ADDENDUM NO. 02

New Hanover County – Castle Hayne Fire Department

Prepared by:

SAMET CORPORATION

8115 Market Street; Suite 304
Wilmington, NC 28411

Date of Issue: May 14, 2024

The following items take precedence over the referenced portion of the bidding documents for the above referenced Project and in executing a contract shall become a part thereof.

PROJECT CLARIFICATIONS

1. The project will have a revised bid schedule as follows:

- **a.** Pre-Bid RFI's are due from subcontractors no later than 5:00PM on Friday, May 3rd, 2024
- **b.** RFI Responses will be issued on addendum #2 May 14, 2024
- **c.** Revised Bid date will be Tuesday; 5/28/2024.
- **d.** Final scopes will be issued 5/16/2024.

2. Pre-Bid Meeting #02 Presentation and Attendance Roster added

PROJECT DOCUMENTS

A. Construction Managers Project Manual Documents

NONE

B. Construction Managers Trade Package Manual Documents

NONE

C. DRAWINGS AND SPECIFICATIONS

D. RFI Log

Add the following documents:

Reference Addendum 02

Remove the following documents:

NONE

Remove and replace the following documents:

Reference Addendum 02

NOTE: Addendum #02 must be acknowledged on the project bid form

END OF - ADDENDUM NO. 02

Updated: 12-Apr-24

Pre-Bid RFI Tracking Log

SAMET CORPORATION

Castle Hayne Fire Station

Drawing No., Spec Section or General	Item No.	Item Description Under Review for Corrective Action	Action Required By Primary Team Member (Sorted by Discipline)	Date Item Identified	Item Status	Date Item Closed and/or Verified by Designer:	Date Item Closed and/or Verified by CM:	CM Comments	Designer Comments	Owner Comments
329200	1	Is irrigation on either of these? It mentions irrigation but does not specifically state there is to be irrigation.		30-Apr-24					Refer to Addedum 02	
210000	2	Are the bunk rooms the only area protected by Fire Sprinkler? No other areas are protected. Is this Fire Sprinkler system an option?		30-Apr-24					Refer to Addedum 02	
083620	3	The specifications for the FF Doors show an International Door as the basis of design and the drawing calls for the Door Engineering FF30. The FF30 is not available with an arched top. The FF300 would be the model from Door Engineering that would need to be used. Also, when pricing the FF Doors as an alternate, do we need to quote (4) doors total or just (2) for the front elevation?		30-Apr-24					Refer to Addedum 02	
114510.1	4	Do you know if there is an updated appliance schedule? I see the appliances in the drawing but I don't see any details about the appliances like there usually are		30-Apr-24						
280000	5	I did a quick take off and noticed that this project has many multi criteria devices with sounder bases throughout the building. Each MC device will require a sounder base as well. This will increase the cost of the project. It might be a good idea to ask whether if all these MC devices will be required or reasoning.		30-Apr-24					Refer to Addedum 02	
122113	6	I just perused the documents and there's only a notation for shades at sleep rooms, but no schedule for the aluminum blinds required on project. We would need a blind schedule.		30-Apr-24						
113013	7	It appears both stations will have the same layout from what I see. Is this true?		30-Apr-24					Refer to Addedum 02	
113013	8	I only see one drawing in 05 Architectural that shows the kitchen with dimensions. It appears the range will need to be 36". This means the hood will also need to be 36". I see in Mechanical the range hood duct will be an 8" round duct. I don't see a gas line going to the range in the plumbing section, so I'm assuming the range needs to be electric. This is odd because we've primarily supplied gas ranges in the fire stations. Are you able to clarify and/or confirm these observations?		30-Apr-24					Refer to Addedum 02	
113013	9	There is no indication on the drawings concerning the ice machine or coffee machine. It does state "under counter ice machine" on the appliance schedule but does not mention which size is needed. We are able to get this in a 15" or 18" version. They also make ice machines with and without pumps. It will most likely need to have a pump but I wanted to clarify. I'll also need to know where the built-in coffee machine will be mounted. They typically require a dedicated waterline plumbed to the area they will be mounted		30-Apr-24					Refer to Addedum 02	
113013	10	The most common garbage disposal we sell is a 1/2 hp Whirlpool. Will this need to be any larger than 1/2 hp		30-Apr-24					Refer to Addedum 02	
08413 FL	11	Can you see if your client will allow me to bid the project in our preferred framing system, YKK? They manufacture an elite product that we try to use on all of our projects.		30-Apr-24					Refer to Addedum 02	
270000	12	I need some clarification of what systems you need us to provide. Please let me know which to provide 100% and which require only raceway and boxes. Telecommunications/Data System Purvis /PA System Security Camera System Access Control System Audio/Visual System		30-Apr-24					Refer to Addedum 02	
042000	13	Will water repellent in spec section 071900 be necessary with CMU with integral water-proofing ? Spray stone only?		30-Apr-24					Refer to Addedum 02	
042000	14	Can we apply bituminous dampproofing to CMU below grade instead of two parge coats of mortar?		30-Apr-24					Refer to Addedum 02	
042000	15	Where is seat wall detail 10/A4.21 located on projects?		30-Apr-24					Refer to Addedum 02	
044313	16	Is stone veneer to be Coronado as per plan, or Boral as per specs		30-Apr-24					Refer to Addedum 02	
042000	17	It appears masonry scope has bituminous damp proofing on CMU behind veneer ? is this damp proofing or fluid applied vapor barrier?		30-Apr-24					Refer to Addedum 02	
042000	18	Found seat wall on Castle Hayne C3.0, do not see a seat wall on Gordon Road plan. Is this correct?		30-Apr-24						
070000	19	C5.0- Heavy Duty Concrete Pavement. Is there a detail of the Joint in the HD Concrete? Does it require Joint Sealant? Is there supposed to be sealant at site concrete to base of wall intersection?		30-Apr-24					Refer to Addedum 02	
070000	20	1-Is there a detail clearly showing the waterproofing/fluid applied vapor barrier as it passes below grade? Is it the intent to run the WRB down to the footer? There are spec sections for Bit DampProofing and Sheet applied Waterproofing but I don't see either called out. 2-If the Architect intends the area below grade to be waterproofing, would they accept a fluid applied product such as Tremco Tremproof that would work with the air barrier?		30-Apr-24					Refer to Addedum 02	
075423	21	Would the Architect consider accepting Polyroof Protec FW 25, fluid applied Membrane as an alternate to the PVC Shown in the plans. The product is cold-applied and comes with a 25 year guarantee.		30-Apr-24					Refer to Addedum 02	
E.160 & E7.01	22	The riser E7.01 shows a 1200A current rating, the notes speak to 800A. Which should it be?		30-Apr-24					Refer to Addedum 02	
263600	23	The ATS specs call for both open transition and delayed transition (Page #4, D & E), which should it be?		30-Apr-24					Refer to Addedum 02	

Updated: 12-Apr-24

Pre-Bid RFI Tracking Log

SAMET CORPORATION

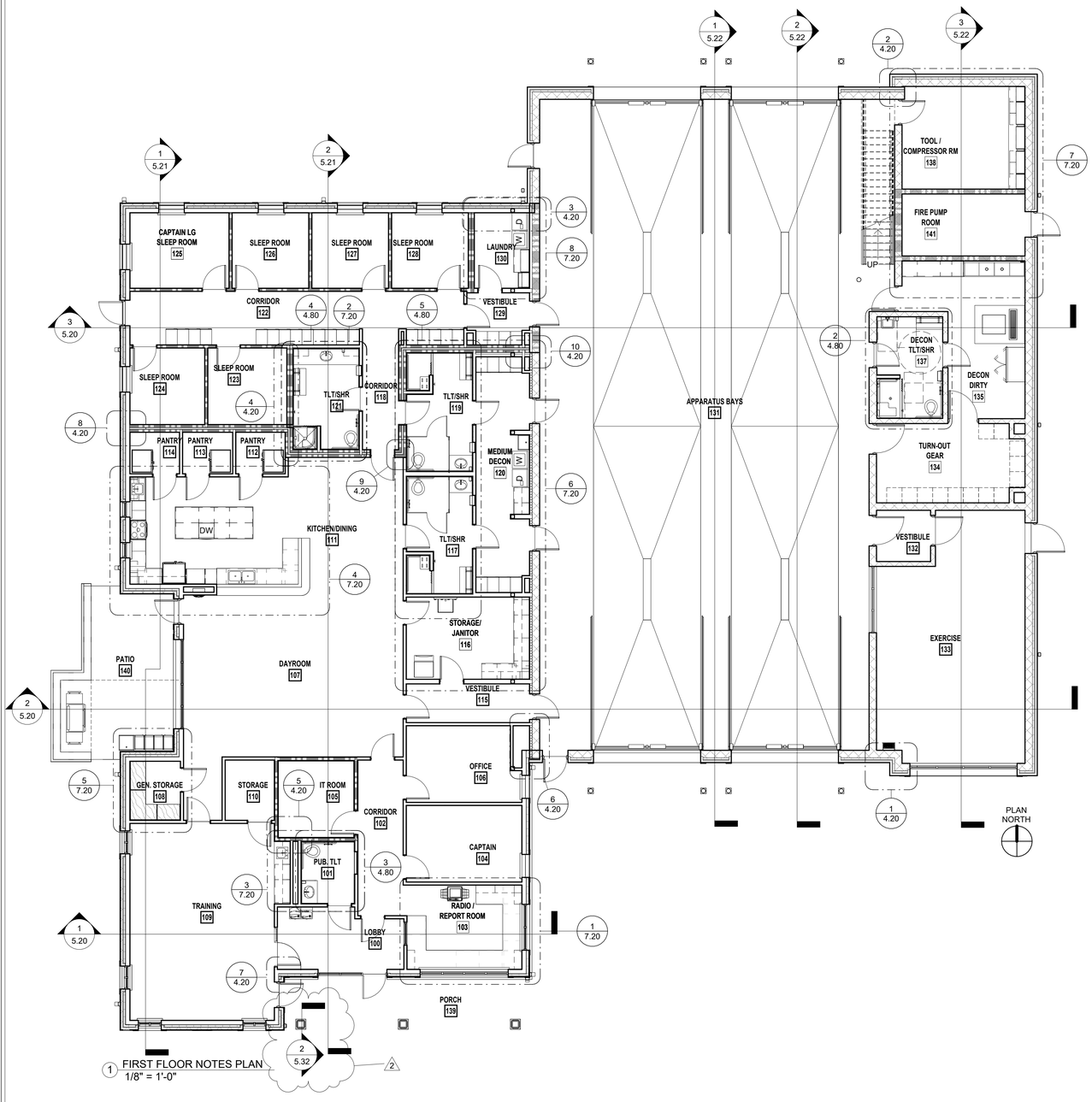
Castle Hayne Fire Station

Drawing No., Spec Section or General	Item No.	Item Description Under Review for Corrective Action	Action Required By Primary Team Member (Sorted by Discipline)	Date Item Identified	Item Status	Date Item Closed and/or Verified by Designer:	Date Item Closed and/or Verified by CM:	CM Comments	Designer Comments	Owner Comments
263613.16	24	The MTS/Docking Stations are also either 4X-SS enclosure (Notes) or N3R (Drawing).. Which should it be?		30-Apr-24					Refer to Addedum 02	
093013	25	P6A/P6B Schluter Kerdi Shower System – The Schluter Shower system uses a specific drain flange that is typically installed with the tile system because it has to sit on top of the subfloor after it is sloped to the drain, do we include the supply and install of the complete Schluter Shower drain system as part of the 09D Tiling Bid Package? This would require the plumber to provide a 2" stub up only at locations with a Schluter Drain.		30-Apr-24					Refer to Addedum 02	
093013	26	Shower Pan Depressions – Shower Pan Detail 5 sheet A7.11 shows a 2" slab depression at showers, structural drawings do not appear to show any slab depressions and spec Section 093013 lists a raised prefabricated shower curb from Schluter. Please confirm if shower stalls will be depressed for a zero-entry or if showers will receive a shower curb.		30-Apr-24					Refer to Addedum 02	
093013	27	FD1/Floor Drains at Tile Floors Over Schluter Ditra/Kerdi System – To be able to provide a watertight connection between floor drains and the specified Schluter Ditra uncoupling membrane/Kerdi waterproofing system a specific floor drain is required – typically the Schluter Kerdi Drain F (info sheet attached). Will the Schluter-Drain-F be used at Floor Drain locations in tiled floors? Would the supply and install of the Schluter Kerdi-Drain-F be included as part of the 09D Tiling Bid package?		30-Apr-24					Refer to Addedum 02	
093013	28	Outside Vertical Corners at Tiled Walls – Detail 1 Sheet A7.11 lists Schluter JOLLY trim at outside vertical corners and Detail 16 Sheet A7.11 lists Schluter QUADEC trim at outside wall corners, please confirm that Detail 16 Schluter QUADEC is the correct trim to include as there is a price difference.		30-Apr-24					Refer to Addedum 02	
093013	29	Floor Protection – Please confirm if the cost to supply and install (1) application of Floor protection is to be included in Bid Package 09C and package 09D or if the supply and/or install of floor protection is provided by others.		30-Apr-24				This scope is to be included in the both 9C and 9D. The installing subcontractor is to provide floor protection.	Protection to be provided. GC to determine who carries it.	
101418	30	Exterior Signage – 101418 Does not mention illumination requirements for Dimensional Letters on Drawing Sheet 5.10. Sheet 5.10 requires backlit letters on 2" spacers. Is this requirement in addition to the 101418 Part 2.3 requirements?		30-Apr-24					Refer to Addedum 02	
101418	31	Exterior Signage – No dimensions are provided for exterior Dimensional Lettering, shall we scale the drawing to get dimensions for the bid, or do we need to check the zoning code for allowable square footage and size appropriately per code requirements?		30-Apr-24					Refer to Addedum 02	
101418	32	Exterior Signage – No font is given for Dimensional Lettering. Will vector artwork or a font be provided for us to create our files for production?		30-Apr-24					Refer to Addedum 02	
101418	33	Exterior Signage – There are no dimensions provided for the Fire Emblem Plaques (4 front façade, 4 rear façade). Same question as #4, do we need to scale those based on the drawings?		30-Apr-24					Refer to Addedum 02	
101418	34	Exterior Signage – For Fire Emblems, same question as number 3 above. There are no illumination requirements for the plaques in 101418 Part 2.4. Are the illumination requirements on sheet 5.10 in addition to 2.4?		30-Apr-24					Refer to Addedum 02	
101418	35	Exterior Signage – there are no placement dimensions provided that we could find on any drawings for dimensional lettering or the fire emblems. Will this be provided later, or is placement to be calculated based on the scaled drawings and added to our proof sheet for approval?		30-Apr-24					Refer to Addedum 02	
101418	36	Misc. – There are no mentions of door lettering (vinyl) for front entryways or garage identification. Will this be needed, and shall it be included in our bid?		30-Apr-24					Refer to Addedum 02	

