBJECT'S ADJACENT.
28. PROVIDE FIRE PUMP MONITORING AS REQUIRED PER NFPA 72. THE FACP IN THE WAREHOUSE BUILDING AND IN THE OFFICE/SHOPS BUILDING ARE TO MONITOR THE FIRE PUMP.

1

3 VOICE EVAC FIRE ALARM RISER DIAGRAM
NO SCALE

FIRE ALARM SYSTEM MATRIX

BUILDING SYSTEM OUTPUTS

	ACTIVATE COMMON ALARM SIGNAL INDICATOR	ACTIVATE AUDIBLE ALARM SIGNAL	ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTIVATE AUDIBLE SUPERVISORY SIGNAL	ACTIVATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE AUDIBLE TROUBLE SIGNAL	ACTIVATE GENERAL EVACUATION SIGNAL	DISPLAY CHANGE OF STATUS AND PRINT	ACTIVATE EXTERNAL SOUNDER/STROBE	TRANSMIT ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION	RECALL ELEVATORS TO PRIMARY RECALL FLOOR	RECALL ELEVATORS TO ALTERNATE RECALL FLOOR	SHUNT TRIP AUTOMATIC DOOR HOLD OPEN DEVICES	SHUT DOWN RESPECTIVE ELEV. REACHES DESIGNATED FLOOR	RELEASE MAGNETIC DOOR HOLD OPEN DEVICES	ACTUATE SMOKE DAMPER IN RESPECTIVE ZONE	ILLUMINATE THE HEMA'S EXIT	SHOW CHANGE OF STATUS ON ANNUNCIATOR	SHOW CHANGE OF STATUS ON CENTRAL PANEL
MANUAL FIRE ALARM PULL BOXES	X	X					X	X	X	X							X		X		X
BUILDING SMOKE DETECTOR	X	X					X	X	X	X							X				X	X
DUCT SMOKE DETECTOR							X	X	X		X				X				X		X	X
SMOKE DETECTOR - AT DOOR HOLD OPENS	X	X					X	X	X	X						X					X	X
BUILDING HEAT DETECTOR	X	X					X	X	X	X							X				X	X
FLOW SWITCH - ANY ZONE OF SPRINKLER SYSTEM	X	X					X	X	X	X							X				X	X
TAMPER SWITCH - ANY ZONE OF SPRINKLER SYSTEM			X	X				X			X										X	X
TAMPER SWITCH - POST INDICATOR VALVE			X	X				X			X										X	X
AHU SHUTDOWN BYPASS SWITCH					X			X													X	X
NOTIFICATION DEVICE SHORT CIRCUIT					X	X		X				X									X	X
OPEN CIRCUIT					X	X		X				X									X	X
GROUND FAULT					X	X		X				X									X	X
FIRE ALARM A.C. POWER FAILURE AFTER 4 HRS					X	X		X				X					X				X	X
FIRE ALARM SYSTEM LOW BATTERY					X	X		X				X					X				X	X
FIRE ALARM A.C. POWER LOSS					X	X		X				X					X				X	X
FIRE ALARM D.C. POWER LOSS					X	X		X				X					X				X	X

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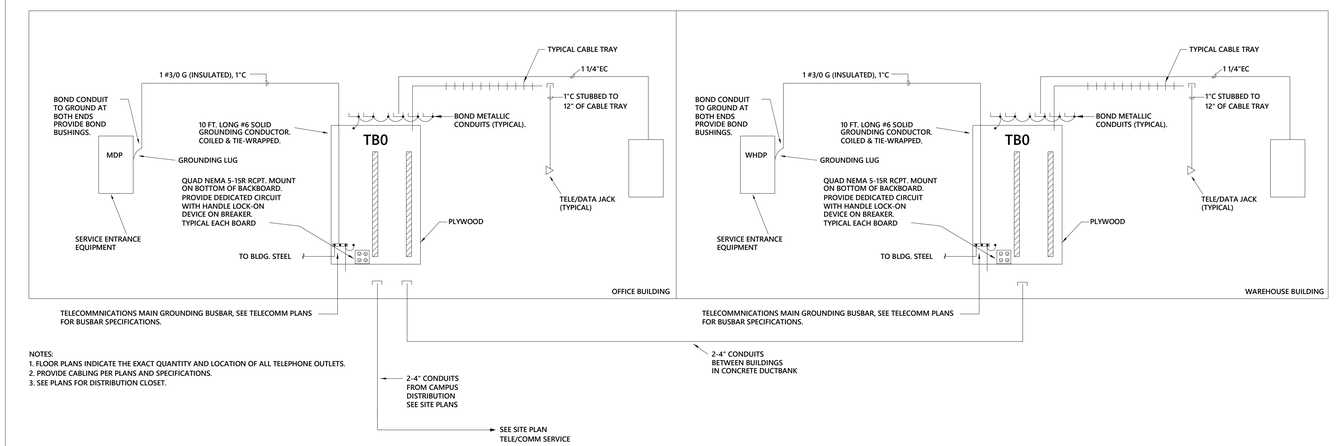
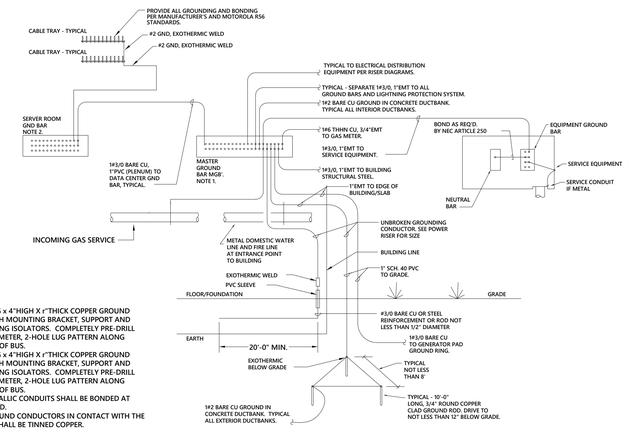


NOTES:
1. FLOOR PLANS INDICATE THE EXACT QUANTITY AND LOCATION OF ALL TELEPHONE OUTLETS.
2. PROVIDE CABLING PER PLANS AND SPECIFICATIONS.
3. SEE PLANS FOR DISTRIBUTION CLOSET.

4 TELECOMMUNICATIONS RISER DIAGRAM
NO SCALE



NOTES:
1. 48"LONG x 4"HIGH X /"THICK COPPER GROUND BUS WITH MOUNTING BRACKET, SUPPORT AND MOUNTING ISOLATORS. COMPLETELY PRE-DRILL 3/8" DIAMETER, 2-HOLE LUG PATTERN ALONG LENGTH OF BUS.
2. 24"LONG x 4"HIGH X /"THICK COPPER GROUND BUS WITH MOUNTING BRACKET, SUPPORT AND MOUNTING ISOLATORS. COMPLETELY PRE-DRILL 3/8" DIAMETER, 2-HOLE LUG PATTERN ALONG LENGTH OF BUS.
3. ALL METALLIC CONDUITS SHALL BE BONDED AT EACH END.
4. ALL GROUND CONDUCTORS IN CONTACT WITH THE EARTH SHALL BE TINNED COPPER.

5 SERVICE GROUND DIAGRAM
NO SCALE

UNC CHARLOTTE

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
8/28/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL DETAILS

E-003

OPTIMA #: 16-0265 [redacted]

BUILDING BID DOCUMENTS

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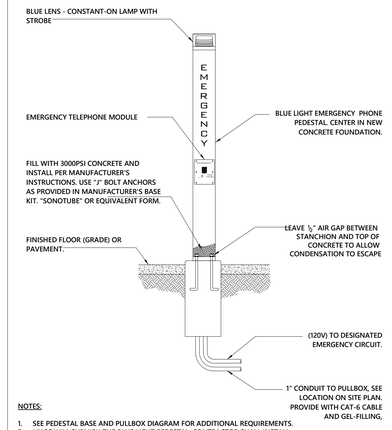
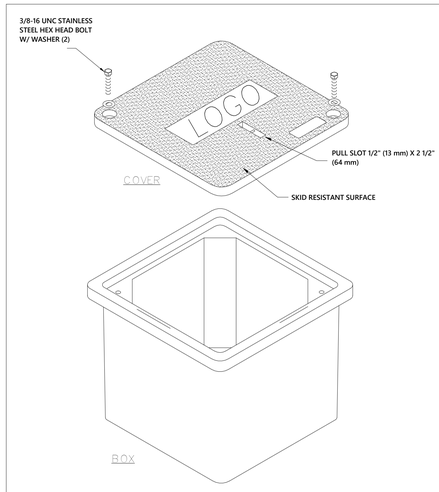


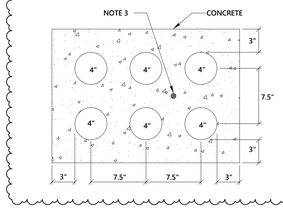
NOTES:

1. SEE PEDESTAL BASE AND PULLBOX DIAGRAM FOR ADDITIONAL REQUIREMENTS.
2. UNCC WILL FURNISH THE BLUE LIGHT PEDESTAL, CONTRACTOR SHALL INSTALL.

1 TYPICAL PEDESTAL MOUNT BLUE LIGHT PHONE ON GRADE OR PAVEMENT ON GRADE
DIAGRAMMATICALLY PROPORTIONAL



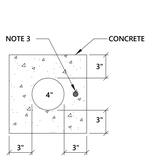
2 IN-GRADE PULL BOX
DIAGRAMATIC-NOT TO SCALE



NOTES:

1. SEE "TYPICAL DUCTBANK TRENCH DETAIL" FOR ADDITIONAL REQUIREMENTS.
2. CONDUITS NOT DRAWN TO SCALE.
3. INSTALL 1#2 BARE COPPER GROUND WIRE WITHIN CONCRETE ALONG ENTIRE DUCTBANK LENGTH. EXOTHERMICALLY CONNECT TO GROUND TRIAD RING. THIS GROUND WIRE IS IN ADDITION TO ANY GROUNDED (NEUTRAL) AND GROUNDING CONDUCTORS INDICATED TO BE INSTALLED WITHIN THE CONDUITS. ALTERNATE THE POSITION OF THE GROUND WIRE THROUGH THE DUCT SPACERS TO PREVENT SAG.

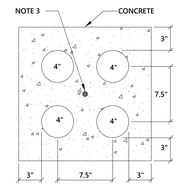
3 6-WAY (3Hx2V) DUCTBANK SECTION
NO SCALE



NOTES:

1. SEE "TYPICAL DUCTBANK TRENCH DETAIL" FOR ADDITIONAL REQUIREMENTS.
2. CONDUITS NOT DRAWN TO SCALE.
3. INSTALL 1#2 BARE COPPER GROUND WIRE WITHIN CONCRETE ALONG ENTIRE DUCTBANK LENGTH. EXOTHERMICALLY CONNECT TO GROUND TRIAD RING. THIS GROUND WIRE IS IN ADDITION TO ANY GROUNDED (NEUTRAL) AND GROUNDING CONDUCTORS INDICATED TO BE INSTALLED WITHIN THE CONDUITS. ALTERNATE THE POSITION OF THE GROUND WIRE THROUGH THE DUCT SPACERS TO PREVENT SAG.

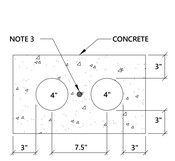
4 1-WAY (1Hx1V) DUCTBANK SECTION
NO SCALE



NOTES:

1. SEE "TYPICAL DUCTBANK TRENCH DETAIL" FOR ADDITIONAL REQUIREMENTS.
2. CONDUITS NOT DRAWN TO SCALE.
3. INSTALL 1#2 BARE COPPER GROUND WIRE WITHIN CONCRETE ALONG ENTIRE DUCTBANK. LENGTH. EXOTHERMICALLY CONNECT TO GROUND TRIAD RING. THIS GROUND WIRE IS IN ADDITION TO ANY GROUNDED (NEUTRAL) AND GROUNDING CONDUCTORS INDICATED TO BE INSTALLED WITHIN THE CONDUITS. ALTERNATE THE POSITION OF THE GROUND WIRE THROUGH THE DUCT SPACERS TO PREVENT SAG.

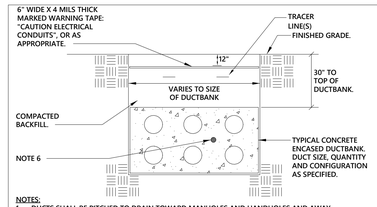
5 4-WAY (2Hx2V) DUCTBANK SECTION
NO SCALE



NOTES:

1. SEE "TYPICAL DUCTBANK TRENCH DETAIL" FOR ADDITIONAL REQUIREMENTS.
2. CONDUITS NOT DRAWN TO SCALE.
3. INSTALL 1#2 BARE COPPER GROUND WIRE WITHIN CONCRETE ALONG ENTIRE DUCTBANK LENGTH. THIS GROUND WIRE IS IN ADDITION TO ANY GROUNDED (NEUTRAL) AND GROUNDING CONDUCTORS INDICATED TO BE INSTALLED WITHIN THE CONDUITS. ALTERNATE THE POSITION OF THE GROUND WIRE THROUGH THE DUCT SPACERS TO PREVENT SAG.

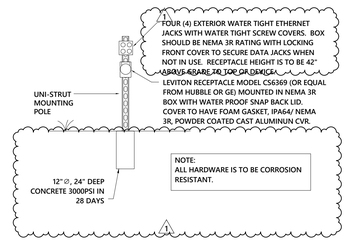
6 2-WAY (2Hx1V) DUCTBANK SECTION
NO SCALE



NOTES:

1. DUCTS SHALL BE PITCHED TO DRAIN TOWARD MANHOLES AND HANDHOLES AND AWAY FROM BUILDINGS AND EQUIPMENT AS APPROPRIATE.
2. DUCT SPACERS SHALL BE INSTALLED AND COORDINATED WITH THE DUCT SIZE. SPACING SHALL BE AS REQUIRED BY THE MANUFACTURER AND TO PREVENT SAGGING/DEFORMING OF DUCTS. SPACERS SHALL BE SECURED BY NON-FERROUS MEANS TO PREVENT FLOATING DURING CONCRETE POUR.
3. STEEL OR TIE WIRES SHOULD NOT BE USED IN SUCH A WAY AS TO FORM CONDUCTIVE OR MAGNETIC LOOPS AROUND DUCTS OR DUCT GROUPS.
4. ALL DUCTS SHALL BE SEALED AT TERMINATIONS WITH APPROVED SEALING COMPOUND AND PLUGS, RATED TO WITHSTAND MINIMUM 15 PSI HYDROSTATIC PRESSURE.
5. ALL DUCTS SHALL BE RODDED, CLEARED AND SWABBED TO REMOVE ALL OBSTRUCTIONS AFTER INSTALLATION AND HAVE A WATERPROOF PULL CORD INSTALLED (130 LB MINIMUM TENSILE TEST). CORD SHALL BE FACTORY MARKED AT MINIMUM ONE FOOT INTERVALS.
6. VIBRATE CONCRETE TO FILL VOIDS.
7. INSTALL 1#2 BARE COPPER GROUND WIRE WITHIN CONCRETE ALONG ENTIRE DUCTBANK LENGTH. EXOTHERMICALLY CONNECT TO GROUND TRIAD RING. THIS GROUND WIRE IS IN ADDITION TO ANY GROUNDED (NEUTRAL) AND GROUNDING CONDUCTORS INDICATED TO BE INSTALLED WITHIN THE CONDUITS. ALTERNATE THE POSITION OF THE GROUND WIRE THROUGH THE DUCT SPACERS TO PREVENT SAG. ELECTRICAL POWER DUCTBANKS ONLY.
8. CONCRETE STRENGTH SHALL BE 3000 PSI @ 28 DAYS MINIMUM.
9. CONCRETE THERMAL RESISTIVITY (RHO) SHALL BE 0.55 m-C/W OR LESS.

7 TYPICAL DUCTBANK TRENCH DETAIL
NO SCALE



8 EVENT PEDESTAL FOR POWER AND TELECOM
NO SCALE

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
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NORTH CAROLINA REGISTERED ARCHITECT 028297 PROFESSIONAL

8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL DETAILS

E-005

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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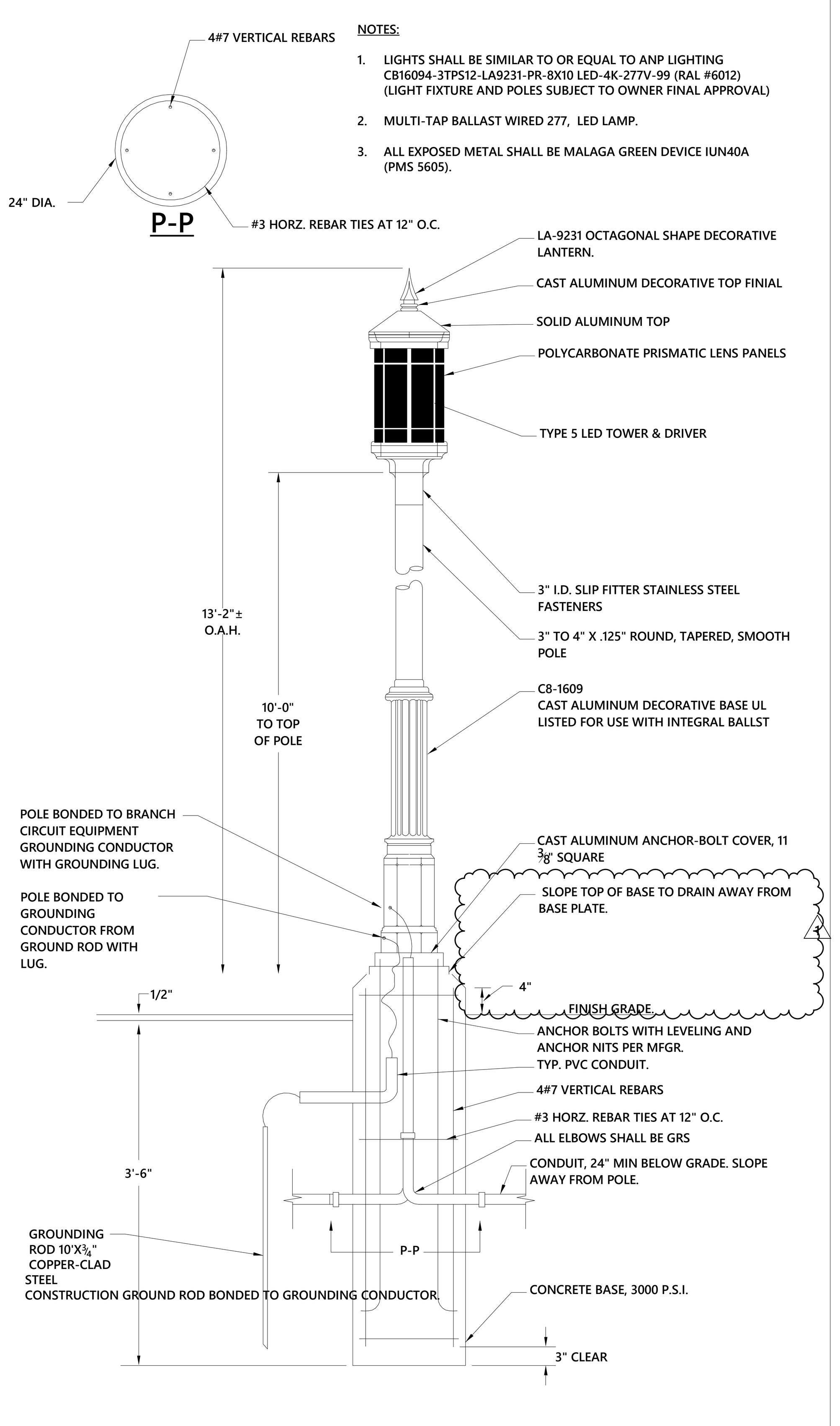
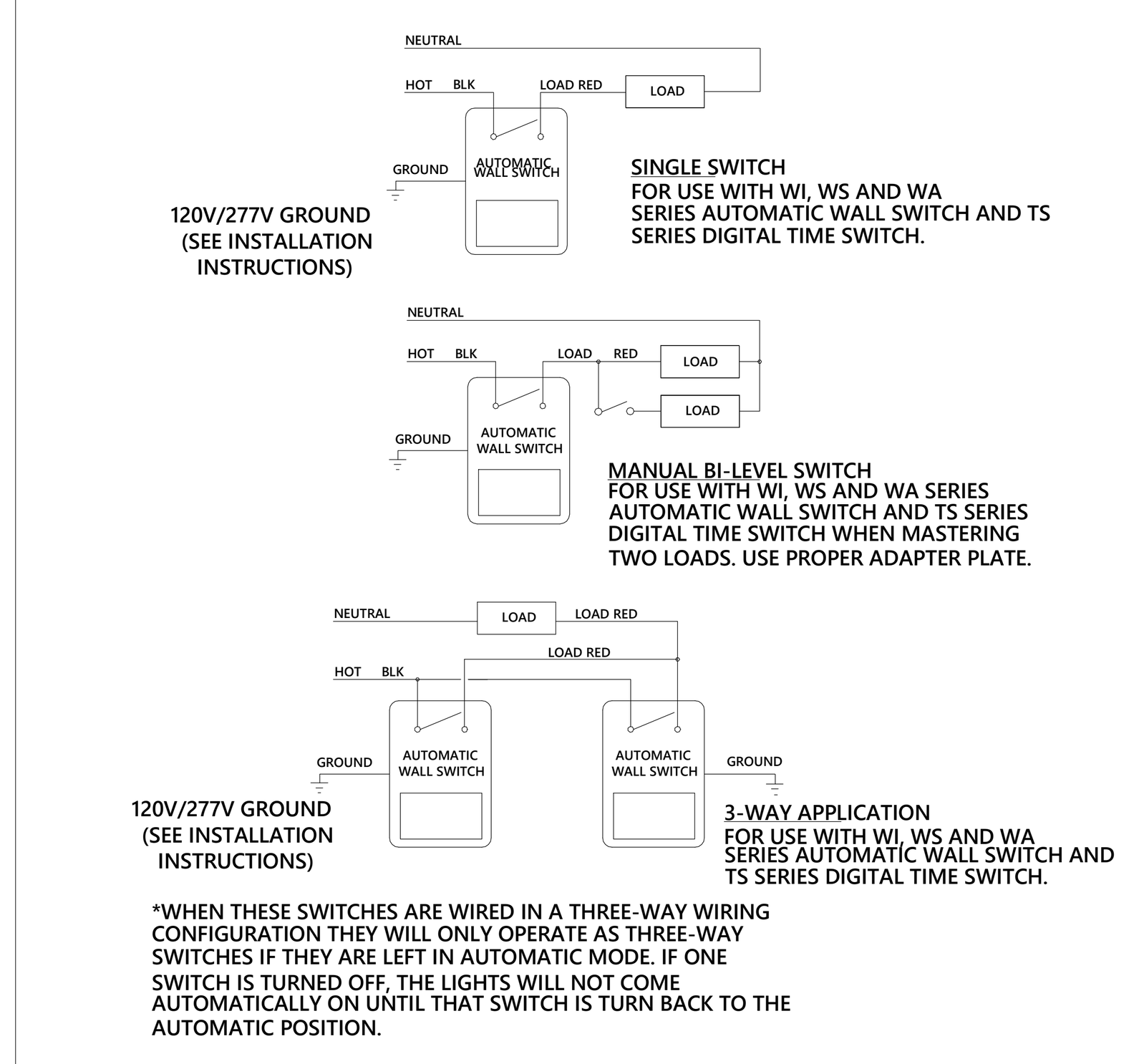
8/29/2017 8:44:19 AM

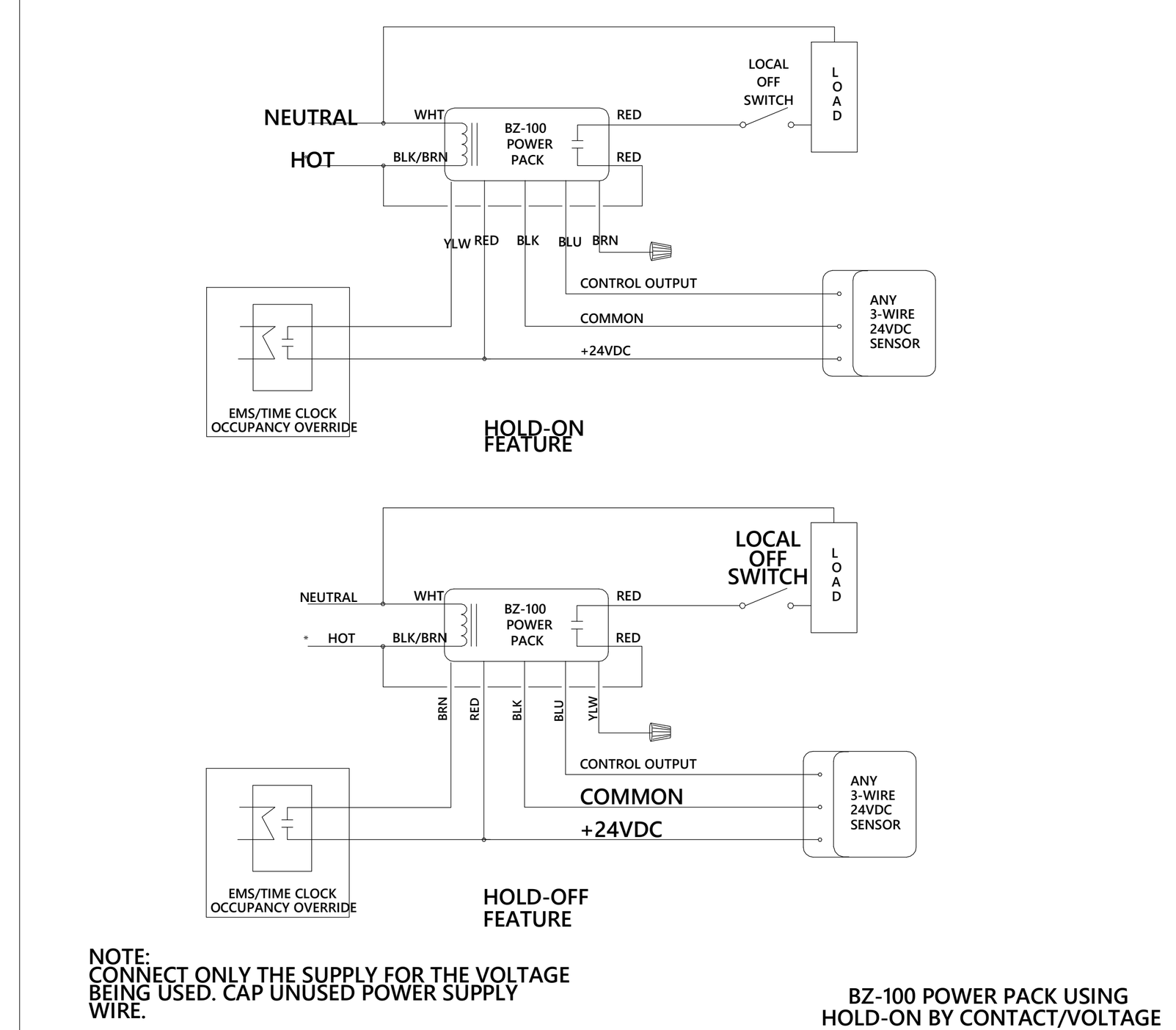
NOTES:
1. LIGHTS SHALL BE SIMILAR TO OR EQUAL TO ANP LIGHTING CB16094-3TPS12-LA9231-PR-8X10 LED-4K-277V-99 (RAL #6012) (LIGHT FIXTURE AND POLES SUBJECT TO OWNER FINAL APPROVAL)
2. MULTI-TAP BALLAST WIRED 277, LED LAMP.
3. ALL EXPOSED METAL SHALL BE MALAGA GREEN DEVICE IUN40A (PMS 5605).



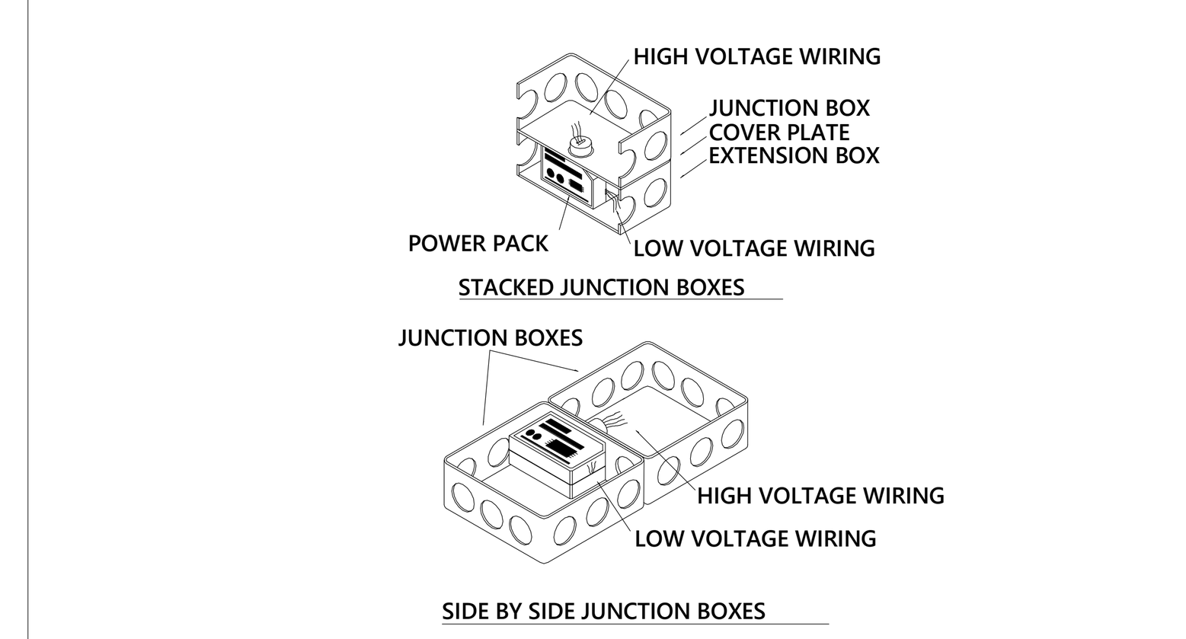
5 POLE BASE DETAIL "DPL" FIXTURE
NO SCALE



1 SINGLE POLE OCC. SENSOR SWITCH
NO SCALE



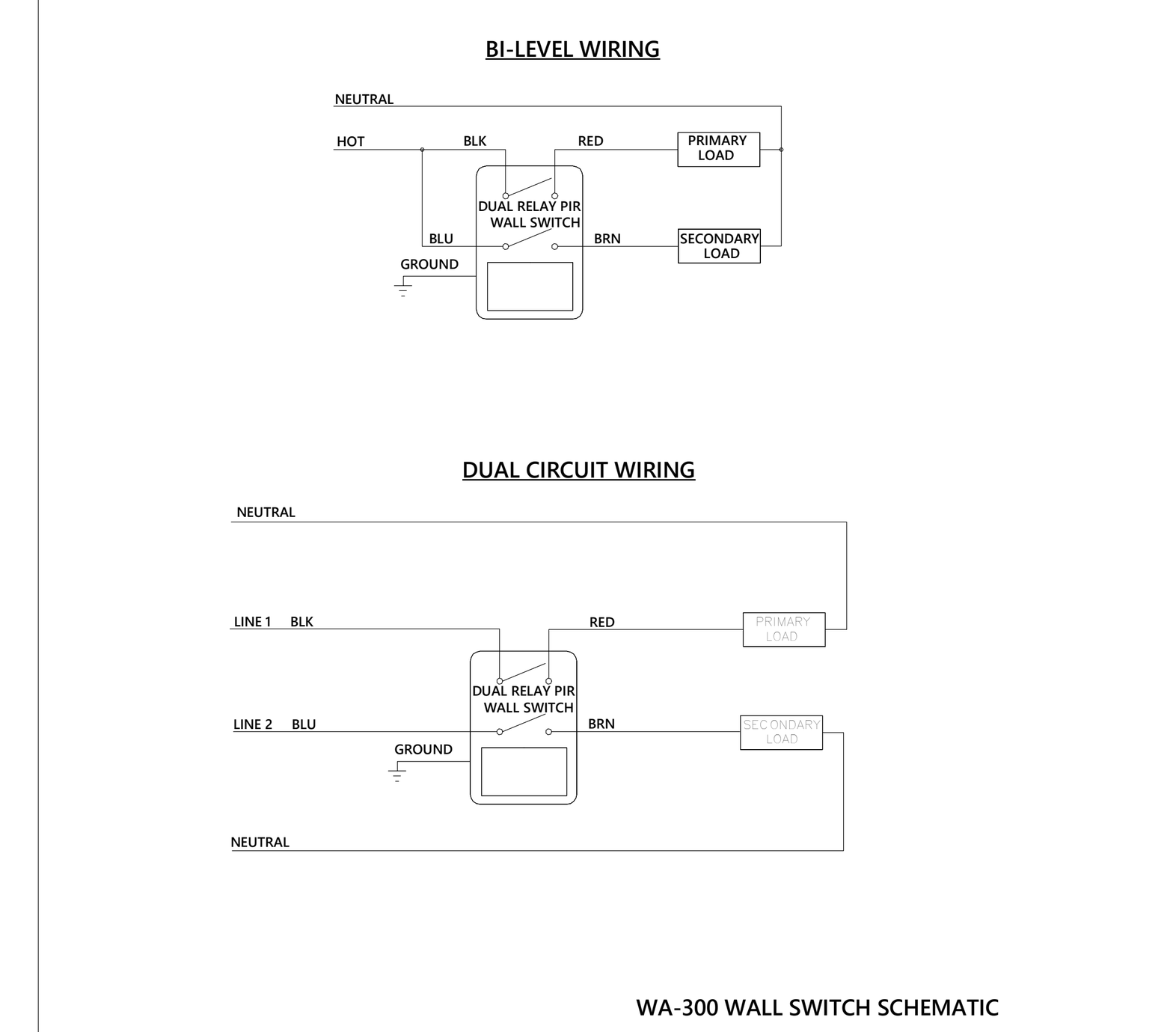
2 POWER PACK WIRING DIAGRAM
NO SCALE



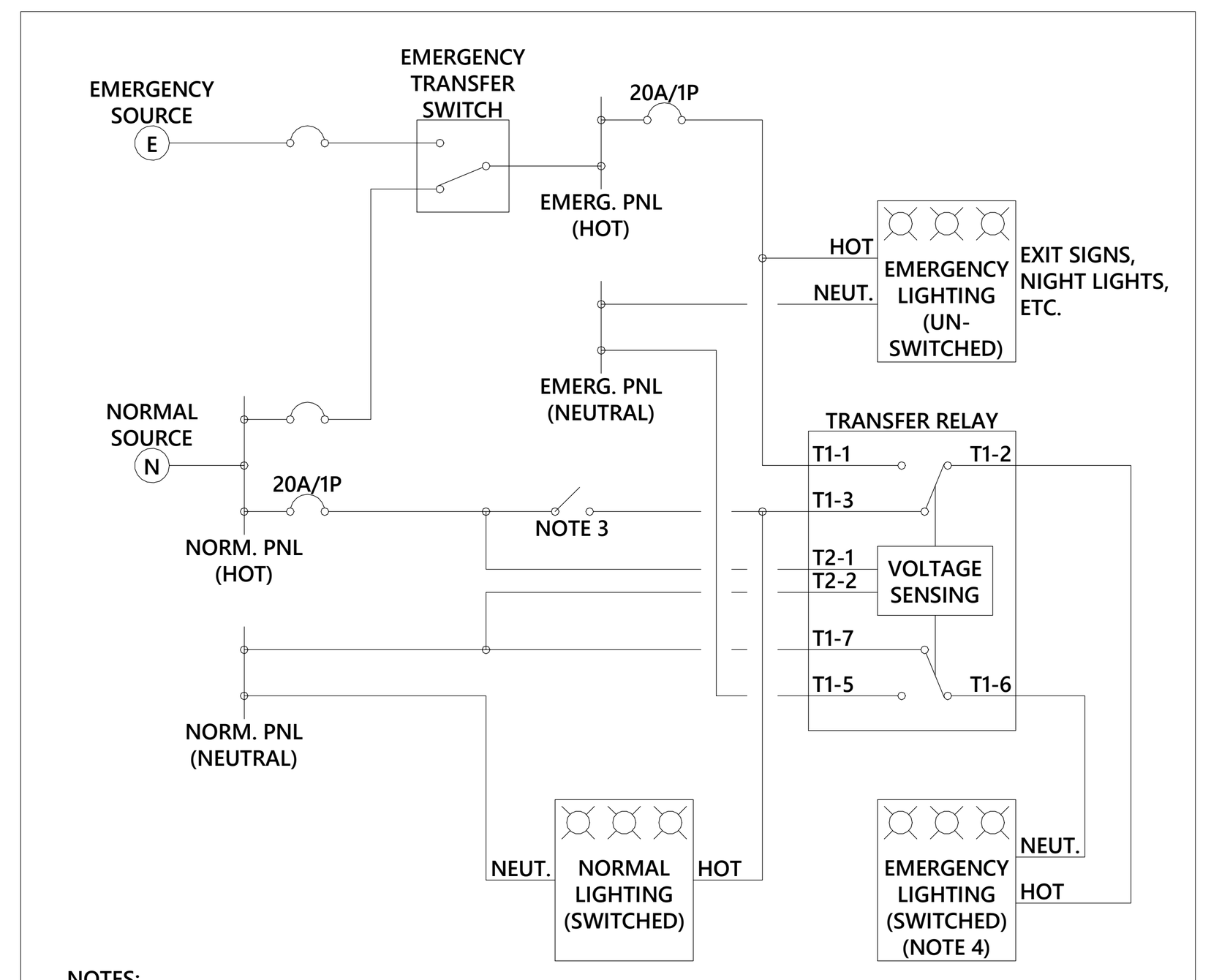
NOTE:
DO NOT MOUNT POWER PACKS CLOSER THAN 6-12 INCHES FROM SENSOR. PROVIDE DOUBLE STACKED JUNCTION BOX FOR MAXIMUM VENTILATION OF POWER PACK. PROVIDE BLANK COVER. WHERE PERMITTED BY CODE AND AHJ, LEAVE (2) OPENINGS IN CONDUIT KNOCKOUT FOR VENTING OF POWER PACK. VERIFY WITH AHJ PRIOR TO KNOCKOUT REMOVAL.