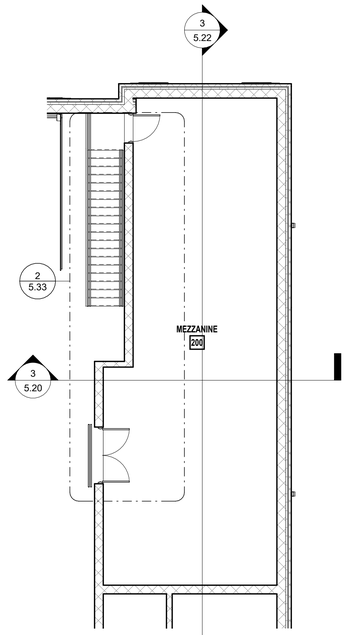
ASI #2

See attached sheets.

Stewart · Cooper · Newell Architects	REFERENCE SHEET NO. 4.11, 5.10, 5.11, 5.32 Revision to include details for Porch Entry Columns. Newly issued Sheet 5.12 to include detail for Entry Column Revision to Sheet 5.10 and 5.11 for Signage, New sheet 5.12 contains signage details.	05.10.2024
FAYETTEVILLE FIRE DEPARTMENT NEW SUB-STATION NO.4	ARCHITECTURAL SUPPLEMENTAL INSTRUCTIONS (ASI)	ASI #2



1 FIRST FLOOR NOTES PLAN
1/8" = 1'-0"



2 MEZZANINE NOTES PLAN
1/8" = 1'-0"

GENERAL NOTES

1. ALL CONTRACTORS MUST MAKE ON SITE VISITATIONS TO PROJECT SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES WITH THE EXTENT OF CONSTRUCTION.
2. DISCREPANCIES: THE CONTRACTOR SHALL INFORM THE ARCHITECT IN WRITING OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS OR OF ANY VARIATIONS NEEDED IN ORDER TO CONFORM TO CODES, RULES AND REGULATIONS. UPON RECEIPT OF SUCH INFORMATION, THE ARCHITECT WILL SEND WRITTEN INSTRUCTION TO ALL CONCERNED. ANY SUCH DISCREPANCY, OMISSION OR VARIATION NOT REPORTED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND WORK SHALL BE PERFORMED IN A MANNER DIRECTED BY THE ARCHITECT.
3. EXISTING CONDITIONS: ALL EXISTING INFORMATION WAS TAKEN FROM DRAWINGS FURNISHED BY OTHERS WHICH MAY OR MAY NOT BE CORRECT. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE JOB SITE. ANY DISCREPANCIES OR VARIATIONS FROM THE CONDITIONS SHOWN ON THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING.
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PERSONS USING THE SURROUNDING FACILITIES WHO COME INTO CONTACT WITH THE AREA OF CONSTRUCTION. HE SHALL PROPERLY BARRICADE THE AREA TO PREVENT INTRUSION BY PERSONS NOT ASSOCIATED WITH CONSTRUCTION.
5. DRAWING SCALES: THESE DRAWINGS ARE PREPARED TO THE SCALE NOTED. HOWEVER, DIMENSIONS ARE NOT TO BE DERIVED BY SCALING THE PLANS, SECTIONS OR DETAILS. IF THERE IS ANY QUESTIONS ABOUT DIMENSIONS OR DETAILS, CONTACT THE ARCHITECT FOR INFORMATION PRIOR TO STARTING WORK.
6. ALL NOTES APPLY TO ALL DRAWINGS AND ALL TRADES. IT IS THE RESPONSIBILITY OF ALL CONTRACTORS AND TRADES TO COORDINATE THE INSTALLATION OF THEIR WORK WITH THE INSTALLATION OF WORK BY ALL OTHER CONTRACTORS AND TRADES.
7. THE REQUIREMENTS OF THE DRAWINGS, GENERAL REQUIREMENTS AND ALL ITEMS OF THE CONTRACT DOCUMENTS ARE EQUALLY BINDING ON ALL CONTRACTORS AND TRADE, EACH CONTRACTOR IS REQUIRED TO KEEP FULL SETS OF THE CONTRACT DOCUMENTS FOR HIS/HERS EMPLOYEES USE ON THE PROJECT TO ASSURE THAT ALL WORK IS PROPERLY COORDINATED AND INSTALLED WITH THE WORK OF OTHER CONTRACTORS AND TRADES.
8. CONTRACTORS SHALL MEET WITH THE ARCHITECT PRIOR TO CONSTRUCTION OF THE PROJECT TO REVIEW ALL EXISTING CONDITIONS AND THE EXACT EXTENT OF THE WORK TO BE COMPLETED.
9. ALL WORK SHALL BE IN ACCORDANCE WITH THE NC 2018 BUILDING CODE AND ALL OTHER LOCAL CODES AND REGULATIONS HAVING JURISDICTION.
10. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING CONSTRUCTION AROUND THE SITE WHICH WILL REMAIN. ANY DAMAGES SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT NO COST.
11. SLOPE ALL EXTERIOR LANDINGS, WALKS, PORCHES, STEPS, ETC. 1/8" : 12" AWAY FROM THE BUILDING FOR DRAINAGE UNLESS NOTED OR SHOWN OTHERWISE.
12. FRAMING LUMBER IN CONTACT WITH MASONRY, CONCRETE OR STEEL SHALL BE PRESSURE TREATED.
13. GENERAL CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS LOOSE STEEL LINTELS AS REQUIRED WHERE MECHANICAL, PLUMBING OR ELECTRICAL EQUIPMENT PASS THRU WALLS OR OVER ANY BUILT-IN ITEMS IN MASONRY WALLS.
14. SLOPE FLOOR TO FLOOR DRAINS. COORDINATE ALL FLOOR DRAINS WITH PLUMBING CONTRACTOR.
15. PROVIDE WEEP HOLES @ 24" O.C. OVER ALL MASONRY OPENINGS.
16. PROVIDE FIRE TREATED LUMBER AS REQUIRED BY THE BUILDING CODE.
17. FIRE PENETRATION NOTES APPLY TO ALL TRADES.
18. PROVIDE BLOCKING IN METAL STUD WALLS AS REQUIRED FOR ALL SUSPENDED ITEMS INCLUDING BUT NOT LIMITED TO E.W.C., TOILET ACCESSORIES, PLUMBING, MECHANICAL, ELECTRICAL & E.T.C. - COORDINATE WITH OTHER TRADES.
19. SEE ELEVATIONS FOR EXTERIOR WALL MASONRY CONTROL JOINTS (CJ) LOCATIONS. CONTROL JOINTS TO BE IN MASONRY JOINTS. LOCATE WALL CONTROL JOINTS AS INDICATED.
20. FURR WALLS AS REQUIRED FOR MECHANICAL AND PLUMBING VENTS.
21. DO NOT CUT ANY LAY-IN ACOUSTICAL CEILING PANELS LESS THAN 6" UNLESS INSTRUCTED BY THE ARCHITECT. LAY-IN CEILING PANELS TO BE EQUALLY SPACED IN AREA.
22. DIMENSIONS SHOWN ON FLOOR PLANS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE (SEE FLOOR PLAN NOTES ON SHEET 4.10).
23. UNLESS NOTED OTHERWISE, CARRY ALL FIRE RATED WALLS AND PARTITIONS TO STRUCTURE ABOVE.
24. NO CORE OF BLOCKS SHOULD BE EXPOSED. USE SOLID BLOCK WHERE REQUIRED TO KEEP CORES FROM BEING VISIBLY EXPOSED.
25. CMU WALLS DIMENSIONED 8" OR 12" NOM U.N.O.
26. WALL TO TERMINATE 12" ABOVE HIGHEST ADJACENT CEILING U.N.O.
27. THERE SHALL BE NO EXPOSED CONDUIT ON THE EXPOSED CMU OR ANY OTHER WALLS.

GENERAL NOTE

ALL NOTES APPLY TO ALL DRAWINGS AND ALL TRADES. IT IS THE RESPONSIBILITY OF ALL CONTRACTORS AND TRADES TO COORDINATE THE INSTALLATION OF THEIR WORK WITH THE INSTALLATION OF WORK BY ALL OTHER CONTRACTORS AND TRADES. THE REQUIREMENTS OF THE DRAWINGS, GENERAL REQUIREMENTS AND ALL ITEMS OF THE CONTRACT DOCUMENTS ARE EQUALLY BINDING ON ALL CONTRACTORS AND TRADES. EACH CONTRACTOR IS REQUIRED TO MAINTAIN FULL SETS OF THE CONTRACT DOCUMENTS FOR HIS EMPLOYEES USE ON THE PROJECT TO ASSURE THAT ALL WORK IS PROPERLY COORDINATED AND INSTALLED WITH THE WORK OF OTHER CONTRACTORS AND TRADES.

WHENEVER THERE ARE DISCREPANCIES BETWEEN DRAWINGS, OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR CONFLICTS WITHIN THE SPECIFICATIONS AND/OR DRAWINGS, AND SUCH DISCREPANCY IS NOT CALLED TO THE ARCHITECTS ATTENTION IN TIME TO PERMIT CLARIFICATION BY ADDENDUM, THE CONTRACTOR SHALL BASE HIS BID UPON PROVIDING THE BETTER QUALITY OR GREATER OF WORK OR MATERIAL CALLED FOR, SHALL SUBMIT A WRITTEN STATEMENT WITH HIS PROPOSAL NOTING SUCH DISCREPANCIES, AND SHALL SO FURNISH AND INSTALL SUCH BETTER QUALITY OR GREATER QUANTITY UNLESS OTHERWISE ORDERED IN WRITING.

Project No.
1738

Date:
03.29.2024
Drawn by:
AJP/GAS
Checked by:
KCN
Revisions:
2
05.10.2024
ADDENDUM 2

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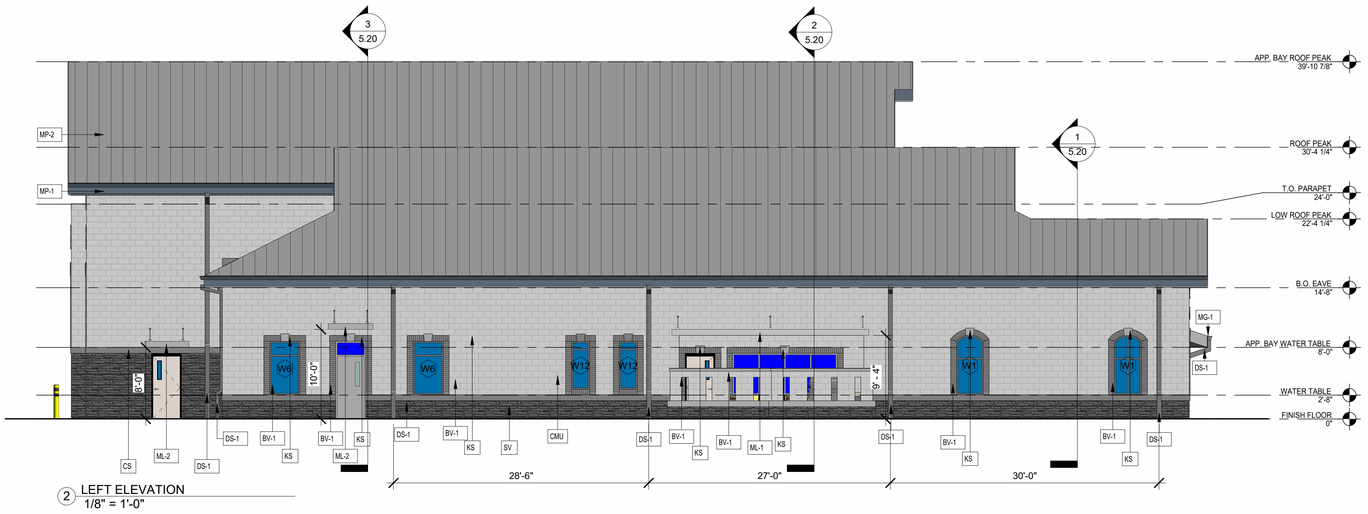
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KATHLEEN C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA
03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

NOTES PLANS

Sheet No.
4.11



2 LEFT ELEVATION
1/8" = 1'-0"

EXTERIOR FINISH MATERIALS:

BRICK VENEER ACCENT TRIM
BV-1 INTERSTATE BRICK; COLOR: MIDNIGHT BLACK, MODULAR WIRECUT

WALL SIDING
WS-1 JAMES HARDIE PRODUCTS; PANEL VERTICAL SIDING (SMOOTH); COLOR: TBD

METAL ROOF
MP-1 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS; COLOR: SLATE GRAY (TRIMS)

MP-2 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS;COLOR: TUNDRA (ROOF PANELS)

CLG-1 METAL ROOFING SYSTEMS, INC. .040 ALUMINUM FLUSH PANEL METAL SOFFIT W/ CONCEALED FASTENERS; COLOR: MATCH MP-2

AZ -TRIM
AZ-TRIM TRIM TO BE AZEC TRADITIONAL 2X12 TRIM OR APPROVED EQUAL; COLOR: PAINT TO MATCH MP-1. FOLLOW MANUFACTUER'S GUDELINES FOR INSTALLATION TO E NSURE PROPER JOINT PLACEMENTS FOR EXPANSION AND CONTRACTION.