POWER PACK INSTALLED IN J-BOX

3 POWER PACK INSTALLATION
NO SCALE

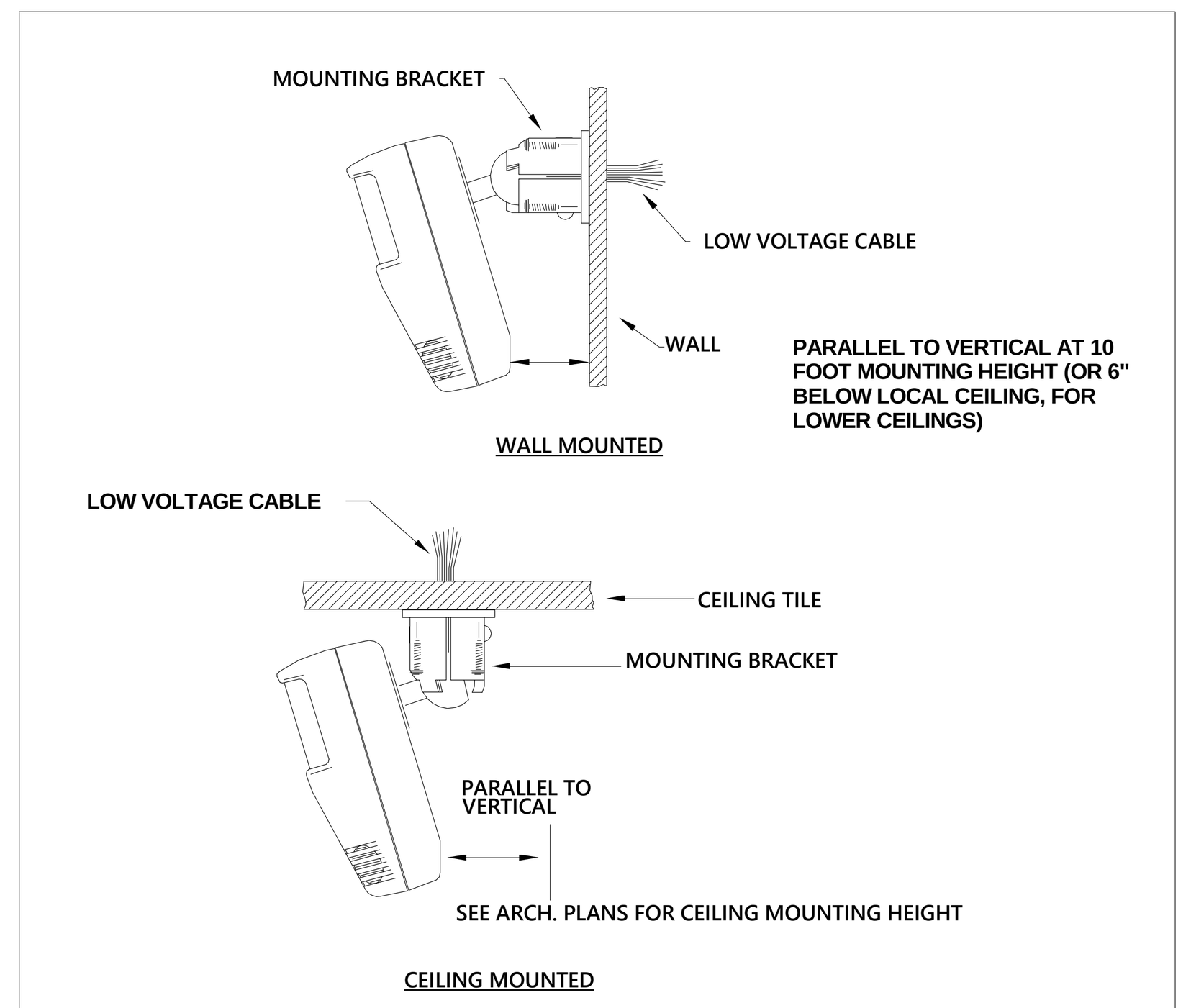


4 DUAL LEVEL WALL OCC. SWITCH
NO SCALE



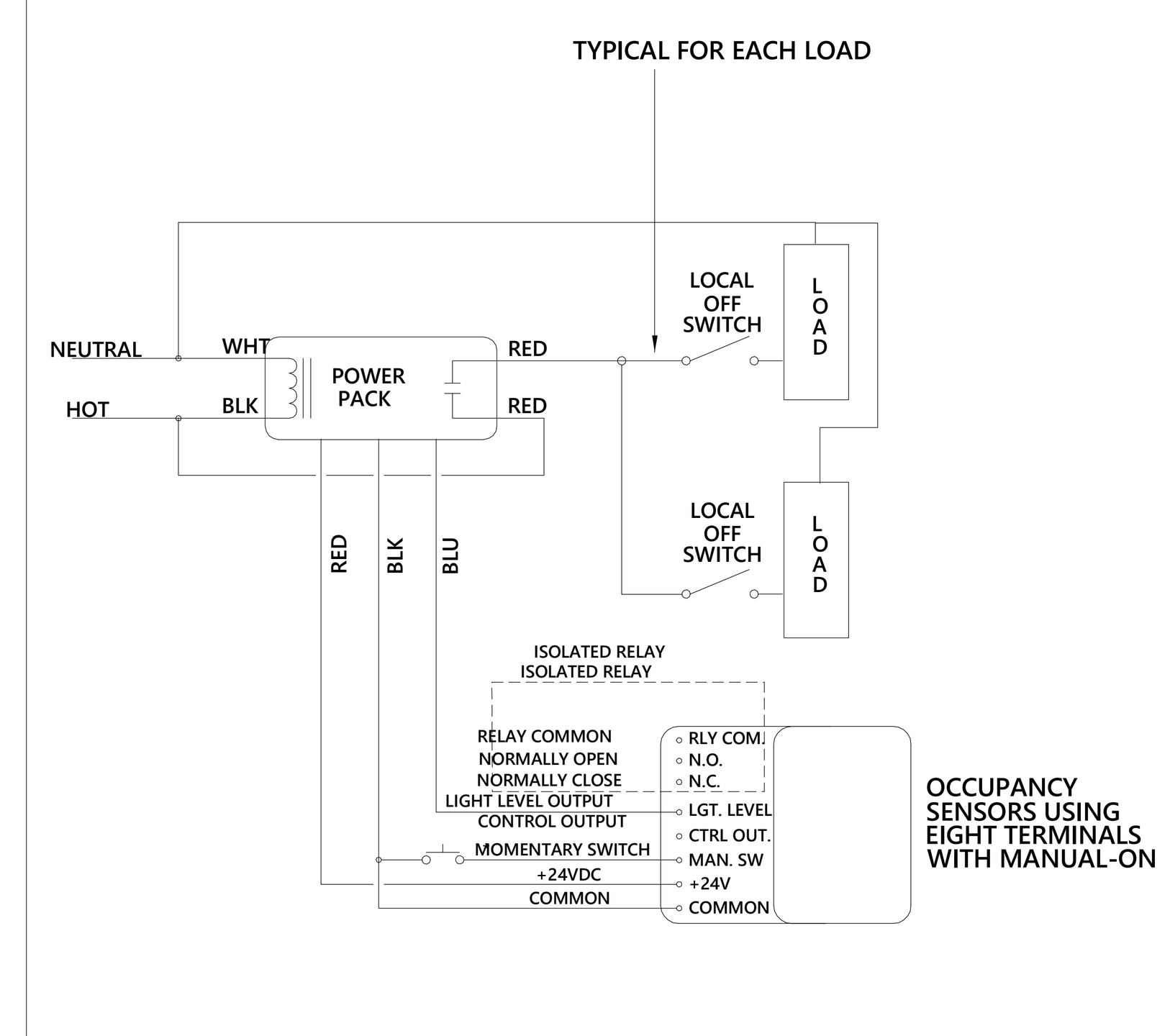
NOTES:
1. SEE SYMBOL LEGEND FOR SPECIFIC RELAY CATALOG NUMBER FOR APPLICATION.
2. PROVIDE ONE RELAY PER LIFE SAFETY SWITCH LEG / CIRCUIT SHOWN ON PLANS.
3. LOCAL LIGHTING CONTROL (WALL SWITCH, OCCUPANCY SENSOR, RELAY, ETC.).
4. SWITCHED EMERGENCY LIGHTING SHALL BE CONTROLLED NORMALLY WITH THE NORMAL LOCAL LIGHTING ONTROL. RELAY SHALL TRANSFER AND ENERGIZE THE EMERGENCY LIGHTING UPON LOSS OF THE NORMAL SOURCE. 20A MAXIMUM LOAD ON GTD20A RELAY, 3A MAXIMUM LOAD ON GTD RELAY.

6 EMERG LTG RELAY CONTROL CIRCUIT
NO SCALE

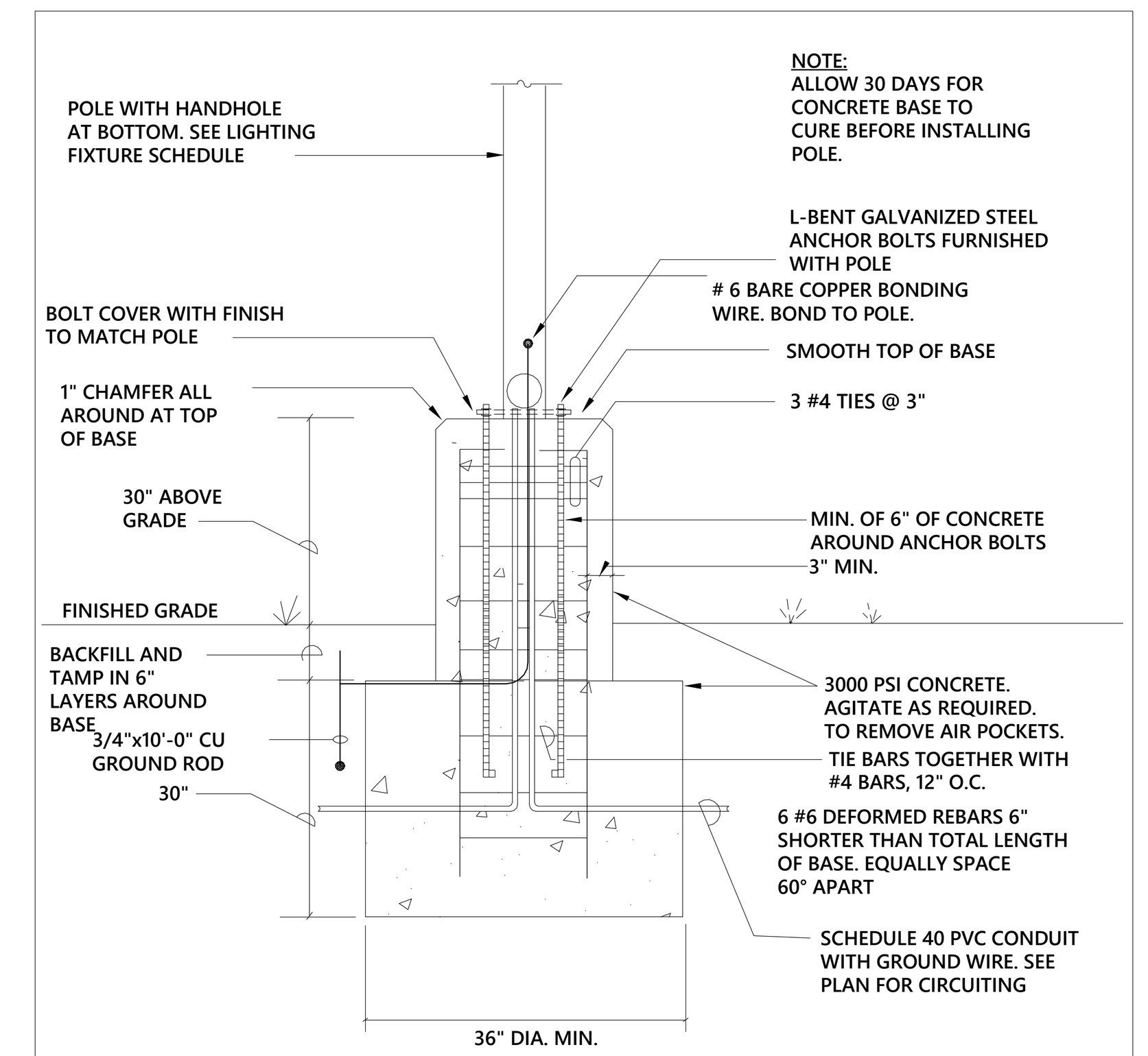


NOTES:
1. TILT SENSOR TOWARD CENTER OF ROOM FOR MAXIMUM EFFECTIVENESS.
2. CALIBRATE SENSITIVITY AND DIRECTION AFTER INSTALLATION.
3. PROVIDE WALL MOUNT BRACKET AND INSTALL AT CORNER MOST SECTION OF ROOM. PATTERN IS BASED ON CONICAL SHAPE.

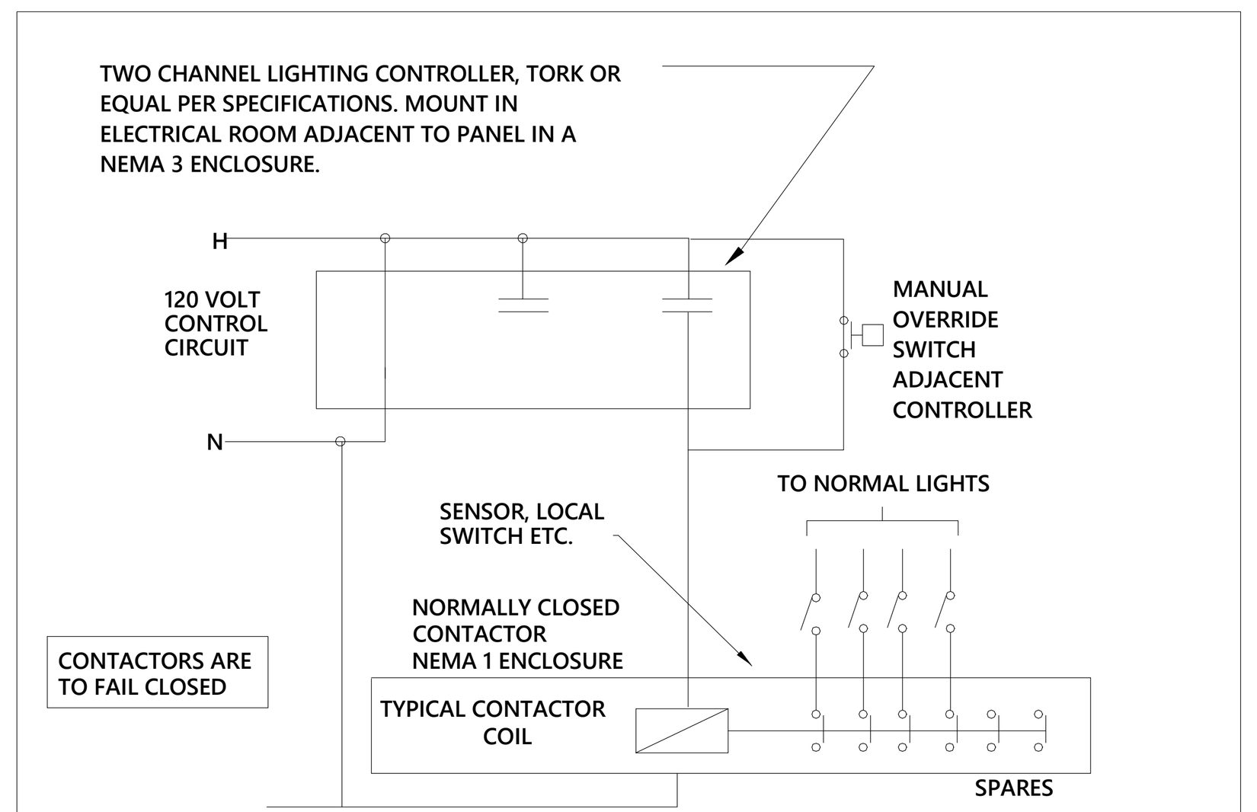
7 CORNER MOUNT SENSOR
NO SCALE



8 DT-200/300
NO SCALE

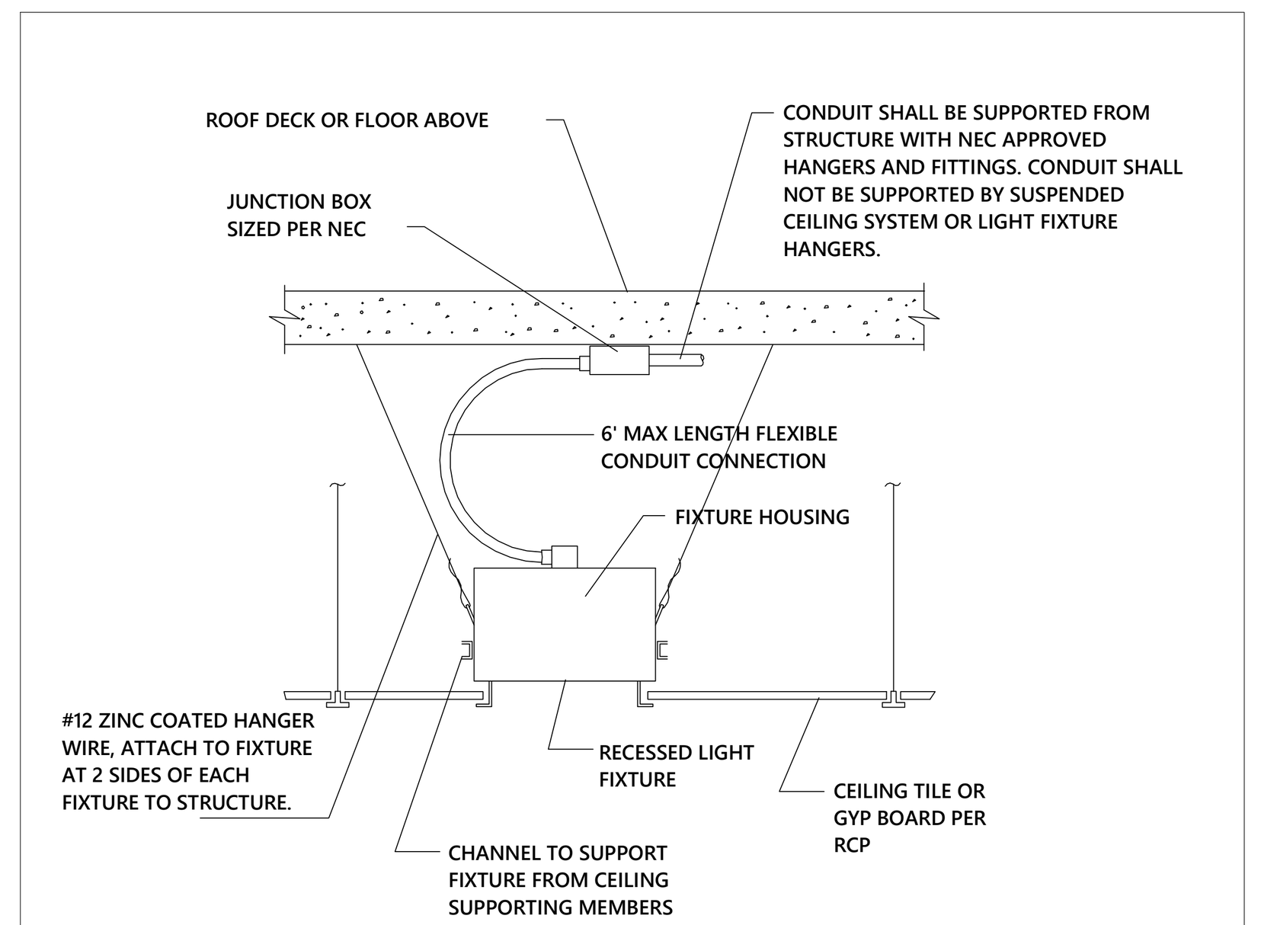


9 POLE BASE DETAIL (PARKING)
NO SCALE

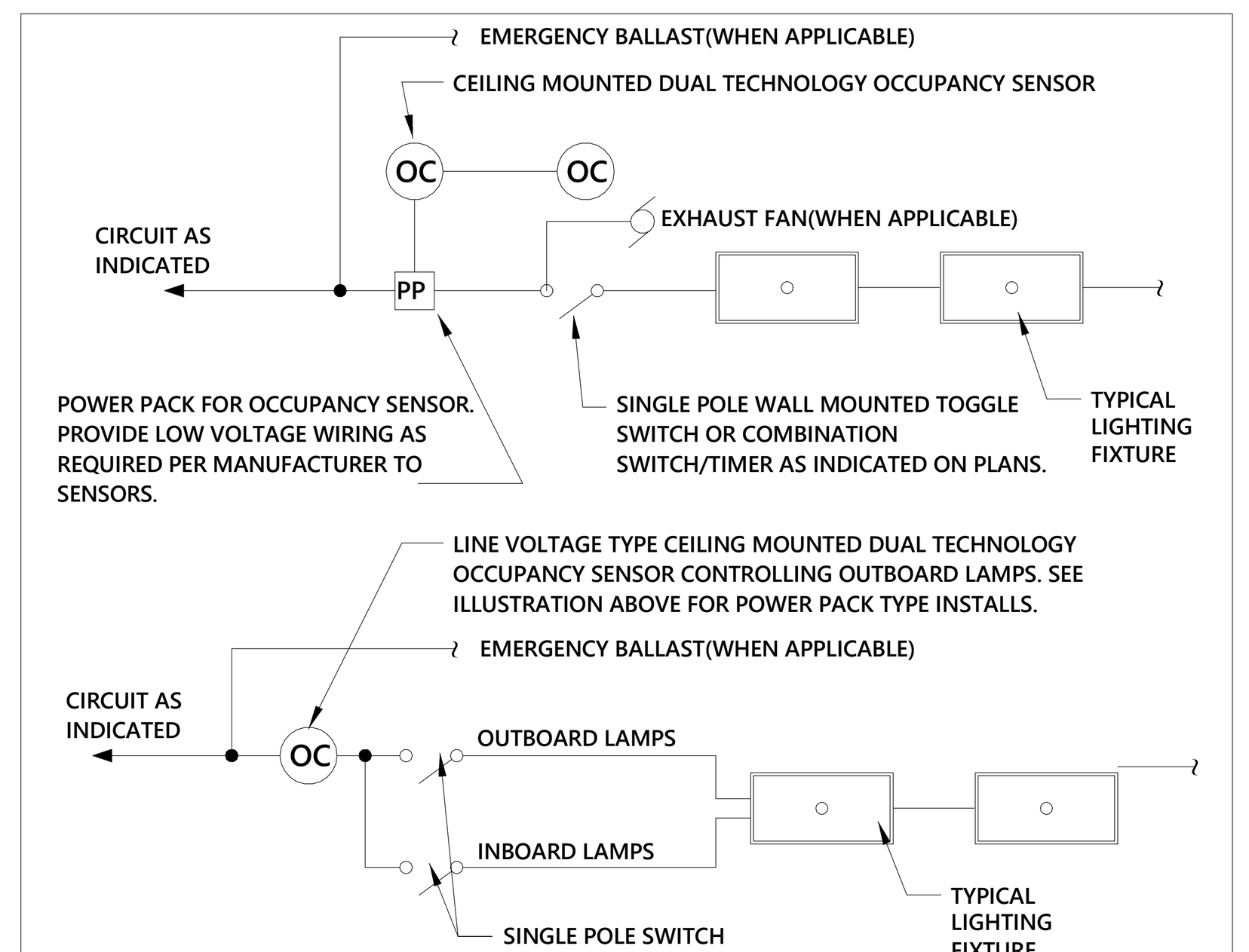


CONTACTOR	COIL VOLTAGE	POLES	CIRCUITS SWITCHED	ZONE DESCRIPTION
LC-1	120 R2-2	4	LS-13 LS-15	EXTERIOR BLDG LIGHTING
LC-2	120 R2-2	6	L1-1 L5-8 L1-11	EXTERIOR SITE LIGHTING

10 OFFICE/SHOPS BUILDING LIGHTING CONTACTOR DETAIL, W/ TIMER
NO SCALE

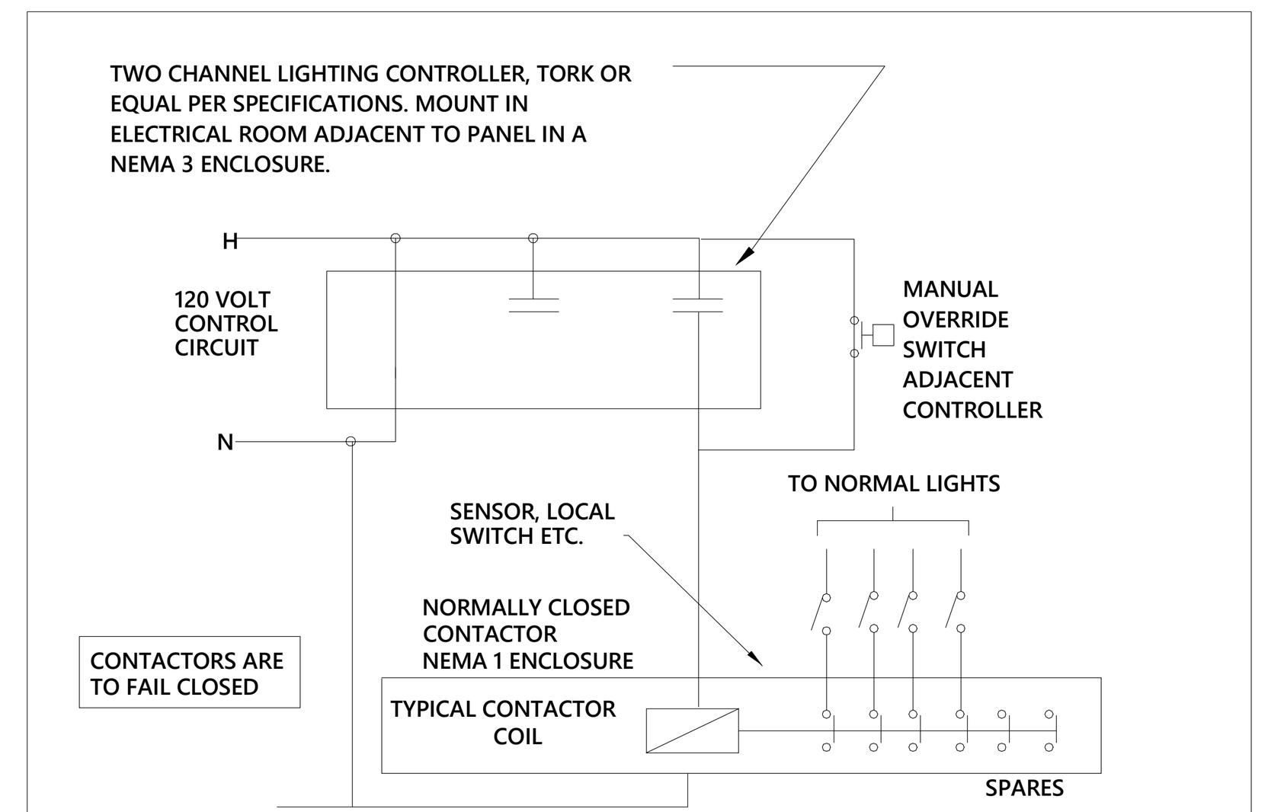


11 TYPICAL RECESSED DOWN LIGHT FIXTURE INSTALLATION DIAGRAM
NO SCALE



NOTES:
1. OCCUPANCY SENSORS SHALL BE SET TO TIME OUT AFTER 15 MINUTES AND THE TRIM POTENTIOMETER IS SET TO 90% FOR SENSITIVITY.
2. OCCUPANCY SENSORS SHALL BE PLACED AS TO NOT FUNCTION UPON SOMEONE JUST PASSING BY THE ROOM DOOR BUT BY ACTUALLY ENTERING THE ROOM IN AS MUCH AS POSSIBLE.

12 TYPICAL CEILING MOUNTED OCCUPANCY SENSOR WIRING DIAGRAMS
NO SCALE



CONTACTOR	COIL VOLTAGE	POLES	CIRCUITS SWITCHED	ZONE DESCRIPTION
LC-3	120 WHR1-1	4	LSW-14	EXTERIOR BLDG LIGHTING

13 WAREHOUSE BUILDING LIGHTING CONTACTOR DETAIL, W/ TIMER
NO SCALE

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8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL DETAILS

E-006

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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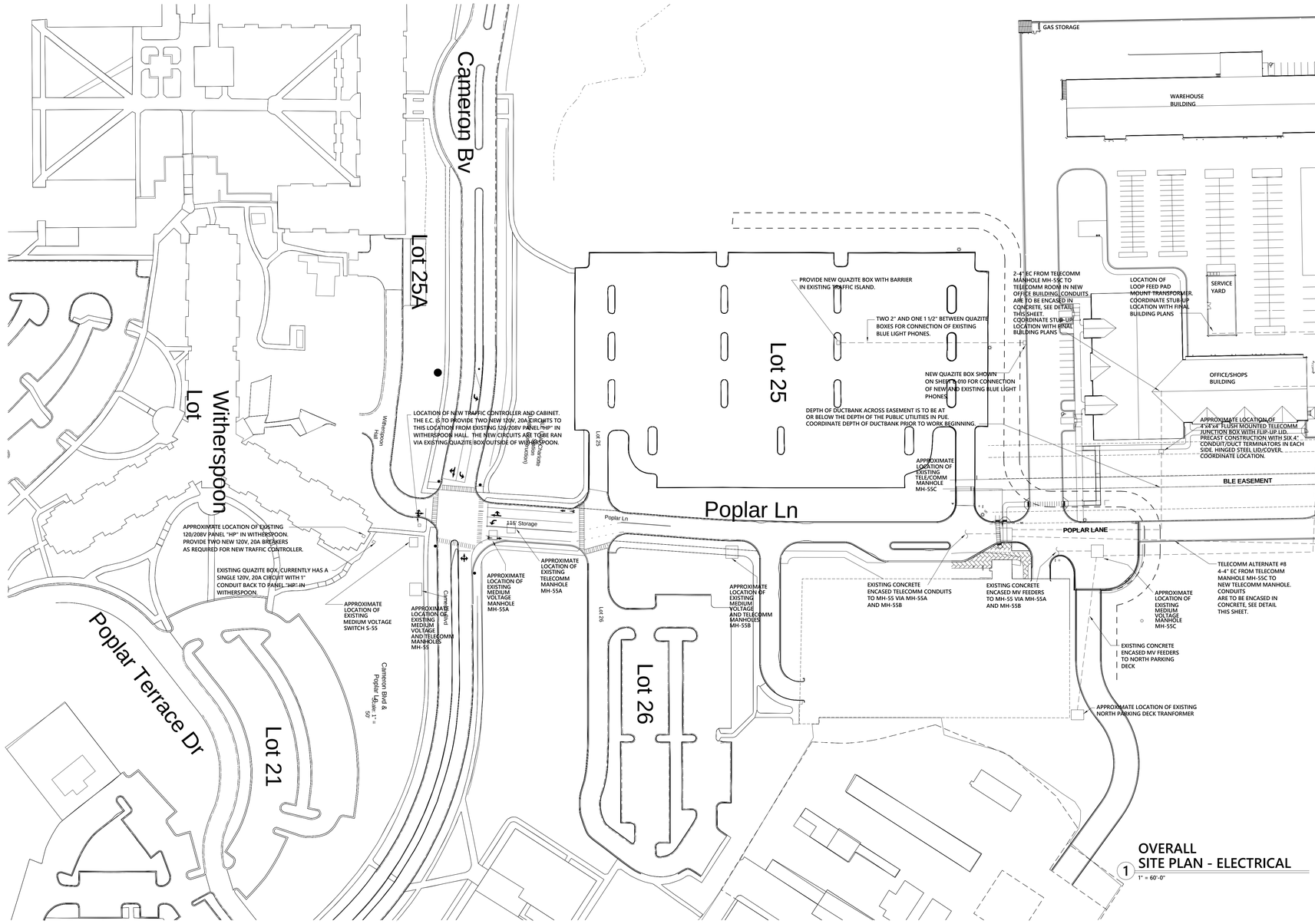
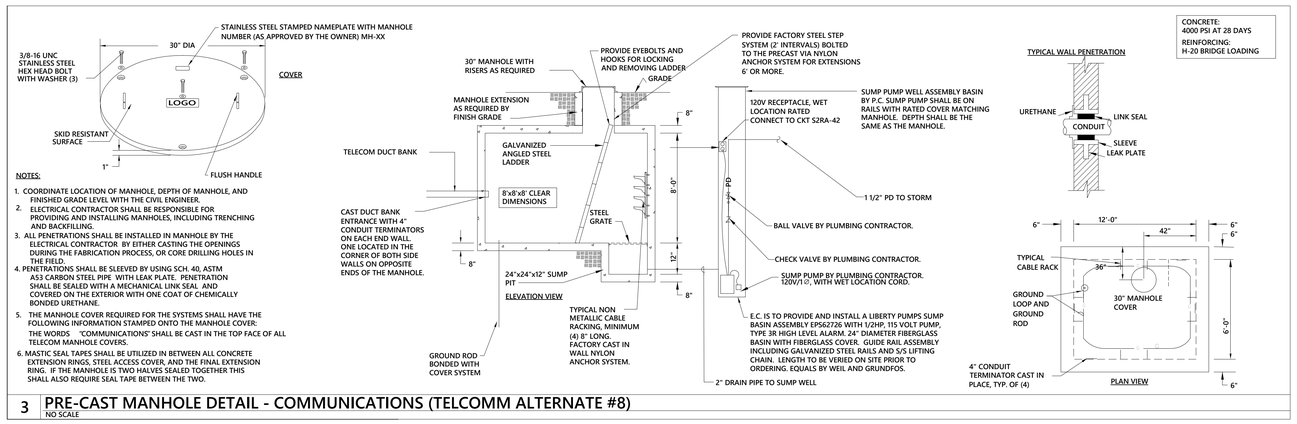


GENERAL NOTE:
ALL NEW UNDERGROUND UTILITIES SHALL BE LOCATED AND RECORDED BY A SURVEYOR REGISTERED IN NORTH CAROLINA UTILIZING A GPS LOCATING SERVICE. SURVEY SHALL BE TIED TO THE NC STATE PLANE COORDINATE SYSTEM AND SHALL MEET NC STANDARDS FOR POSITIONAL ACCURACY. PROVIDE X,Y,Z COORDINATES IN ACCORDANCE WITH THE SPECIFICATIONS AND IN A FORMAT APPROVED BY THE OWNER TO INCLUDE THE FOLLOWING:

- DUCT BANKS (POWER AND TELECOM), LOCATIONS SHALL BE MADE AT 25' INTERVALS ALONG TOP EDGE AND BOTH SIDES OF DUCT BANK AT ALL STRUCTURE CONNECTIONS AND ALL CHANGES IN DIRECTION. NOTE DUCT BANK THICKNESS ON SURVEY.
- MANHOLES (POWER AND TELECOM), LOCATIONS TO INCLUDE STRUCTURE WIDTH, LENGTH AND DEPTH WITH ELEVATIONS OF TOP AND BOTTOM OF VAULT, TOP OF MANHOLE ENTRANCE AND ALL CONDUIT ENTERING AND EXITING THE MANHOLE.

1 OVERALL SITE PLAN - ELECTRICAL
1" = 60'-0"



3 PRE-CAST MANHOLE DETAIL - COMMUNICATIONS (TELCOMM ALTERNATE #8)
NO SCALE

1

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NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 3028297 PROFESSIONAL
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL SITE PLAN - OVERALL

E-009

OPTIMA #: 16-0265

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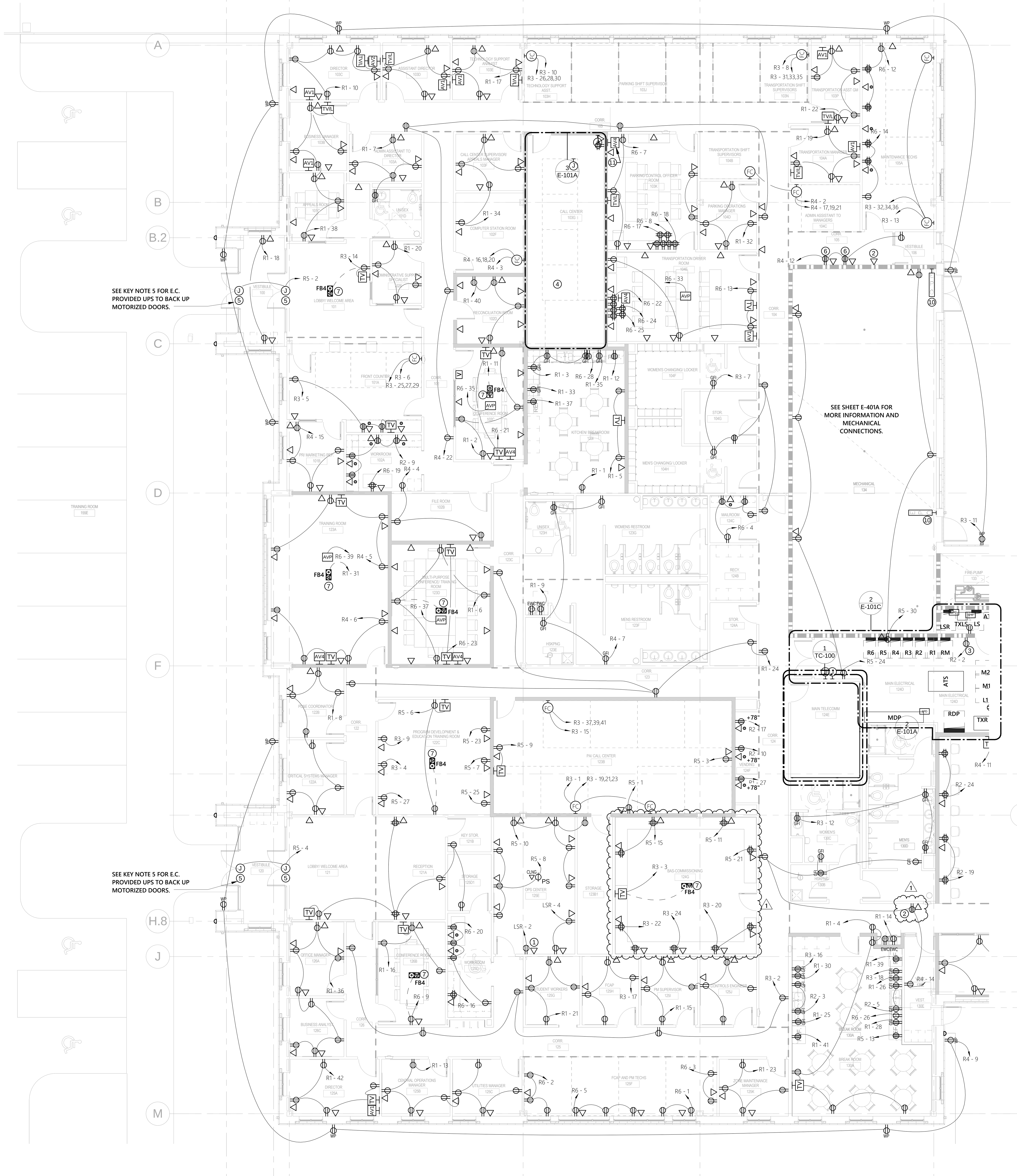
GENERAL NOTES

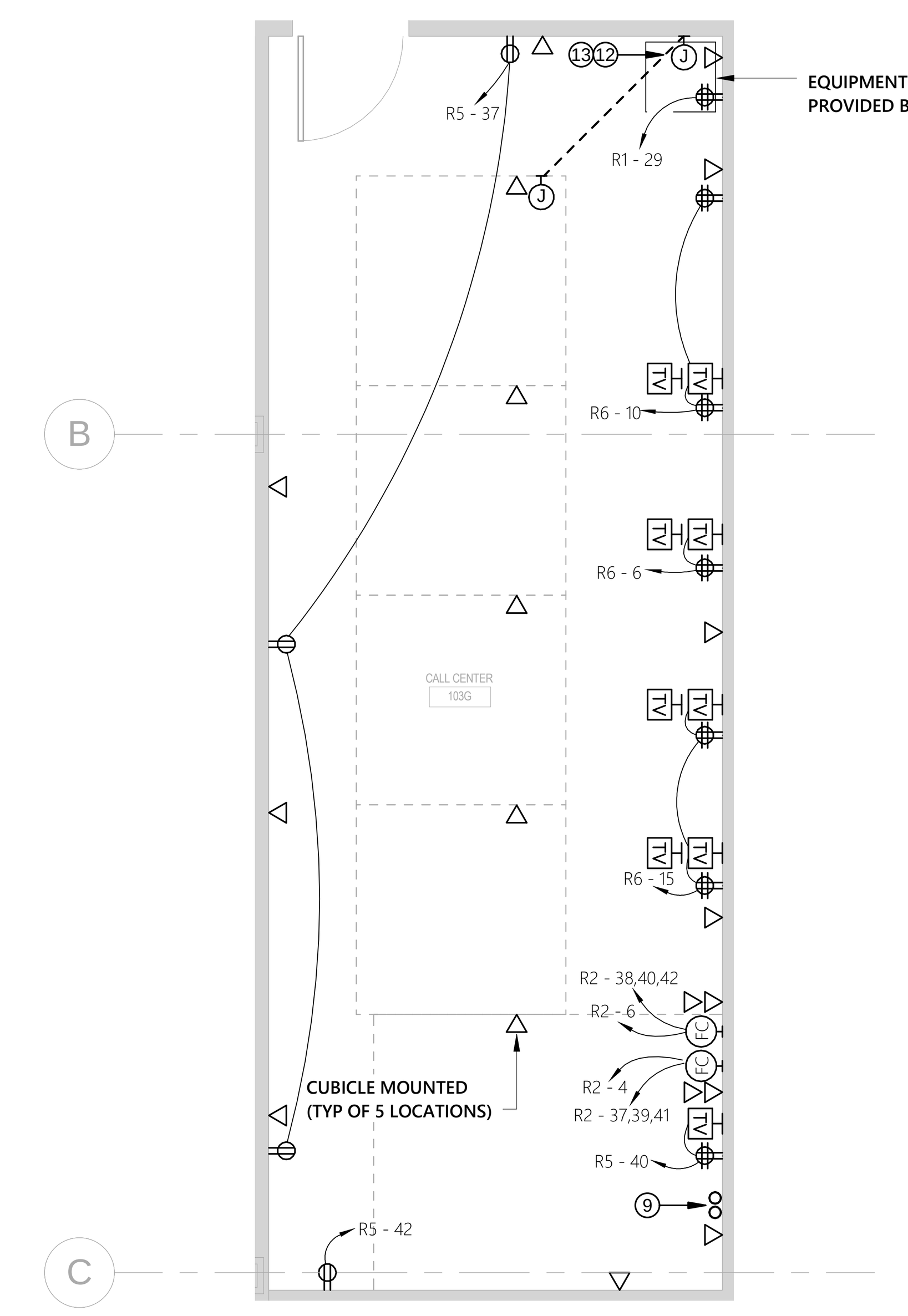
1. COORDINATE EXACT LOCATIONS OF ALL DEVICES IN FIELD WITH UNIVERSITY REPRESENTATIVE PRIOR TO ROUGH-IN.

KEY NOTES:(XX)

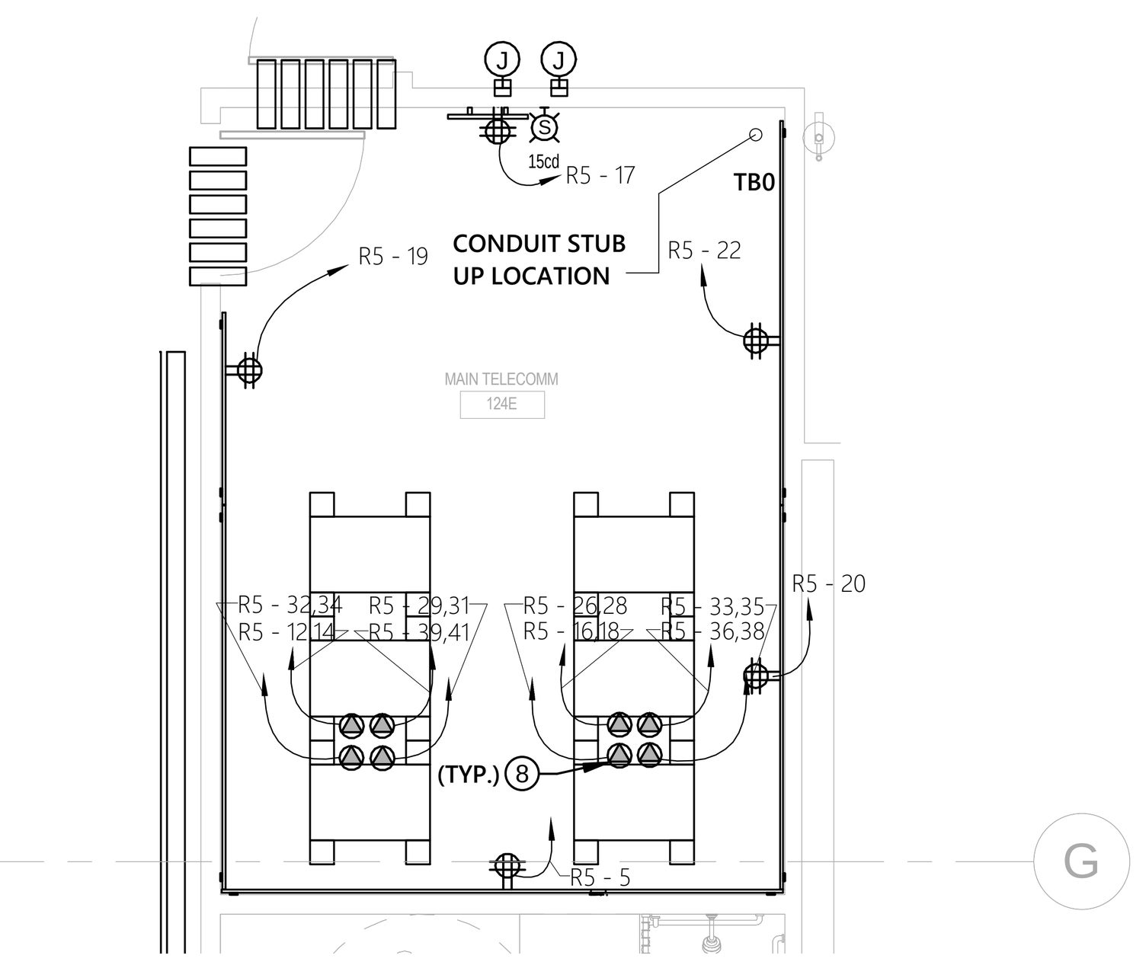
1. E.C. IS TO PROVIDE 24 STRAND, MULTIMODE, 62.5 MICRON FIBER OPTIC CABLE FROM OPS CENTER TO MAIN TELECOM ROOM. LEAVE ENOUGH SLACK FOR THE OWNER TO MAKE FINAL CONNECTION ANYWHERE IN THIS ROOM.
2. TIME CLOCK LOCATION. COORDINATE MOUNTING HEIGHT WITH OWNER.
3. PROVIDE LIGHTING CONTACTOR. REFER TO DETAIL #10/E006.
4. E.C. IS TO VERIFY ALL MOUNTING HEIGHTS OF ELECTRICAL DEVICES AND ROUGH-IN LOCATIONS IN THIS ROOM WITH OWNER PRIOR TO ROUGH-IN.
5. J-BOX FOR CONNECTION TO MOTORIZED DOOR. DOORS ARE TO BE POWERED THROUGH A UPS. PROVIDE 120V, 20A, 1500W UPS, FOR EACH SET OF MOTORIZED DOORS. WALL MOUNT UPS UP HIGH IN THE MAIN ELECTRICAL ROOM. APC SMART PRO SERIES OR EQUAL BY EATON OR SQUARE D.
6. RECEPTACLES FOR KEY BOXES. COORDINATE MOUNTING HEIGHT WITH OWNER.
7. SEE SYMBOL SCHEDULE ON E001 FOR ALL FLOOR BOX REQUIREMENTS AND ASSOCIATED CONDUIT RUNS FOR POWER/DATA/AV.
8. MOUNT RECEPTACLES INDEPENDENTLY FROM STRUCTURE, CONTRACTOR IS TO ATTACH RECEPTACLE TO CABLE TRAY FOR LATERAL STABILITY. REFER TO TELECOMMUNICATIONS DRAWINGS FOR ADDITIONAL INFORMATION. TYPICAL OF EQUIPMENT RACK POWER.
9. PROVIDE 2-3" CONDUITS ABOVE ACCESSIBLE CEILING ROUTED TO ROOF FOR ANTENNA CABLING. PROVIDE WEATHERPROOF NECK AND CAP FOR FUTURE USE.
10. SEE DETAIL #3/E-002 FOR EMERGENCY GAS BOILER SHUTOFF.
11. ROUTE CONDUIT TO PLENUM BOX LOCATED IN TRANSPORTATION DRIVER ROOM 104E.
12. PROVIDE (2) 2" CONDUITS FROM EQUIPMENT RACK LOCATION TO WALL ADJACENT TO CUBICALS. COORDINATE EXACT LOCATION OF JUNCTION BOX AT EQUIPMENT RACK AND WALL LOCATIONS.
13. PROVIDE (2) 2" CONDUITS FROM ACCESSIBLE CEILING SPACE IN CORRIDOR TO WALL ADJACENT TO CUBICALS. COORDINATE EXACT LOCATION OF JUNCTION BOX.



1 FLOOR PLAN - POWER - PATS/FO
1/8" = 1'-0"
SCALE: 1/8"=1'-0"



3 FLOOR PLAN - POWER - PATS/FO - ENLARGED CALL CENTER
1/4" = 1'-0"
SCALE: 1/4"=1'-0"



2 FLOOR PLAN - POWER - PATS/FO - ENLARGED TELE
1/4" = 1'-0"
SCALE: 1/4"=1'-0"

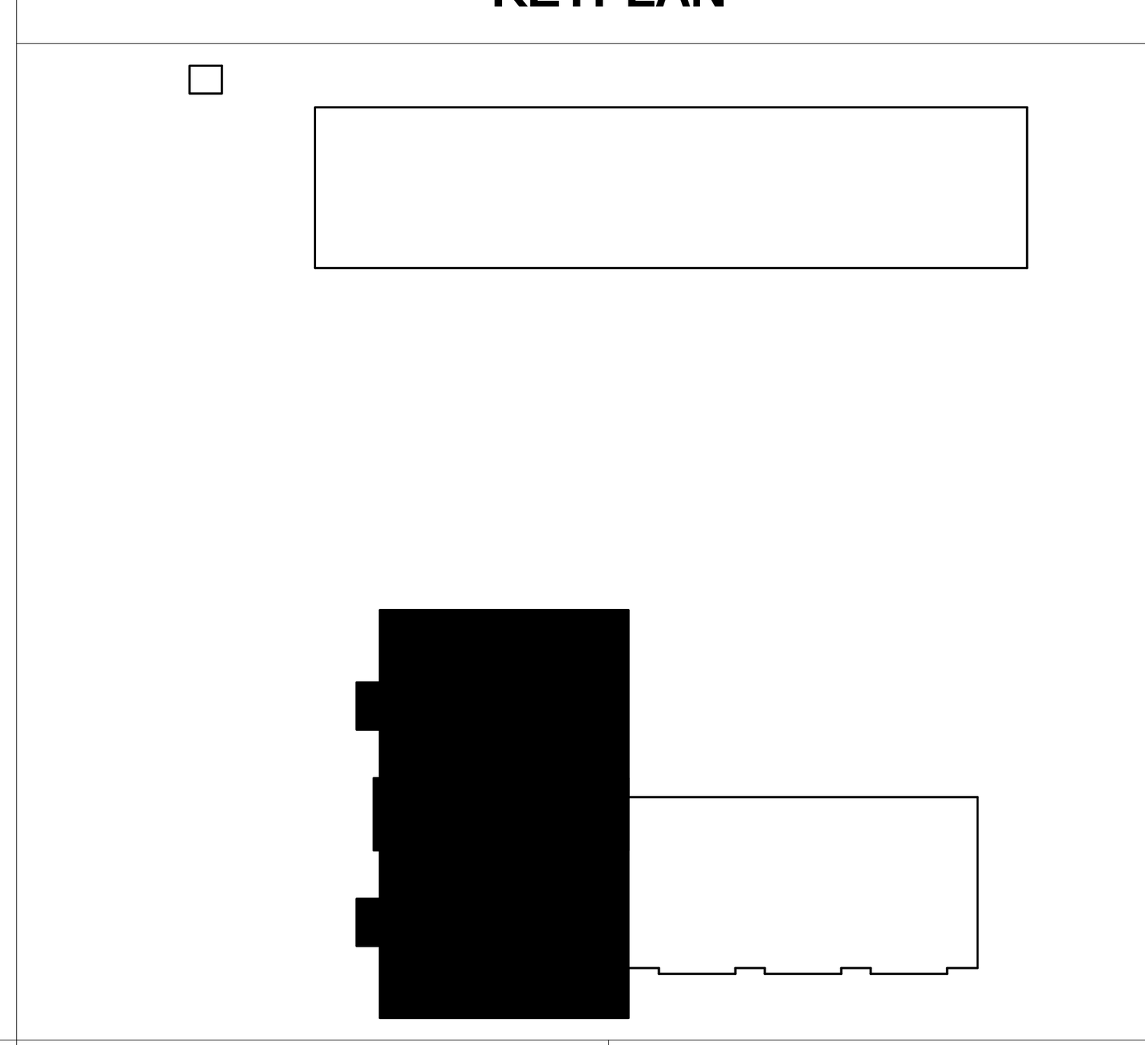
PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

- NON-RATED PARTITION TO CEILING
- NON-RATED PARTITION TO DECK
- 1 HR. RATED PARTITION TO DECK
- 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN



PROJECT NORTH TRUE NORTH

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER 8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

FLOOR PLAN - PATS/FO - POWER

E-101A

OPTIMA #: 16-0265

[redacted]

BUILDING BID DOCUMENTS

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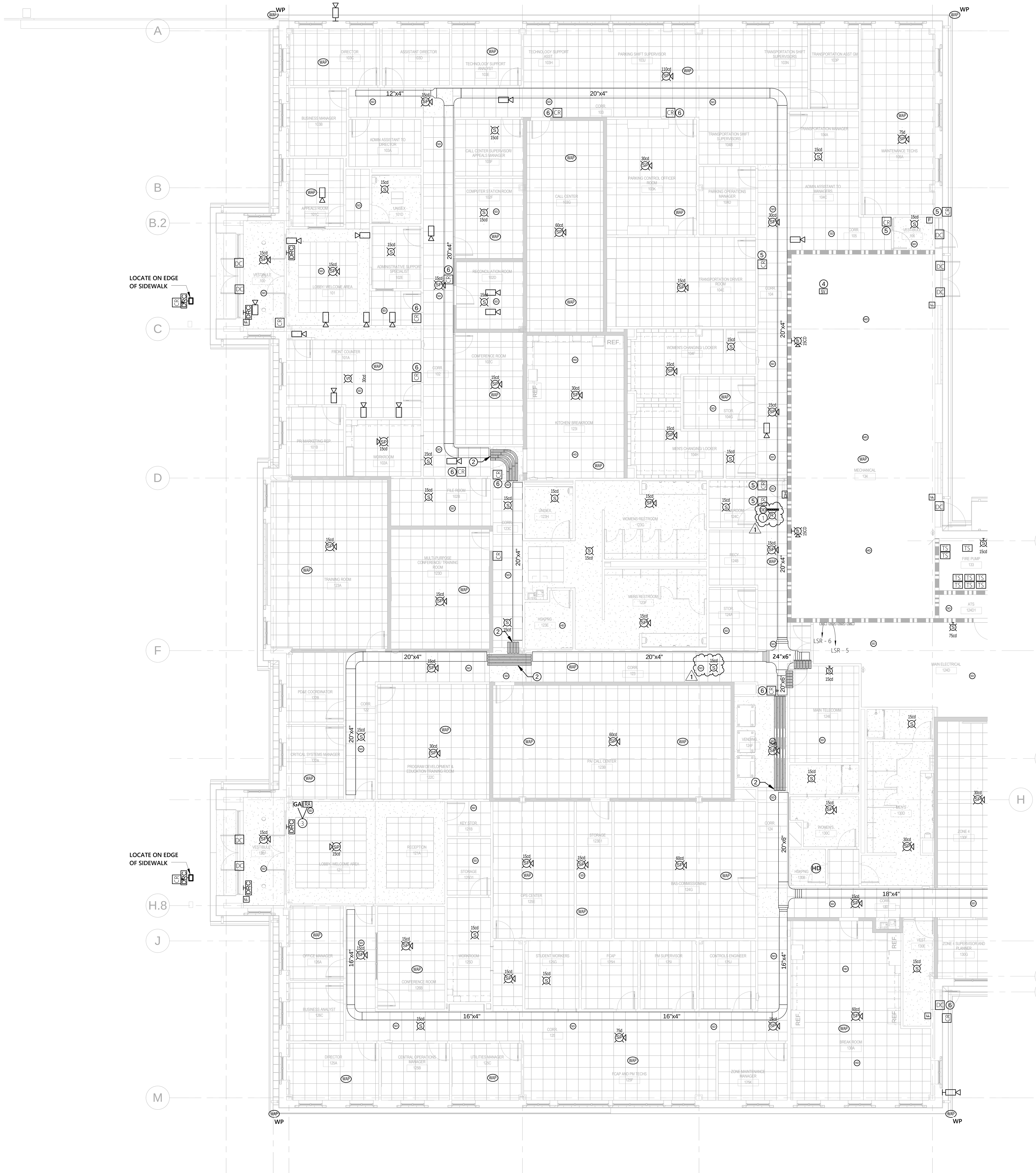
E

D

C

B

A



1 OFFICE/SHOPS - SPECIAL SYSTEMS PLAN - PATS/FO
1/8" = 1'-0"

8 6 4 2 0 8 16
SCALE: 1/8"=1'-0"

GENERAL NOTES:

A. COORDINATE EXACT LOCATIONS OF ALL DEVICES IN FIELD WITH UNIVERSITY REPRESENTATIVE PRIOR TO ROUGH-IN.

KEY NOTES: (X)

1. DUCT DETECTOR FOR AHU-1. COORDINATE WITH MECHANICAL CONTRACTOR AND DRAWINGS FOR MORE INFO.
2. PROVIDE (8) 4" CONDUITS [(6) TELECOMMUNICATIONS & (2) SECURITY/CAMERAS] AS INDICATED ABOVE CEILING. STACK CONDUITS AS REQUIRED. CONDUIT SLEEVES SHALL BE COLOR CODED. REFER TO DRAWING TC-001 FOR ADDITIONAL INFORMATION.
3. FIRE ALARM AND GENERATOR REMOTE ANNUNCIATOR PANEL LOCATION. COORDINATE WITH OWNER.
4. CONNECT TO 120V CONTROL CIRCUIT RM-33.
5. PROVIDE 120V POWER TO CARD READER DOOR LOCATION, CONNECT TO CIRCUIT RM-39.
6. PROVIDE 120V POWER TO CARD READER DOOR LOCATION, CONNECT TO CIRCUIT RM-41.

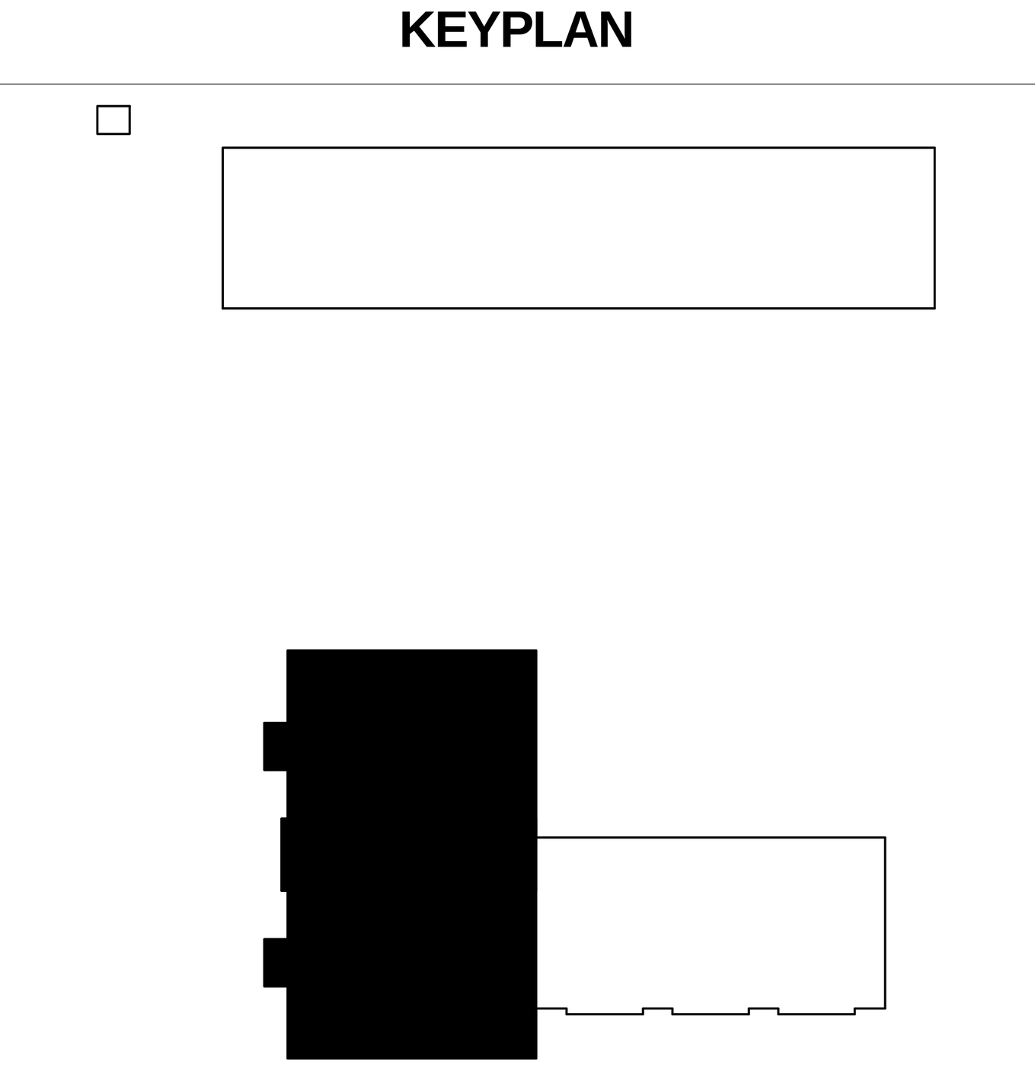
PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED PARTITION TO CEILING
NON-RATED PARTITION TO DECK
1 HR. RATED PARTITION TO DECK
2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN



PROJECT NORTH TRUE NORTH

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
8/28/17

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No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

REFLECTED CEILING PLAN - PATS/FO - SPECIAL SYSTEMS

E-301A

OPTIMA #: 16-0265
[redacted]

1 2 3 4 5

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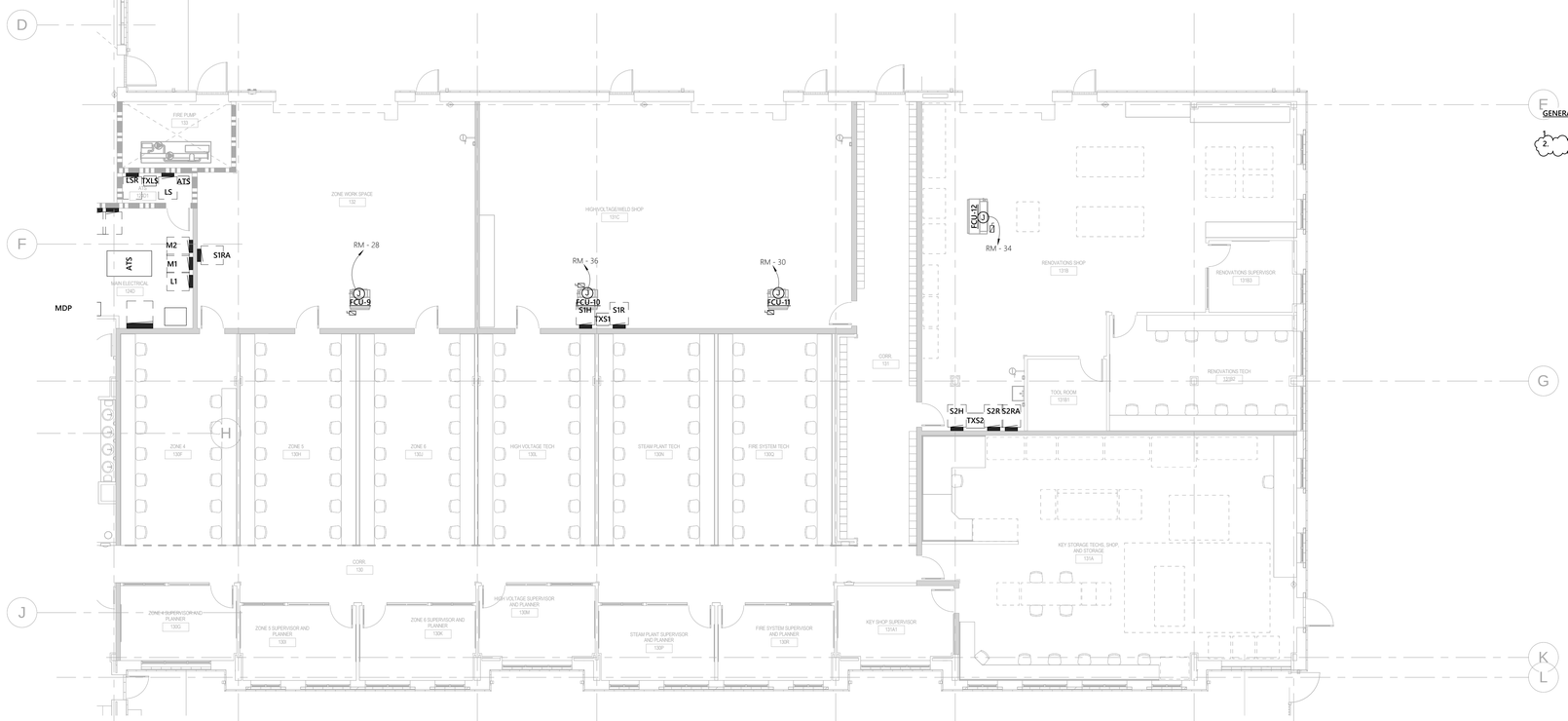


2 FLOOR PLAN - POWER/HVAC - FO SHOPS ALTERNATE-10

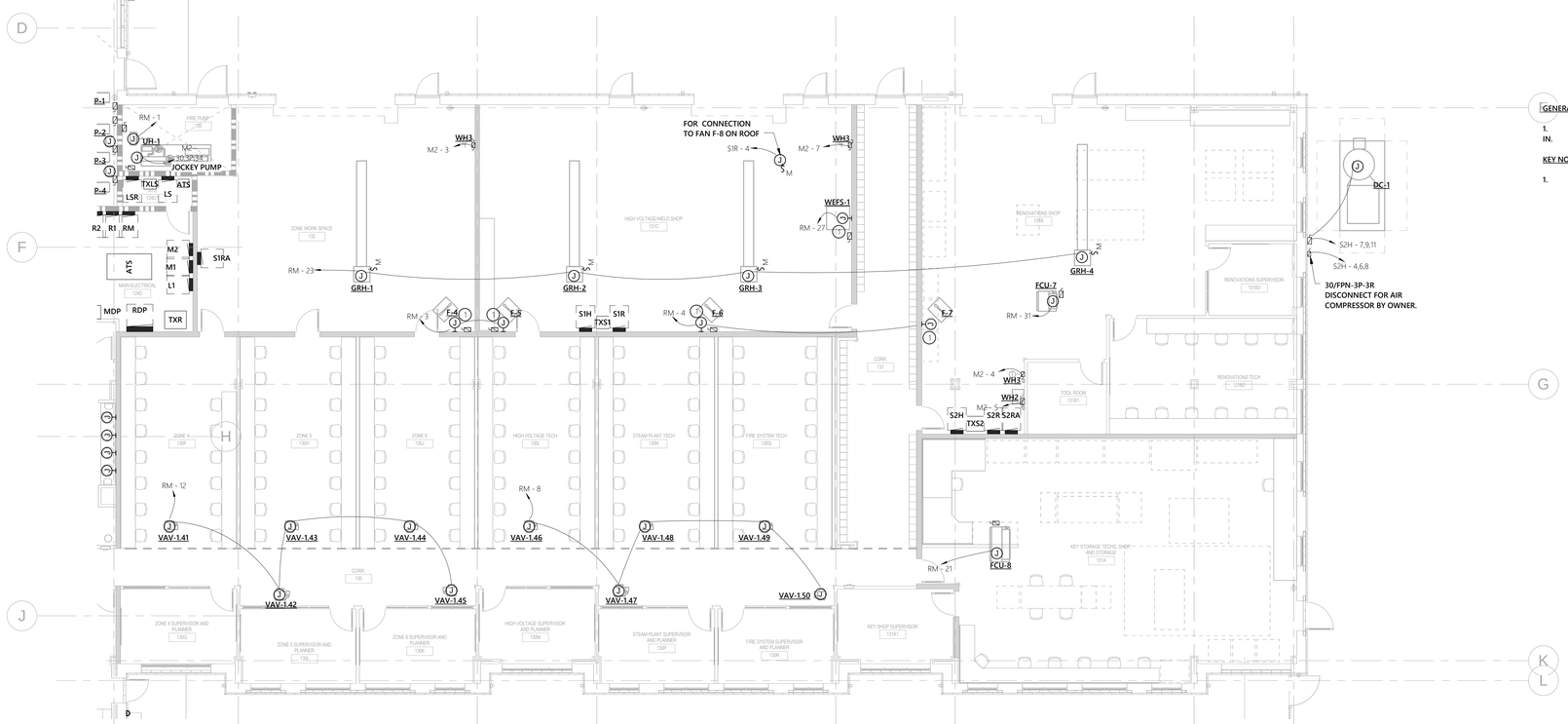
1/8" = 1'-0"

8 6 4 2 0 8 16

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

GENERAL NOTES

1. COORDINATE EXACT LOCATIONS OF ALL DEVICES IN FIELD WITH MECHANICAL/PLUMBING PLANS/CONTRACTOR PRIOR TO ROUGH-IN.
2. FOR THIS PLAN, REFER TO PANEL SCHEDULE "RM ALTERNATE" ON SHEET E-605.



1 FLOOR PLAN - POWER/HVAC - FO SHOPS - BASE BID

1/8" = 1'-0"

8 6 4 2 0 8 16

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

GENERAL NOTES

1. COORDINATE EXACT LOCATIONS OF ALL DEVICES IN FIELD WITH MECHANICAL/PLUMBING PLANS/CONTRACTOR PRIOR TO ROUGH-IN.

KEY NOTES:

1. PROVIDE J-BOX WITH REQUIRED NEMA PLUG CONFIGURATION. (COORDINATE WITH EQUIPEMENT MANUFACTURER FOR PLUG TYPE), VERIFY HEIGHT WITH MECHANICAL CONTRACTOR.

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

- NON-RATED PARTITION TO CEILING
- NON-RATED PARTITION TO DECK
- 1 HR. RATED PARTITION TO DECK
- 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN

PROJECT NORTH TRUE NORTH

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

NORTH CAROLINA PROFESSIONAL 028297 ENGINEER BRANDON L. MILLER

8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

FLOOR PLAN - FO SHOPS - POWER/HVAC

E-401C

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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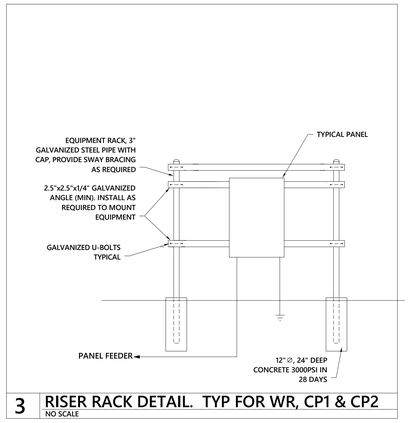
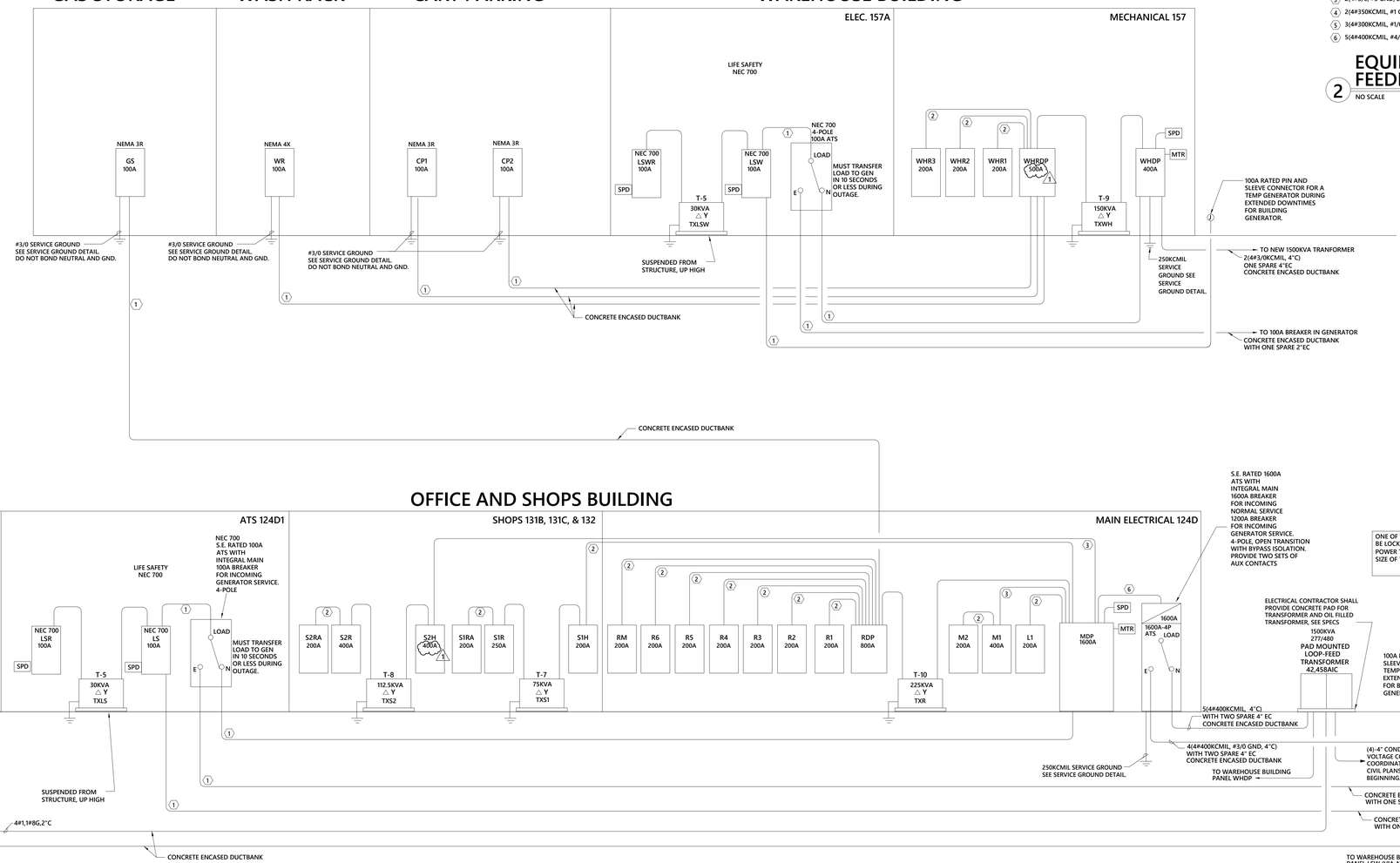


3 RISER RACK DETAIL. TYP FOR WR, CP1 & CP2
NO SCALE

DRY-TYPE TRANSFORMER SCHEDULE

TRANSF. TYPE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	KVA	SQUARE "D"	PRIMARY	SECONDARY	GROUNDING ELECTRODE CONDUCTOR	SIZE
T-5	480	208/120 Y	30		(3)-#8, #10 Gnd. -3/4 "C. 50 AMP	(4)-#3, #8 Gnd. -1 1/2" C. 100 A	#8	25/14
T-6	480	208/120 Y	45		(3)-#4, #8 Gnd. -1 1/4" C. 70 AMP	(4)-#1/0, #6 Gnd. -2" C. 150 A	#6	30/20
T-7	480	208/120 Y	75		(3)-#1, #6 Gnd. -1 1/2" C. 125 AMP	(4)-#4/0, #2 Gnd. -2 1/2" C. 225 A	#2	30/20
T-8	480	208/120 Y	112.5		(3)-#2/0, #6 Gnd. -1 1/2" C. 175 AMP	(2) SETS(4)-#3/0, #1/0 Gnd. - 2"C. 400 A	#1/0	35/29
T-9	480	208/120 Y	150		(3)-#4/0, #4 Gnd. -2 1/2" C. 225 AMP	(2)-SETS (4)-#250, #1/0 Gnd., -3"C 500A	#1/0	41/32
T-10	480	208/120 Y	225		(3) #500kcmil, #3 Gnd. 3" C. 350 AMP	(3)-SETS (4)-#300kcmil, #2/0 Gnd. -3" C. EA. / 800 AMP	#2/0	48/30

NOTE: NOT ALL SIZES OR TYPES MAY BE USED.