SIGNAGE
SG-1 BACKLIT REVESE PAN SIGNAGE; LETTER SIGNAGE ON 2" SPACES; PAINTED TO MATCH MP-2 . COLOR: TBD. LETTERS ARE TO BE INDIVIDUALLY MOUNTED WITHOUT A RAIL; FONT: TIMES NEW ROMAN

KEYSTONE
KS CAST STONE KEYSTONE; CUSTOM COLORED TO MATCH BV-1 (INTEGRAL WATER REPELLENT)

FIREFIGHTER EMBLEM
EMB REVERSE PAN BACKLIT METAL EMBLEM

CAST STONE
CS COLOR: TO MATCH BV-1 (INTEGRAL WATER REPELLENT & STONE ANCHORS REQUIRED)

STONE VENEER
SV CORONADO STONE ARTISAN LEDGE PANEL - COLOR: HURON HAND-LAID DRY STACKED

MORTAR - TYPE 'S'
FOR STONE AND BRICK: SUBMIT STANDARD COLOR SAMPLES FOR APPROVAL
FOR CAST STONE: MORTAR JOINT COLOR TO MATCH CAST STONE.
JOINTS TO BE CONCAVE ROUND TOOLED JOINTS

EXTERIOR MASONRY WALLS
CMU OLD CASTLE SMOOTH FACE BLOCK. COLOR: 4205
CMU TO HAVE INTEGRAL WATER REPELLANT. SEE SPECS

HOLLOW METAL EXTERIOR FRAMES
PRIMED WITH SHERWIN WILLIAMS KEM BOND HS UNIVERSAL METAL PRIMER GRAY B50AZ18; PRO INDUSTRIAL URETHANE ALKYD ENAMEL FINISH COAT COLOR:TBD

METAL GUTTERS & DOWNSPOUTS
MG-1 METAL ROOFING SYSTEMS "STYLE D" GUTTER. SIZE 7" X .040 ALUMINUM. FOLLOW PROFI;E SHOWN ON ELEVATIONS PROVIDE PERFORATED ALUMINIM LEAF GUARD FOR ALL GUTTERS

DS-1 DOWNSPOUT - SIZE 4" X 5" X .040 ALUMINUM. FOLLOW PROFILE SHOWN ON ELEVATIONS

FASCIA TRIM
FT COLOR: TO MATCH MP-1

OVERHEAD DOORS
COMMERCIAL SECTIONAL INSULATED OVERHEAD DOOR SEE SPECIFICATION WITH IMPACT GLASS. SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10).

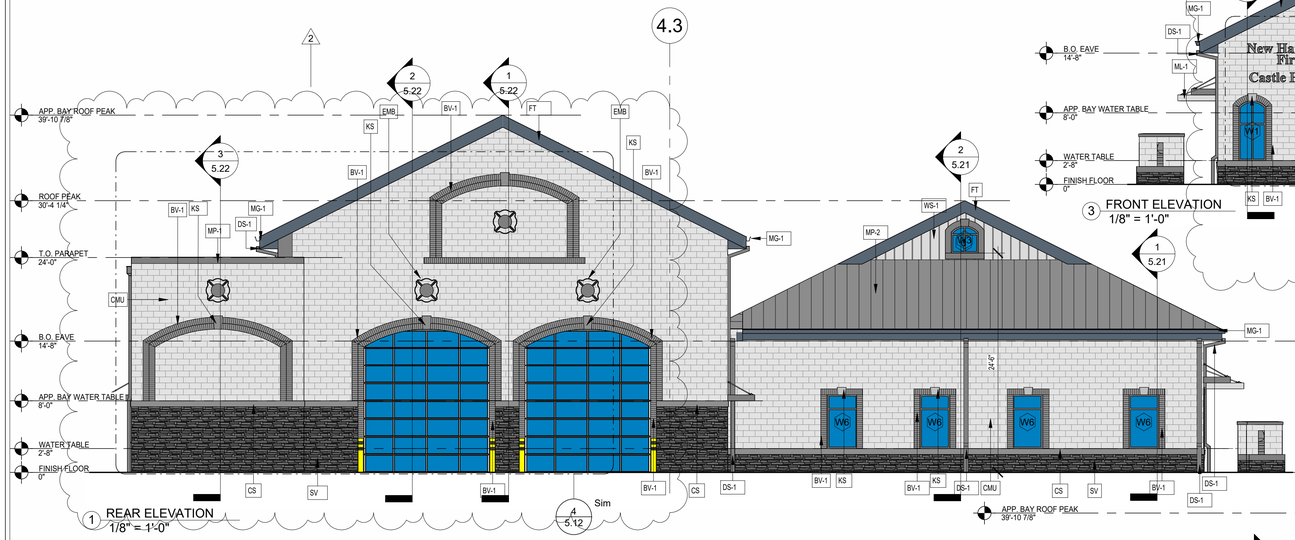
BIFOLD DOORS
SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10)

OVERHEAD DOOR FRAMES
PAINT WITH EPOXY; COLOR TO MATCH MP-2

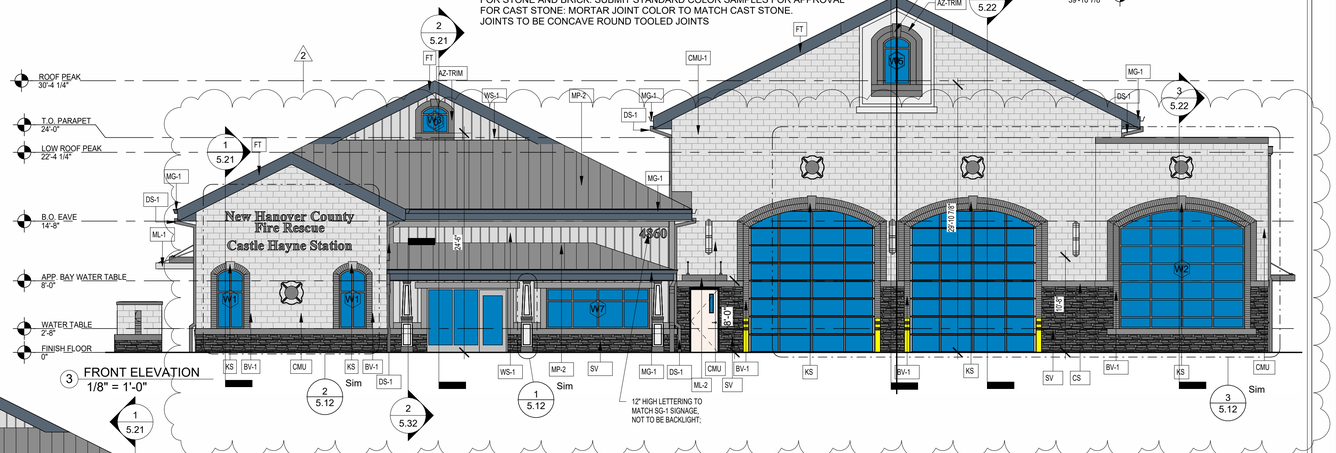
STOREFRONT DOORS & WINDOWS
ALUMINUM STOREFRONT; COLOR: ANODIZED BLACK

PVC ROOFING MEMBRANE
SARNAFIL FULLY ADHERED 80 MIL. PVC ROOFING. COLOR TO BE GRAY TO MATCH MP-2

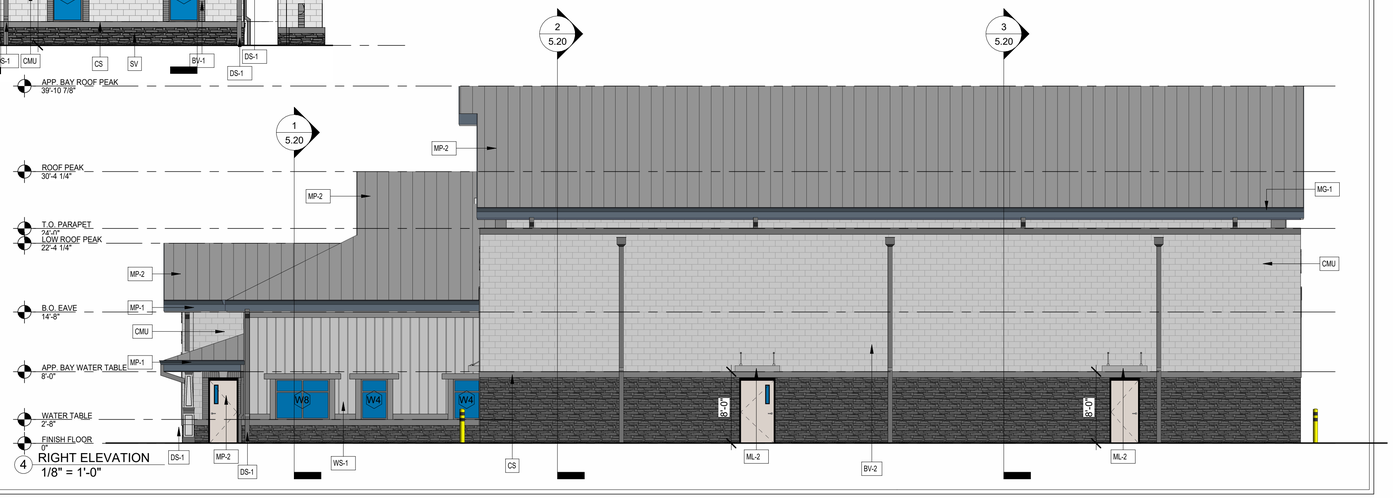
METAL CANOPY
ML-1 MAPES LUMISHADE (22' W x 4'-6" D); COLOR TO MATCH MP-1
ML-2 MAPES LUMISHADE (5' W x 3' D); COLOR TO MATCH MP-1



1 REAR ELEVATION
1/8" = 1'-0"



3 FRONT ELEVATION
1/8" = 1'-0"



4 RIGHT ELEVATION
1/8" = 1'-0"

Project No.
1738

Date:
5/9/2024 4:09:17 PM
Drawn by:
Author
Checked by:
Checker
Revisions: 2
05.10.2024
ADDENDUM 2

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www.scn-architects.com

KENNETH C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA

03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

ELEVATIONS COLORED

Sheet No.
5.10

EXTERIOR FINISH MATERIALS:

BRICK VENEER ACCENT TRIM
BV-1 INTERSTATE BRICK; COLOR: MIDNIGHT BLACK, MODULAR WIRECUT

WALL SIDING
WS-1 JAMES HARDIE PRODUCTS; PANEL VERTICAL SIDING (SMOOTH); COLOR: TBD

METAL ROOF
MP-1 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS; COLOR: SLATE GRAY (TRIMS)

MP-2 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS;COLOR: TUNDRA (ROOF PANELS)

CLG-1 METAL ROOFING SYSTEMS, INC. .040 ALUMINUM FLUSH PANEL METAL SOFFIT W/ CONCEALED FASTENERS; COLOR: MATCH MP-2

AZ -TRIM
AZ-TRIM TRIM TO BE AZEC TRADITIONAL 2X12 TRIM OR APPROVED EQUAL; COLOR: PAINT TO MATCH MP-1. FOLLOW MANUFACTUER'S GUDELINES FOR INSTALLATION TO E NSURE PROPER JOINT PLACEMENTS FOR EXPANSION AND CONTRACTION.

SIGNAGE
SG-1 BACKLIT REVESE PAN SIGNAGE; LETTER SIGNAGE ON 2" SPACES; PAINTED TO MATCH MP-2 . COLOR: TBD. LETTERS ARE TO BE INDIVIDUALLY MOUNTED WITHOUT A RAIL; FONT: TIMES NEW ROMAN

KEYSTONE
KS CAST STONE KEYSTONE; CUSTOM COLORED TO MATCH BV-1 (INTEGRAL WATER REPELLENT)

FIREFIGHTER EMBLEM
EMB REVERSE PAN BACKLIT METAL EMBLEM

CAST STONE
CS COLOR: TO MATCH BV-1 (INTEGRAL WATER REPELLENT & STONE ANCHORS REQUIRED)

STONE VENEER
SV CORONADO STONE ARTISAN LEDGE PANEL - COLOR: HURON HAND-LAID DRY STACKED

MORTAR - TYPE 'S'
FOR STONE AND BRICK: SUBMIT STANDARD COLOR SAMPLES FOR APPROVAL FOR CAST STONE: MORTAR JOINT COLOR TO MATCH CAST STONE. JOINTS TO BE CONCAVE ROUND TOOLED JOINTS

EXTERIOR MASONRY WALLS
CMU OLD CASTLE SMOOTH FACE BLOCK. COLOR: 4205
CMU TO HAVE INTEGRAL WATER REPELLANT. SEE SPECS

HOLLOW METAL EXTERIOR FRAMES
PRIMED WITH SHERWIN WILLIAMS KEM BOND HS UNIVERSAL METAL PRIMER GRAY B50AZ18; PRO INDUSTRIAL URETHANE ALKYD ENAMEL FINISH COAT COLOR:TBD

METAL GUTTERS & DOWNSPOUTS
MG-1 METAL ROOFING SYSTEMS "STYLE D" GUTTER. SIZE 7" X .040 ALUMINUM. FOLLOW PROFI;E SHOWN ON ELEVATIONS PROVIDE PERFORATED ALUMINIM LEAF GUARD FOR ALL GUTTERS

DS-1 DOWNSPOUT - SIZE 4" X 5" X .040 ALUMINUM. FOLLOW PROFILE SHOWN ON ELEVATIONS

FASCIA TRIM
FT COLOR: TO MATCH MP-1

OVERHEAD DOORS
COMMERCIAL SECTIONAL INSULATED OVERHEAD DOOR SEE SPECIFICATION WITH IMPACT GLASS. SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10).

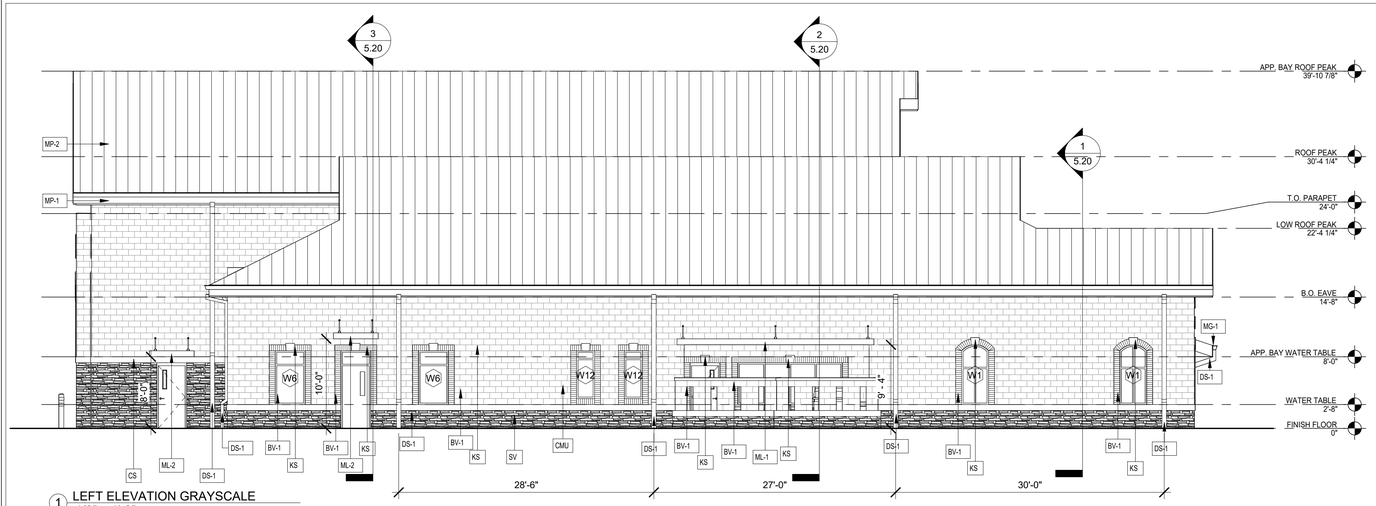
BIFOLD DOORS
SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10)

OVERHEAD DOOR FRAMES
PAINT WITH EPOXY; COLOR TO MATCH MP-2

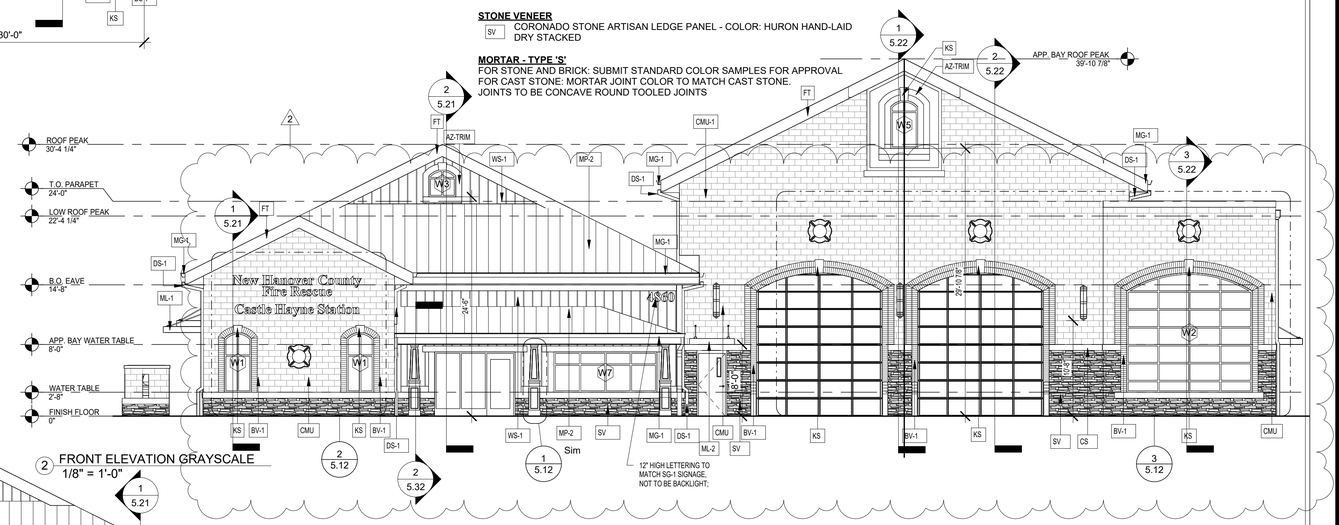
STOREFRONT DOORS & WINDOWS
ALUMINUM STOREFRONT; COLOR: ANODIZED BLACK

PVC ROOFING MEMBRANE
SARNAFIL FULLY ADHERED 80 MIL. PVC ROOFING. COLOR TO BE GRAY TO MATCH MP-2

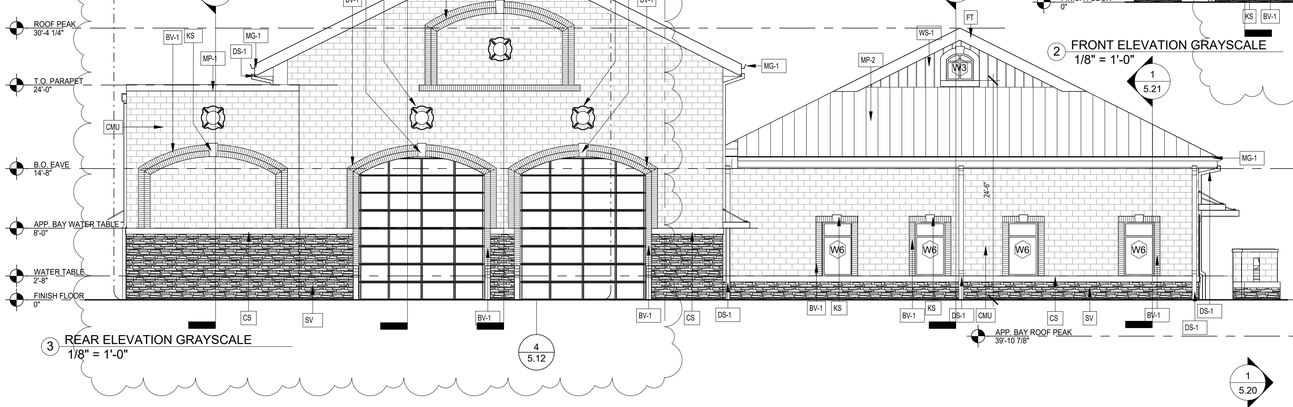
METAL CANOPY
ML-1 MAPES LUMISHADE (22' W x 4'-6" D); COLOR TO MATCH MP-1
ML-2 MAPES LUMISHADE (5' W x 3' D); COLOR TO MATCH MP-1



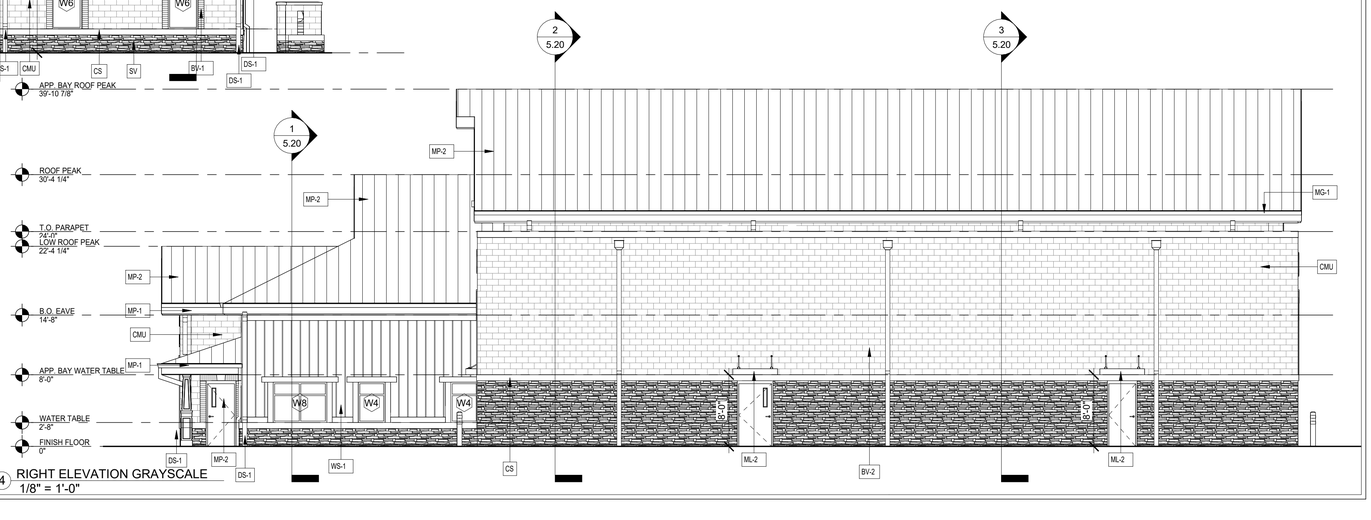
1 LEFT ELEVATION GRAYSCALE
1/8" = 1'-0"



2 FRONT ELEVATION GRAYSCALE
1/8" = 1'-0"



3 REAR ELEVATION GRAYSCALE
1/8" = 1'-0"



4 RIGHT ELEVATION GRAYSCALE
1/8" = 1'-0"

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PAULETTE C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA

03.29.2024

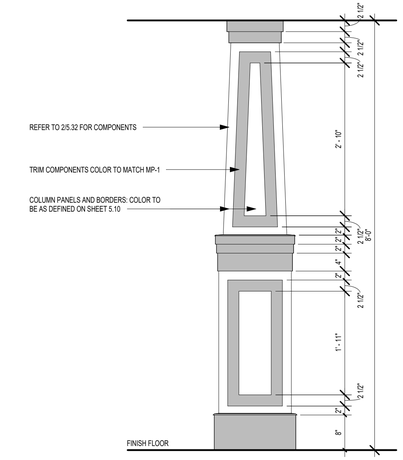
Project No.
1738

Date:
5/9/2024 4:09:29 PM
Drawn by:
Author
Checked by:
Checker
Revisions: 2
05.10.2024
ADDENDUM 2