1 4#3, #8 GND, 2"C
2 4#3/0, #6 GND, 2 1/2"C
3 2(4#3/0, #3 GND, 2 1/2"C)
4 2(4#350KCMIL, #1 GND, 3"C)
5 3(4#300KCMIL, #1/0 GND, 3"C)
6 5(4#400KCMIL, #4/0 GND, 4"C)

EQUIPMENT AND FEEDER LEGEND

2 NO SCALE

1. TYPE OF METER ON "MDP" IS VERIFIED WITH OWNER PRIOR TO ORDERING. BASIS OF DESIGN IS "CUTLER HAMMER" IQ-250 OR EQUAL. METERS ARE SHOWN AS "MTR". COORDINATE COMMUNICATION PROTOCOL WITH M.C. PRIOR TO ORDERING.
2. FEEDERS THAT ARE REQUIRED TO BE CONCRETE ENCASED ARE TO BE CONCRETE ENCASED UNTIL TERMINATION POINT, INCLUDING UNDER BUILDING SLABS. EXCAVATION WILL BE REQUIRED IN EXISTING MAIN ELECTRICAL ROOM.
3. PROVIDE CONCRETE PAD FOR INDOOR TRANSFORMER. PAD SPECS ARE TO BE COORDINATED WITH TRANSFORMER MANUFACTURER.
4. MOTOR(S), CONTROLLER(S), AND ASSOCIATED ACCESSORIES FOR THE FIRE PUMP SYSTEM SHALL BE LISTED FOR FIRE PROTECTION SERVICE. COORDINATE EXACT SIZING REQUIREMENTS WITH MANUFACTURER. ADJUST BREAKER/FUSE/WIRING SIZING AS REQUIRED BASE ON THE MANUFACTURER'S REQUIREMENTS.
5. FIRE/JOCKEY PUMPS CONTROLLER DISCONNECTS SHALL BE LISTED FOR USE AS SERVICE ENTRANCE EQUIPMENT, LOCKABLE IN THE "ON" POSITION, LABELED PER NEC 695-4(b)(3) AND SUPERVISED IN THE CLOSED POSITION BY THE FIRE ALARM CONTROL PANEL. LOCATE DISCONNECTS ADJACENT TO FIRE/JOCKEY PUMPS CONTROLLER.

1 POWER RISER DIAGRAM
1/8" = 1'-0"

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NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 028297 PROFESSIONAL ENGINEER
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

POWER RISER

E-501

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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PANEL: R1

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLES - BREAK 123I	12	20 A	1	1	0.2	0.7					1	2	20 A	12	RECEPTACLES - CONF. 102C
COUNTER RECEPTACLES - BREAK 123I	12	20 A	3	1			0.4	1.3			1	4	20 A	12	RECEPTACLES - BREAK 130A & 130
RECEPTACLES - BREAK 123I	12	20 A	5	1					0.7	1.1	1	6	20 A	12	RECEPTACLES - CONF. 123D
RECEPTACLES - OFFICE 103A	12	20 A	7	1	0.9	1.4					1	8	20 A	12	RECEPTACLES - OFFICES 122A & 122B
EWC - 123C (NOTE 7)	12	20 A	9	1			1.2	1.3			1	10	20 A	12	RECEPTACLES - OFFICE 103C
FLOOR BOX - CONF. 102C	12	20 A	11	1					1.0	1.2	1	12	20 A	12	REFRIGERATOR - BREAK 123I (NOTE 7)
RECEPTACLES - OFFICES 125B & 125C	12	20 A	13	1	1.4	0.4					1	14	20 A	12	EWC - 130 (NOTE 7)
RECEPTACLES - OFFICES 125I & 125J	12	20 A	15	1			1.4	0.9			1	16	20 A	12	RECEPTACLES - CONF. 126B
RECEPTACLES - OFFICES 103D & 103E	12	20 A	17	1					1.4	0.4	1	18	20 A	12	RECEPTACLES - VESTIBULE 100
RECEPTACLES - OFFICE 104A	12	20 A	19	1	0.7	0.7					1	20	20 A	12	RECEPTACLES - OFFICE 102E
RECEPTACLES - OFFICE 125G	12	20 A	21	1			0.7	0.9			1	22	20 A	12	RECEPTACLES - OFFICE 103P
RECEPTACLES - OFFICE 125K	12	20 A	23	1					0.7	0.9	1	24	20 A	12	RECEPTACLES - CORRIDOR 123 & 124
MICROWAVE - BREAK 130A	12	20 A	25	1	1.0	1.0					1	26	20 A	12	MICROWAVE - BREAK 130A
VENDING - 124F (NOTE 7)	12	20 A	27	1			1.0	1.0			1	28	20 A	12	MICROWAVE - BREAK 130A
EQUIPMENT RACK - CALL CTR 103G	12	20 A	29	1					0.5	1.0	1	30	20 A	12	MICROWAVE - BREAK 130A
FLOOR BOX - TRAINING 123A	12	20 A	31	1	0.4	1.1					1	32	20 A	12	RECEPTACLES - OFFICE 104D
MICROWAVE - BREAK 123I	12	20 A	33	1			1.0	0.9			1	34	20 A	12	RECEPTACLES - OFFICES 102F & 103F
MICROWAVE - BREAK 123I	12	20 A	35	1					1.0	1.4	1	36	20 A	12	RECEPTACLES - OFFICES 126A & 126C
REFRIGERATOR - BREAK 123I (NOTE 7)	12	20 A	37	1	1.2	1.3					1	38	20 A	12	RECEPTACLES - OFFICES 101C & 103B
REFRIGERATOR - BREAK 130A (NOTE 7)	12	20 A	39	1			1.2	0.7			1	40	20 A	12	RECEPTACLES - OFFICES 105D
REFRIGERATOR - BREAK 130A (NOTE 7)	12	20 A	41	1					1.2	1.1	1	42	20 A	12	RECEPTACLES - OFFICES 125A

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	6.40 kVA	65.00%	4.16 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	30.91 kVA	66.17%	20.46 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	2.56 kVA	100.00%	2.56 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	39.9 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	27.2 kVA	103 A	117 A	115 A
TOTAL AMP. (CONNECTED):	111 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	75 A	129 A	146 A	144 A

PANEL: RDP

VOLTAGE: 208Y/120	MAIN TYPE: MCB	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 800 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		12.4	10.4						2			
PANEL "R1"	**	200 A	3	3			13.9	11.7			3	4	200 A	**	PANEL "R2"
			5						13.6	10.6		6			
			7		6.6	6.2						8			
PANEL "R3"	**	200 A	9	3			7.3	5.4			3	10	200 A	**	PANEL "R4"
			11						7.6	4.5		12			
			13		15.2	9.4						14			
PANEL "R5"	**	200 A	15	3			15.4	9.4			3	16	200 A	**	PANEL "R6"
			17						17.4	8.9		18			
			19		8.4	0.2						20			
PANEL "RM"	**	200 A	21	3			10.9	1.1			3	22	100 A	**	PANEL "GS"
			23						9.0	1.1		24			
			25		0.0	0.0						26			
SPARE	--	100 A	27	3			0.0	0.0			3	28	100 A	--	SPARE
			29						0.0	0.0		30			
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	2.00 kVA	100.00%	2.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	6.66 kVA	100.00%	6.66 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	5.10 kVA	100.00%	5.10 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	10.46 kVA	104.40%	10.92 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	10.32 kVA	65.00%	6.71 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	128.76 kVA	53.88%	69.38 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	0.05 kVA	100.00%	0.05 kVA	
MISC.	53.13 kVA	100.00%	53.13 kVA	
Spare	18.00 kVA	100.00%	18.00 kVA	

TOTAL KVA (CONNECTED):	234.5 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	172.0 kVA	573 A	630 A	611 A
TOTAL AMP. (CONNECTED):	651 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	477 A	716 A	788 A	764 A

SWITCHBOARD: MDP

VOLTAGE: 480Y/277	PHASE: 3	WIRE: 4	MANUFACTURER:
MOUNTING: FLOOR			TYPE:
		MAIN: 1600A MCB	AIC: 65000

MAIN CB NOTES: 100% RATED

MAIN BREAKER SHALL BE PROVIDED WITH ENERGY-REDUCING MAINTENANCE SWITCH WITH LOCAL INDICATOR. NEC 240.87(B)
PROVIDE MAIN BREAKER SHALL BE PROVIDE WITH WITH ADJUSTABLE LSI & GFP TRIP FUNCTIONS.

CKT/ID	LOAD SERVED	FRAME	TRIP	POLE	FEEDER	NOTES	Load
1	PANEL "L1"	200 A	200 A	3	NOTE 8	NOTE 8	22.52 kVA
2	PANEL "M1"	400 A	400 A	3	NOTE 8	NOTE 8	145.87 kVA
3	PANEL "RDP" (VIA TXR TRANSFORMER)	400 A	350 A	3	NOTE 8	NOTE 8	216.50 kVA
4	PANEL "S1H"	200 A	200 A	3	NOTE 8	NOTE 8	123.83 kVA
5	PANEL "S2H"	400 A	400 A	3	NOTE 8	NOTE 8	179.26 kVA
6	PANEL "LS" (VIA ATS)	100 A	100 A	3	NOTE 8	NOTE 8	18.72 kVA
7	CHILLER #1	250 A	250 A	3	4-250KCMIL,1#4G,2-1/2"C.	4-250KCMIL,1#4G,2-1/2"C.	151.82 kVA
8	CHILLER #2	250 A	250 A	3	4-250KCMIL,1#4G,2-1/2"C.	4-250KCMIL,1#4G,2-1/2"C.	151.82 kVA
9	SPD	30 A	30 A	3	SEE DETAIL #3/E-007	SEE DETAIL #3/E-007	0.00 kVA
10	SPARE	--	200 A	3			0.00 kVA
11	SPARE	--	200 A	3			0.00 kVA
12	SPARE	--	400 A	3			0.00 kVA
		Total Conn. Load:	1029.99...				
		Total Amps:	1239 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	28.24 kVA	125.00%	35.30 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	2.00 kVA	100.00%	2.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	310.30 kVA	100.00%	310.30 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	48.24 kVA	100.00%	48.24 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	124.45 kVA	103.36%	128.63 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	10.32 kVA	65.00%	6.71 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	152.82 kVA	53.27%	81.41 kVA	7. THIS PANEL SHALL BE U.L. LISTED FOR USE AS S.E. EQUIP.
WATER HEATER	21.35 kVA	100.00%	21.35 kVA	8. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
MISC.	107.05 kVA	100.00%	107.05 kVA	9. PROVIDE WITH TYPE 1 SPD (120kA/MODE, 240kA/PHASE MIN).
Spare	213.00 kVA	100.00%	213.00 kVA	10. PROVIDE CT SHORTING BLOCKS.

TOTAL LOAD PER PHASE (CONNECTED)		
1205 A	1230 A	1215 A
TOTAL LOAD PER PHASE @125% (CONNECTED)		
1507 A	1538 A	1518 A
TOTAL DEMAND:		966.21 kVA
TOTAL DEMAND:		1162 A

PANEL: R2

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
CONTROL POWER - PLUMBING DEVICES	12	20 A	1	1	0.0	0.2					1	2	20 A	12	LIGHTING CONTACTOR LC-1 & LC-2
COUNTER RECEPTACLES - 130A	12	20 A	3	1			0.4	0.5			1	4	20 A	12	FURNITURE - 103G
COUNTER RECEPTACLES - 130A	12	20 A	5	1					0.4	0.5	1	6	20 A	12	FURNITURE - 103G
RECEPTACLES - ZONE 4 130F	12	20 A	7	1	0.5	0.7					1	8	20 A	12	RECEPTACLES - OFFICE 130G
RECEPTACLES - WORKROOM 102A	12	20 A	9	1			0.7	1.0			1	10	20 A	12	VENDING - 124F (NOTE 7)
RECEPTACLES - CORRIDOR 130 & 131	12	20 A	11	1					0.9	0.2	1	12	20 A	12	TIME CLOCK & KEY BOX - CORR. 131
RECEPTACLES - OFFICES 130M & 130P	12	20 A	13	1	1.4	1.0					1	14	20 A	12	RECEPTACLES - ZONE 5 130H
RECEPTACLES - OFFICES 130I & 130K	12	20 A	15	1			1.4	1.0			1	16	20 A	12	RECEPTACLES - ZONE 6 130J
VENDING - 124F (NOTE 7)	12	20 A	17	1					1.0	1.0	1	18	20 A	12	RECEPTACLES - ZONE 5 130H
RECEPTACLES - ZONE 4 130F	12	20 A	19	1	1.0	1.0					1	20	20 A	12	RECEPTACLES - ZONE 5 130H
RECEPTACLES - ZONE 6 130J	12	20 A	21	1			1.0	1.0			1	22	20 A	12	RECEPTACLES - ZONE 4 130F
RECEPTACLES - ZONE 5 130H	12	20 A	23	1					1.0	1.0	1	24	20 A	12	RECEPTACLES - ZONE 4 130F
RECEPTACLES - STEAM TECH 130N	12	20 A	25	1	1.0	1.0					1	26	20 A	12	RECEPTACLES - STEAM TECH 130N
RECEPTACLES - STEAM TECH 130N	12	20 A	27	1			1.0	1.0			1	28	20 A	12	RECEPTACLES - H.V. TECH 130L
RECEPTACLES - FIRE TECH 130Q	12	20 A	29	1					1.0	1.0	1	30	20 A	12	RECEPTACLES - FIRE TECH 130Q
RECEPTACLES - ZONE 6 130J	12	20 A	31	1	1.0	1.0					1	32	20 A	12	RECEPTACLES - H.V. TECH 130L
RECEPTACLES - STEAM TECH 130N	12	20 A	33	1			1.0	1.0			1	34	20 A	12	RECEPTACLES - H.V. TECH 130L
RECEPTACLES - H.V. TECH 130L	12	20 A	35	1					1.0	1.0	1	36	20 A	12	RECEPTACLES - ZONE 6 130J
			37		0.4	0.4						38			
FURNITURE - 103G	12	20 A	39	3			0.4	0.4			3	40	20 A	12	FURNITURE - 103G
			41						0.4	0.4		42			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.72 kVA	80.00%	0.58 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	29.98 kVA	66.68%	19.99 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	2.00 kVA	100.00%	2.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	32.7 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	22.6 kVA	87 A	97 A	88 A
TOTAL AMP. (CONNECTED):	91 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	63 A	109 A	122 A	111 A

PANEL: R3

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
FURNITURE - 123B	12	20 A	1	1	0.0	0.9					1	2	20 A	12	RECEPTACLES - CORRIDOR 125 & 126
FURNITURE - 124G	12	20 A	3	1			0.0	1.0			1	4	20 A	12	DEDICATED RECEPTACLE - TRAIN.122C
RECEPTACLES - COUNTER 101A	12	20 A	5	1					0.5	0.5	1	6	20 A	12	FURNITURE - 101A
RECEPTACLES - LOCKERS 104F, G, & H	12	20 A	7	1	0.9	0.5					1	8	20 A	12	FURNITURE - 103J
DEDICATED RECEPTACLE - TRAIN.122C	12	20 A	9	1			1.0	0.5			1	10	20 A	12	FURNITURE - 103J
RECEPTACLES - EXTERIOR	12	20 A	11	1					1.3	0.5	1	12	20 A	12	REC - 252 & 254 (HAIR DRYERS)
FURNITURE - 105A	12	20 A	13	1	0.7	0.5					1	14	20 A	12	FLOOR BOX & REC. - LOBBY 101
FURNITURE - 123B	12	20 A	15	1			0.7	1.0			1	16	20 A	12	MICROWAVE - BREAK 130A
RECEPTACLES - OFFICE 125H	12	20 A	17	1					0.7	1.0	1	18	20 A	12	MICROWAVE - BREAK 130A
			19		0.0	0.0						20			
FURNITURE - 123B	12	20 A	21	3			0.0	0.0			3	22	20 A	12	FURNITURE - 124G
			23						0.0	0.0		24			
			25		0.4	0.4						26			
FURNITURE - 101A	12	20 A	27	3			0.4	0.4			3	28	20 A	12	FURNITURE - 103J
			29						0.4	0.4		30			
			31		0.4	0.5						32			
FURNITURE - 103J	12	20 A	33	3			0.4	0.5			3	34	20 A	12	FURNITURE - 105A
			35						0.4	0.5		36			
			37		0.5	1.0						38			
FURNITURE - 123B	12	20 A	39	3			0.5	1.0			3	40	50 A	6	EXTERIOR PEDESTAL POWER
			41						0.5	1.0		42			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	2.00 kVA	100.00%	2.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	14.58 kVA	84.29%	12.29 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	5.00 kVA	100.00%	5.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	21.6 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	19.3 kVA	55 A	62 A	65 A
TOTAL AMP. (CONNECTED):	60 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	54 A	69 A	77 A	81 A

PANEL: R4

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLE - FIRE PUMP 133	12	20 A	1	1	0.2	0.4					1	2	20 A	12	FURNITURE - 104C
FURNITURE - 102F	12	20 A	3	1			0.5	0.5			1	4	20 A	12	RECEPTACLES - FILE 102B
RECEPTACLES - TRAINING 123A	12	20 A	5	1					1.1	1.1	1	6	20 A	12	RECEPTACLES - TRAINING 123A
RECEPTACLES - RESTROOM 123E-H	12	20 A	7	1	0.7	2.1					1	8	20 A	12	RECEPTACLES - LOBBY / STOR. 121 &...
RECEPTACLES - EXTERIOR	12	20 A	9	1			0.9	0.7			1	10	20 A	12	TVS - TECH 130N & 130Q
TVS - ZONE 4 & 5 130F & 130H	12	20 A	11	1					0.7	0.5	1	12	20 A	12	TIME CLOCK & KEY BOX - CORR. 105
TVS - TECH 130J & 130L	12	20 A	13	1	0.7	1.1					1	14	20 A	12	RECEPTACLES - BATHROOM 130B, C, & D
RECEPTACLES - OFFICE 101B	12	20 A	15	1			0.7	0.4				16			
			17						0.7	0.4	3	18	20 A	12	FURNITURE 102F
FURNITURE 104B & 104C	12	20 A	19	3	0.7	0.4						20			
			21				0.7	0.9			1	22	20 A	12	RECEPTACLES - CORRIDOR 102 & 103
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	16.10 kVA	81.05%	13.05 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	16.1 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	13.1 kVA	53 A	46 A	38 A
TOTAL AMP. (CONNECTED):	45 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	36 A	66 A	58 A	47 A

PANEL: R5

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLES - CALL CTR 123B	12	20 A	1	1	0.2	0.5					1	2	20 A	12	MOTORIZED DOOR - VESTIBULE 100
RECEPTACLES - CALL CTR 123B	12	20 A	3	1			0.2	0.5			1	4	20 A	12	MOTORIZED DOOR - VESTIBULE 120
IT RECEPTACLE - TELECOM 124E	12	20 A	5	1					0.5	1.1	1	6	20 A	12	FLOOR BOX & RECS - TRAIN 122C
DEDICATED RECEPTACLE - TRAIN.122C	12	20 A	7	1	1.0	1.0					1	8	20 A	12	PROJECTOR & RECS - OPS 125E
RECEPTACLES - CALL CTR 123B	12	20 A	9	1			0.5	0.9			1	10	20 A	12	RECEPTACLES - OPS 125E
RECEPTACLES - BAS 124G	12	20 A	11	1					0.5	2.5	2	12	30 A	10	IT RECEPTACLE - TELECOM 124E
REFRIGERATOR - BREAK 130A (NOTE 7)	12	20 A	13	1	1.2	2.5						14			
FLOOR BOX & RECS - BAS 124G	12	20 A	15	1			1.7	2.5			2	16	30 A	10	IT RECEPTACLE - TELECOM 124E
IT RECEPTACLE - TELECOM 124E	12	20 A	17	1					0.5	2.5		18			
IT RECEPTACLE - TELECOM 124E	12	20 A	19	1	0.5	0.5					1	20	20 A	12	IT RECEPTACLE - TELECOM 124E
RECEPTACLES - BAS 124G	12	20 A	21	1			0.5	0.5			1	22	20 A	12	IT RECEPTACLE - TELECOM 124E
DEDICATED RECEPTACLE - TRAIN.122C	12	20 A	23	1					1.0	1.1	1	24	20 A	12	RECEPTACLES - ELEC & MECH 124D &...
DEDICATED RECEPTACLE - TRAIN.122C	12	20 A	25	1	1.0	1.6					2	26	20 A	12	IT RECEPTACLE - TELECOM 124E
DEDICATED RECEPTACLE - TRAIN.122C	12	20 A	27	1			1.0	1.6				28			
IT RECEPTACLE - TELECOM 124E	12	20 A	29	2					1.6	0.5	1	30	20 A	12	RECEPTACLES - MECHANICAL 134
			31		1.6	1.6					2	32	20 A	12	IT RECEPTACLE - TELECOM 124E
IT RECEPTACLE - TELECOM 124E	12	20 A	33	2			1.6	1.6				34			
			35						1.6	1.6	2	36	20 A	12	IT RECEPTACLE - TELECOM 124E
RECEPTACLES - CALL CTR 103G	12	20 A	37	1	0.5	1.6						38			
IT RECEPTACLE - TELECOM 124E	12	20 A	39	2			1.6	0.9			1	40	20 A	12	TV & QUAD REC - CALL CTR 103G
			41						1.6	1.0	1	42	20 A	12	COPIER - CALL CTR 103G

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	1.20 kVA	100.00%	1.20 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	12.06 kVA	91.46%	11.03 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	34.70 kVA	100.00%	34.70 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	48.0 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	46.9 kVA	126 A	129 A	145 A
TOTAL AMP. (CONNECTED):	133 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	130 A	158 A	161 A	182 A

PANEL: R6

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLES - FCAP TECH 125F	12	20 A	1	1	0.4	0.5					1	2	20 A	12	RECEPTACLES - FCAP TECH 125F
RECEPTACLES - FCAP TECH 125F	12	20 A	3	1			0.4	0.7			1	4	20 A	12	RECEPTACLES - MAILROOM 124C
RECEPTACLES - FCAP TECH 125F	12	20 A	5	1					0.5	0.9	1	6	20 A	12	TV & QUAD REC - CALL CTR 103G
TV & REC - PARK. CTRL 103K	12	20 A	7	1	0.9	1.0					1	8	20 A	12	RECEPTACLES QUADS - PARK. CTRL...
FLOOR BOX & RECS - CONF. 126B	12	20 A	9	1			0.5	1.3			1	10	20 A	12	TV & QUAD REC - CALL CTR 103G
EXTERIOR GATE	12	20 A	11	1					1.0	1.2	1	12	20 A	12	RECEPTACLES - MTN. TECH 105A
RECEPTACLES - TRANS. 104E	12	20 A	13	1	1.1	1.2					1	14	20 A	12	RECEPTACLES - MTN. TECH 105A
TV & QUAD REC - CALL CTR 103G	12	20 A	15	1			1.7	0.5			1	16	20 A	12	PLOTTER - WORKROOM 125D
RECEPTACLES QUADS - PARK. CTRL...	12	20 A	17	1					1.5	0.5	1	18	20 A	12	RECEPTACLES QUADS - PARK. CTRL...
PLOTTER - WORKROOM 102A	12	20 A	19	1	0.5	0.7					1	20	20 A	12	RECEPTACLES - WORKROOM 125D
TV'S - CONF. 102C	12	20 A	21	1			0.7	1.0			1	22	20 A	12	RECEPTACLES QUADS - TRANS. 104E
TV'S - CONF. 123D	12	20 A	23	1					0.7	1.0	1	24	20 A	12	RECEPTACLES QUADS - TRANS. 104E
RECEPTACLES QUADS - TRANS. 104E	12	20 A	25	1	1.0	1.2					1	26	20 A	12	UC ICEMAKER - BREAK 130A (NOTE 7)
EXTERIOR GATE	12	20 A	27	1			1.0	1.2			1	28	20 A	12	UC ICEMAKER - BREAK 123I (NOTE 7)
BLUE LIGHT PHONE	12	20 A	29	1					0.8	0.8	1	30	20 A	12	BLUE LIGHT PHONE
BLUE LIGHT PHONE	12	20 A	31	1	0.8	0.0					1	32	20 A	--	SPARE
PLENUM BOX - TRANS. DRIVER 104E	12	20 A	33	1			0.2	0.0			1	34	20 A	--	SPARE
PLENUM BOX - CONF. ROOM 102C	12	20 A	35	1					0.2	0.0	1	36	20 A	--	SPARE
PLENUM BOX - MP CONF. ROOM 123D	12	20 A	37	1	0.2	0.0					1	38	20 A	--	SPARE
PLENUM BOX - TRAINING ROOM 123A	12	20 A	39	1			0.2	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	22.94 kVA	71.79%	16.47 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	4.74 kVA	100.00%	4.74 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	27.7 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	21.2 kVA	79 A	79 A	74 A
TOTAL AMP. (CONNECTED):	77 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	59 A	98 A	99 A	93 A

PANEL: RM

VOLTAGE: 208Y/120	MAIN TYPE: MLO	MFR:
MOUNTING: SURFACE	PHASE: 3	TYPE:
MAIN: 200 A	WIRE: 4	AIC: 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
UH-1	12	20 A	1	1	0.0	0.1					1	2	20 A	12	WATER METER CONNECTION
F-4 & F-5	12	20 A	3	1			0.9	0.9			1	4	20 A	12	F-6 & F-7
WH1 & RCP1	12	15 A	5	1					0.1	0.7	1	6	20 A	12	VAV 1.20 - 1.26
VAV 1.1 - 1.6	12	20 A	7	1	0.6	0.5					1	8	20 A	12	VAV 1.46 - 1.51
ODU-2 / AC-2	10	30 A	9	2			2.2	0.5			1	10	20 A	12	B-2
			11						2.2	0.5	1	12	20 A	12	VAV 1.41 - 1.45
VAV 1.13 & 1.19	12	20 A	13	1	0.7	1.0					1	14	20 A	12	CHILLER#1 CONTROLS
VAV 1.34 - 1.40	12	20 A	15	1			0.7	1.0			1	16	20 A	12	GENERATOR BATTERY CHARGER
GENERATOR BLOCK HEATER	12	20 A	17	2					1.0	0.7	1	18	20 A	12	VAV 1.7 - 1.12 & 1.52
			19		1.0	0.5					1	20	20 A	12	B-1
FCU-8	12	20 A	21	1			1.1	1.1			1	22	20 A	12	FCU-5
GRH-1 & GRH-2 (NOTE 8)	12	20 A	23	1					1.0	1.1	1	24	20 A	12	P-9
VAV 1.27 - 1.33	12	20 A	25	1	0.7	1.0					1	26	20 A	12	CHILLER#2 CONTROLS
WEFS-1	12	20 A	27	1			1.8	0.0			1	28	20 A	--	SPARE
FCU-6	12	20 A	29	1					1.1	0.0	1	30	20 A	--	SPARE
FCU-7	12	20 A	31	1	1.1	1.1					1	32	20 A	12	FCU-4
SOLENOID CONTROL CIRCUIT	12	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	100 A	35	2					0.0	0.0	1	36	20 A	--	SPARE
			37		0.0	0.0					1	38	20 A	--	SPARE
ACCESS CONTROL	12	20 A	39	1			0.5	0.0			1	40	20 A	12	HEAT TAPE - CHILLER #1 (NOTE 7)
ACCESS CONTROL	12	20 A	41	1					0.5	0.0	1	42	20 A	12	HEAT TAPE - CHILLER #1 (NOTE 7)

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	2.00 kVA	100.00%	2.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	4.49 kVA	100.00%	4.49 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	5.10 kVA	100.00%	5.10 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	10.46 kVA	104.40%	10.92 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	2.00 kVA	100.00%	2.00 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.05 kVA	100.00%	0.05 kVA	8. BREAKER CIRCUIT IS FOR BASE BID ONLY.
MISC.	4.12 kVA	100.00%	4.12 kVA	REMOVE IF ALTERNATE IS CHOSEN
Spare	0.00 kVA	0.00%	0.00 kVA	9. IF ALTERNATE IS CHOSEN, REFER TO ALTERNATE "RM" PANEL ON SHEET...
				FOR ADDITIONAL CIRCUITS REQUIRED IN THIS PANEL.

TOTAL KVA (CONNECTED):	28.2 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	28.7 kVA	70 A	91 A	75 A
TOTAL AMP. (CONNECTED):	78 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	80 A	87 A	114 A	94 A

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT:	9202-164730
SCO ID:	16-15656-02B
ITEM: 315	CODE: 41526
DATE:	AUGUST 21, 2017
DRAWN BY:	J. Holcolmb
CHECKED BY:	M. Mazzone

R1	RDP	MDP
R2	R3	R4
R5	R6	RM

PANEL SCHEDULES

E-602

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

C:\Users\bmiller\Documents\16-0265_R16_MEP_BMiller.rvt
8/29/2017 8:46:33 AM

PANEL: L1

VOLTAGE: 480Y/277 **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 35,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
LIGHTING - SITE / PARKING VIA LC-2	12	20 A	1	1	1.2	1.5					1	2	20 A	12	LIGHTING - FO SHOPS
SPARE	--	20 A	3	1			0.0	1.6			1	4	20 A	12	LIGHTING - FO SHOPS
LIGHTING - FO SHOPS	12	20 A	5	1					1.4	2.7	1	6	20 A	12	LIGHTING - PATS/FO
LIGHTING - PATS/FO	12	20 A	7	1	2.1	2.9					1	8	20 A	12	LIGHTING - PATS/FO
LIGHTING - PATS/FO	12	20 A	9	1			2.3	2.4			1	10	20 A	12	LIGHTING - PATS/FO
LIGHTING - SITE / PARKING VIA LC-2	12	20 A	11	1					1.9	2.6	1	12	20 A	12	LIGHTING - PATS/FO
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	22.52 kVA	125.00%	28.15 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	22.5 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	28.1 kVA	29 A	23 A	32 A
TOTAL AMP. (CONNECTED):	27 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	34 A	36 A	28 A	40 A

PANEL: M1

VOLTAGE: 480Y/277 **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 400 A **WIRE:** 4 **AIC:** 35,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		23.0	0.5						2			
PANEL "M2"	**	200 A	3	3			27.1	0.5			3	4	20 A	12	F-3
			5						27.9	0.5		6			
			7		0.0	3.7						8			
SPARE	--	20 A	9	3			0.0	3.7			3	10	20 A	12	RAF-1
			11						0.0	3.7		12			
			13		4.0	0.0						14			
BP1	10	30 A	15	3			4.0	0.0			3	16	20 A	--	SPARE
			17						4.0	0.0		18			
			19		7.2	7.2						20			
AHU-1	6	50 A	21	3			7.2	7.2			3	22	50 A	6	AHU-1
			23						7.2	7.2		24			
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	43.14 kVA	100.00%	43.14 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	81.43 kVA	103.72%	84.46 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	21.30 kVA	100.00%	21.30 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	145.9 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	148.9 kVA	165 A	182 A	185 A
TOTAL AMP. (CONNECTED):	175 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	179 A	206 A	227 A	231 A

PANEL: M2

VOLTAGE: 480Y/277 **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 35,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
SPARE	--	20 A	1	1	0.0	0.0					1	2	20 A	--	SPARE
WH3	12	20 A	3	1			4.1	4.1			1	4	20 A	12	WH3
WH2	12	50 A	5	1					9.0	0.7		6			
WH3	12	20 A	7	1	4.1	0.7					3	8	20 A	12	P-5
			9				0.7	0.7				10			
P-6	12	20 A	11	3					0.7	2.0		12			
			13		0.7	2.0					3	14	20 A	12	P-1
			15				2.0	2.0				16			
P-2	12	20 A	17	3					2.0	2.0		18			
			19		2.0	2.0					3	20	20 A	12	P-7
			21				2.0	2.0				22			
P-8	12	20 A	23	3					2.0	3.7		24			
			25		2.0	3.7					3	26	25 A	10	P-3
			27				3.7	3.7				28			
P-4	10	25 A	29	3					3.7	2.0		30			
			31		3.7	2.0					3	32	20 A	12	JOCKEY PUMP
SPARE	--	20 A	33	1			0.0	2.0				34			
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	56.74 kVA	104.91%	59.53 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	
WATER HEATER	21.30 kVA	100.00%	21.30 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	78.0 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	80.8 kVA	83 A	100 A	103 A
TOTAL AMP. (CONNECTED):	94 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	97 A	104 A	125 A	129 A

PANEL: S1H

VOLTAGE: 480Y/277 **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 35,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
SPARE	--	20 A	1	1	0.0	0.0					2	2	50 A	--	FUTURE WELDER (NOTE 8)
SPARE	--	20 A	3	1			0.0	0.0				4			
SPARE	--	20 A	5	1					0.0	0.0	1	6	20 A	--	SPARE
SPARE	--	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
			37		3.0	40.0						38			
PANEL "S1R" (VIA TXS1)	**	125 A	39	3			0.8	40.0			3	40	0 A	--	FUTURE LOAD
			41						0.0	40.0		42			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	3.83 kVA	109.79%	4.21 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	8. PROVIDE BREAKER WITH CT AND RELAY FOR CONTROL OF EXHAUST FAN
MISC.	0.00 kVA	0.00%	0.00 kVA	COORDINATE WIHT MECHANICAL FOR MORE INFORMATION.
Spare	120.00 kVA	100.00%	120.00 kVA	

TOTAL KVA (CONNECTED):	123.8 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	124.2 kVA	156 A	148 A	144 A
TOTAL AMP. (CONNECTED):	149 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	149 A	195 A	185 A	181 A

PANEL: S1R

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 250 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		1.5	1.5					1	2	20 A	12	GARAGE DOOR - 131C
PANEL "S1RA"	**	200 A	3	3			0.0	0.8			1	4	20 A		MISC.
			5						0.0	0.0	1	6	20 A	--	SPARE
SPARE	--	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	3.83 kVA	109.79%	4.21 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	3.8 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	4.2 kVA	26 A	8 A	0 A
TOTAL AMP. (CONNECTED):	11 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	12 A	33 A	10 A	0 A

PANEL: S1RA

VOLTAGE: 208Y/120 **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
GARAGE DOOR - 132	12	20 A	1	1	1.5	0.0					1	2	20 A	--	SPARE
SPARE	--	20 A	3	1			0.0	0.0			1	4	20 A	--	SPARE
SPARE	--	20 A	5	1					0.0	0.0	1	6	20 A	--	SPARE
SPARE	--	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	1.50 kVA	125.00%	1.88 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	1.5 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	1.9 kVA	13 A	0 A	0 A
TOTAL AMP. (CONNECTED):	4 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	5 A	16 A	0 A	0 A

PANEL: S2H

VOLTAGE: 480Y/277 **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 400 A **WIRE:** 4 **AIC:** 35,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		5.3	2.1					1	2	20 A	12	LIGHTING - FO SHOPS 131A & 131B
MACHINE SHOP - 131B	12	20 A	3	3			5.3	4.0				4			
			5						5.3	4.0	3	6	30 A	10	AIR COMPRESSOR
			7		5.6	4.0						8			
DC-1	8	35 A	9	3			5.6	0.0			1	10	20 A	--	SPARE
			11						5.6	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
			37		19.9	25.0						38			
S2R (VIA TXS2)	**	175 A	39	3			21.5	25.0			3	40	0 A	--	FUTURE LOAD
			41						16.3	25.0		42			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	2.13 kVA	125.00%	2.66 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	28.73 kVA	114.56%	32.91 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	20.83 kVA	74.00%	15.42 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	53.92 kVA	100.00%	53.92 kVA	
Spare	75.00 kVA	100.00%	75.00 kVA	

TOTAL KVA (CONNECTED):	180.6 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	179.9 kVA	227 A	224 A	203 A
TOTAL AMP. (CONNECTED):	217 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	216 A	283 A	281 A	254 A

PANEL: S2R

VOLTAGE: 208Y/120 **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 400 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
GARAGE DOOR - 131B	12	20 A	1	1	0.2	6.8						2			
RECEPTACLES - TOOLRM 131B1	12	20 A	3	1			0.5	7.5			3	4	200 A	**	S2RA
RECEPTACLES - SHOP 131B	12	20 A	5	1					0.7	6.5		6			
RECEPTACLES - TECH 131B2	12	20 A	7	1	1.0	1.1					1	8	20 A	12	RECEPTACLES - OFFICE 131B3
RECEPTACLES - TECH 131B2	12	20 A	9	1			1.0	3.3			1	10	20 A	12	RENO SHOP MACHINE - 131B
CEILING CORD REEL - SHOP 131B	12	20 A	11	1					1.0	1.5	1	12	20 A	12	RECEPTACLES - TECH 131B2
RENO SHOP MACHINE - 131B	8	40 A	13	2	3.1	0.4					1	14	20 A	12	RECEPTACLES - TOOL ROOM 131B1
			15				3.1	0.4			1	16	20 A	12	RECEPTACLES - TOOL ROOM 131B1
RENO SHOP MACHINE - 131B	12	20 A	17	2					1.7	0.4	1	18	20 A	12	RECEPTACLES - TOOL ROOM 131B1
			19		1.7	1.0					1	20	20 A	12	DEDICATED RECEPTACLE - SHOP 131B
DEDICATED RECEPTACLE - SHOP 131B	12	20 A	21	1			1.0	1.0			1	22	20 A	12	CEILING CORD REEL - SHOP 131B
DEDICATED RECEPTACLE - SHOP 131B	12	20 A	23	1					1.0	1.0	1	24	20 A	12	CEILING CORD REEL - SHOP 131B
CEILING CORD REEL - SHOP 131B	12	20 A	25	1	1.0	1.7						26			
			27				1.1	1.7			3	28	20 A	12	RENO SHOP MACHINE - 131B
RENO SHOP MACHINE - 131B	12	20 A	29	3					1.1	1.7		30			
			31		1.1	1.0					1	32	20 A	12	TRAFFIC ISLAND - ACCESS CONTROL
SPARE	--	20 A	33	1			0.0	1.0			1	34	20 A	12	TRAFFIC ISLAND - ACCESS CONTROL
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	20.83 kVA	74.00%	15.42 kVA	7. NOT USED
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	8. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
MISC.	37.92 kVA	100.00%	37.92 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	58.8 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	53.3 kVA	171 A	185 A	138 A
TOTAL AMP. (CONNECTED):	163 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	148 A	214 A	231 A	172 A