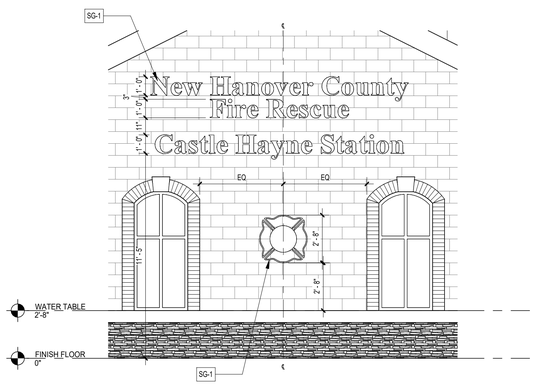
CASTLE HAYNES FIRE DEPARTMENT

ELEVATIONS GRAYSCALE

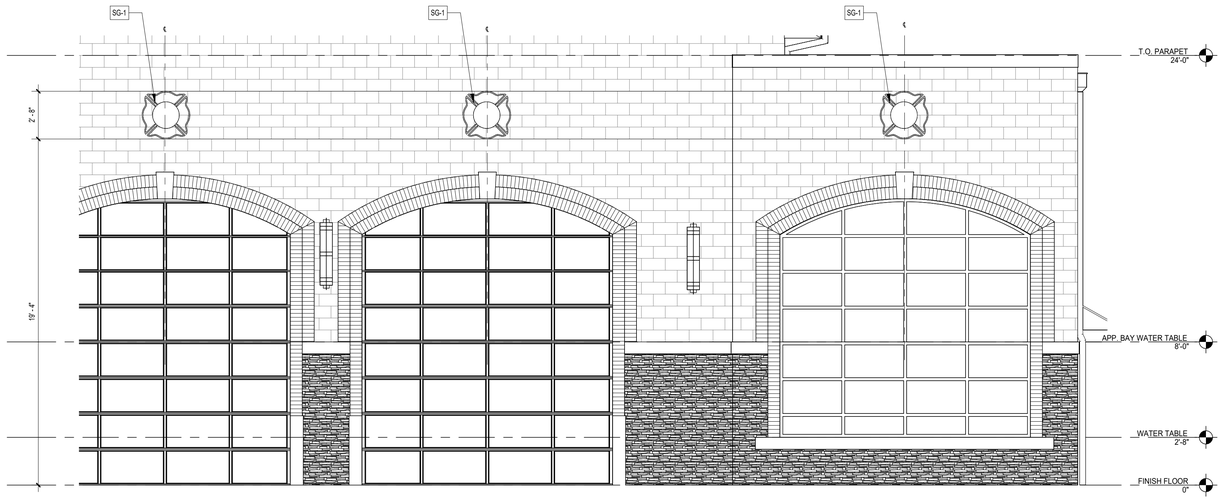
Sheet No.
5.11



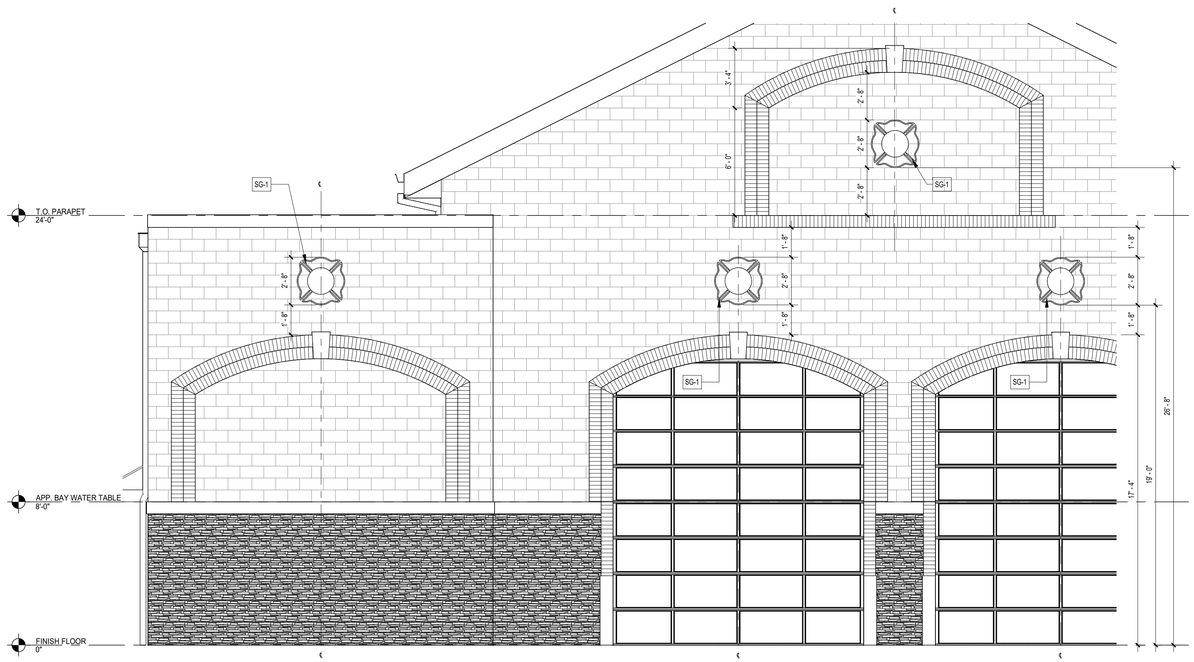
1 COLUMN ELEVATION
3/4" = 1'-0"



2 TRAINING ROOM EXTERIOR SIGNAGE
1/4" = 1'-0"



3 APPARATUS FRONT BAY SIGNAGE
1/4" = 1'-0"



4 APPARATUS BAY REAR ELEVATION SIGNAGE
1/4" = 1'-0"

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1738

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5/8/2024 5:56:13 PM
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Revisions: 2
05.10.2024
ADDENDUM 2

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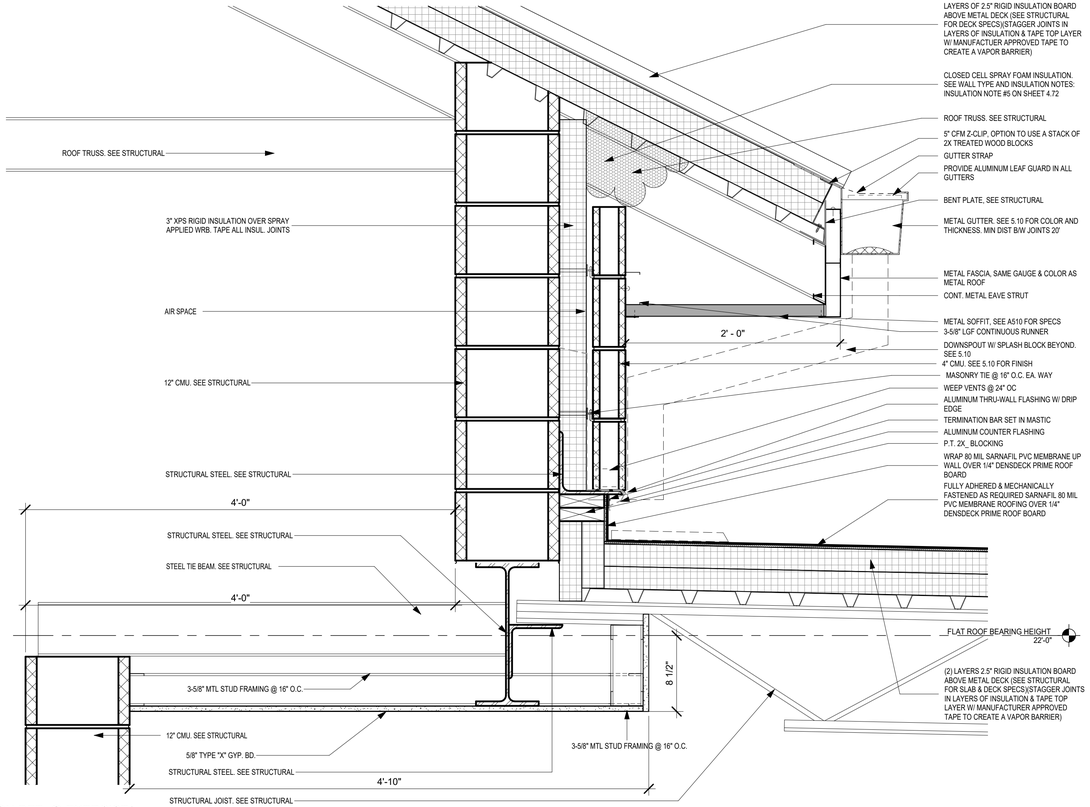
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KENNETH C. HERRELL
REGISTERED ARCHITECT
6205
NORTH CAROLINA
05.10.2024

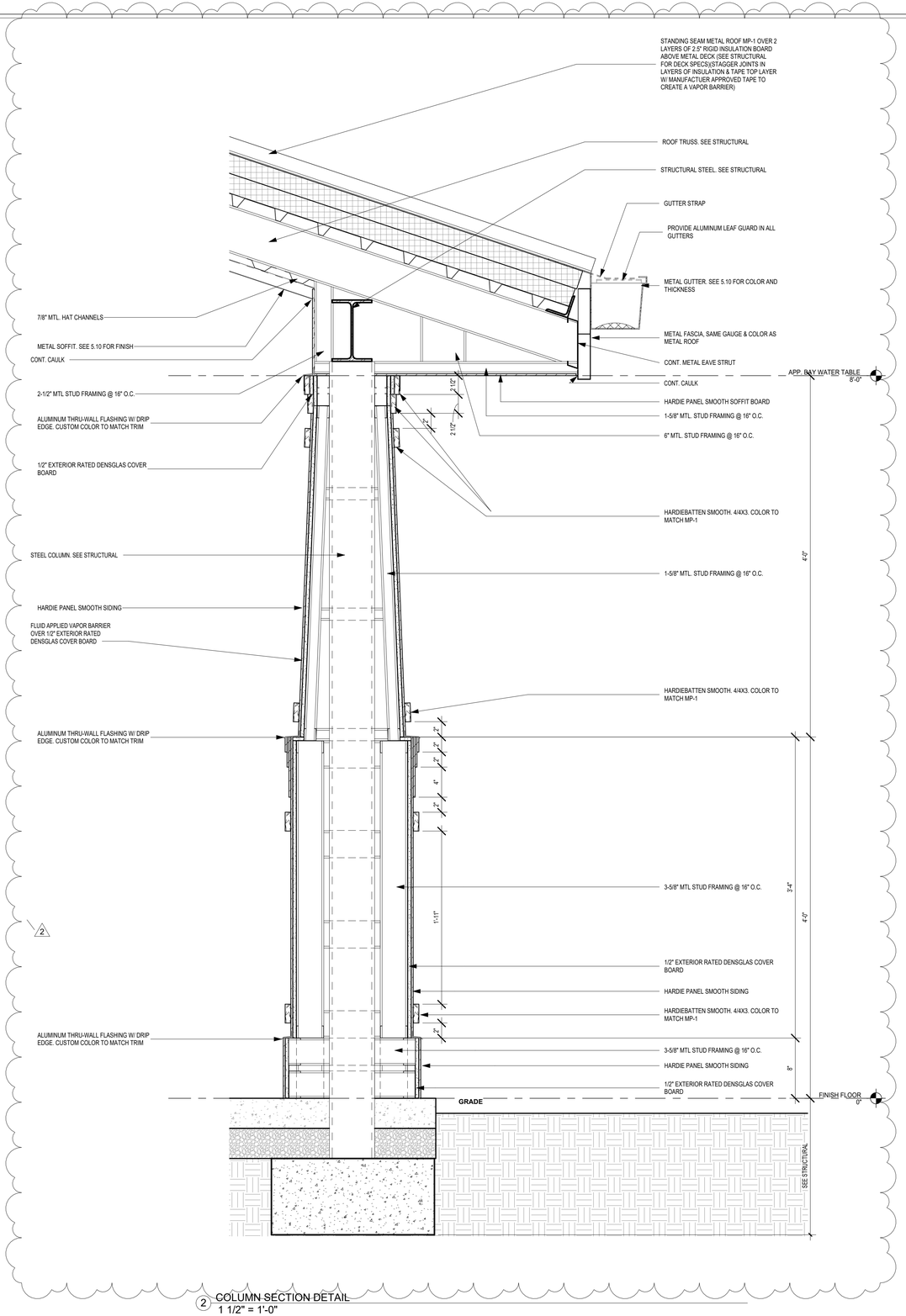
CASTLE HAYNES FIRE DEPARTMENT

ELEVATION DETAILS

Sheet No.
5.12



1 SECTION DET. @ EXERCISE/ MEZZANINE
1 1/2" = 1'-0"



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

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1738

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ADDENDUM 2

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FRANKLIN C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA
03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

WALL SECTION DETAILS

Sheet No.
5.32

CIVIL

100% CONSTRUCTION DOCUMENTS

CASTLE HAYNE FIRE STATION

NEW HANOVER COUNTY
4860 CASTLE HAYNE ROAD, CASTLE HAYNE, NORTH CAROLINA 28429

UTILITY / MUNICIPALITY CONTACTS:

A. NEW HANOVER COUNTY:
PLANNING AND LAND USE
CONTACT: ZACHARY DICKERSON
PHONE: (910) 798-7450
EMAIL: ZDICKERSON@NHCGOV.COM

B. BURIED CABLE LOCATION
NC 811

C. DUKE ENERGY
(866) 582-6345

CONSULTANT CONTACTS:

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NEW HANOVER COUNTY
FACILITIES MANAGEMENT
200 DIVISION DRIVE
WILMINGTON, NC 28401
910-798-4338
KCAISON@NHCGOV.COM
704-865-6311

SITE ENGINEER/ LANDSCAPE ARCHITECT
TIMMONS GROUP
CONTACT: WILL ALTMAN, PE
5410 TRINITY ROAD, SUITE 102
RALEIGH, NC 27607
PHONE: 919-866-4938

ARCHITECT
GREGORY SCOTT
PROJECT MANAGER
STEWART-COOPER-NEWELL ARCHITECTS, P.A.
719 EAST SECOND AVENUE
GASTONIA, NC 28054

GENERAL NOTES:
1. ALL CONSTRUCTION SHALL CONFORM TO THE NEW HANOVER COUNTY DESIGN AND CONSTRUCTION STANDARDS.
2. CONSTRUCTION DRAWING APPROVAL IS REQUIRED PRIOR TO BEGINNING CONSTRUCTION. DEVELOPMENT FEES (ACREAGE, FEE-IN-LIEU OF ASSESSMENT AND INSPECTION FEES AND OTHERS AS REQUIRED MAY BE APPLICABLE) ARE DUE BEFORE CONSTRUCTION DRAWING APPROVAL.
3. THE PLAN IS SUBJECT TO REVISIONS DURING CONSTRUCTION DRAWING APPROVAL PROCESS.
4. IF THERE IS A GEODETIC MONUMENT LOCATED ON THIS SITE, IT MUST BE PROTECTED OR IF RELOCATION IS NEEDED IT WILL BE THE RESPONSIBILITY OF THE DEVELOPER TO RELOCATE IT WITH SURVEY ACCURACY.
5. ALL NEW UTILITY LINES (POWER, CABLE, ETC.) MUST BE UNDERGROUND



VICINITY MAP
1" = 1000'



VICINITY MAP
1" = 500'

SITE DATA TABLE

PIN:	3231060477
TOTAL SITE AREA:	2.22 AC
DISTURBED AREA	2.47 AC
ZONING:	B-1 BUSINESS DISTRICT
WATERSHED:	CAPE FEAR
PROPOSED IMPERVIOUS	0.98 AC
MAXIMUM BUILDING HEIGHT:	40'
PROPOSED BUILDING HEIGHT	39'-10 7/8"
MINIMUM BUILDING SETBACK	FRONT: 25' SIDE: 25' (STREET) REAR: 30' (RESIDENTIAL)
PROVIDED BUILDING SETBACK	FRONT: 25' SIDE: 25' REAR: 30'
MINIMUM LANDSCAPE BUFFERS	10'
TOTAL BUILDING FOOTPRINT AREA	11,357 SQFT
PARKING REQUIREMENTS	
TOTAL REQUIRED PARKING	2.5 SPACES / 1,000 SF (2.5 SPACES * 11,357 SF) / 1,000 SF = 29 SPACES
TOTAL PARKING SPACES PROVIDED	29 PARKING SPACES
ADA PARKING REQUIRED	2 SPACES
ADA SPACES PROVIDED	2 SPACES

Sheet List Table

Sheet Number	Sheet Title
C0.0	COVER SHEET
C1.0	EXISTING CONDITIONS
C2.0	PHASE I EC PLAN
C2.1	PHASE II EC PLAN
C2.2	PHASE III EC PLAN
C2.3	PHASE IV EC PLAN
C3.0	SITE PLAN
C3.1	UTILITY PLAN
C4.0	GRADING PLAN
C4.1	SW COMPLIANCE PLAN
C4.2	DRAINAGE AREA MAP
C4.3	DRY DETENTION
C4.4	DRY DETENTION
C4.5	DRY DETENTION
C4.6	STORM FILTER
C4.7	STORMWATER PROFILES
C5.0	NOTES AND DETAILS
C5.1	NOTES AND DETAILS
C5.2	NOTES AND DETAILS
C5.3	NOTES AND DETAILS
C5.4	NOTES AND DETAILS
C5.5	NOTES AND DETAILS
C5.6	NOTES AND DETAILS
C6.0	SEPTIC PLAN
C6.1	SEPTIC PLAN
L1.1	TREE INVENTORY
L2.0	PLANTING PLAN
--	LIGHTING PLAN

2

GENERAL NOTE

ALL NOTES APPLY TO ALL DRAWINGS AND ALL TRADES. IT IS THE RESPONSIBILITY OF ALL CONTRACTORS AND TRADES TO COORDINATE THE INSTALLATION OF THEIR WORK WITH THE INSTALLATION OF WORK BY ALL OTHER CONTRACTORS AND TRADES. THE REQUIREMENTS OF THE DRAWINGS, GENERAL REQUIREMENTS AND ALL ITEMS OF THE CONTRACT DOCUMENTS ARE EQUALLY BINDING ON ALL CONTRACTORS AND TRADES. EACH CONTRACTOR IS REQUIRED TO MAINTAIN FULL SETS OF THE CONTRACT DOCUMENTS FOR HIS EMPLOYEES USE ON THE PROJECT TO ASSURE THAT ALL WORK IS PROPERLY COORDINATED AND INSTALLED WITH THE WORK OF OTHER CONTRACTORS AND TRADES.

WHENEVER THERE ARE DISCREPANCIES BETWEEN DRAWINGS, OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR CONFLICTS WITHIN THE SPECIFICATIONS AND/OR DRAWINGS, AND SUCH DISCREPANCY IS NOT CALLED TO THE ARCHITECT'S ATTENTION IN TIME TO PERMIT CLARIFICATION BY ADDENDUM, THE CONTRACTOR SHALL BASE HIS BID UPON PROVIDING THE BETTER QUALITY OR GREATER OF WORK OR MATERIAL CALLED FOR, SHALL SUBMIT A WRITTEN STATEMENT WITH HIS PROPOSAL NOTING SUCH DISCREPANCIES, AND SHALL SO FURNISH AND INSTALL SUCH BETTER QUALITY OR GREATER QUANTITY UNLESS OTHERWISE ORDERED IN WRITING.

Project No.
56400

Date:
03/29/2024
Drawn by:
J GLAS
Checked by:
W ALTMAN
Revisions:
Addendum 02
5/10/2024

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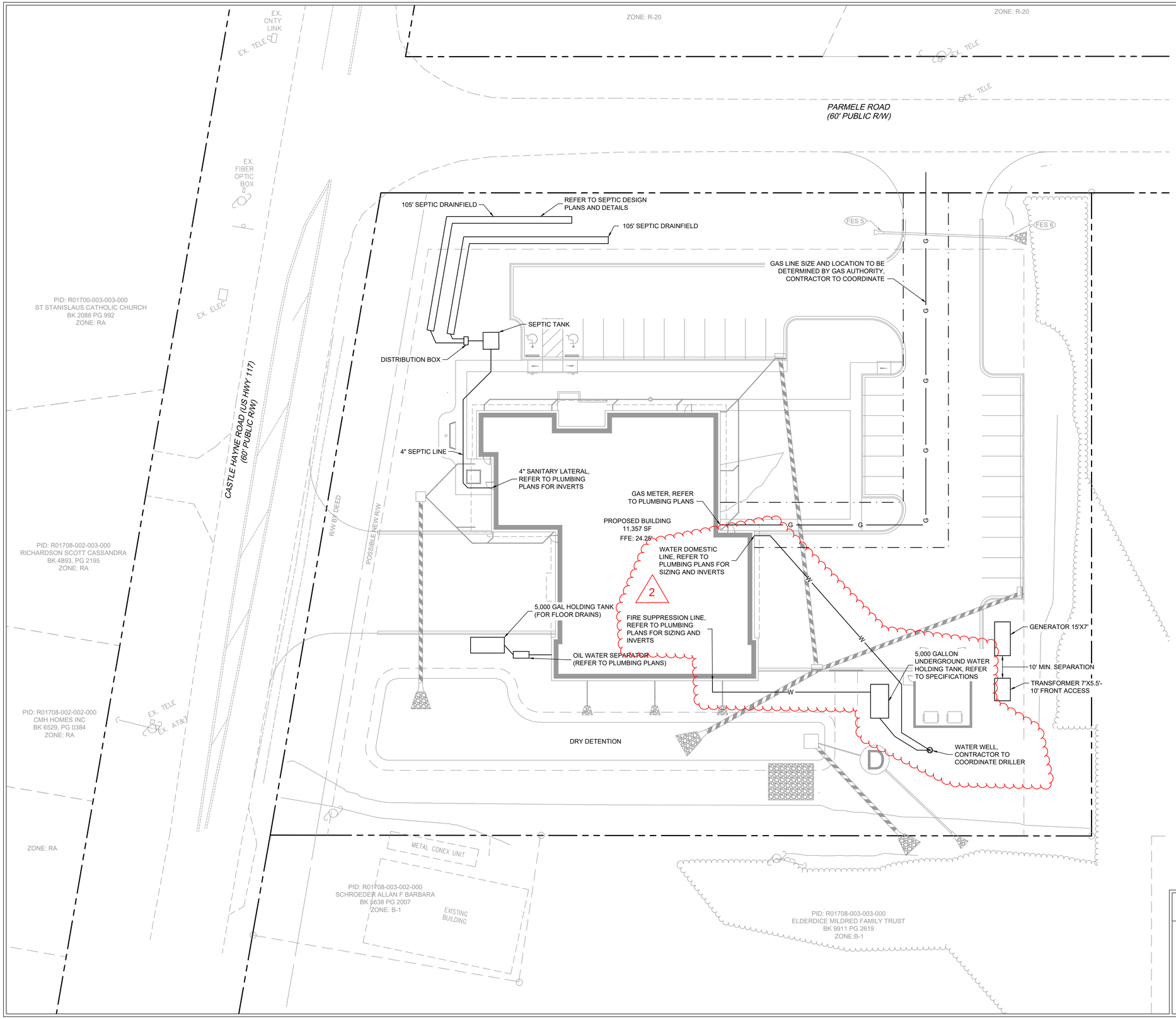
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NORTH CAROLINA PROFESSIONAL SEAL 045892 ENGINEER William P. Altman

CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

COVER SHEET

Sheet No.
C0.0



GENERAL UTILITY NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL OSHA REQUIREMENTS, NEW HANOVER COUNTY, AND NCDOT STANDARDS, SPECIFICATIONS AND DETAILS.
2. ALL SANITARY SEWER SERVICES SHALL BE 4" OR 6" PVC (SCH 40) @1.04% MIN. SLOPE UNLESS INDICATED OTHERWISE. USE DUCTILE IRON WHEN COVER IS LESS THAN 36-IN.
3. CLEANOUTS ARE REQUIRED AT LEAST EVERY 50 FEET FOR FOUR-INCH SEWER SERVICES AND EVERY 100 FEET FOR SIX-INCH SEWER SERVICES AND AT ALL JUNCTIONS AND BENDS WHICH EXCEED 45 DEGREES. BENDS ARE REQUIRED AT ALL CHANGES IN DIRECTION.
4. COORDINATE AND SCHEDULE INSTALLATION OF ALL UTILITIES WITH OTHER PRIME CONTRACTORS, UTILITY COMPANIES AND OTHER TRADES INCLUDING BUT NOT LIMITED TO: NATURAL GAS, ELECTRICITY, TELEPHONE AND CATV.
5. VERIFY EXISTING CONDITIONS AND CONNECTIONS TO EXISTING UTILITIES PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT IF ANY DISCREPANCIES ARE DISCOVERED.
6. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGES DURING CONSTRUCTION AND SHALL MAKE REPAIRS AT NO EXPENSE TO THE OWNER.
7. THE CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY OF ALL UTILITY AND STORM DRAINAGE IMPROVEMENTS FOLLOWING CONSTRUCTION.
8. METALLIC LINES SHALL BE IDENTIFIED WITH DURABLE PRINTED PLASTIC WARNING TAPES, MINIMUM 3 INCHES WIDE WITH LETTERING TO IDENTIFY BURIED LINE BELOW.
9. NON-METALLIC PIPES, OTHER THAN GAS LINES, SHALL BE IDENTIFIED BY DETECTABLE WARNING TAPE, MINIMUM 2 INCHES WIDE, WITH LETTERING TO IDENTIFY BURIED LINE BELOW.
10. FOR PLASTIC SEWER PIPING, AN INSULATED COPPER TRACER WIRE OR OTHER APPROVED CONDUCTOR SHALL BE INSTALLED ADJACENT TO AND OVER THE FULL LENGTH OF THE PIPING. ACCESS SHALL BE PROVIDED TO THE TRACER WIRE OR THE TRACER WIRE SHALL TERMINATE AT THE CLEANOUT BETWEEN THE BUILDING DRAIN AND BUILDING SEWER. THE TRACER WIRE SIZE SHALL BE NOT LESS THAN 14 AWG AND THE INSULATION TYPE SHALL BE LISTED FOR DIRECT BURIAL.
11. 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.
12. UTILITIES CONTRACTOR TO NOTIFY INSPECTOR AT LEAST 48 HOURS BEFORE FLUSHING THE PROPOSED WATERLINE.
13. ALL EXISTING UTILITIES, SUCH AS VALVE BOXES, VAULT COVERS, AND MANHOLES, AFFECTED BY GRADING OR PAVING OPERATIONS MUST BE ADJUSTED TO FINAL GRADE AFTER CONSTRUCTION.
14. REFER TO PLUMBING DRAWINGS FOR SANITARY SEWER INVERTS OUT OF BUILDINGS
15. FENCE POSTS SHALL NOT BE LOCATED WITHIN UTILITY EASEMENTS.
16. ALL NEW UTILITY LINES (POWER, CABLE, ETC.) MUST BE UNDERGROUND.
17. ALL CONSTRUCTION SHALL CONFORM TO NEW HANOVER COUNTY DESIGN AND CONSTRUCTION STANDARDS.
18. CONSTRUCTION DRAWING APPROVAL IS REQUIRED PRIOR TO BEGINNING CONSTRUCTION. DEVELOPMENT FEES (ACREAGE, FEE-IN-LIEU OF ASSESSMENT AND INSPECTION FEES AND OTHERS AS REQUIRED MAY BE APPLICABLE) ARE DUE BEFORE CONSTRUCTION DRAWING APPROVAL.
19. THE PLAN IS SUBJECT TO REVISIONS DURING CONSTRUCTION DRAWING APPROVAL PROCESS.
20. REFER TO C1.0 FOR ZONING CONDITIONS IN THE DEVELOPMENT AGREEMENT.
21. IF THERE IS A GEODETIC MONUMENT LOCATED ON THIS SITE, IT MUST BE PROTECTED OR IF RELOCATION IS NEEDED IT WILL BE THE RESPONSIBILITY OF THE DEVELOPER TO RELOCATE IT WITH SURVEY ACCURACY.
22. INTERNAL ROADWAYS MUST BE LIGHTED PRIOR TO FIRST C.O. AND THAT ALL ADJACENT WILL BE LIGHTED PRIOR TO STREET ACCEPTANCE FOR 1 YEAR WARRANTY.
23. THE GAS SHOWN ON PLANS IS APPROXIMATE. THE GAS ALIGNMENT IS SUBJECT TO CHANGE BASED ON CONTRACTOR COORDINATION WITH NATURAL GAS SUPPLIER.
24. THE CONTRACTOR SHALL TRENCH THE NATURAL GAS LINE.