PANEL: S2RA

VOLTAGE: 208Y/120 **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	1	1	0.5	0.5					1	2	20 A	12	RECEPTACLES - OFFICE 131A1
RECEPTACLES - SHOP 131A	12	20 A	3	1			1.0	1.1			1	4	20 A	12	RECEPTACLES - EXTERIOR
CEILING CORD REEL - SHOP 131A	12	20 A	5	1					0.5	0.7	1	6	20 A	12	RECEPTACLES - SHOP 131A
FLOOR BOX - SHOP 131A	12	20 A	7	1	0.7	0.9					1	8	20 A	12	RECEPTACLES - EXTERIOR
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	9	1			0.2	2.1			2	10	30 A	10	RECEPTACLES DED - SHOP 131A
RECEPTACLES - SHOP 131A	12	20 A	11	1					0.9	2.1		12			
RECEPTACLE - SHOP 131A	12	20 A	13	1	1.5	0.2					1	14	20 A	12	DEDICATED RECEPTACLE - SHOP 131A
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	15	1			0.5	1.0			1	16	20 A	12	PLOTTER - SHOP 131A
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	17	1					0.2	0.5	1	18	20 A	12	DEDICATED RECEPTACLE - SHOP 131A
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	19	1	0.5	1.0					1	20	20 A	12	DEDICATED RECEPTACLE - SHOP 131A
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	21	1			1.0	1.0			1	22	20 A	12	DEDICATED RECEPTACLE - SHOP 131A
RECEPTACLES - KEY SUPV 131A1	12	20 A	23	1					1.0	0.0	1	24	20 A	--	SPARE
DEDICATED RECEPTACLE - SHOP 131A	12	20 A	25	1	1.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	1.0	1	42	20 A	8	MANHOLE SUMP PUMP

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	9.74 kVA	100.00%	9.74 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	11.70 kVA	100.00%	11.70 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	21.4 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	21.4 kVA	57 A	65 A	57 A
TOTAL AMP. (CONNECTED):	60 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	60 A	71 A	81 A	71 A

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

PANEL SCHEDULES

E-603

L1 M1 M2
S1H S1R S1RA
S2H S2R S2RA

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

C:\Users\bmiller\Documents\16-0265_R16_MEP_BMiller.rvt
8/29/2017 8:46:36 AM

PANEL: WHDP

VOLTAGE: 480Y/277 **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 500 A **WIRE:** 4 **AIC:** 32,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		30.3	0.0						2			
PANEL" WHRDP" (VIA TXWH)	**	225 A	3	3			33.1	0.0			3	4	30 A	6	SPD
			5						31.5	0.0		6			
LIGHTING - MECH 157 & STOR 154A &...	12	20 A	7	1	1.9	1.9					1	8	20 A	12	LIGHTING - PARTS CRIB 154
LIGHTING - WAREHOUSE OFFICES	12	20 A	9	1			2.7	1.9			1	10	20 A	12	LIGHTING - STORAGE 156B
LIGHTING - STORAGE 156C	12	20 A	11	1					2.5	1.7	1	12	20 A	12	LIGHTING - STORAGE 156B
			13		2.0	4.0						14			
AHU-2 △1	12	20 A	15	3			2.0	4.0			3	16	25 A	12	AHU-3 △1
			17						2.0	4.0		18			
			19		18.0	2.1					1	20	20 A	12	LIGHTING - STOCK 155B, C, & D
WH4	2	90 A	21	3			18.0	0.0			1	22	20 A	--	SPARE
			23						18.0	0.0	1	24	20 A	--	SPARE
			25		0.0	0.0						26			
SPARE	--	100 A	27	3			0.0	0.0			3	28	100 A	--	SPARE
			29						0.0	0.0		30			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	14.69 kVA	125.00%	18.36 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	1.00 kVA	100.00%	1.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	3.25 kVA	100.00%	3.25 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.80 kVA	100.00%	0.80 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	41.81 kVA	107.24%	44.84 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	1.20 kVA	100.00%	1.20 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	29.27 kVA	67.08%	19.64 kVA	7. THIS PANEL SHALL BE U.L. LISTED FOR USE AS S.E. EQUIP.
WATER HEATER	54.00 kVA	100.00%	54.00 kVA	8. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
MISC.	18.49 kVA	100.00%	18.49 kVA	9. PROVIDE "ALL MODES" SPD (40kA / MODE, 80kA / PHASE).
Spare	75.00 kVA	100.00%	75.00 kVA	

TOTAL KVA (CONNECTED):	239.8 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	236.8 kVA	218 A	223 A	216 A
TOTAL AMP. (CONNECTED):	288 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	285 A	272 A	279 A	270 A

PANEL: WHRDP

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 500 A **WIRE:** 4 **AIC:** 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		5.7	7.6						2			
PANEL "WHR1"	**	200 A	3	3			6.9	8.6			3	4	200 A	**	PANEL "WHR2"
			5						6.4	8.9		6			
			7		10.4	9.0						8			
PANEL "WHR3"	**	200 A	9	3			10.9	9.0			3	10	100 A	**	PANEL "CP1"
			11						10.0	9.0		12			
			13		9.0	0.6						14			
PANEL "CP2"	**	100 A	15	3			9.0	1.4			3	16	100 A	**	PANEL "WR"
			17						9.0	0.6		18			
			19		0.0	0.0						20			
SPARE	--	20 A	21	3			0.0	0.0			3	22	20 A	--	SPARE
			23						0.0	0.0		24			

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	1.00 kVA	100.00%	1.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	3.25 kVA	100.00%	3.25 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.80 kVA	100.00%	0.80 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	23.65 kVA	101.59%	24.03 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	1.20 kVA	100.00%	1.20 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	29.27 kVA	67.08%	19.64 kVA	7. ** - SEE POWER RISER DIAGRAM FOR WIRE SIZE
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	18.49 kVA	100.00%	18.49 kVA	
Spare	75.00 kVA	100.00%	75.00 kVA	

TOTAL KVA (CONNECTED):	152.9 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	143.7 kVA	353 A	383 A	367 A
TOTAL AMP. (CONNECTED):	424 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	399 A	441 A	479 A	459 A

PANEL: GS

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 100 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLES - GAS STORAGE	12	20 A	1	1	0.2	6.0						2			
ODU-3 / AC-3	12	15 A	3	2			1.1	6.0			3	4	20 A	--	FUTURE LOAD
			5						1.1	6.0		6			
LIGHTING - GAS STORAGE	12	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	2.17 kVA	100.00%	2.17 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.18 kVA	100.00%	0.18 kVA	7. PANEL SHALL BE RATED NEMA 3R.
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	18.00 kVA	100.00%	18.00 kVA	

TOTAL KVA (CONNECTED):	20.4 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	20.4 kVA	52 A	60 A	60 A
TOTAL AMP. (CONNECTED):	57 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	57 A	65 A	75 A	75 A

PANEL: WHR1

VOLTAGE: 208Y/120 **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
LIGHTING CONTACTOR LC-3	12	20 A	1	1	0.2	0.5					1	2	20 A	12	FURNITURE - WORKSTATION 153E
FURNITURE - WORKSTATION 153E	12	20 A	3	1			0.4	1.1			1	4	20 A	12	RECEPTACLES STORAGE - 156C
FURNITURE - WORKSTATION 153E	12	20 A	5	1					0.4	0.5	1	6	20 A	12	RECEPTACLES GEN WAREHOUSE - 156B
RECEPTACLES - MECH 157	12	20 A	7	1	0.4	0.9					1	8	20 A	12	RECEPTACLES - MECH 157
RECEPTACLES GEN WAREHOUSE - 154	12	20 A	9	1			1.1	1.1			1	10	20 A	12	RECEPTACLES STORAGE - 156C
RECEPTACLES STORAGE - 156B	12	20 A	11	1					0.7	0.9	1	12	20 A	12	RECEPTACLES STORAGE - 156C
RECEPTACLES SHOWROOM - 153R	12	20 A	13	1	1.1	0.9					1	14	20 A	12	RECEPTACLES GEN WAREHOUSE - 154A
RECEPTACLES WAREHOUSE - 154, 152B	12	20 A	15	1			1.1	0.5			1	16	20 A	12	RCP4
RECEPTACLES STORAGE - 156C	12	20 A	17	1					1.1	1.1	1	18	20 A	12	RECEPTACLES SHOWROOM - 153R
			19		0.2	0.2						20			
FURNITURE - WORKSTATION 153E	12	20 A	21	3			0.2	0.2			3	22	20 A	12	FURNITURE - WORKSTATION 153E
			23						0.2	0.2		24			
			25		0.4	0.9						26			
FURNITURE - WORKSTATION 153E	12	20 A	27	3			0.4	0.9			3	28	20 A	12	SPRINKLER COMPRESSOR (2HP)
			29						0.4	0.9		30			
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	15.84 kVA	81.57%	12.92 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	3.21 kVA	100.00%	3.21 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	19.1 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	16.1 kVA	48 A	59 A	54 A
TOTAL AMP. (CONNECTED):	53 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	45 A	59 A	73 A	68 A

PANEL: WHR2

VOLTAGE: 120/208 Wye **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
IT RECEPTACLE - 157B	12	20 A	1	1	0.5	1.1					1	2	20 A	12	RECEPTACLES - OFFICE 153C & 153F
IT RECEPTACLE - 157B	12	20 A	3	1			0.5	1.2			1	4	20 A	12	EWC - CORR. 151 (NOTE 7)
RECEPTACLES - OFFICE 152D	12	20 A	5	1					0.9	1.1	1	6	20 A	12	RECEPTACLES - OFFICE 152A
IT RECEPTACLE - 157B	12	20 A	7	2	1.6	0.5					1	8	20 A	12	IT RECEPTACLE - 157B
			9				1.6	0.5			1	10	20 A	12	IT RECEPTACLE - 157B
RECEPTACLES CONF/BRKRM 153B	12	20 A	11	1					1.4	0.5	1	12	20 A	12	IT RECEPTACLE - 157B
COUNTER RECEPTACLES - 153B	12	20 A	13	1	0.2	0.7					1	14	20 A	12	RECEPTACLES - OFFICE 153A
MICROWAVE - 153B	12	20 A	15	1			1.0	0.7			1	16	20 A	12	RECEPTACLES - OFFICE 153F
REFRIGERATOR - 153B (NOTE 7)	12	20 A	17	1					1.2	0.7	1	18	20 A	12	RECEPTACLES BATHRM - 151A, 151B
IT RECEPTACLE - 157B	12	20 A	19	2	1.6	0.0					1	20	20 A	--	SPARE
			21				1.6	1.6			2	22	30 A	10	IT RECEPTACLE - 157B
IT RECEPTACLE - 157B	12	20 A	23	2					1.6	1.6		24			
			25		1.6	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	1.20 kVA	100.00%	1.20 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	10.22 kVA	98.92%	10.11 kVA	7. PROVIDE CLASS A GFI (6mA-PERSONNEL) BRKR (250' MAX).
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	13.68 kVA	100.00%	13.68 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	25.1 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	25.0 kVA	64 A	73 A	75 A
TOTAL AMP. (CONNECTED):	70 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	69 A	80 A	91 A	94 A

PANEL: WHR3

VOLTAGE: 120/208 Wye **MAIN TYPE:** MLO **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 200 A **WIRE:** 4 **AIC:** 22,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A (LOAD KVA)		B (LOAD KVA)		C (LOAD KVA)		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
CONTROL POWER - PLUMBING DEVICES	12	20 A	1	1	0.0	0.8					1	2	20 A	12	VAV 2.1 - 2.7
UH-3'S	12	20 A	3	1			0.5	0.6			1	4	20 A	12	UH-2'S
FORKLIFT CHARGER - WAREHOUSE 154	10	30 A	5	1					1.0	0.7	1	6	15 A	12	HVLS-3
F-1	12	20 A	7	1	0.8	0.8					1	8	20 A	12	F-2
GARAGE DOOR WAREHOUSE - 154	12	20 A	9	1			1.5	1.5			1	10	20 A	12	GARAGE DOOR WAREHOUSE - 154
ODI-1 / AC-1	10	25 A	11	2					1.6	1.1	1	12	20 A	12	FCU-3
			13		1.6	0.7					1	14	15 A	12	HVLS-1
HVLS-2	12	15 A	15	1			0.7	1.1			1	16	20 A	12	FCU-2
△1 GARAGE DOOR WAREHOUSE - 154	12	20 A	17	1					1.5	1.5	1	18	20 A	12	GARAGE DOOR WAREHOUSE - 154
FCU-1	12	20 A	19	1	1.1	1.5					1	20	20 A	12	GARAGE DOOR WAREHOUSE - 154
GARAGE DOOR WAREHOUSE - 156B	12	20 A	21	1			1.5	1.5			1	22	20 A	12	GARAGE DOOR WAREHOUSE - 154
GARAGE DOOR WAREHOUSE - 154	12	20 A	23	1					1.5	0.0	1	24	20 A	12	ACCESS CONTROL
GARAGE DOOR WAREHOUSE - 154	12	20 A	25	1	1.5	1.5					1	26	20 A	12	GARAGE DOOR WAREHOUSE - 154
GARAGE DOOR WAREHOUSE - 154	12	20 A	27	1			1.5	0.5			1	28	20 A	12	REC - ELEC 157A
SPARE	--	20 A	29	1					0.0	1.0	1	30	20 A	12	FORKLIFT CHARGER
SPARE	--	20 A	31	1	0.0	0.0					1	32	20 A	--	SPARE
SPARE	--	20 A	33	1			0.0	0.0			1	34	20 A	--	SPARE
SPARE	--	20 A	35	1					0.0	0.0	1	36	20 A	--	SPARE
SPARE	--	20 A	37	1	0.0	0.0					1	38	20 A	--	SPARE
SPARE	--	20 A	39	1			0.0	0.0			1	40	20 A	--	SPARE
SPARE	--	20 A	41	1					0.0	0.0	1	42	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	3.25 kVA	100.00%	3.25 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.80 kVA	100.00%	0.80 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	23.65 kVA	101.59%	24.03 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	2.49 kVA	100.00%	2.49 kVA	
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	1.10 kVA	100.00%	1.10 kVA	
Spare	0.00 kVA	0.00%	0.00 kVA	

TOTAL KVA (CONNECTED):	31.3 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	31.7 kVA	87 A	92 A	83 A
TOTAL AMP. (CONNECTED):	87 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	88 A	109 A	115 A	104 A

PANEL: CP1

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 100 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		9.0	0.0					1	2	20 A	--	SPARE
FUTURE LOAD	--	0 A	3	3			9.0	0.0			1	4	20 A	--	SPARE
			5						9.0	0.0	1	6	20 A	--	SPARE
SPARE	--	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	7. PANEL SHALL BE RATED NEMA 3R.
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	27.00 kVA	100.00%	27.00 kVA	

TOTAL KVA (CONNECTED):	27.0 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	27.0 kVA	75 A	75 A	75 A
TOTAL AMP. (CONNECTED):	75 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	75 A	94 A	94 A	94 A

PANEL: CP2

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 100 A **WIRE:** 4 **AIC:** 10,000 AMPS SYMMETRICAL

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
			1		9.0	0.0					1	2	20 A	--	SPARE
FUTURE LOAD	--	0 A	3	3			9.0	0.0			1	4	20 A	--	SPARE
			5						9.0	0.0	1	6	20 A	--	SPARE
SPARE	--	20 A	7	1	0.0	0.0					1	8	20 A	--	SPARE
SPARE	--	20 A	9	1			0.0	0.0			1	10	20 A	--	SPARE
SPARE	--	20 A	11	1					0.0	0.0	1	12	20 A	--	SPARE
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	0.00 kVA	0.00%	0.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.00 kVA	0.00%	0.00 kVA	7. PANEL SHALL BE RATED NEMA 3R.
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.00 kVA	0.00%	0.00 kVA	
Spare	27.00 kVA	100.00%	27.00 kVA	

TOTAL KVA (CONNECTED):	27.0 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	27.0 kVA	75 A	75 A	75 A
TOTAL AMP. (CONNECTED):	75 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	75 A	94 A	94 A	94 A

PANEL: WR

VOLTAGE: 120/208 Wye **MAIN TYPE:** MCB **MFR:**
MOUNTING: SURFACE **PHASE:** 3 **TYPE:**
MAIN: 100 A **WIRE:** 4 **AIC:** 10,000 AIC

LOAD SERVED	Wire Size	TRIP	CKT NO	POLES	A		B		C		POLES	CKT NO	TRIP	Wire Size	LOAD SERVED
RECEPTACLE - WACH RACK	12	20 A	1	1	0.2	0.2					1	2	20 A	12	RECEPTACLE - WACH RACK
RECEPTACLE - WACH RACK	12	20 A	3	1			0.2	0.2			1	4	20 A	12	RECEPTACLE - WACH RACK
			5						7.0	0.5	1	6	20 A	12	OIL INTERCEPTOR CONTROL PANEL
FUTURE LOAD	--	20 A	7	3	7.0	0.2					1	8	20 A	12	LIGHTING - WASH RACK
			9				7.0	1.0			1	10	20 A	12	HOT BOX
SPARE	--	20 A	11	1					0.0	0.1	1	12	20 A	12	LIGHTING - WASH RACK (NIGHT LIGHTS)
SPARE	--	20 A	13	1	0.0	0.0					1	14	20 A	--	SPARE
SPARE	--	20 A	15	1			0.0	0.0			1	16	20 A	--	SPARE
SPARE	--	20 A	17	1					0.0	0.0	1	18	20 A	--	SPARE
SPARE	--	20 A	19	1	0.0	0.0					1	20	20 A	--	SPARE
SPARE	--	20 A	21	1			0.0	0.0			1	22	20 A	--	SPARE
SPARE	--	20 A	23	1					0.0	0.0	1	24	20 A	--	SPARE
SPARE	--	20 A	25	1	0.0	0.0					1	26	20 A	--	SPARE
SPARE	--	20 A	27	1			0.0	0.0			1	28	20 A	--	SPARE
SPARE	--	20 A	29	1					0.0	0.0	1	30	20 A	--	SPARE

LOAD	Connected Load	Demand Factor	Estimated Demand	NOTES:
LIGHTS	0.00 kVA	0.00%	0.00 kVA	1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
HEATING	1.00 kVA	100.00%	1.00 kVA	2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
COOLING	0.00 kVA	0.00%	0.00 kVA	3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
VENTILATION	0.00 kVA	0.00%	0.00 kVA	4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
MOTORS	0.00 kVA	0.00%	0.00 kVA	5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
KITCHEN	0.00 kVA	0.00%	0.00 kVA	6. PROVIDE METAL DIRECTORY FRAME.
RECEPTACLES	0.72 kVA	100.00%	0.72 kVA	7. PANEL SHALL BE RATED NEMA 4X.
WATER HEATER	0.00 kVA	0.00%	0.00 kVA	
MISC.	0.50 kVA	100.00%	0.50 kVA	
Spare	21.00 kVA	100.00%	21.00 kVA	

TOTAL KVA (CONNECTED):	23.5 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	23.5 kVA	63 A	70 A	63 A
TOTAL AMP. (CONNECTED):	65 A	TOTAL PER PHASE: (CONNECTED @ 125%)		
TOTAL AMP. (DEMAND):	65 A	79 A	87 A	79 A

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
8/28/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017

PROJECT:	9202-164730
SCO ID:	16-15656-02B
ITEM: 315	CODE: 41526
DATE:	AUGUST 21, 2017
DRAWN BY:	J. Holcolmb
CHECKED BY:	M. Mazzone

PANEL SCHEDULES

E-604

WHDP WHRDP GS
WHR1 WHR2 WHR3
CP1 CP2 WR

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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UNC CHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE

PRE-BID MEETING
AUGUST 29, 2017

NewAtlantic
CONTRACTING, INC.

AGENDA

- Introduction of Team
- Project Overview
- Issuance of Construction Documents
- Bid Packages
- Important Preconstruction Dates
- HUB Participation Requirements
- Project Schedule / Milestone Dates
- Questions

INTRODUCTION OF THE TEAM

UNC CHARLOTTE

Brian Kugler – Senior Project Manager
Doug Walters – Construction Manager
Dorothy Vick – HUB Coordinator

CONSTRUCTION MANAGER

Glenn Wise – Preconstruction Director
Grady Dwiggins – Project Engineer
Joe Crompton – Senior Project Manager
Chris Zananiri – Project Director
Steve Tabor – Project Superintendent

DESIGNERS

LS3P – ***Sharon Huot*** AIA, CDT, LEED AP
LS3P – ***Krissy Ferguson*** AIA, CDT, LEED AP
LAND DESIGN – Civil
SKA ENGINEERS – Structural
OPTIMA ENGINEERING – MEPF Engineer
KIMLEY HORN – Road Improvement

PROJECT OVERVIEW

EARLY SITE / STRUCTURAL PHASE

- 13 acres - *Currently underway*
- Site Demolition, Clearing, Grading, Utilities, Asphalt Paving, Curb & Gutter, Site Concrete, Building Concrete, Structural Steel, etc.

BUILDING PHASE

- Site Fencing, Polished Concrete, Masonry, Casework/Countertops, Waterproofing/Air Barriers, Joint Sealants, Roofing, Gutters & Downspouts, Doors/Frames/Hardware, Overhead Doors, Loading Dock Equipment, Storefront, Glass & Glazing, Gypsum Board Assemblies, Acoustical Ceilings, Tile, Carpet, VCT, LVT, Painting, Specialties, Signage, Metal Lockers, Window Treatments, Pre-Engineered Metal Buildings, Fire Protection, Plumbing, HVAC, Test & Balance, Electrical, Security, Fire Alarm, Telecom.

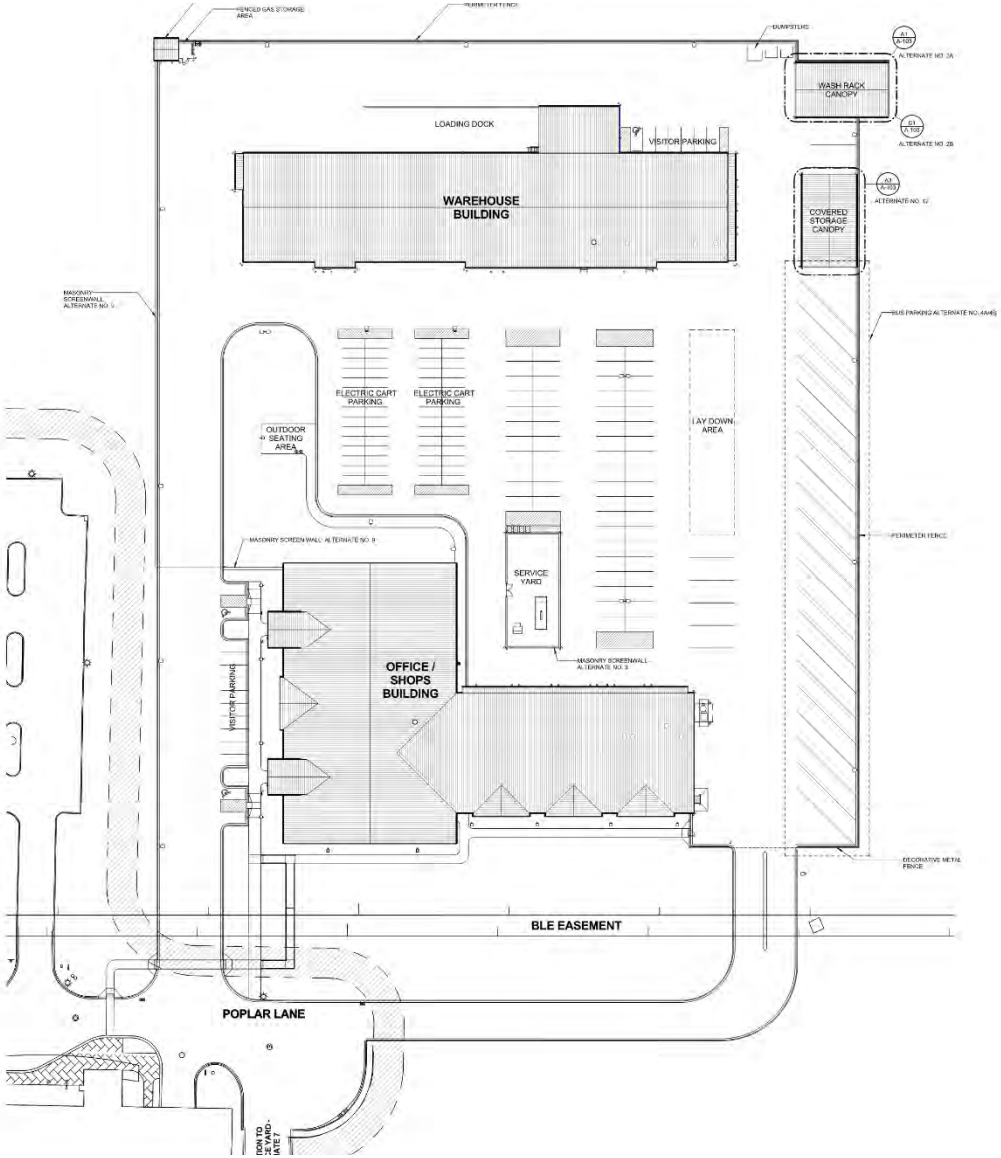
Project Located North of Lot 25, across Poplar Lane from the North Deck

UNC CHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE

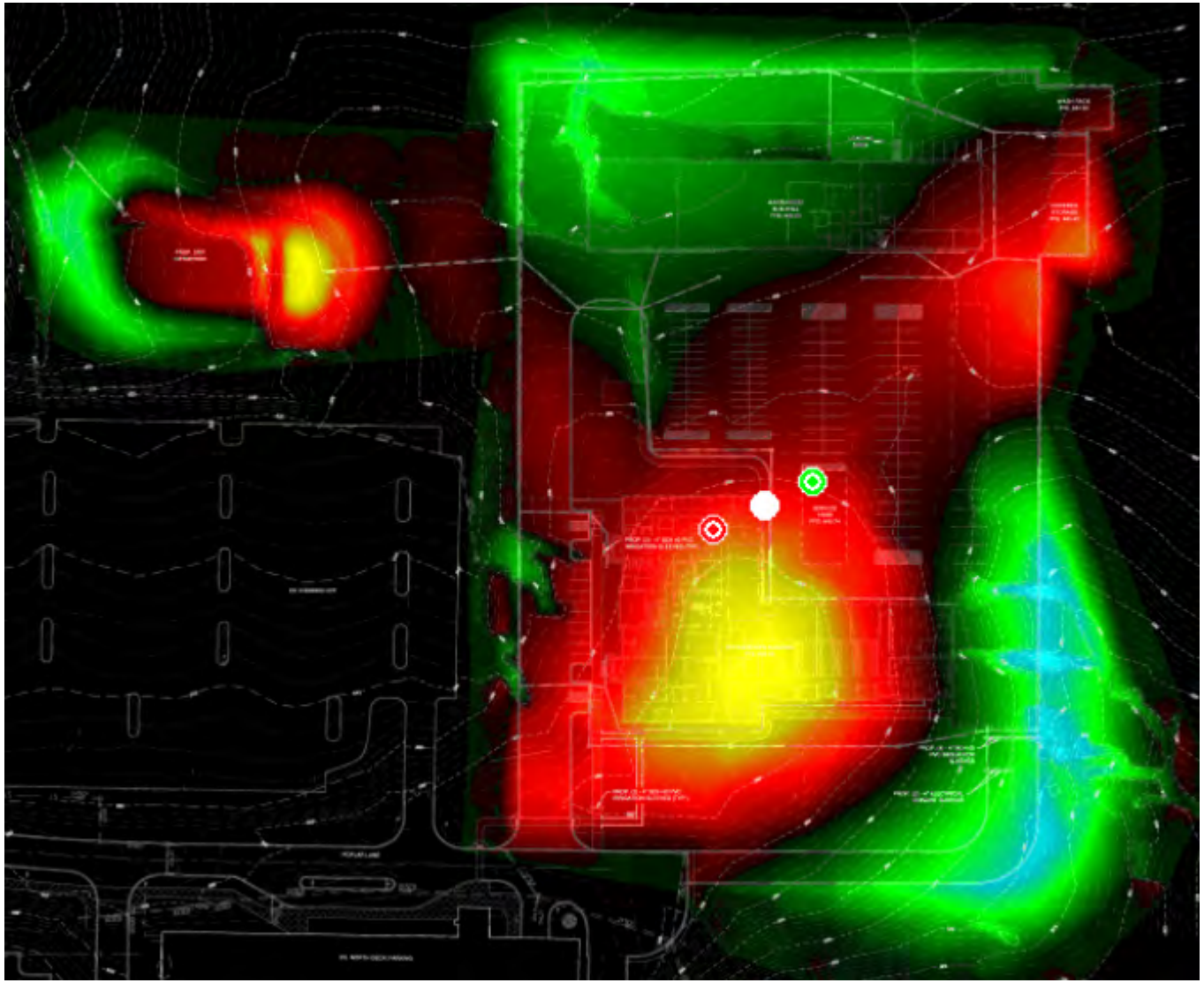
UNCCHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



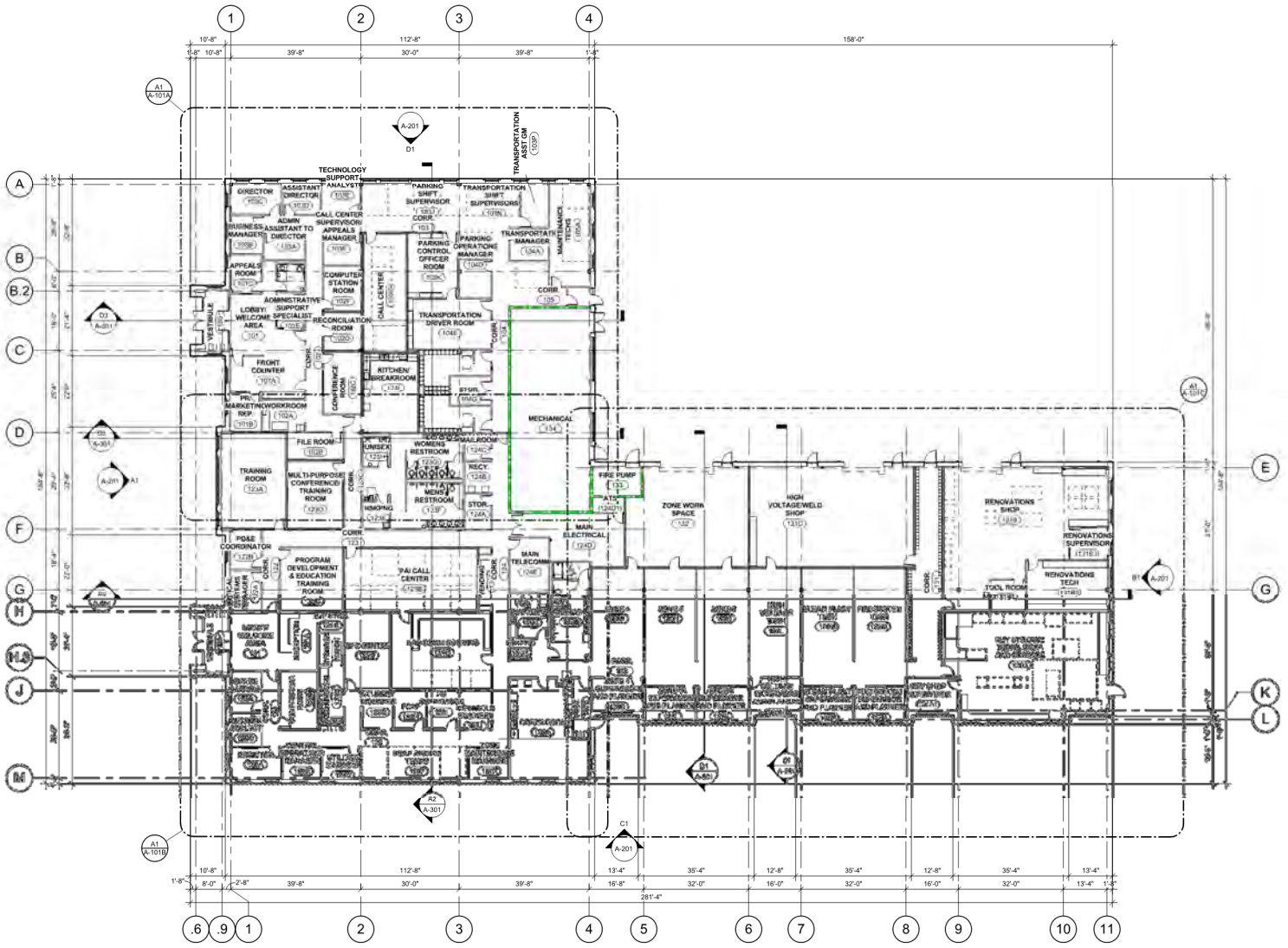
UNCCHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



UNCCHARLOTTE

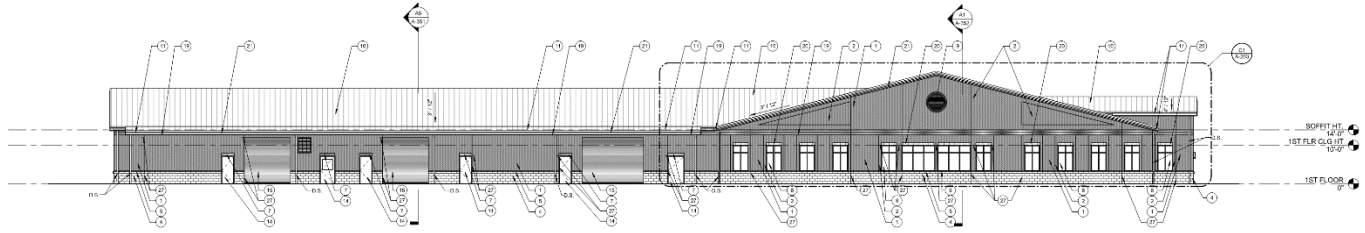
FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



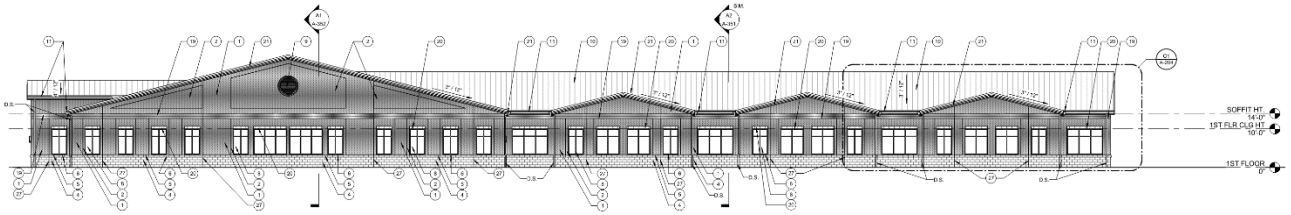
A1 OFFICE/SHOPS BUILDING OVERALL FLOOR PLAN
1/16" = 1'-0"

UNCCHARLOTTE

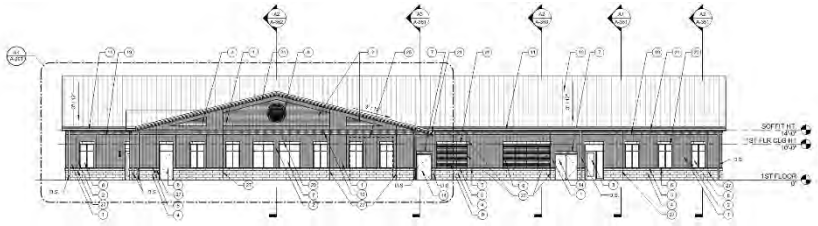
FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



D1 NORTH - OFFICE/SHOPS

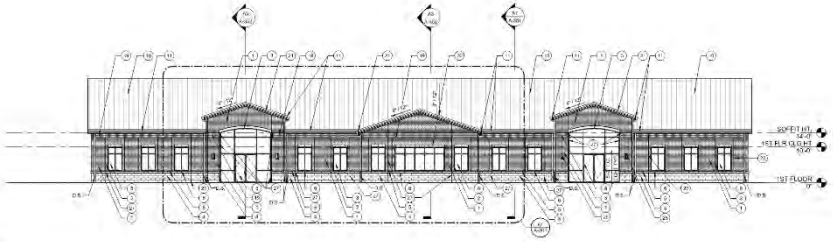


C1 SOUTH - OFFICE/SHOPS



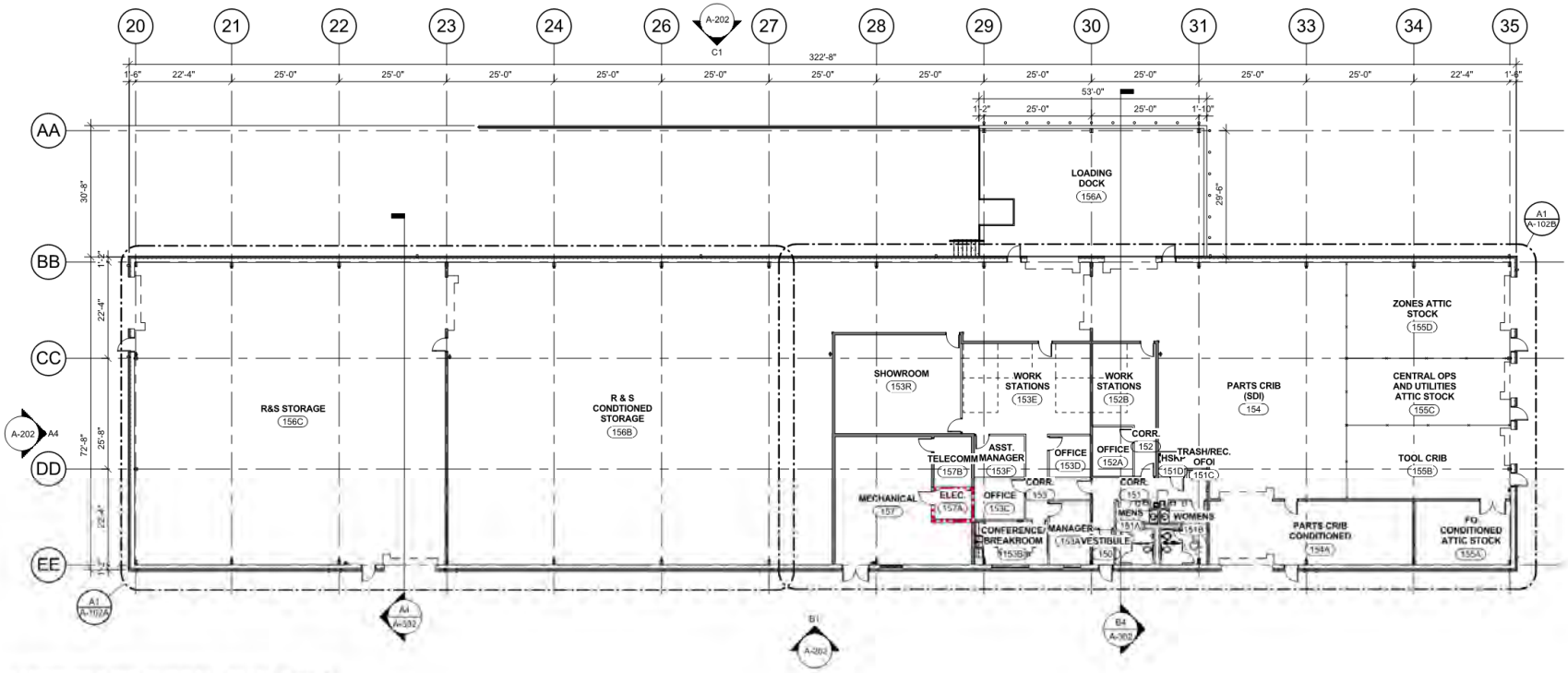
B1 EAST - OFFICE/SHOPS

B4 EAST - PARTIAL ELEV AT DOOR 130EA



A1 WEST - OFFICE/SHOPS

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE

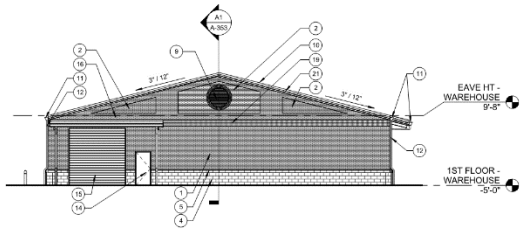


A1 WAREHOUSE OVERALL FLOOR PLAN

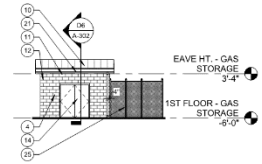
1/16" = 1'-0"