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Date:
03/29/2024
Drawn by:
J GLAS
Checked by:
W ALTMAN
Revisions:
Addendum 02
5/10/2024

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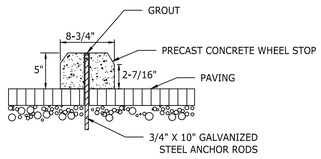
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NORTH CAROLINA PROFESSIONAL SEAL 045892 ENGINEER William P. Altman

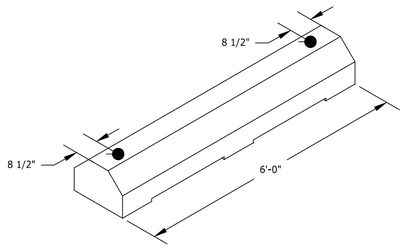
CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

UTILITY PLAN

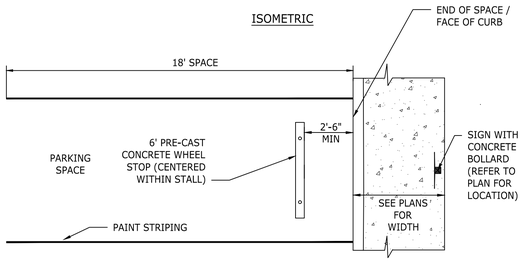
Sheet No.
C3.1



SECTION



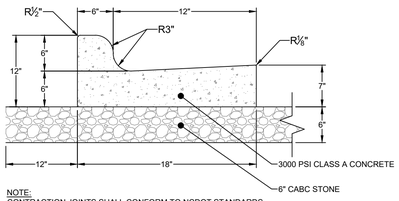
ISOMETRIC



WHEEL STOP POSITION WITHIN PARKING STALL

PRE-CAST CONCRETE WHEELSTOP

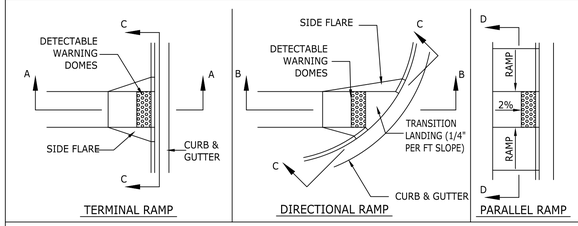
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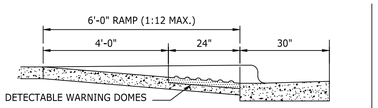


NOTE:
CONTRACTION JOINTS SHALL CONFORM TO NCDOT STANDARDS

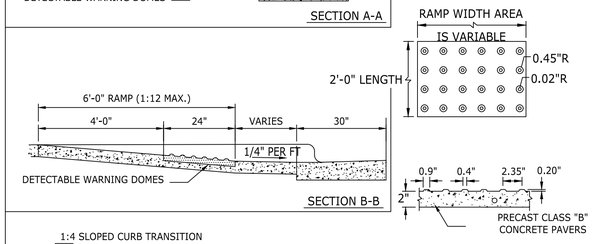
18" CURB & GUTTER

NO SCALE

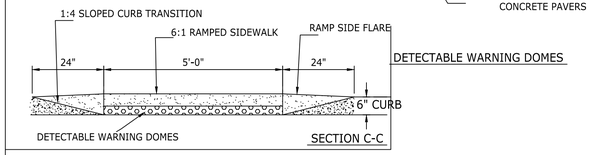




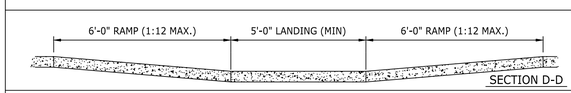
SECTION A-A



SECTION B-B



SECTION C-C



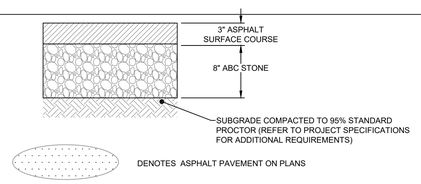
SECTION D-D

NOTES:

1. NO SLOPE ON THE SIDEWALK ACCESS RAMP SHALL EXCEED 1"/1' (1:12) IN RELATIONSHIP TO THE GRADE OF THE STREET.
2. IN NO CASE SHALL THE WIDTH OF THE ACCESS RAMP BE LESS THAN 48" (4'-0")
3. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN.

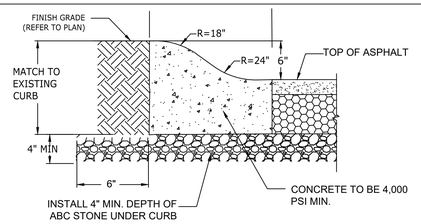
ACCESSIBLE CURB RAMPS

NO SCALE



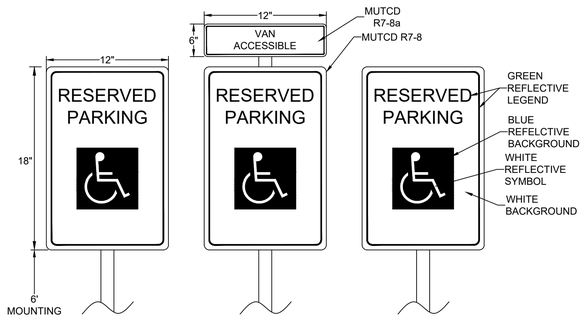
HEAVY DUTY ASPHALT

NO SCALE

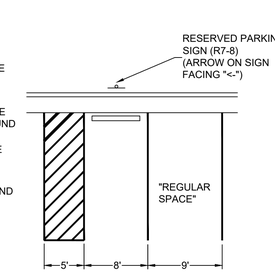


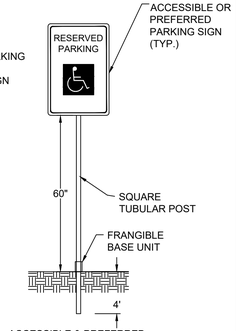
ROLLED FACE CURB & GUTTER (SECTION)

NO SCALE



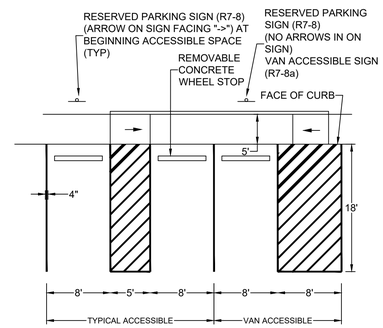
REFER TO DETAIL BELOW AND LAYOUT PLAN FOR PLACEMENT OF ACCESSIBLE SIGN AND VAN ACCESSIBLE SIGNS





ACCESSIBLE & PREFERRED PARKING SIGN FOUNDATION

N.T.S.



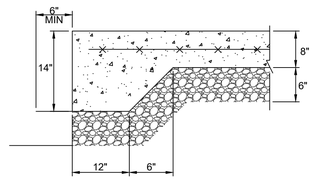
TYPICAL ACCESSIBLE SPACE LAYOUT

NOTE:

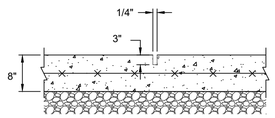
1. VERIFY WITH SITE PLANS FOR NON-TYPICAL ACCESSIBLE SPACES.
2. FOR SPACES LABELED 'VAN' PROVIDE MUTCD R7-8 SIGN AND ADDITIONAL R7-8a.

ACCESSIBLE PARKING SPACE MARKINGS AND SIGNAGE

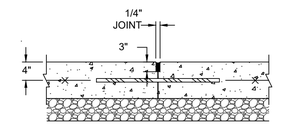
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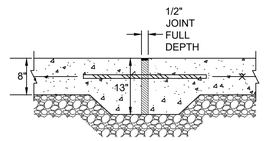
TYPICAL THICKENED EDGE



TYPICAL CONTRACTION JOINT



TYPICAL CONSTRUCTION JOINT



TYPICAL ISOLATION (EXPANSION) JOINT

CONCRETE PAVEMENT DIMENSIONS	
CONC SLAB THICKNESS	= 8"
ABC THICKNESS	= 6"
REINFORCEMENT	= #4 rebar @ 16" O.C.E.W.
DOWEL RODS	= 18" #5 SMOOTH BARS GREASED BOTH SIDES

NOTES:

1. THE REINFORCEMENT ONLY NEEDS TO BE INCLUDED IN ODD-SHAPED SLABS AND SLABS CONTAINING STRUCTURES (LIGHTS, BOLLARDS, ETC.).
2. THE CONTRACTOR SHALL SUBMIT A WRITTEN PLAN BEFORE PLACEMENT OF CONCRETE TO OUTLINE HIS/HER PLAN FOR INSTALLATION OF JOINTS AND DOWELS IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
3. ALL CONCRETE PAVEMENT SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI MIN. (ASTM C39).
4. CONTRACTION JOINTS: SHALL BE SPACED AT 10' O.C.E.W. MAX. OR AS INDICATED ON THE PLAN, EXCEPT WHERE EXPANSION AND CONSTRUCTION JOINTS ARE LOCATED. REFER TO SPECIFICATION 321313 FOR ADDITIONAL INFORMATION.
5. ISOLATION (EXPANSION) JOINTS: FORM ISOLATION JOINTS OF PREFORMED JOINT FILLER STRIPS ABUTTING CONCRETE CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, WALKS, OTHER FIXED OBJECTS, AND WHERE INDICATED. INSTALL DOWEL RODS IN ISOLATION JOINTS WHEREVER ABUTTING TO CONCRETE PAVEMENT SLABS.
6. CONSTRUCTION JOINTS: SET CONSTRUCTION JOINTS AT SIDE AND END TERMINATIONS OF PAVING AND AT LOCATIONS WHERE PAVING OPERATIONS ARE STOPPED FOR MORE THAN 1/2 HOUR, UNLESS PAVING TERMINATES AT ISOLATION JOINTS. INSTALL DOWEL RODS 18-IN ON CENTER ALONG CONSTRUCTION JOINTS.
7. DOWEL RODS: DOWEL RODS SHALL BE EPOXY COATED AND PLACED 18" O.C. EPOXY COATED DOWEL BASKETS ARE AN ACCEPTABLE ALTERNATIVE. SUBMIT FOR SHOP DRAWING REVIEW.
8. FABRIC JOINT FILLER AND CAULK SEALANT: INSTALL AT ALL ISOLATION JOINTS AND THICKENED EDGES.
9. INSTALL THICKENED EDGES ALONG ALL EDGES / SIDES OF CONCRETE PAVEMENT.