UNCCHARLOTTE

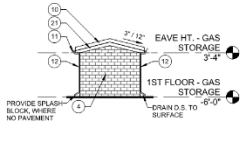
FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



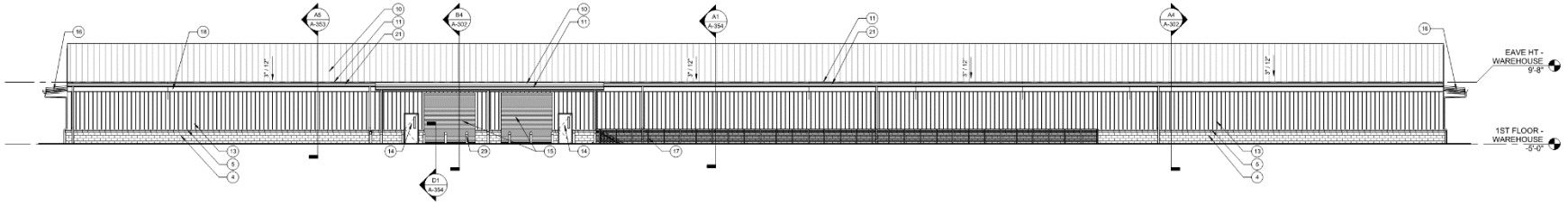
D3 WEST - WAREHOUSE - ALTERNATE NO. 1
3/32" = 1'-0"



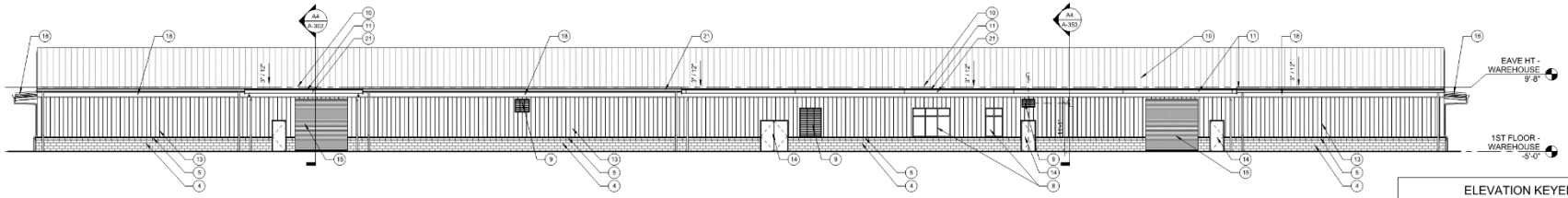
D5 SOUTH - GAS STORAGE
3/32" = 1'-0"



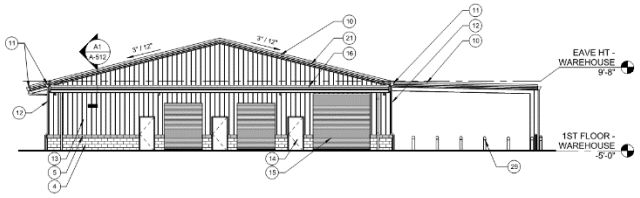
D6 WEST - GAS STORAGE
3/32" = 1'-0"



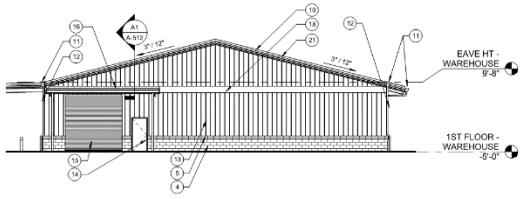
C1 NORTH - WAREHOUSE
3/32" = 1'-0"



B1 SOUTH - WAREHOUSE
3/32" = 1'-0"



A1 EAST - WAREHOUSE
3/32" = 1'-0"

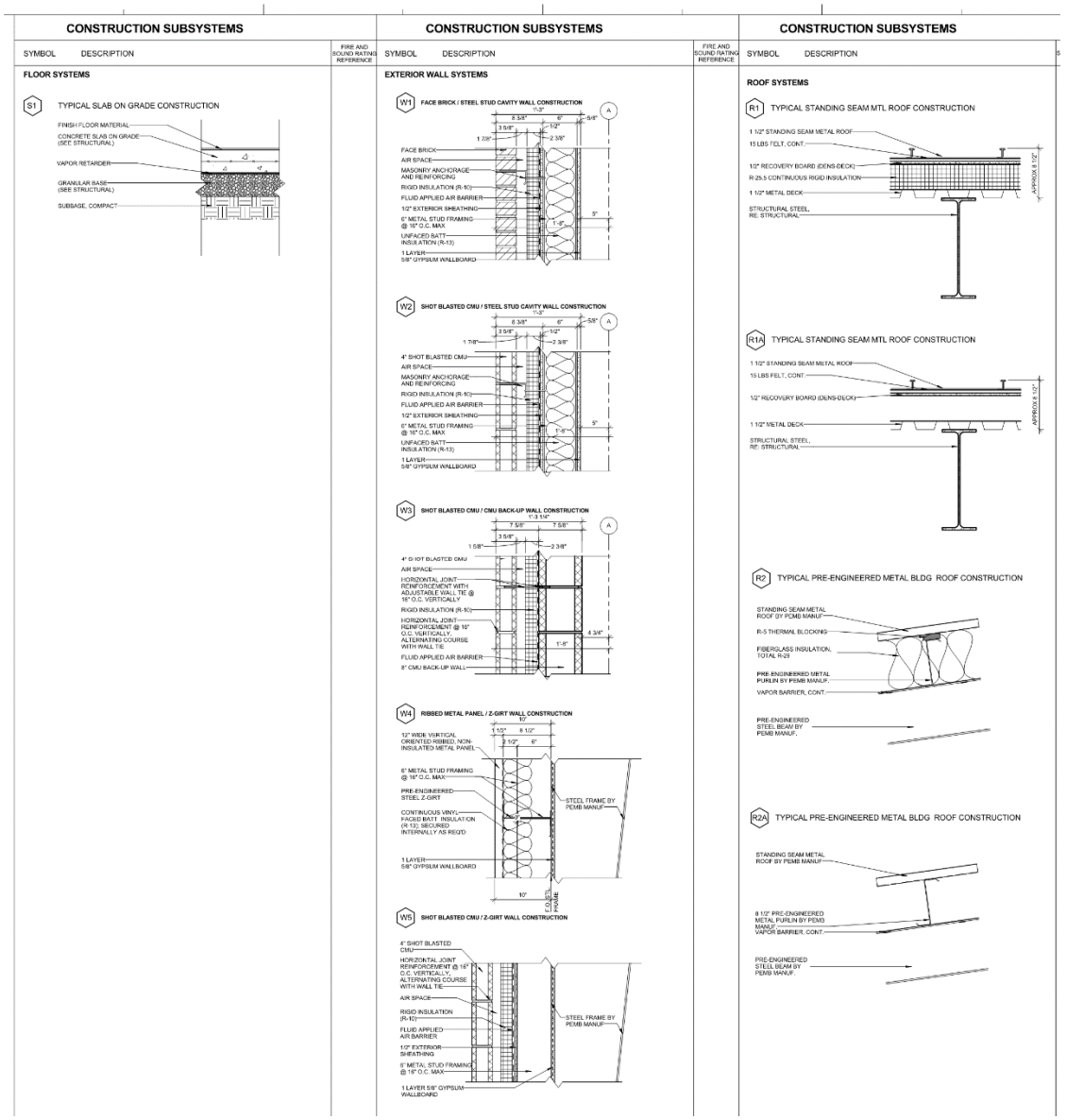


A4 WEST - WAREHOUSE
3/32" = 1'-0"

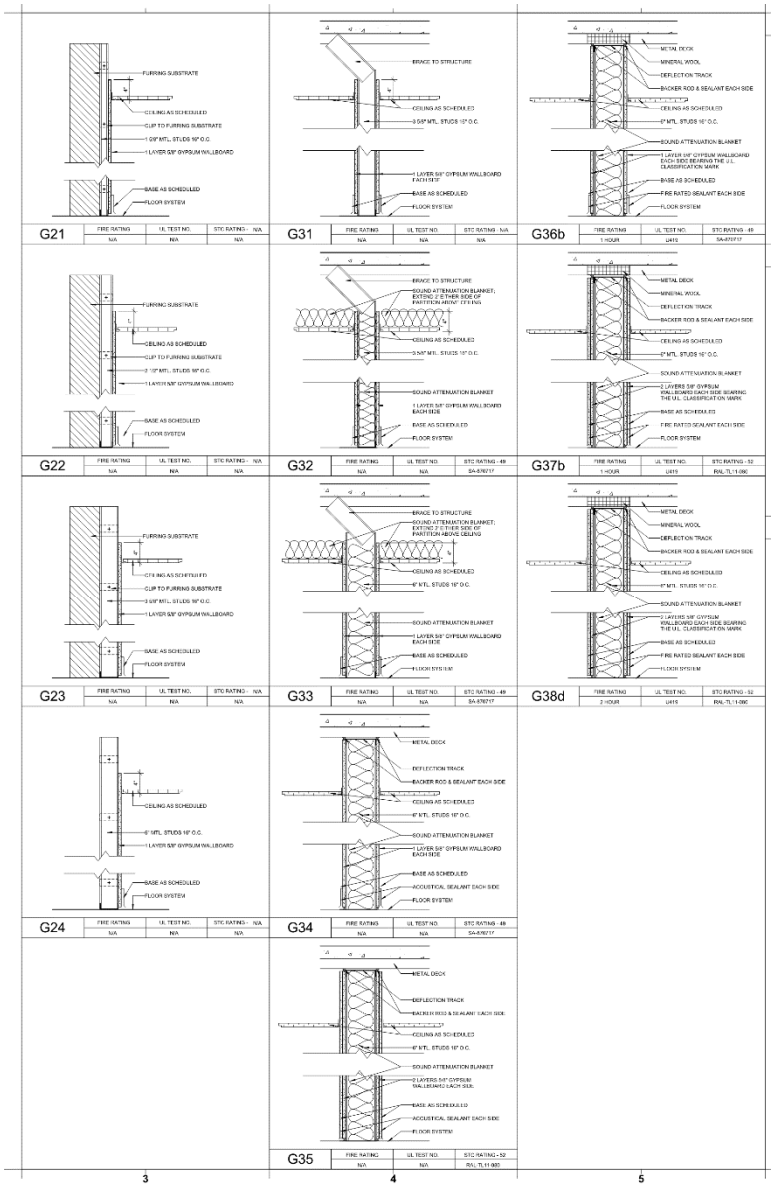
ELEVATION KEYED NOTES

1	FACE BRICK - RUNNING BOND
2	1" RECESSED FACE BRICK - RUNNING BOND
3	CAST STONE LINTEL (FINAL COLOR TO BE APPROVED BY ARCHITECT)
4	SHOTBLASTED CMU - RUNNING BOND
5	SHOTBLASTED CMU WATERTABLE
6	SHOTBLASTED CMU SILL
7	BRICK SOLDIER COURSE HEADER
8	ALUMINUM STOREFRONT
9	ALUMINUM LOUVERS
10	STANDING SEAM METAL ROOF
11	6 1/2" W x 5" H ALUMINUM GUTTER, PREFINISHED
12	2 3/4" x 4 1/4" ALUMINUM DOWNSPOUT, PREFINISHED
13	METAL PANEL (VERTICAL DIRECTION), PREFINISHED
14	INSULATED HM DOOR AND FRAME
15	INSULATED OVERHEAD DOOR
16	PRE-ENGINEERED METAL CANOPY
17	GUARDRAIL, RE: CIVIL
18	METAL PANEL TRIM
19	DOUBLE SOLDIER COURSE FACE BRICK
20	CAST STONE HEADER
21	PREFINISHED ALUM FASCIA AND, VENTED SOFFIT
22	HM DOOR AND FRAME
23	OVERHEAD DOOR
24	PRE-ENGINEERED METAL CANOPY, FASCIA AND TRIM
25	CHAINLINK FENCE, RE: CIVIL
26	DUST COLLECTOR, RE: MECH
27	CONTROL JOINT - REFER TO C5 AND C6 ON A-502
28	EXTERIOR LIGHT - RE ELECTRICAL
29	BOLLARD - RE CIVIL

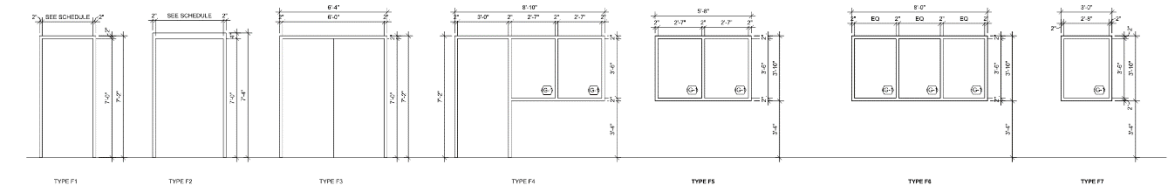
Exterior Walls & Roofing



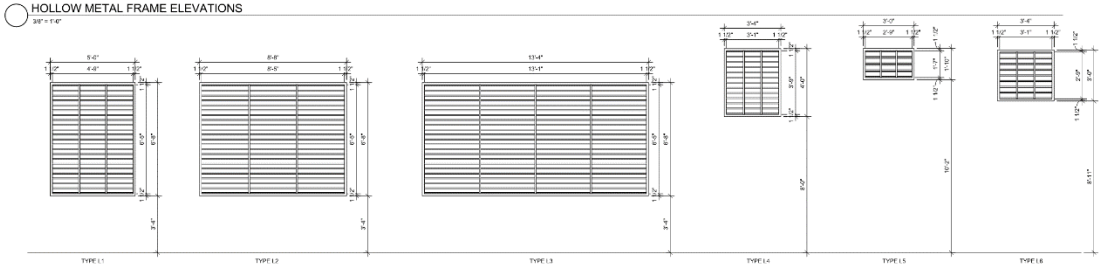
Interior Partitions



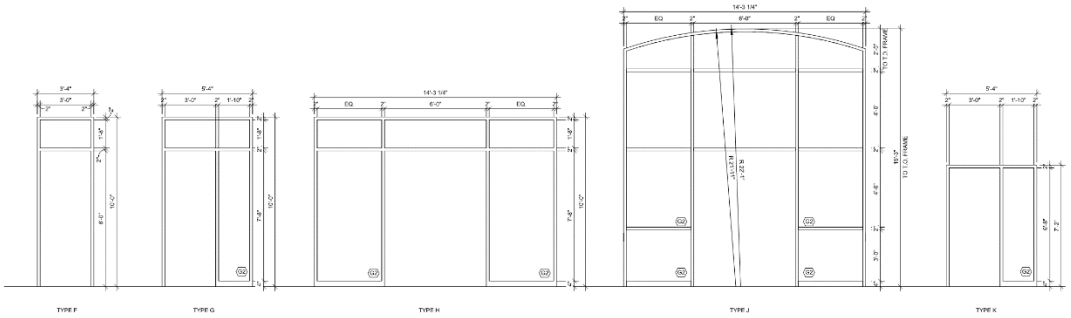
Frames, Storefront, Glass, & Louvers

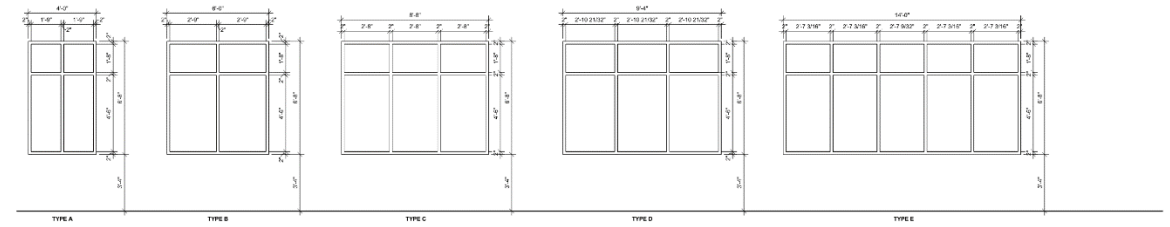


HOLLOW METAL FRAME ELEVATIONS



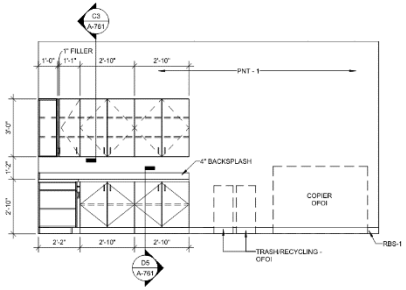
LOUVER ELEVATIONS



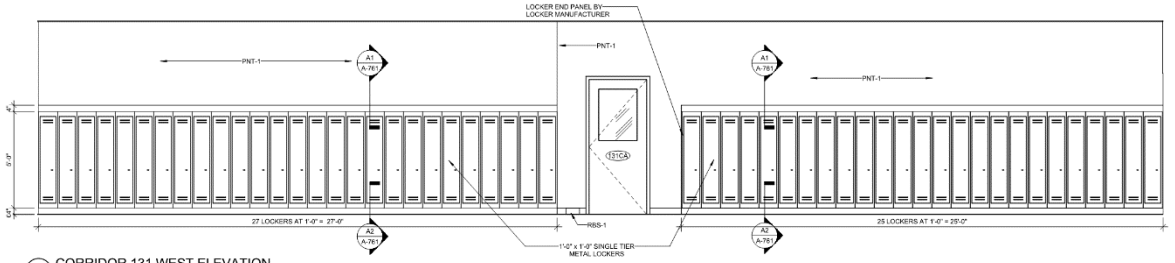


ALUMINUM STOREFRONT ELEVATIONS

Interior Elevations

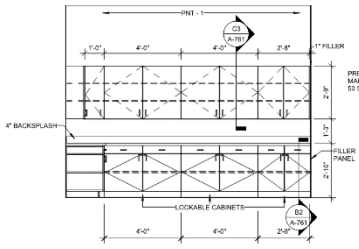


C1 WORKROOM 125D WEST ELEVATION
3/8" = 1'-0"

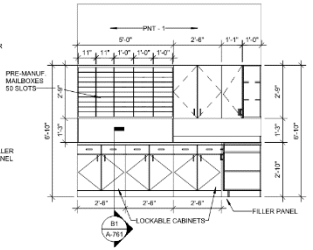


C2 CORRIDOR 131 WEST ELEVATION
3/8" = 1'-0"

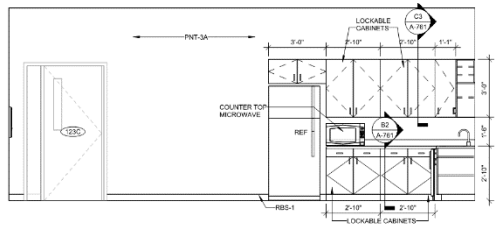
SIM



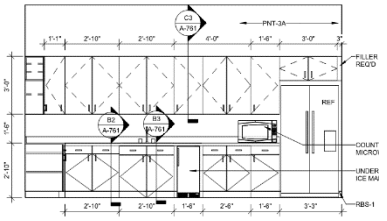
B1 WORKROOM 102A NORTH ELEVATION
3/8" = 1'-0"



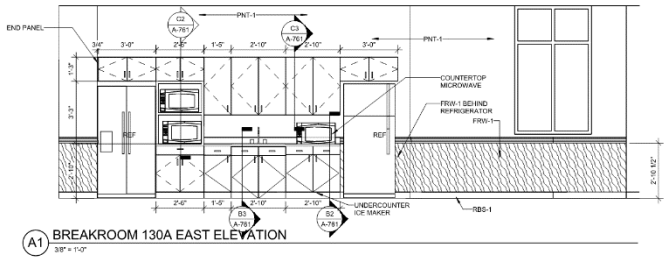
B2 WORKROOM 102A WEST ELEVATION
3/8" = 1'-0"



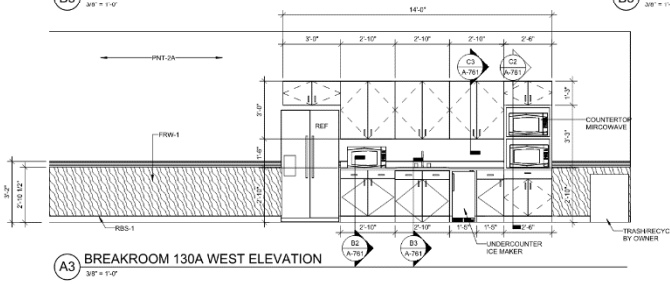
B3 KITCHEN/ BREAKROOM 123I WEST ELEVATION
3/8" = 1'-0"



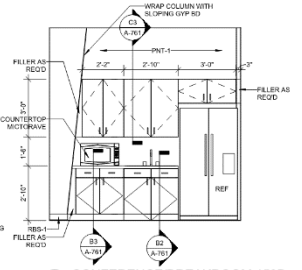
B5 KITCHEN/ BREAKROOM 123I NORTH ELEVATION
3/8" = 1'-0"



A1 BREAKROOM 130A EAST ELEVATION
3/8" = 1'-0"



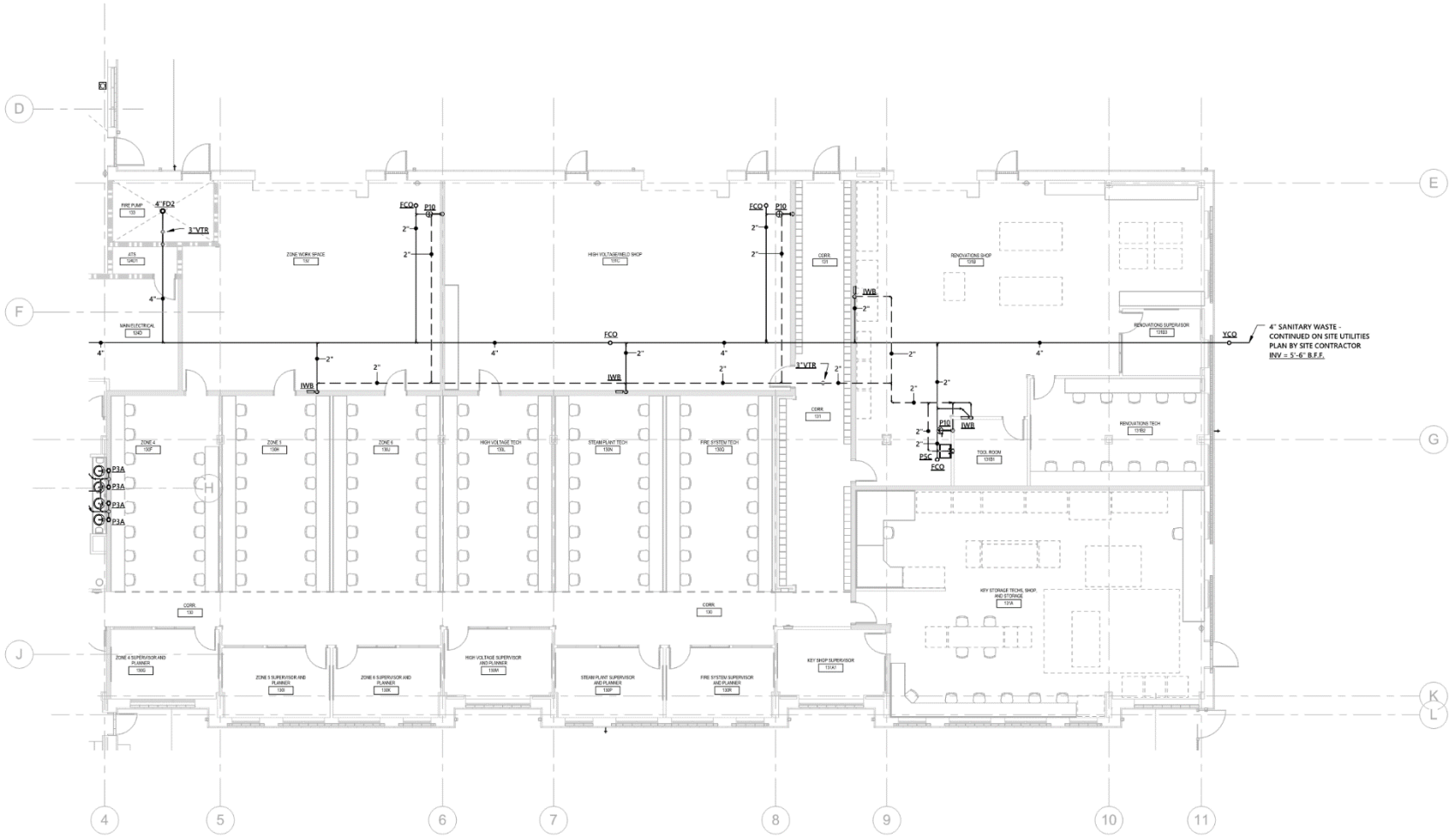
A3 BREAKROOM 130A WEST ELEVATION
3/8" = 1'-0"



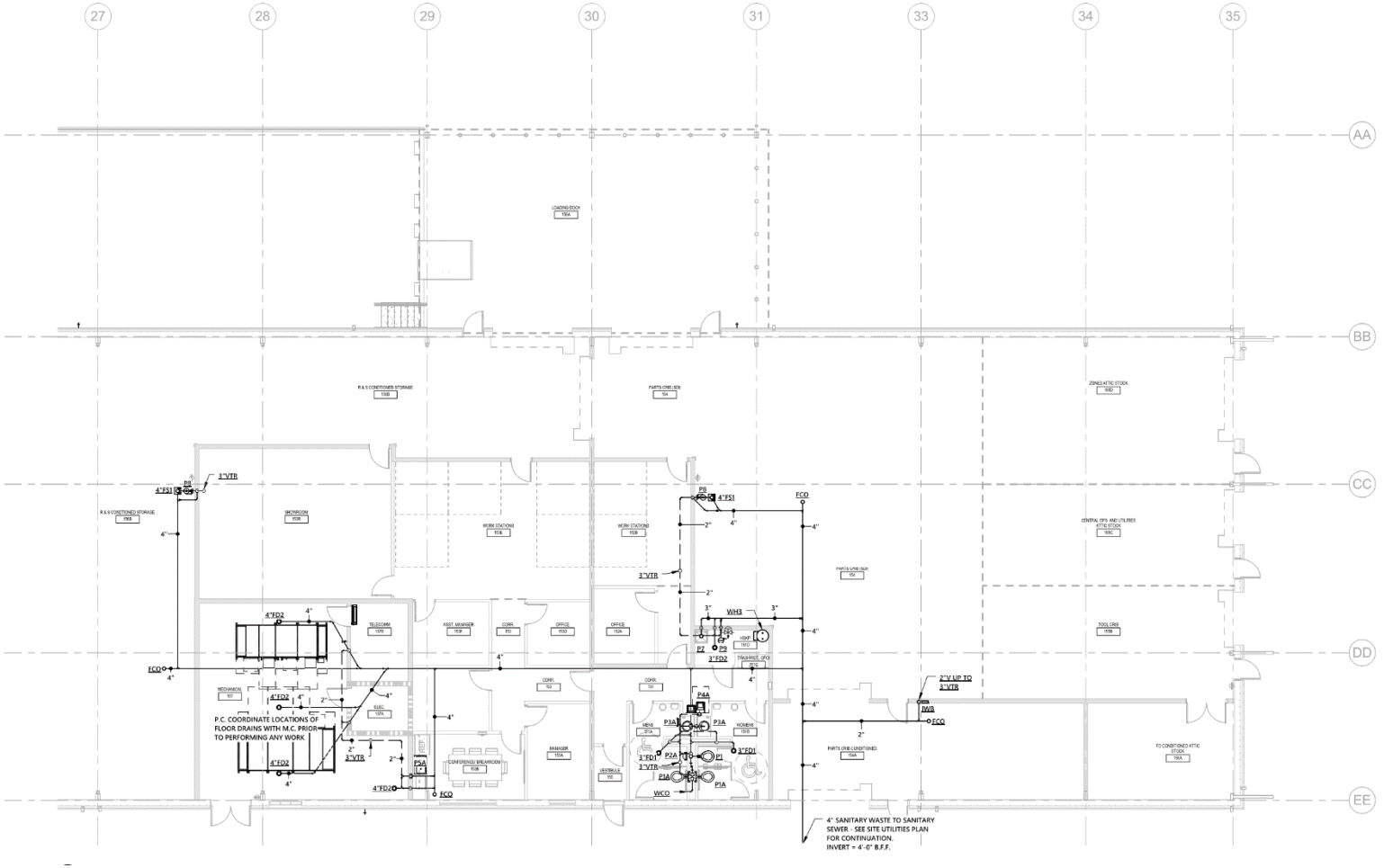
A5 CONFERENCE/BREAKROOM 153B
3/8" = 1'-0"

Plumbing – Office/Shops

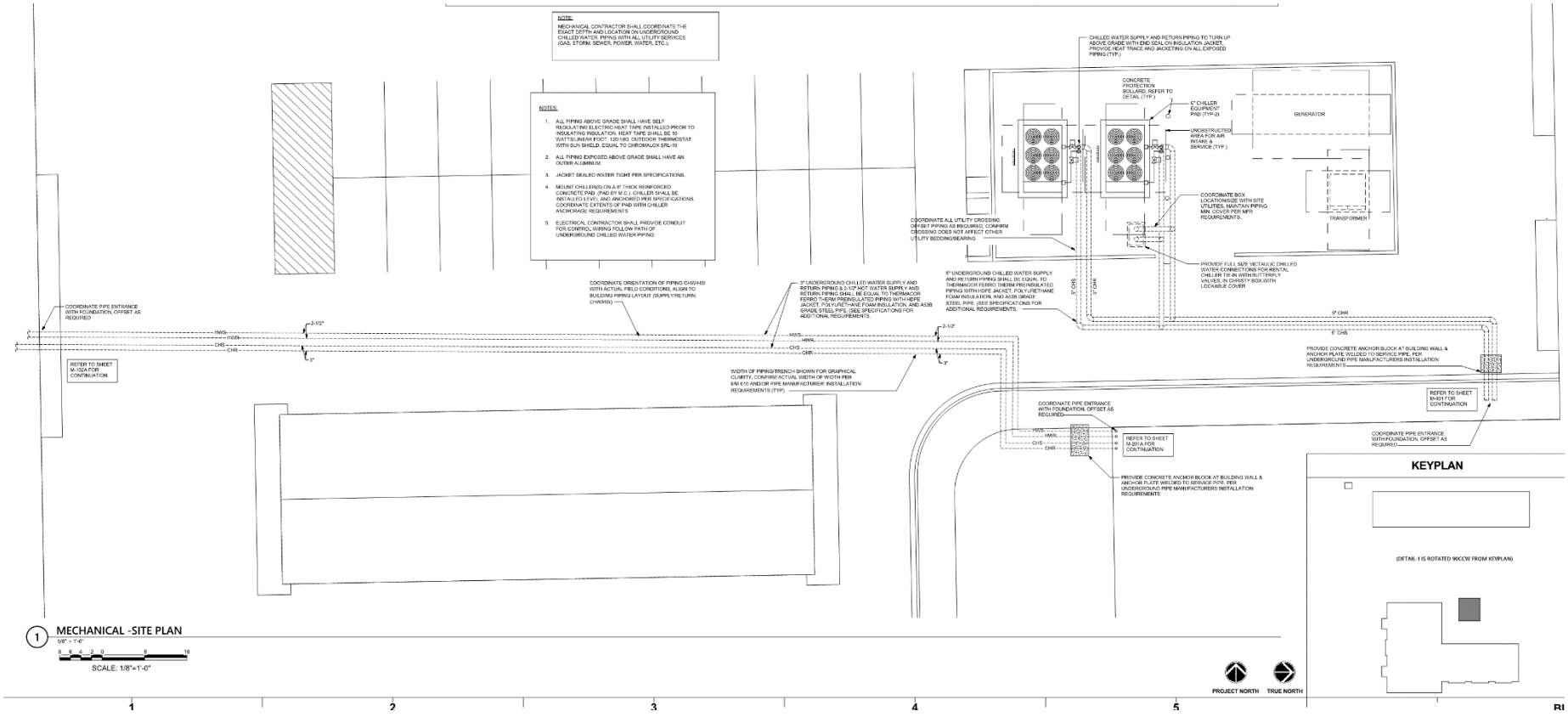
Plumbing – Office/Shops



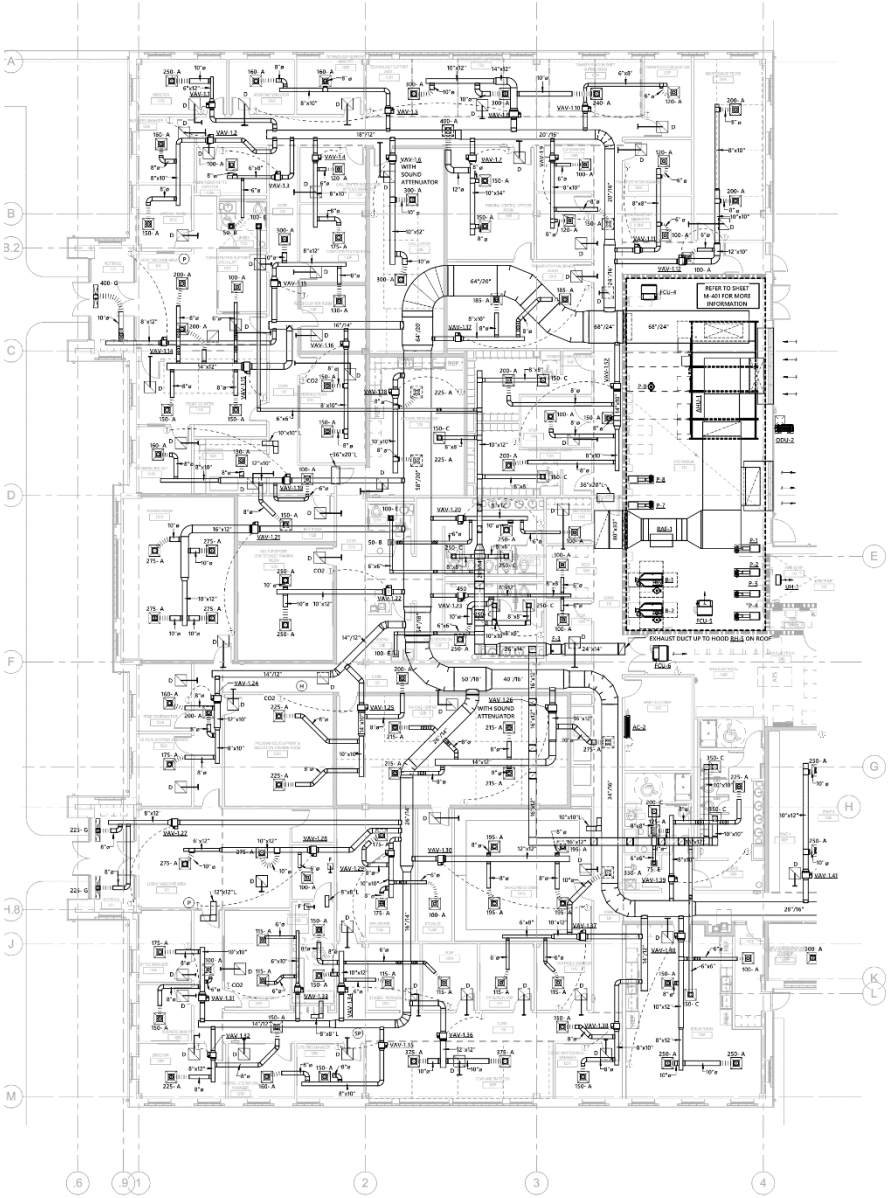
Plumbing - Warehouse



Mechanical – Site

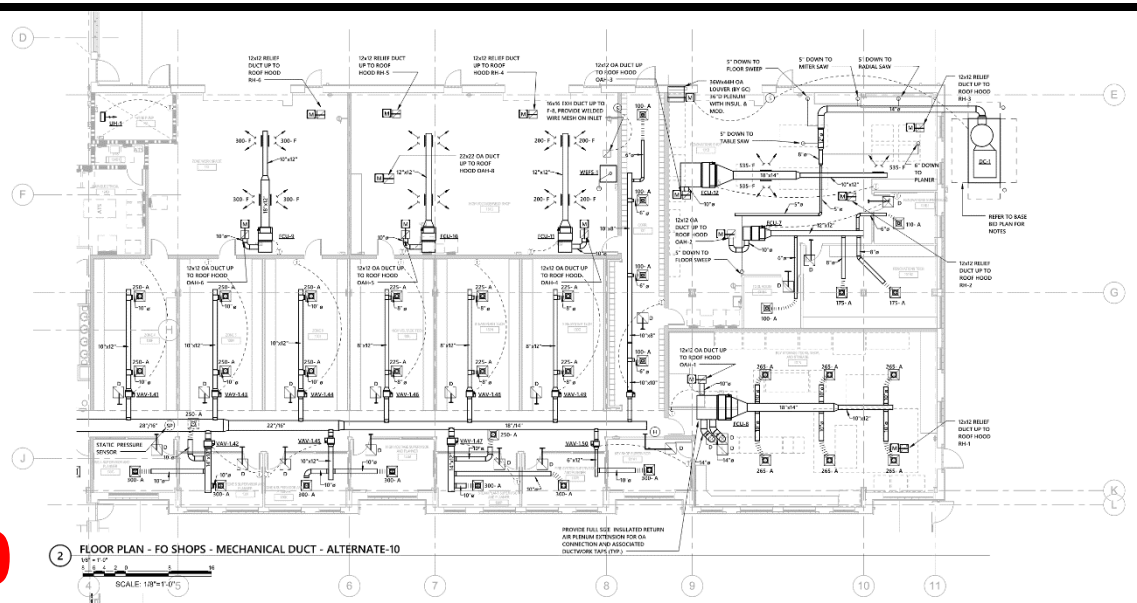


Mechanical – Office/Shops

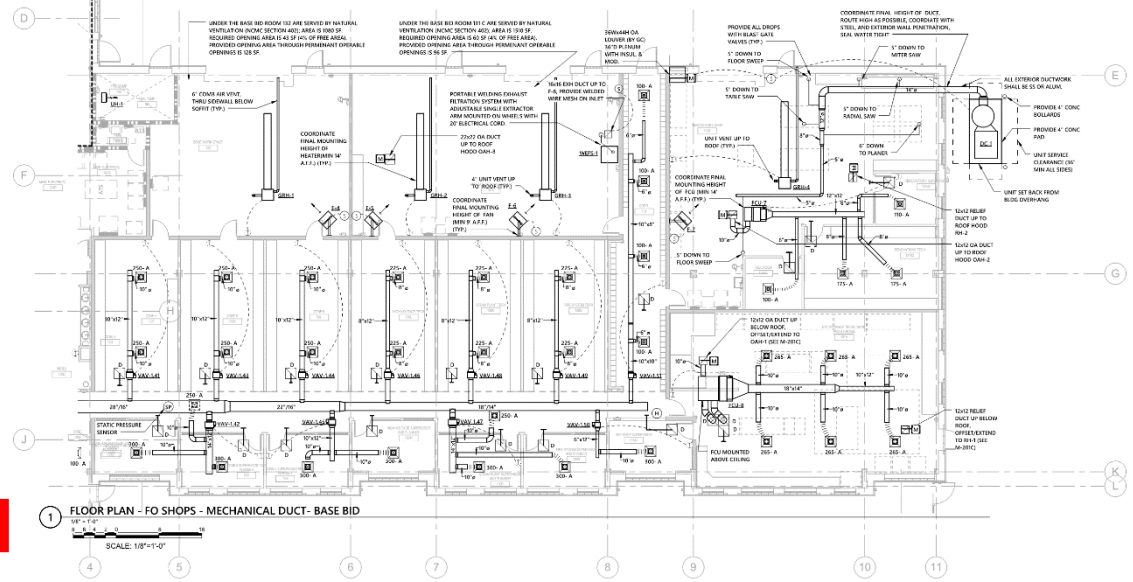


Mechanical – Office/Shops

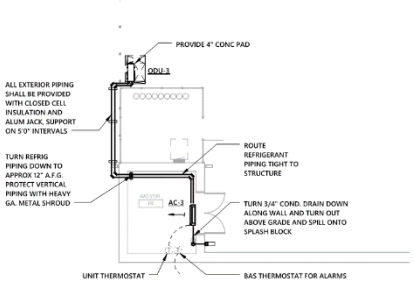
Alternate #10

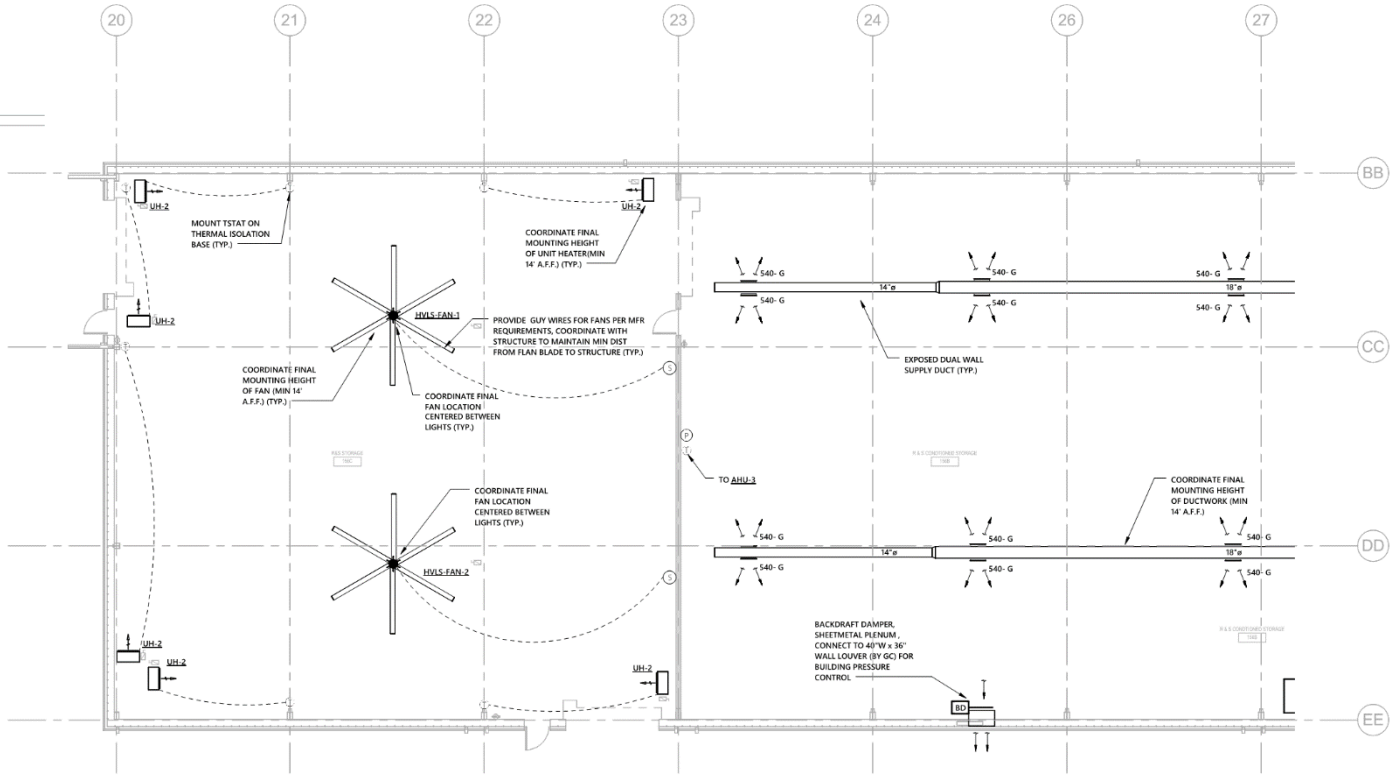


Base Bid



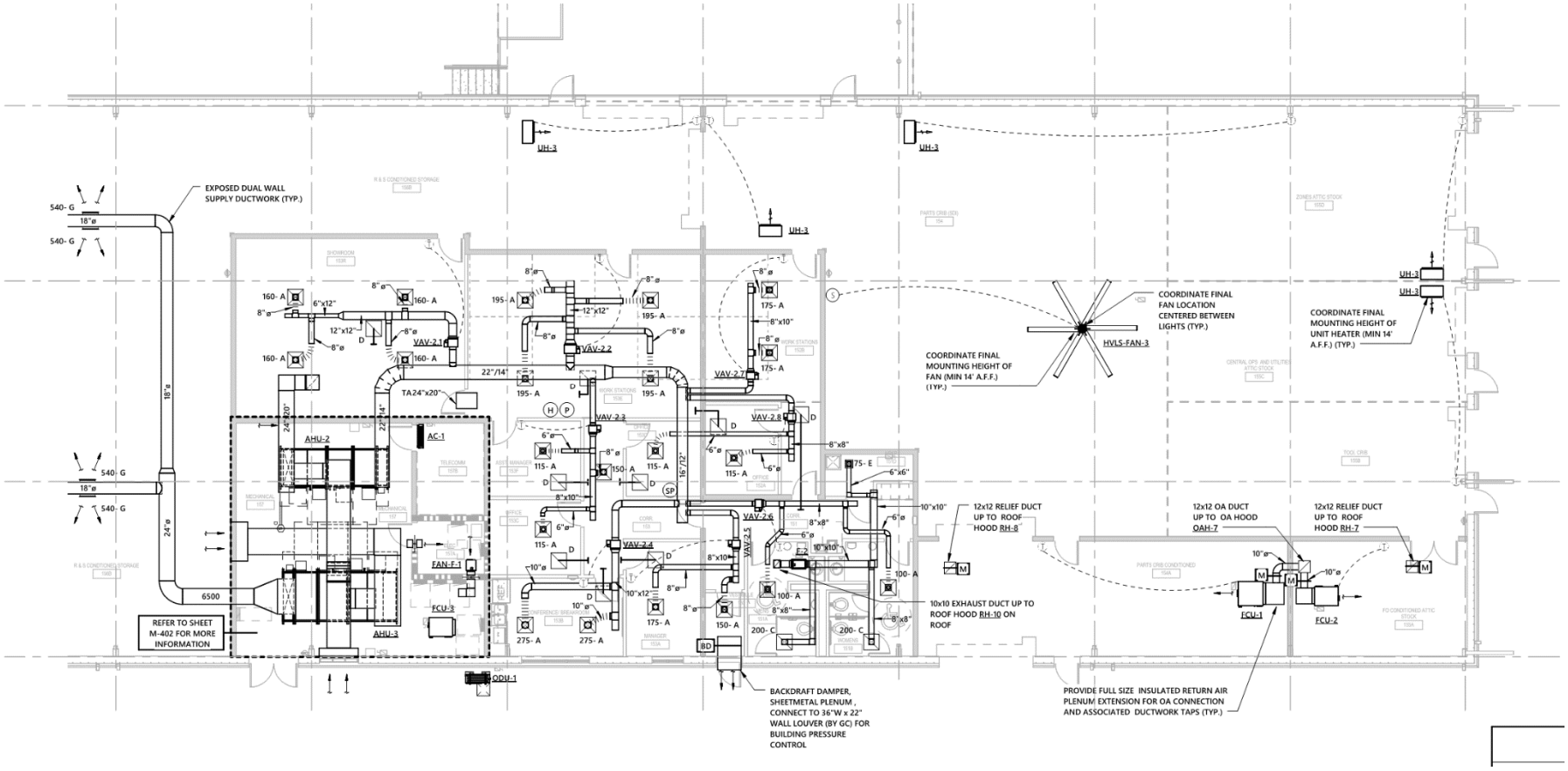
Mechanical - Warehouse



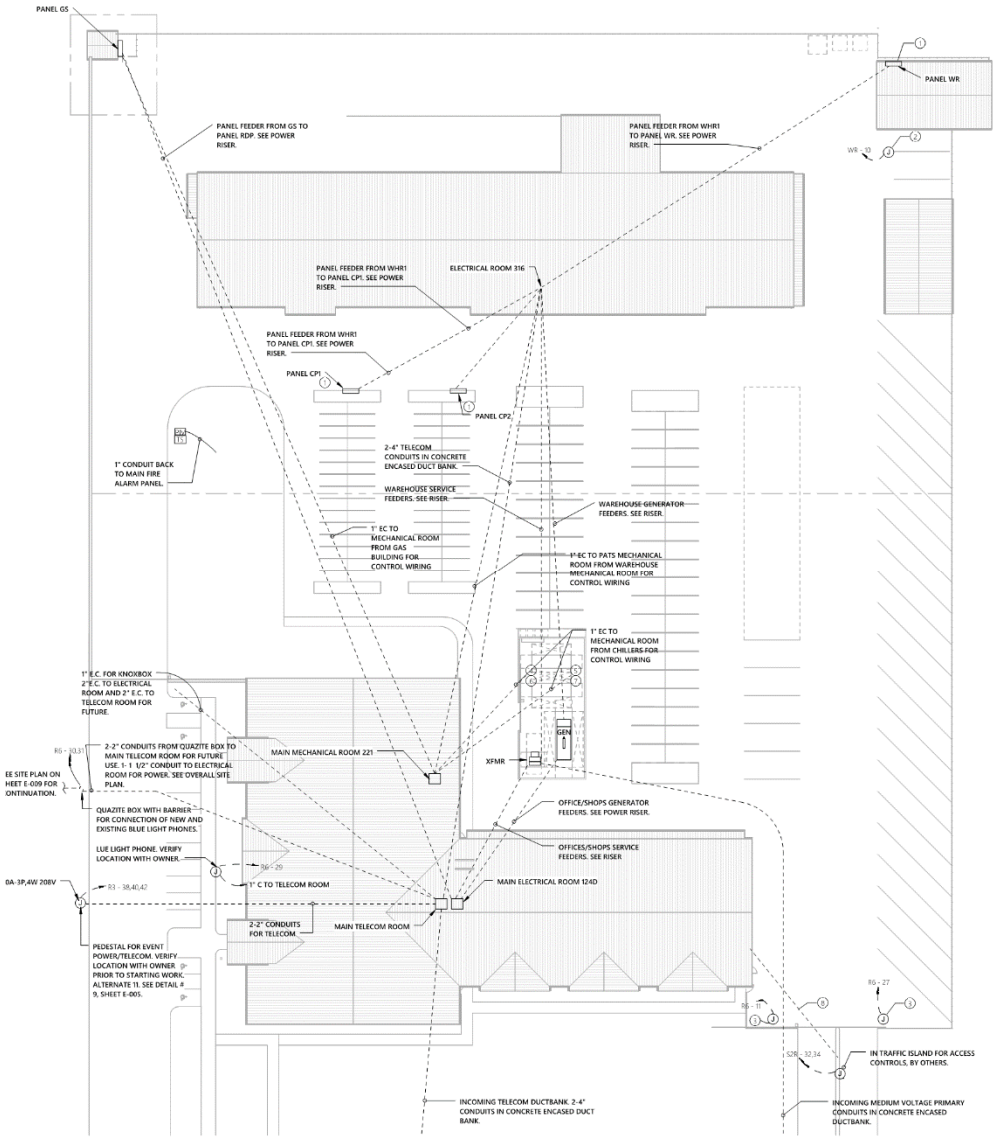


1 FLOOR PLAN - WAREHOUSE - MECHANICAL DUCT - WEST
1/8" = 1'-0"
8 6 4 2 0 8 16
SCALE: 1/8"=1'-0"

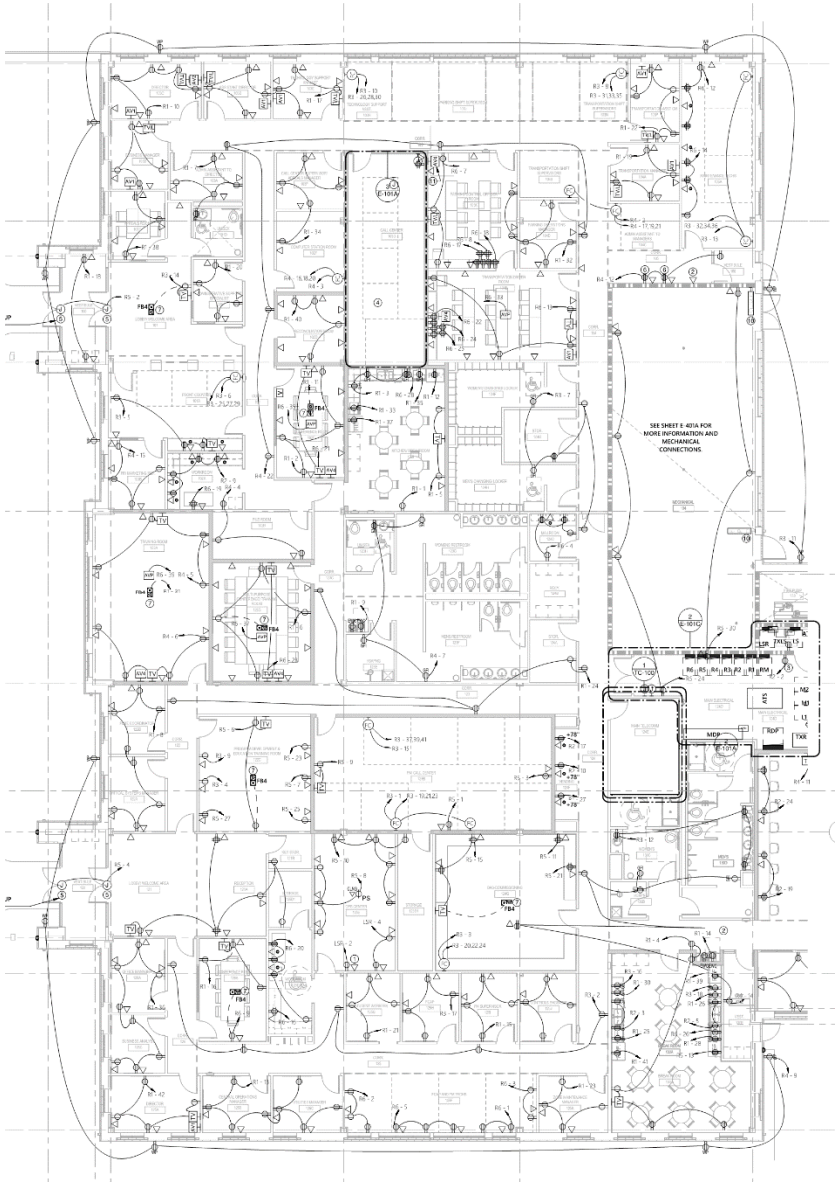
Mechanical - Warehouse



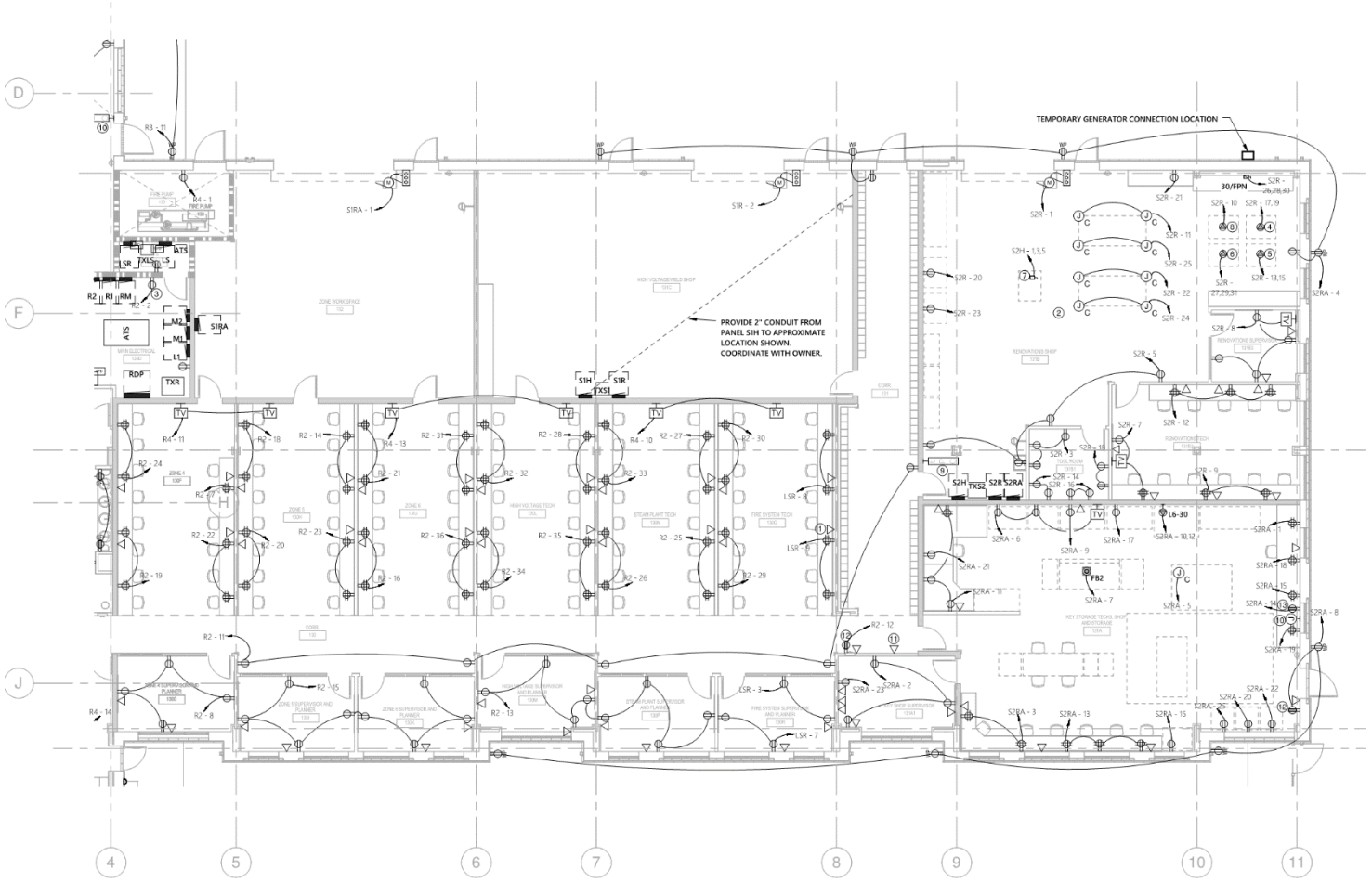
Electrical – Site



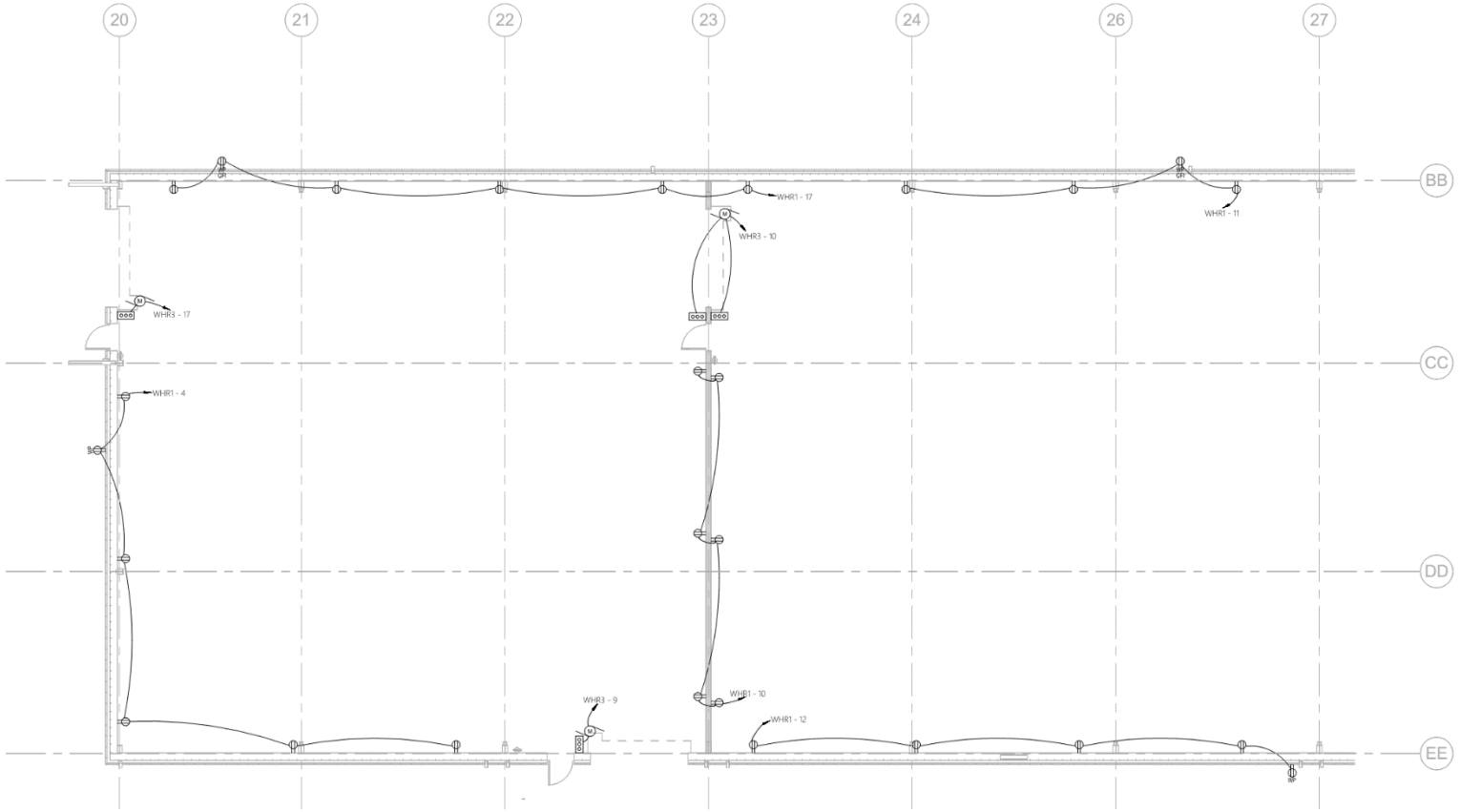
Electrical – Office/Shops



Electrical – Office/Shops

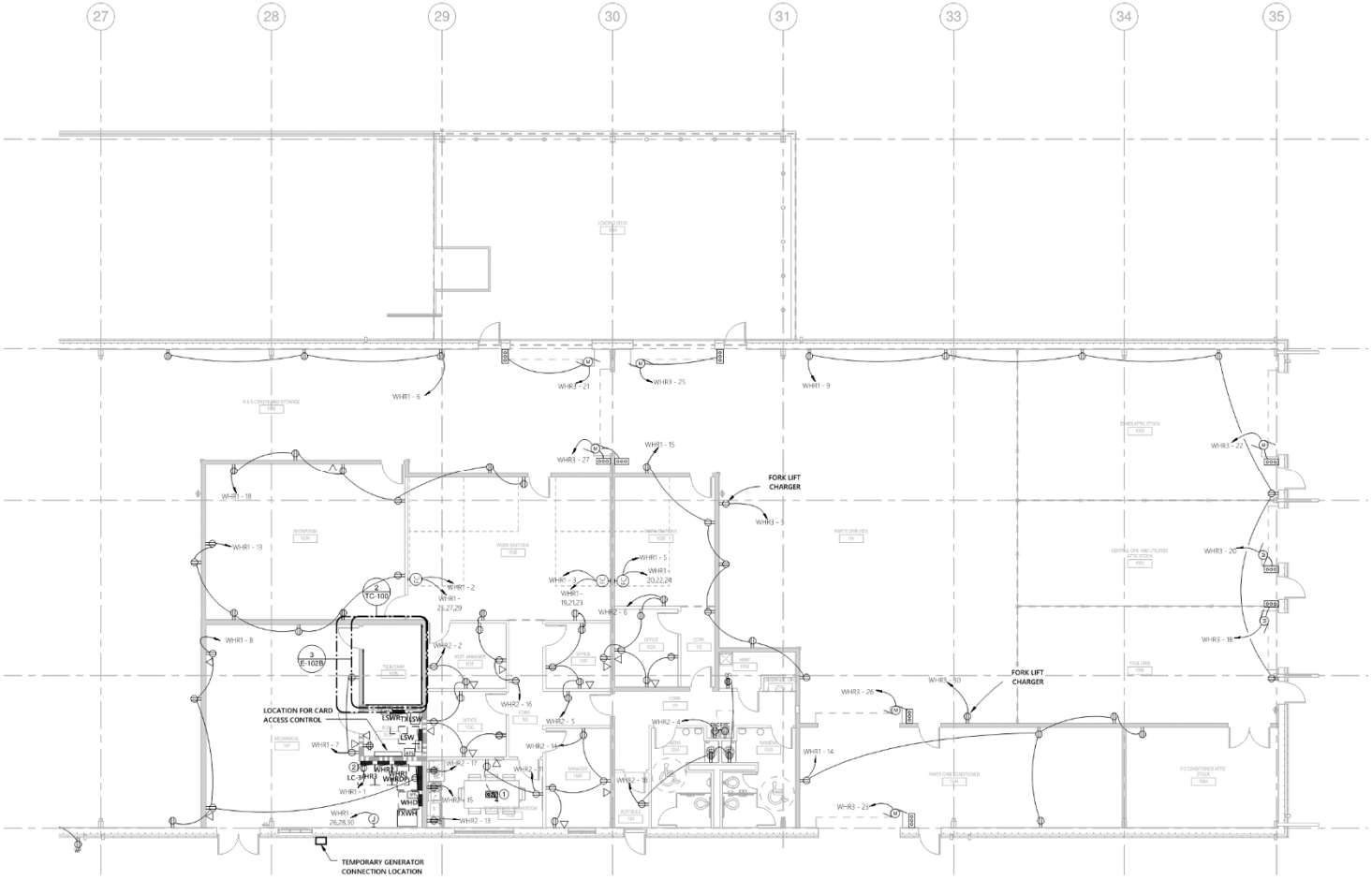


Electrical – Warehouse



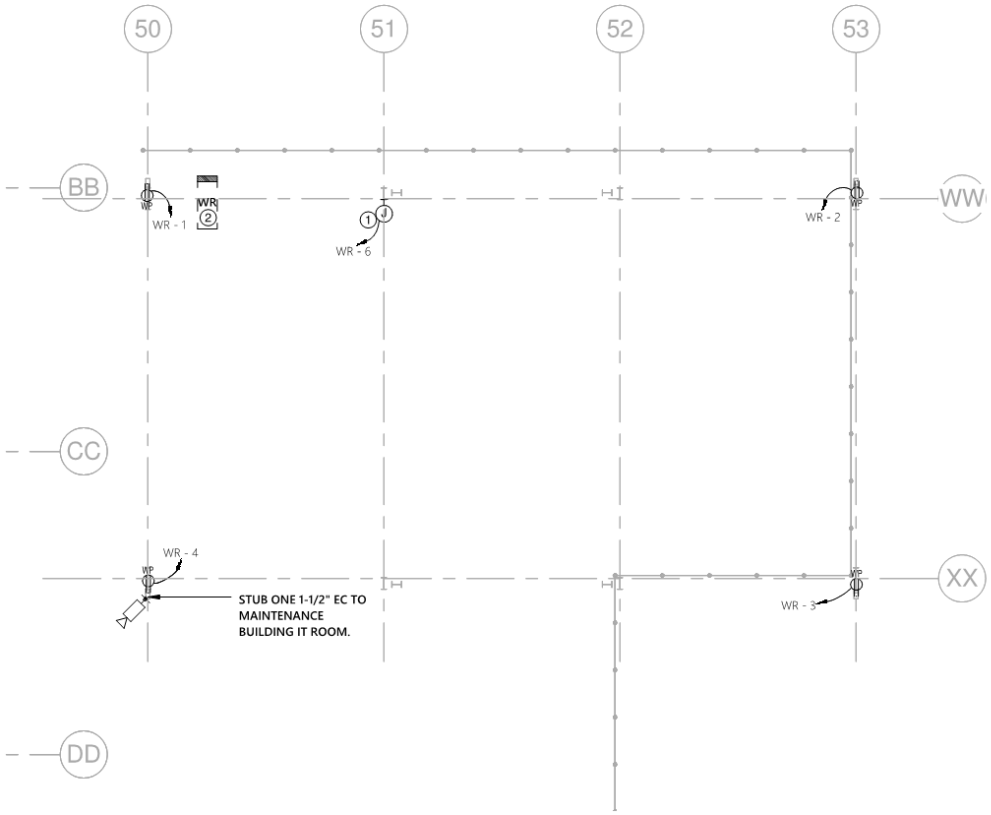
1 FLOOR PLAN - POWER - WAREHOUSE - WEST
1/8" = 1'-0"

Electrical – Warehouse



1 FLOOR PLAN - POWER - WAREHOUSE - EAST
1/8" = 1'-0"

Electrical – Washrack



PROJECT ALTERNATES

Alternate No. 1: Provide brick façade in lieu of metal siding on the south facade of Warehouse building as detailed on the Drawings and described in the Specifications.

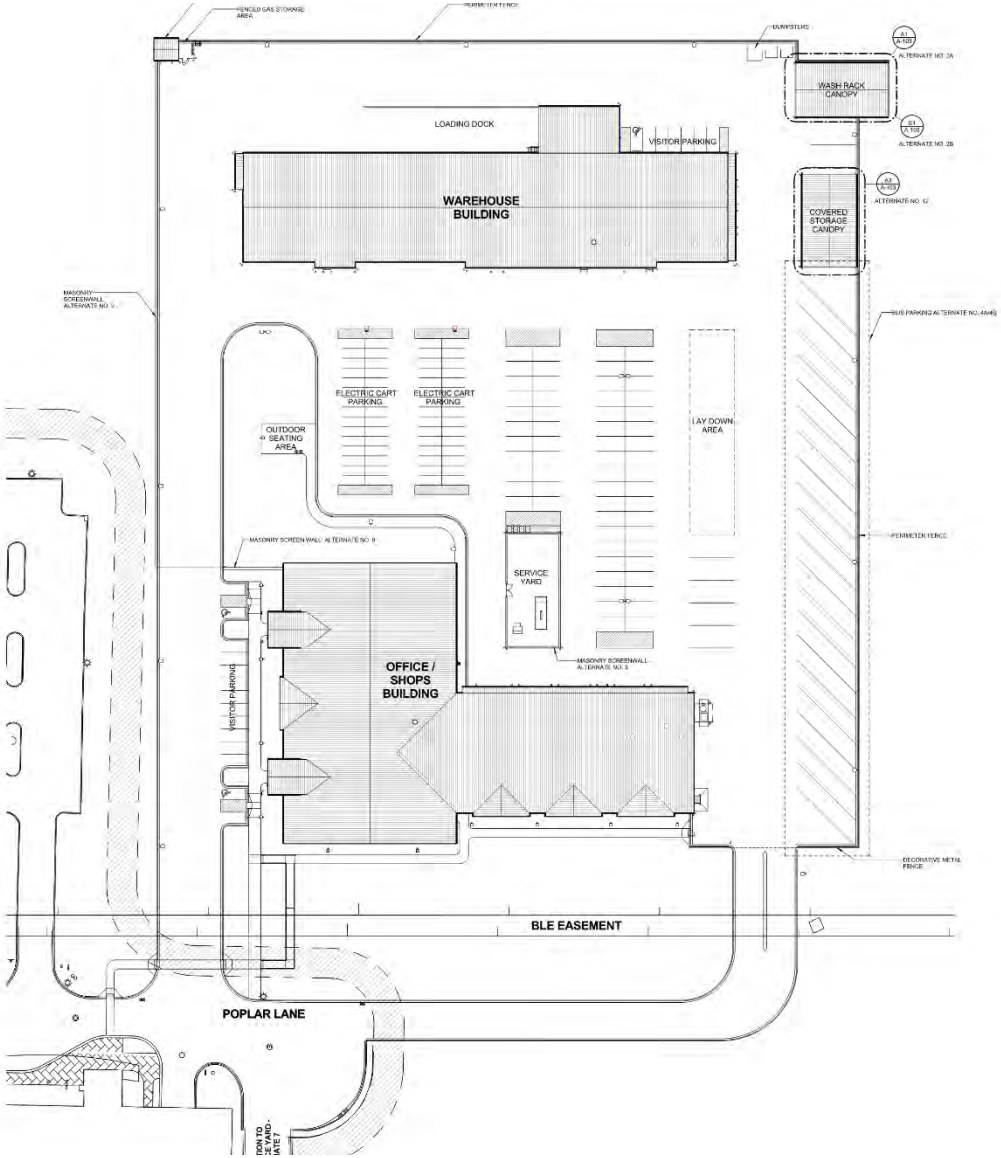
Alternate No. 2A: Provide pre-engineered metal canopy for Wash Rack as detailed on the Drawings and described in the Specifications.

Alternate No. 2B: Provide decorative CMU masonry walls, on two sides, and roof for Wash Rack in lieu of pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.

Alternate No. 3: Provide decorative CMU with ribbed interior finish masonry screenwall with precast cap in lieu of chain link fence around Service Yard as detailed on the Drawings and described in the Specifications.

UNCCHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



PROJECT ALTERNATES

Alternate No. 8: Extend telecomm infrastructure along Poplar Lane as detailed on the Drawings. Scope of work includes new concrete encased duct bank from existing manhole to new Telecommunications manhole.

Alternate No. 9: Provide decorative CMU masonry screenwall with precast cap in lieu of decorative metal fence along south edge of complex as detailed on the Drawings and described in the Specifications.

Alternate No. 10: Condition shops areas as indicated on the Drawings and described in the Specifications.

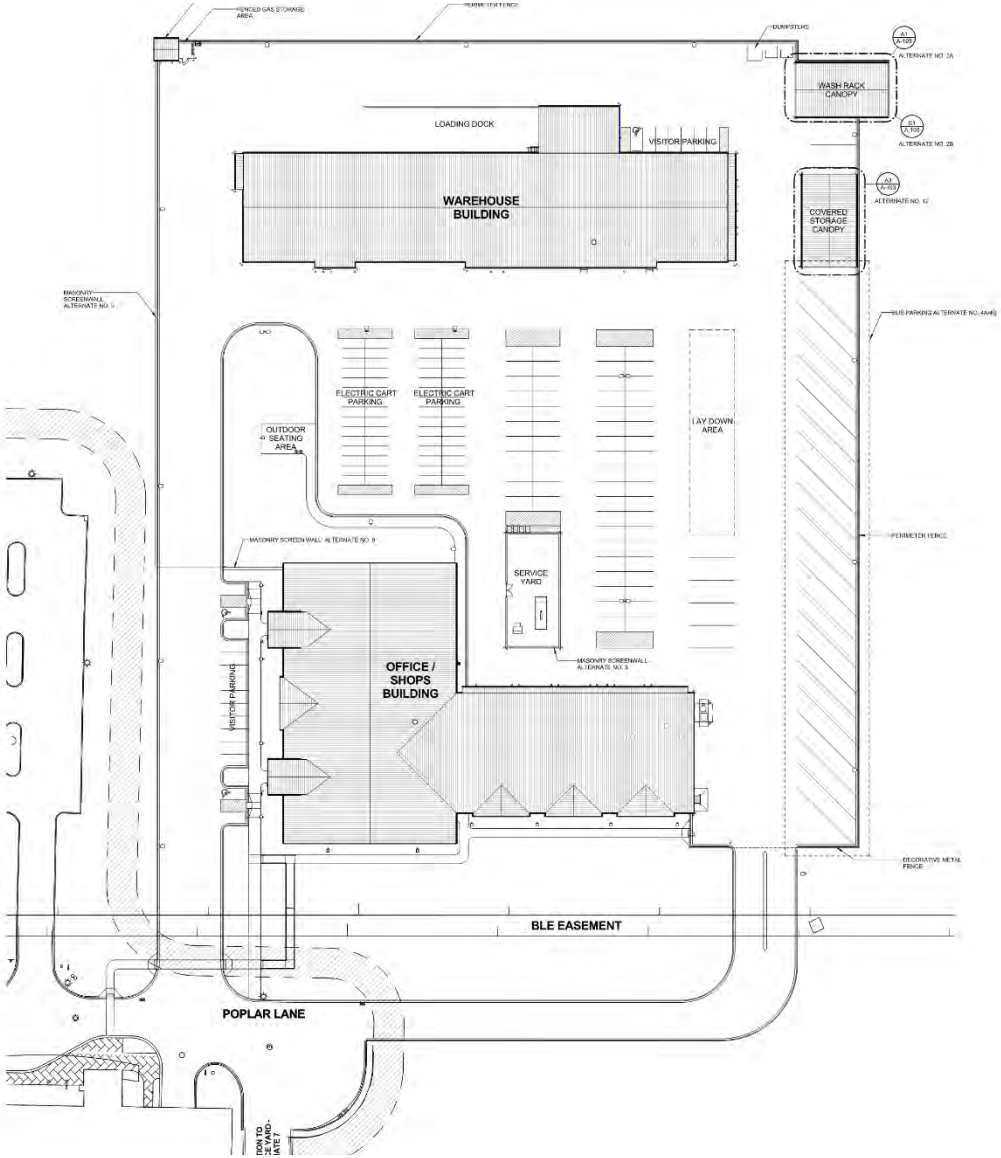
Alternate No. 11: Install event power as indicated on the Drawings and described in the Specifications.

Alternate No. 12: Provide pre-engineered metal canopy for Covered Storage as detailed on the Drawings and described in the Specifications.

Alternate No. 13: Provide lightning protection system as described in the specifications.

UNCCHARLOTTE

FACILITIES OPERATIONS AND PARKING SERVICES COMPLEX
BUILDING PHASE



OWNER PREFERRED ALTERNATES

Alternate No. P1: Provide Schlage Locksets, (no substitutions) as described in Specification Section 087100.

Alternate No. P2: Provide Simplex Fire Detection Systems, (no substitutions) as described in Specification Section 283111.

Alternate No. P3: Provide Open Option Systems, (no substitutions) as described in Specification Section 281300.

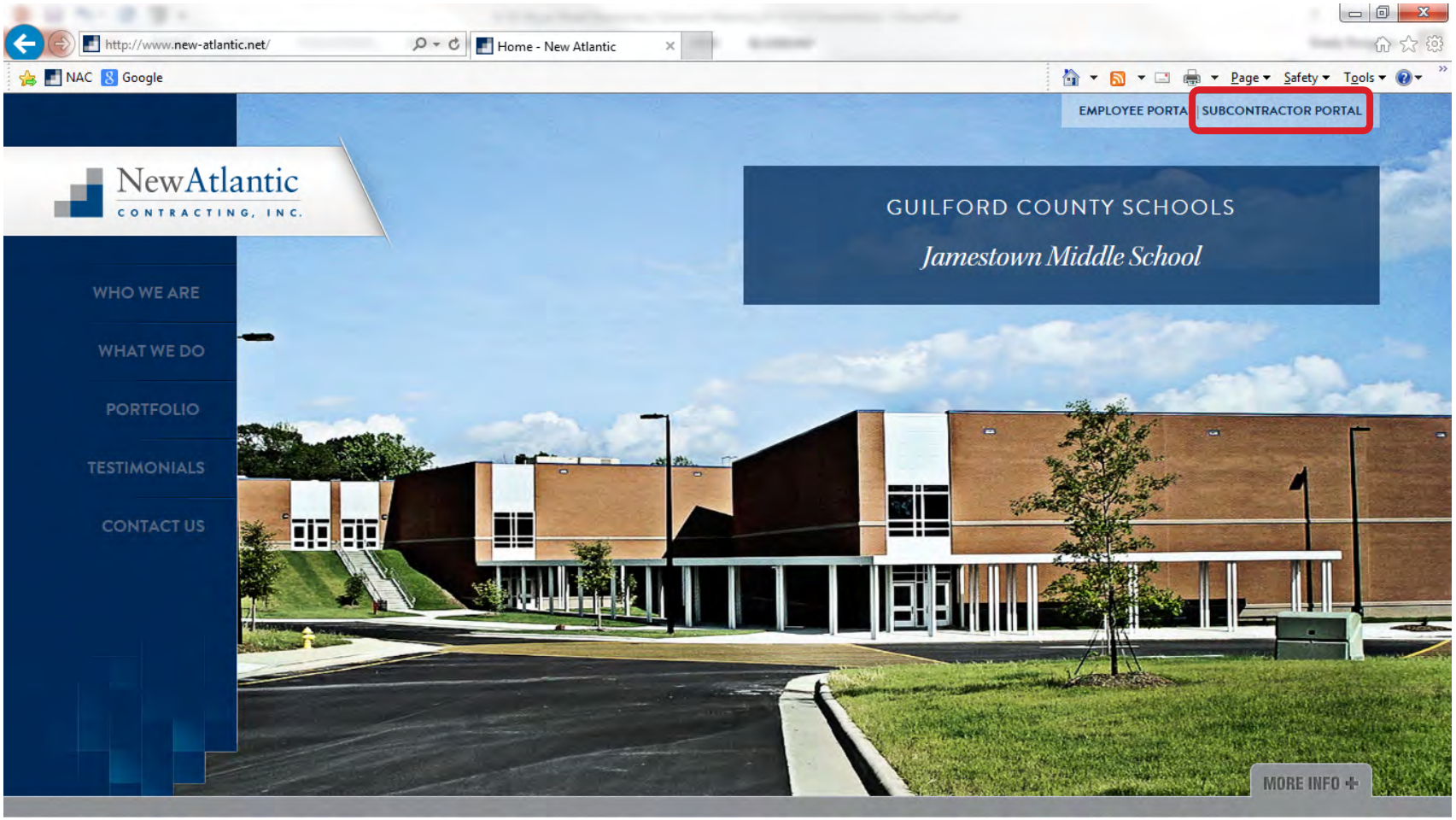
Alternate No. P4: Provide Hanson Brick, "Morrocroft Special" brick (no substitutions), as described in Specification Section 042000.

Alternate No. P5: Provide Pine Hall, English Edge Pavers, (no substitutions) as described in Specification Section 321400.

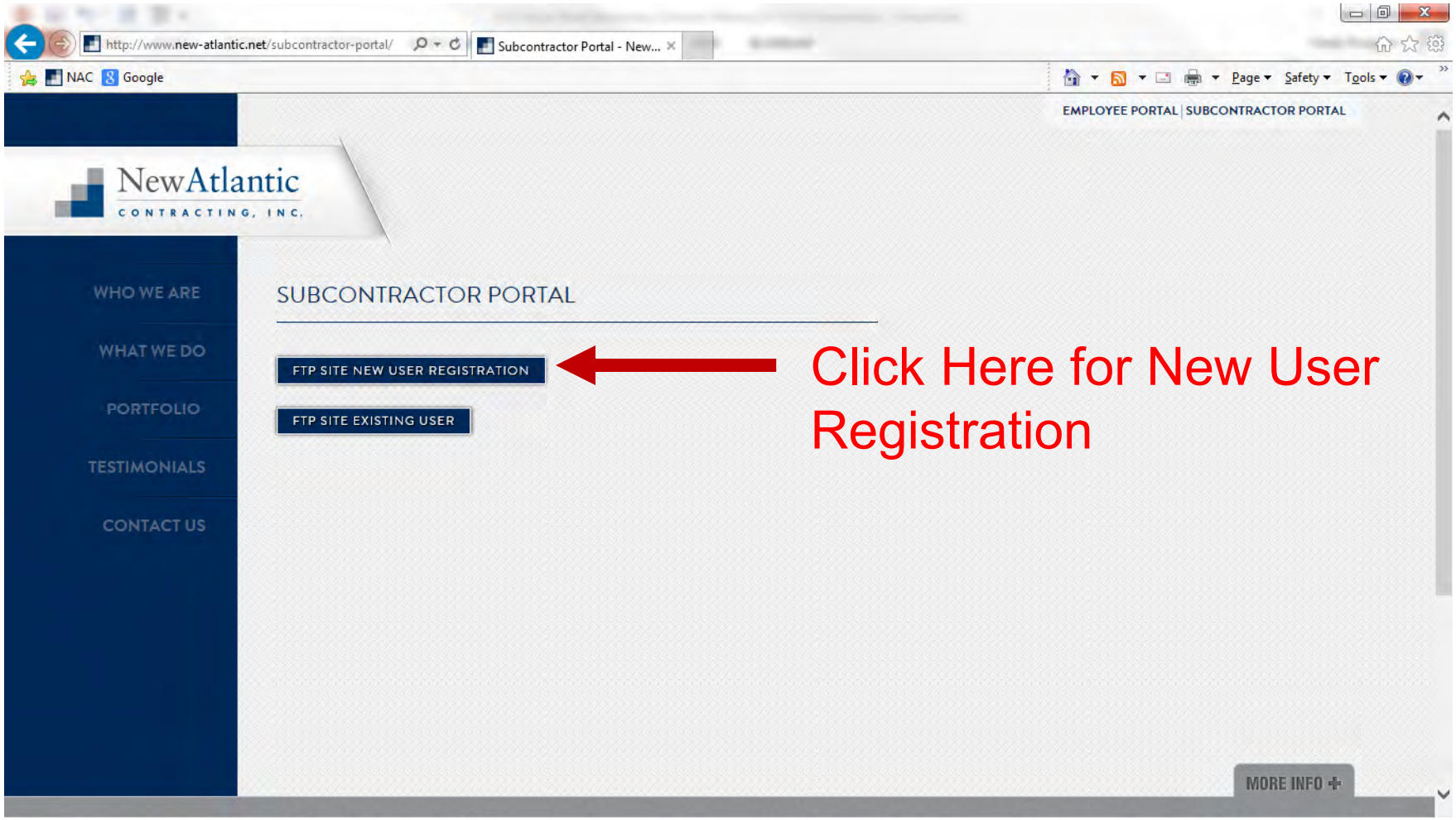
CONSTRUCTION DOCUMENTS

- **Charlotte Area**
  - **Sharpe Images** (*Charlotte*)
- **Triad Area**
  - **Sharpe Images** (*Winston-Salem*)
  - **New Atlantic Contracting Office**
    - *Contact Grady Dwiggins to check availability*
- **www.new-atlantic.net**

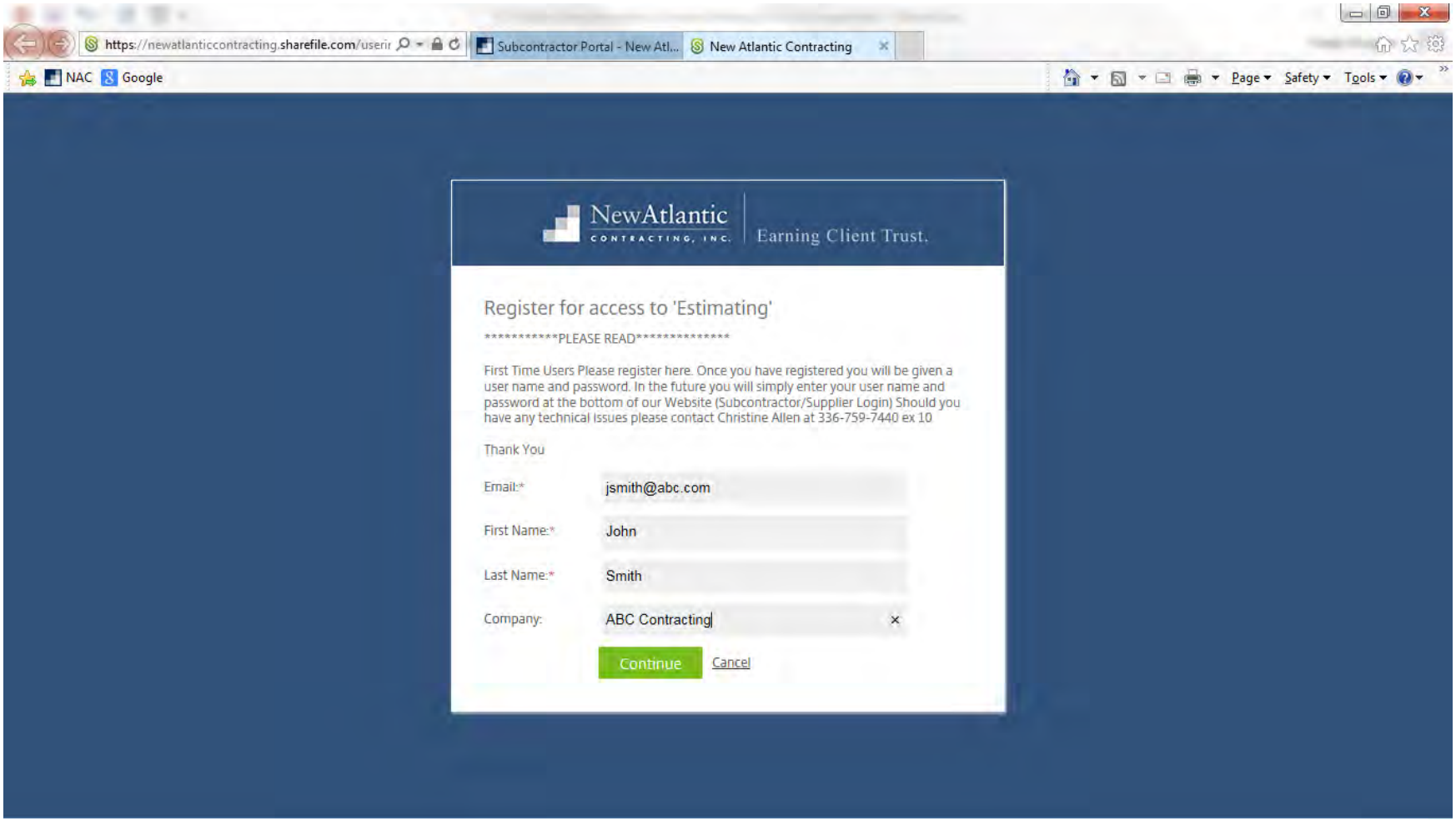
www.new-atlantic.net



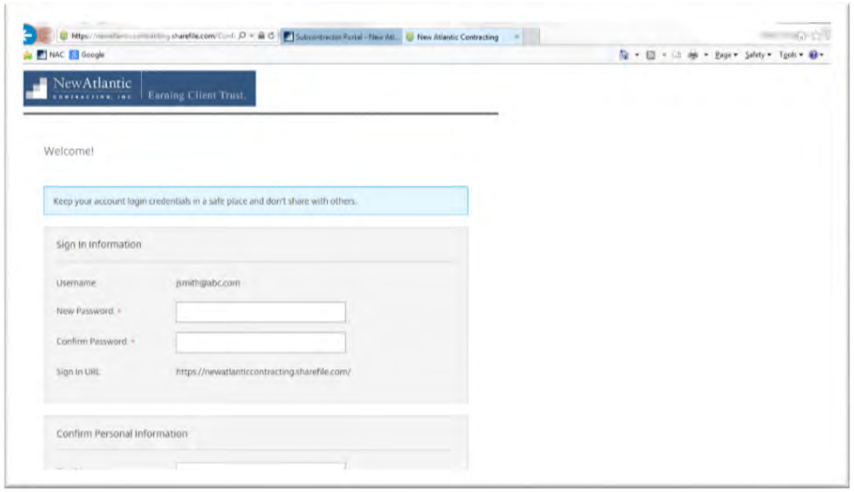
www.new-atlantic.net

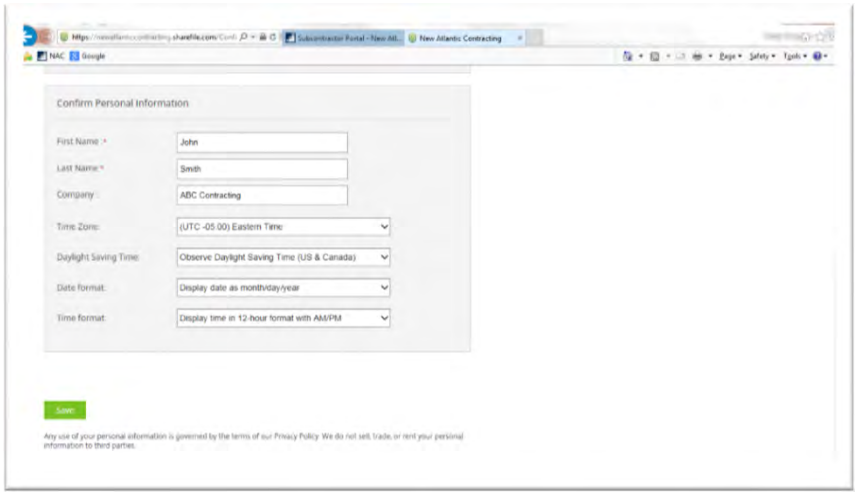


www.new-atlantic.net

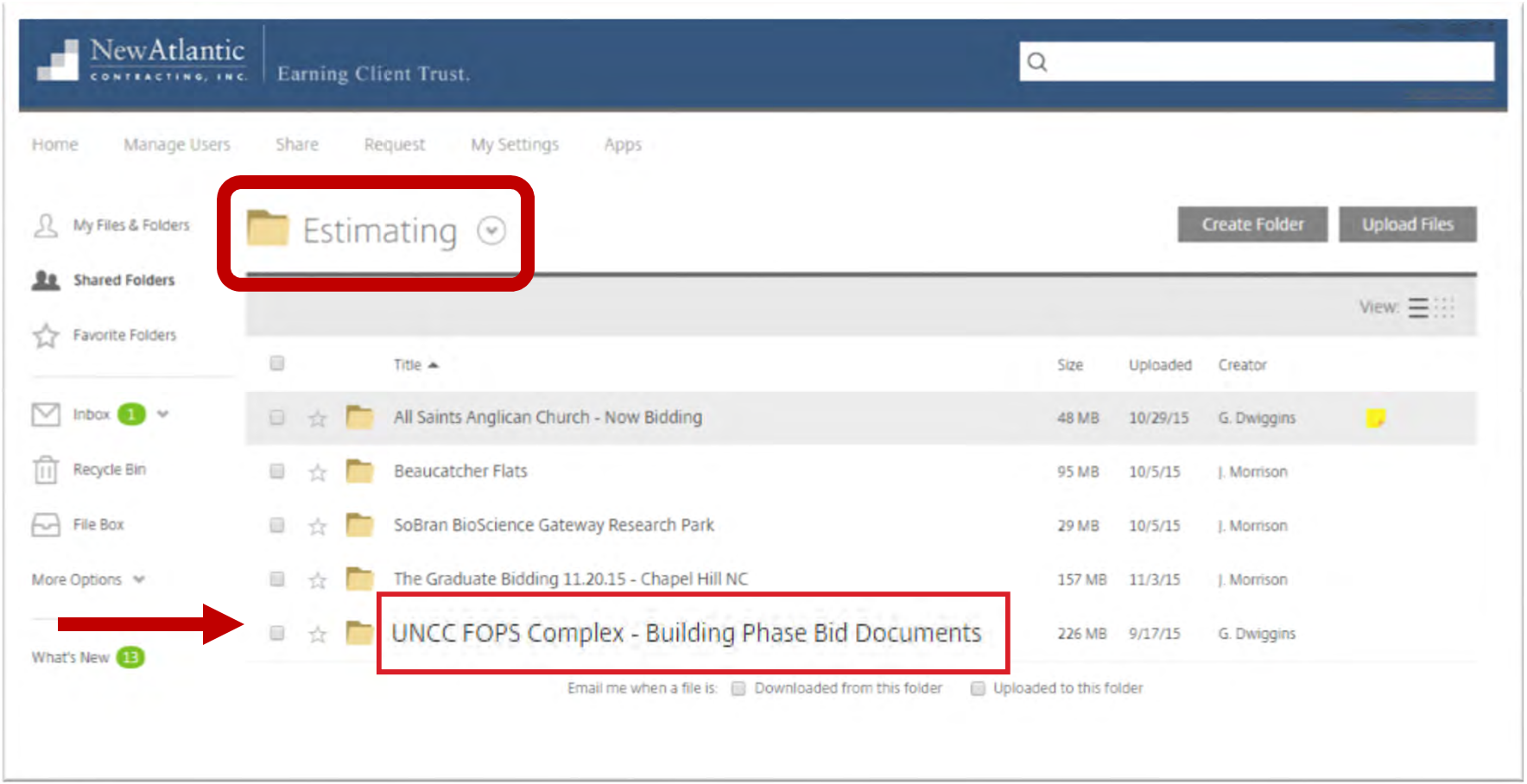


www.new-atlantic.net





www.new-atlantic.net



IMPORTANT DATES – PRECONSTRUCTION

- **Deadline for <u>Questions & Substitution Requests</u>**
  - Tuesday – September 5, 2017 @ 5:00pm
- **Last Addendum Issued**
  - Tuesday – September 12, 2017
- **BID OPENING**
  - Tuesday – September 19, 2017 @ 2:00pm

IMPORTANT DATES – PRECONSTRUCTION

- **BID OPENING**
  - Tuesday – September 19, 2017 @ 2:00pm
- **Bids may be hand delivered to bid room at bid time**
  - Lucas Room (#341) in the Cone University Center Building
- **Bids may be hand delivered or mailed prior to the bid opening – provided they arrive no later than <u>1:00pm</u> on day of bid opening**

Addressed to: Ms. Joyce Clay
UNC Charlotte
Facilities Management / Capital Projects
9201 University City Blvd.
Charlotte, NC 28223
Reference: Facilities Operations and Parking Services Complex

REDUCING BARRIERS

- **HUB Goals – 30%**
  - **Focus on Diverse Workforce**
  - **Good Faith Efforts**
- **Bid Packaging**
  - **Building Phase First-Tier Opportunities**
  - **Intentional in creating multiple 2nd & 3rd tier opportunities**
    - Labor, Material Supplier, Equipment Rental, Dumpsters, Drug Testing
- **Quick Pay Arrangements**
  - **Available to Contractors with Cash Flow Demands**
    - On less than monthly basis
- **Joint Check Arrangements**
  - **Resource allows subcontractors to work with material vendors without establishing credit**

REDUCING BARRIERS

- **HUB Compliance**
  - Subcontractor / Supplier ID Form
  - Affidavit A / Affidavit B
  - Post Bid Documentation

Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid

Identification of HUB Certified/ Minority Business Participation

I,_____.
(Name of Bidder)
do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

** **HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be ($)_____.

MBForms 2002-Revised July 2010

Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I 0101)

☐ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.

☐ [illegible]

☐ [illegible]

☐ [illegible]

☐ [illegible]

☐ [illegible]

☐ [illegible]

☐ [illegible]

☐ [illegible]

[illegible]

[illegible]

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public _____

My commission expires _____

[illegible]

Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, ordinarily performs and has the capability to perform and will perform all elements of the work on this project with his/her own current workforce; and

The Bidder agrees to provide any additional information or documentation requested by the owner to support the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized by the Bidder to bid commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____ County of _____

Subscribed and sworn to before me this _____ day of _____, 20___.

Notary Public: _____

My commission expires _____

MBEForms 3002 Revised July 2007

BONDING

- **Bid Bonds**
  - Not required for bids under $500,000

- **Performance & Payment Bonds (P&P)**
  - Required for all “Building Envelope” packages
    - 04A, 07B, 08C, 13A
  - Not required for bids under $500,000 *(except for the packages listed above)*
  - Bid P&P bonds as add alternate

FORM OF PROPOSAL

University of North Carolina at Charlotte
Facilities Operations and Parking Services Complex
Early Site / Structural Phase

Bidding Contractor: _____

NC License #: _____

Date: _____

COMPLIANCE STATEMENT

I hereby acknowledge that I have read and accept the complete Bidders Manual dated June 18, 2017. I acknowledge these documents in their entirety and agree that, if awarded a subcontract, these documents will be signed and executed as-is with no modifications. The undersigned bidder proposes to furnish all labor, materials, equipment, engineering, permits, fees, taxes, insurance, scaffolding, hoisting, clean-up, safety measures, and supervision and perform all work necessary for the construction of this Trade Package, in accordance with Drawings and Specifications dated 6/15/17 (as itemized in the Bidders Manual), and the addenda noted below for consideration of the following amount:

ADDENDA Number: _____ Dated: _____
Number: _____ Dated: _____
Number: _____ Dated: _____

BASE BID for Bid Package # _____

Show amount both in words and figures.

_____

_____ Dollars.

$ _____. 00

ALTERNATE – PAYMENT & PERFORMANCE BOND (if accepted will be an add to base bid)

Show amount both in words and figures.

_____

_____ Dollars.

$ _____. 00

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

Show amount both in words and figures.

Alternate No. 1: ***Provide foundations for brick façade in lieu of metal siding on the south facade of Warehouse building as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 2A: ***Provide foundations for Wash Rack pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 2B: ***Provide foundations, for masonry walls, and roof structure for Wash Rack in lieu of pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 3: ***Provide foundations for masonry screenwall in lieu of chain link fence around Service Yard as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 4A: ***Provide Gravel Bus Parking as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 4B: ***Provide Concrete Bus Parking in lieu of gravel as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 5: ***Provide Sanitary Dump Station as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 6: ***Provide Concrete Paving in lieu of Asphalt as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 7: ***Provide Connection to Facilities Maintenance Yard as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 8: ***Extend telecomm infrastructure along Poplar Lane as detailed on the Drawings. Scope of work includes new concrete encased duct bank from existing manhole to new Telecommunications manhole.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 9: ***Provide foundations for masonry screenwall in lieu of decorative metal fence along south edge of complex as detailed on the Drawings.***

(Add) *(Deduct)* _____ Dollars ($) _____

Alternate No. 12: ***Provide foundations for Covered Storage pre-engineered metal canopy as detailed on the Drawings and described in the Specifications.***

(Add) *(Deduct)* _____ Dollars ($) _____

UNIT PRICES / QUANTITY ALLOWANCES

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents. Reference Specification Section 012200 - UNIT PRICES for more details.

UP-1: Excavation of Unforeseen Unsuitable Materials, Off-Site Disposal, and Replacement with Off-Site Suitable Fill. Provide removal of unsuitable soils in accordance with Section 310000 and replacement of qualified unsuitable material volume with equal volume of off-site suitable structural fill, which will include purchase, transportation, placement and compaction.

*QUANTITY ALLOWANCE 1: Bid Package 2A Base bid proposal to include **500 CY**, to be used at the discretion of the CMAR.*

($/CY) Unit Price 1 = $ _____

UP-2: **Trench Rock Excavation, Off-Site Disposal, and Replacement with Off-Site Suitable Fill.** Include the removal of trench rock including all necessary equipment, material and labor for trench rock excavation and removal off-site. Provide the replacement of trench rock with compacted off-site suitable fill in accordance with Section 312316.26. See Bidder's Manual and Bid Form for quantities to be carried in individual trade package base bids

*QUANTIFY ALLOWANCE 2: Bid Package 2A Base bid proposal to include **800 CY**, to be used at the discretion of the CMAR.*

($/CY) Unit Price 2 = $ _____

UP-3: **Blast Rock Excavation, Off-Site Disposal, and Replacement with Off-Site Suitable Fill.** Include the removal of blast rock including all necessary equipment, material and labor for blast rock excavation and removal off-Site. Provide the replacement of rock with off-site suitable compacted fill in accordance with Section 312316.26.

*QUANTITY ALLOWANCE 3: Bid Package 2A Base bid proposal to include **1000 CY**, to be used at the discretion of the CMAR.*

($/CY) Unit Price 3 = $ _____

UP-4: **Excavation of Unforeseen Unsuitable Soil Materials and Disposal On-Site.** Excavation of unsuitable material and disposal on-site. Include removal of unsuitable material quantified by geotechnical engineer and placed on-site in approved location per direction of Owner.

*QUANTITY ALLOWANCE 4: Bid Package 2A Base bid proposal to include **500 CY**, to be used at the discretion of the CMAR.*

($/CY) Unit Price 4 = $ _____

UP-5: **Cast-in-Place Concrete for Column Footings (Not Reinforced).** Cast-in place concrete for column footings. Include placement and finishing of concrete in accordance with applicable project specification sections.

($/CY) Unit Price 5 = $ _____

UP-6: **Cast-in-Place Concrete for Column Footings (Not Reinforced).** Cast-in place concrete for column footings. Include placement and finishing of concrete in accordance with applicable project specification sections.

($/CY) Unit Price 5 = $ _____

UP-7: **Cast-in-Place Concrete for Column Footings (Not Reinforced).** Cast-in place concrete for column footings. Include placement and finishing of concrete in accordance with applicable project specification sections.

($/CY) Unit Price 5 = $ _____

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

_____
(Proprietorship or Partnership)

By: _____
Signature

Name: _____
Print or type

Title _____
(Owner/Partner/Pres./V.Pres)

Address _____

_____

ATTEST:

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(CORPORATE SEAL)

PROJECT MILESTONES *(start dates)*

- **Bid date:** September 19, 2017
- **Roofing:** January 3, 2018
- **MEPF OH Rough-in:** January 12, 2018
- **Masonry:** January 24, 2018
- **Framing:** February 2, 2018
- **Storefront/Glass:** February 7, 2018
- **Main Mechanical Room / Electrical:** February 21, 2018
- **Pre-Engineered Building:** March 6, 2018
- **Permanent Power:** March 13, 2018
- **Drywall:** March 16, 2018
- **Ceilings & Casework:** June 1, 2018
- **Flooring:** June 18, 2018
- **T&B:** June 22, 2018
- **Doors/Hardware & Paint:** June 25, 2018
- **SCO Final Inspections:** August 27, 2018

Questions?

Site Visit Available

UNC Charlotte - Poplar Lane
North of Lot 25

DIRECTIONS

Head northwest on Mary Alexander Rd toward McEniry Ln

0.3 mi

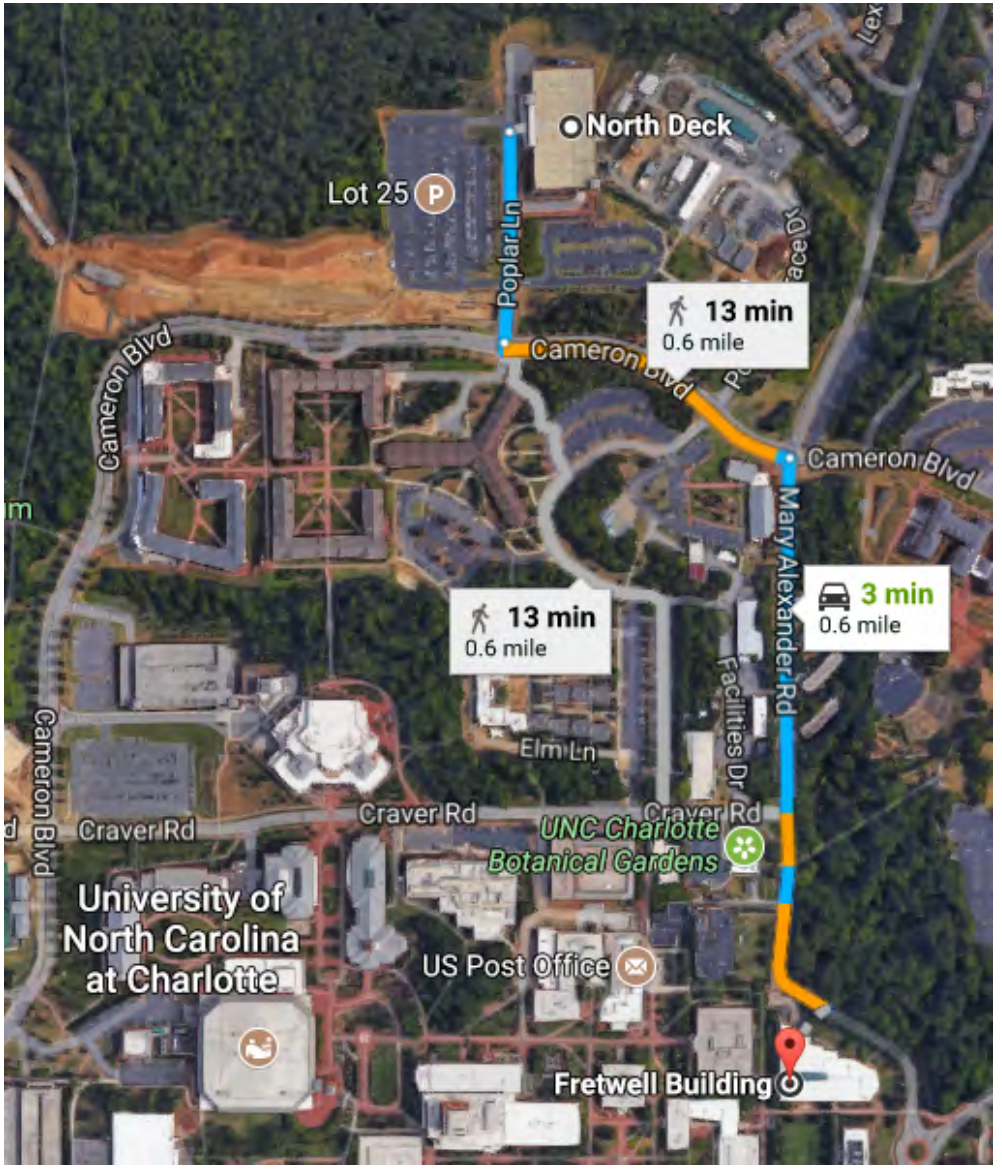
Turn left onto Cameron Blvd

0.2 mi

Turn right onto Poplar Ln

Destination will be on the left

9628 Poplar Lane
Charlotte, NC
28223



NewAtlantic CONTRACTING, INC.

UNCCHARLOTTE

UNC CHARLOTTE FOPS COMPLEX - BUILDING PHASE - PREBID MEETING SIGN-IN SHEET

ATTENDEE NAME	COMPANY	TRADE	EMAIL ADDRESS	PHONE NUMBER
GRADY OWIGGINS	NAC	CM	GOWIGGINS@NEW-ATLANTIC.NET	336 759 7440
LEE SNODGRASS	UNC Charlotte	FM	lsnodgra@uncc.edu	7-0564
Justin Malave'	Polished Concrete Professionals	Polished Concrete	jmalave'@wepolishconcrete.biz	336-508-7406
Desmond Jenkins	SMS	MECH.	jfields@superiormechserv.com	336-855-1846
Joel Padgett	Watson Electrical	Elec.	jpodgett@watsonelec.com	704-400-3443
Paul Taylor	UNCC	FM	Ptaylo18@uncc.edu	704-687-0563
Don Gariepy	UNC CHARLOTTE	FM	dgariepy@uncc.edu	704-687-6111
Josh Wilson	CAM-FIL INC.	MECHANICAL	JWILSON@CAM-FIL.com	704-556-0301
RODNEY RISER	WATSON ELEC	ELEC	~~RISE~~ Rodney@WATSONELECTRIC.com	704 996 4621
Kwesi Nichols	Nichols Custom Builders	Acoustical Ceilings	support@nicholscustombuilders.onaddesign.com	704 400-6786
Scott Greene	Greene Building Corporation	PEMB	Scott@greenebuildingcorp.com	704-473-7705
Donald Winbush	AAC	Division 10	dwinbush@aacenterprisellc.com	
Demeshia Leathers	AAC	Division 10	dleathers@aacenterprisellc.com	704 244 2063
Chevaia Alexander	AAC Enterprise	Div 10	calexander@aacenterprisellc.com	704 791 9765
Jarris Arnold	Taylor Interiors, LLC	Div 7	jarnold@taylorinteriorsllc.com	704-886-4813
Chisa Brookes	Brookes Construction	GC	rcbrookes@gmail.com	832-846-3955
Rafael Medina	Agua Source LLC	plumbing	rmedina@aguasourcellc.com	7044924937
Julio E Barriga	Agua Source LLC	Plumbing	julio.b@aguasourcellc.com	704 831 8311
Brady Bowles	Saf Technologies	Commercial Door/Access Control	Brady.Bowles@Saftechnologies.com	704-877-3133

NewAtlantic
CONTRACTING, INC.

UNCCHARLOTTE

UNC CHARLOTTE FOPS COMPLEX - BUILDING PHASE - PREBID MEETING SIGN-IN SHEET

ATTENDEE NAME	COMPANY	TRADE	EMAIL ADDRESS	PHONE NUMBER
GLENN WISE	NEW ATLANTIC	CMAR	gwise@new-atlantic.net	336-759-7440
RON ALMOND	OPTIMA	MEP	RALMOND@OPTIMAPA.com	704-997-1778
SCOTT BAKER	LS3P	ARCHITECT	scottbaker@LS3P.com	704-333-6686
Jerry Tucker	East Coast Construction Services LLC	Elec	jtucker@ecccselc.com	336 822 2807
Linda Heyworth	Heyworth Plumbing Co	Plumbing	Linda@heyworthplumbing.com	704-523-2696
STEVEN MILLER	NATIONS ROOF	ROOFING	SMILLER@NATIONSROOF.COM	704 726 8733
Rick Kisby	MAK Floor Images	conc. polish	makfloorimages@yahoo.com	704-922-3038
JAKE MILINICHIK	KIRLIN CAROLINAS	MECH. CONTRACTOR	JMILINICHIK@JJKLLC.com	919-669-6397
Tamika Kelly	AAC-Enterprise, LLC.	Division 10	tkelly@aacenterprisellc.com	704-994-9765
MATTHEW MORRISON	P.C. GODFREY.	PLUMBING & MECH.	mmorrison@pcgodfrey.com	704. 334. 8604
LEE A PARKS	THE BOSWELL GROUP	PLUMBING	PLUMBING@THEBOSWELLGROUP.com	704.989.0764

AUGUST 29, 2017

NewAtlantic
CONTRACTING, INC.

UNCCHARLOTTE

UNC CHARLOTTE FOPS COMPLEX - BUILDING PHASE - PREBID MEETING SIGN-IN SHEET

ATTENDEE NAME	COMPANY	TRADE	EMAIL ADDRESS	PHONE NUMBER
Sharon Huot	LS3P	Architect	sharonhuot@ls3p.com	704-371-7845
Chuck Cardwell	SKA	Structural	cecardwell@skaeng.com	704-424-9663
DOROTHY VICK	UNC CHARLOTTE	HUB COORDINATOR	dlvick@uncc.edu	704-687-0527
DREW AVERITT	UNCC, BUSINESS SERVICES	-	DAVERITT@uncc.edu	704-687-8653
Brian Kugler	UNC Charlotte Capital	-	bhkugler@uncc.edu	704.687.0522
MARC MOFFETT	LAND DESIGN			
WILLIAM MORRIS	LANDDESIGN	CIVIL	WMORRIS@LANDDESIGN.com	980-521-9105
Desmond Jenkins	Superior Mechanical Services	MECH.	jfields@superiormechserv.com	336-855-1846
Doug Lape	UNCC P&TS		dllape@uncc.edu	704-687-0161

AUGUST 29, 2017