2

HEAVY DUTY CONCRETE PAVEMENT

NO SCALE

GENERAL NOTE

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Project No.
56400

Date:
03/29/2024
Drawn by:
J GLAS
Checked by:
W ALTMAN
Revisions:
Addendum 02
5/10/2024

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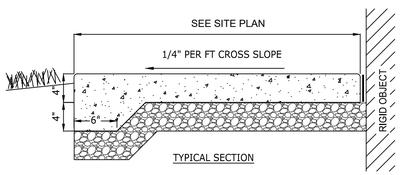
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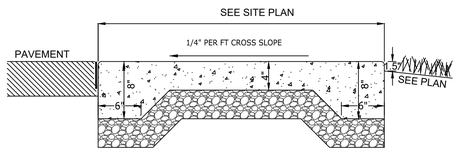
CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

NOTES AND DETAILS

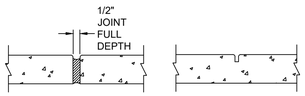
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TYPICAL SECTION



TYPICAL SECTION AT PAVEMENT



TYPICAL EXPANSION JOINT TYPICAL CONTROL JOINT

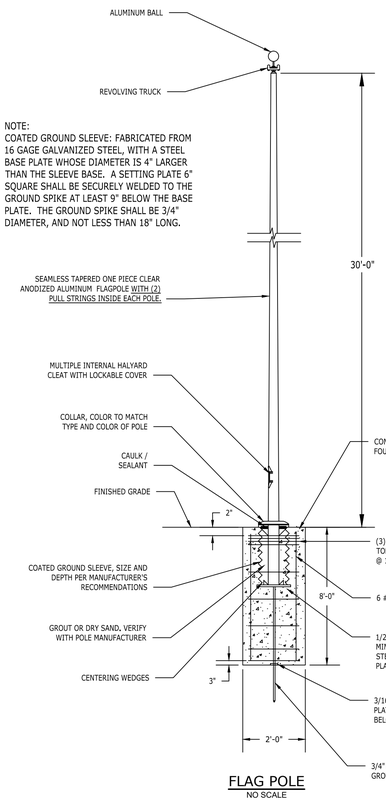
NOTES:

1. PROVIDE GROOVE CONTROL JOINT 1" DEEP WITH 1/8" RADII IN SIDEWALK AT 5' INTERVALS UNLESS INDICATED OTHERWISE.
2. PROVIDE 1/2" WIDE EXPANSION JOINT AT 30' INTERVALS.
3. PROVIDE 1/2" WIDE EXPANSION JOINT WHERE THE SIDEWALK ABUTS ANY RIGID STRUCTURE.
4. SEE SPECIFICATIONS FOR ADDITIONAL JOINT SPACING REQUIREMENTS.
5. ALL CONCRETE SIDEWALKS SHALL BE 4,000 P.S.I. MIN. WITH BROOM FINISH.
6. INSTALL SIDEWALK OVER 4" OF ABC STONE.
7. WHERE SIDEWALK ABUTS GRASS OR MULCH, THERE SHALL BE 1.5" OF RELIEF FROM THE TOP OF SIDEWALK TO THE GROUND.

CONCRETE SIDEWALK

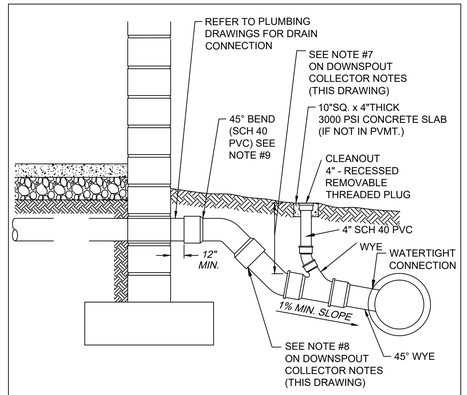
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2



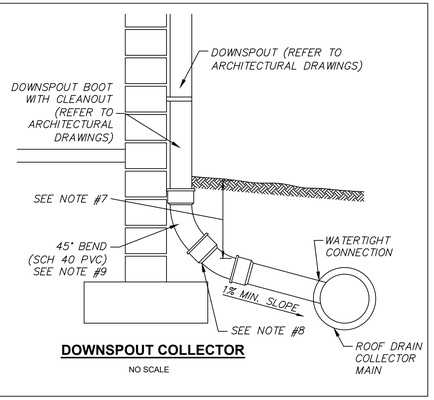
FLAG POLE

NO SCALE



ROOF DRAIN COLLECTOR

NO SCALE

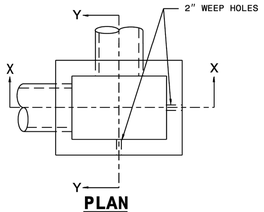


DOWNSPOUT COLLECTOR

NO SCALE

DOWNSPOUT COLLECTOR NOTES:

1. CONNECT ALL BUILDING DOWNSPOUTS INTO THE ROOF DRAIN COLLECTOR SYSTEM OR DIRECTLY INTO THE STORM SEWER SYSTEM.
2. THE ROOF DRAIN COLLECTOR SYSTEM IS SMOOTH-LINED, CORRUGATED POLYETHYLENE PIPE LAID AT MINIMUM SLOPES AS INDICATED.
3. PIPES CONNECTING TO INDIVIDUAL DOWNSPOUTS ARE 6" PROVIDE MINIMUM 6" PIPE SIZE 5' OUTSIDE BUILDING. ALL OTHER DRAIN PIPES ARE SIZED AS INDICATED INCREASING IN SIZE FROM UPSTREAM TO DOWNSTREAM.
4. PROVIDE CLEANOUTS AS INDICATED AND AS REQUIRED BY LOCAL BUILDING CODE.
5. MAKE CONNECTIONS INTO CONCRETE PIPES WITH A FLEXIBLE WATERTIGHT TEE CONNECTOR THAT IS MECHANICALLY EXPANDED INTO A CORDED OPENING. CONNECTOR SHALL BE KOR-N-TEE OR APPROVED EQUAL.
6. MAINTAIN ADEQUATE OUTFALL FOR ROOF DRAIN DURING AND AFTER THE COMPLETION OF CONSTRUCTION.
7. MINIMUM DEPTH OF COVER SHALL BE ONE (1) FOOT. FOR ALL DEPTHS OF COVER LESS THAN TWO (2) FEET, PIPE MUST BE SCHEDULE 40 PVC. FOR DEPTHS OF COVER GREATER THAN TWO (2) FEET, FLEXIBLE PIPE MAY BE USED. REFER TO SPECIFICATIONS FOR ALLOWABLE PIPE TYPES.
8. MAINTAIN A WATERTIGHT CONNECTION AT ALL PIPE CONNECTIONS BELOW GRADE.
9. INSTALL THE DOWNSPOUT COLLECTOR DRAIN BEFORE THE DOWNSPOUTS ARE INSTALLED ON THE BUILDING. THE SITE WORK CONTRACTOR IS RESPONSIBLE FOR ALL WORK TO AND INCLUDING THE 45° BEND. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF DOWNSPOUTS ON BUILDING EXTERIOR WALLS.



PLAN

WITH GRATE & FRAME REMOVED

GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR 2" KEYWAY OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

MAX.DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12'-0". STD. DWG. 840.45 OR 840.46 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

CONSTRUCT WITH PIPE CROWNS MATCHING.

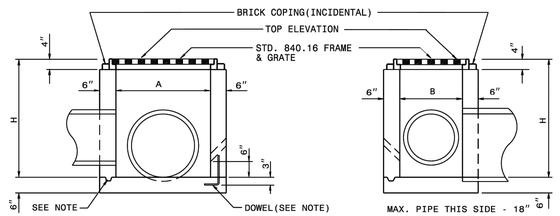
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES NOT SHOWN.

INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.

INSTALL STONE DRAINS, OF A MINIMUM OF 1 CUBIC FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR WRAP, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER.

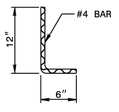
CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.



SECTION X-X

SECTION Y-Y



DOWEL

DIMENSIONS AND QUANTITIES FOR DROP INLET(BASED ON MIN. HEIGHT, H)							
DIMENSIONS OF BOX & PIPE				CUBIC YARDS CONC. IN BOX			DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	MIN. HEIGHT					
D	A	B	H	BOTTOM SLAB	WALL PER FT. HT.	TOTAL CONCRETE FOR MINIMUM HEIGHT, H	C.M.	R.C.
12"	3'-0"	2'-0"	2'-0"	0.222	0.222	0.592	0.015	0.026
15"			2'-3"			0.648	0.023	0.036
18"			2'-6"			0.703	0.033	0.049
24"			3'-0"			0.814	0.059	0.085
30"	3'-0"	2'-0"	3'-6"	0.222	0.222	0.925	0.092	0.127

1-24 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR

CONCRETE DROP INLET

12" THRU 30" PIPE

SHEET 1 OF 1

840.14

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Project No.
56400

Date:
03/29/2024
Drawn by:
J GLAS
Checked by:
W ALTMAN
Revisions:
Addendum 02
5/10/2024

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NORTH CAROLINA PROFESSIONAL SEAL 045892 ENGINEER William P. Altman

CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

NOTES AND DETAILS

Sheet No.
C5.1

2

Mitchell Environmental, P.A.

SEPTIC SYSTEM DESIGN

for

CASTLE HAYNE FIRE STATION
New Hanover County, North Carolina

Submitted to:
New Hanover County
Environmental Health
230 Government Center Drive, Suite 140
Wilmington, NC 28403

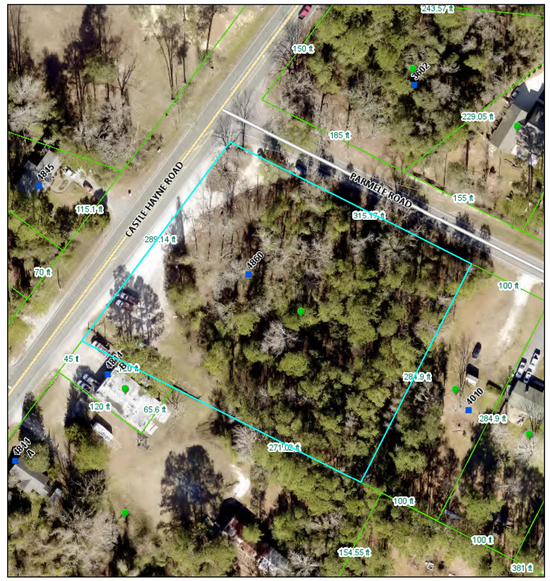
Prepared for:
Timmons Group
5410 Trinity Road, Suite 102
Raleigh, NC 27607

Prepared by:
Scott Mitchell, PE, LSS
Adam Aycock, EI

DATE: March 27, 2024
PROJECT NO.: 3022

1501 Lakestone Village Lane, Suite 205
Fuquay-Varina, North Carolina 27526
919-669-0329

Find A Parcel



5/24/2022, 4:55:10 PM

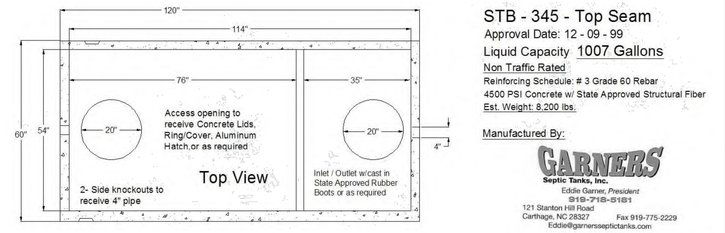
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0 0.01 0.01 0.03 mi
0 0.01 0.03 0.05 km

Property Owners
Addresses
Roads
Major Roads
Municipal Boundaries
Parcel Boundaries
Dimensions ROW
Dimensions Property

The information made available by this service originates from the county's building permitting and inspections records. This GIS rendering is refreshed on a monthly basis., New Hanover County, NC

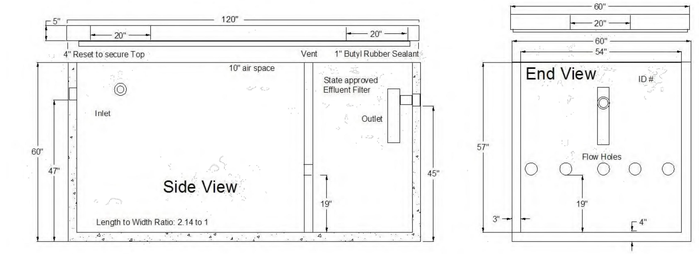
NHC GIS Services
New Hanover County, NC

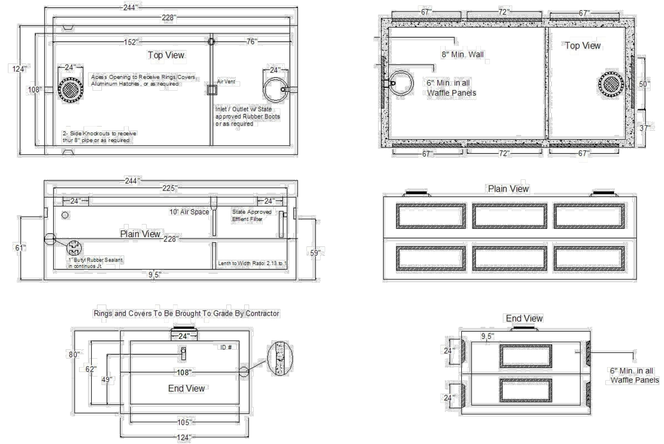


STB - 345 - Top Seam
Approval Date: 12 - 09 - 99
Liquid Capacity 1007 Gallons
Non Traffic Rated
Reinforcing Schedule: # 3 Grade 60 Rebar
4500 PSI Concrete w/ State Approved Structural Fiber
Est. Weight: 8,200 lbs.

Manufactured By:

GARNERS
Septic Tanks, Inc.
Eddie Garner, *President*
919-718-5181
121 Stanton Hill Road
Carthage, NC 28327 Fax 919-775-2229
Eddie@garnersseptictanks.com





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Eddie Garner, *President*
919-718-5181
121 Stanton Hill Road
Carthage, NC 28327 Fax 919-775-2229
Eddie@garnersseptictanks.com

General Information	STB - 596 Traffic Rated
This form also manufactures our 8000 – 22,000 gallon tanks.Engineered and state approved panels are installed onto the form to manufacture our 4000 – 6000 gallon tanks. This will reduce the wall thickness from 8-½" down to 6" and still maintain Traffic Rated specifications. This will also reduce the weight, and allow a smaller crane to set tanks which will be more cost effective for the consumer. Engineered Anti Flotation Brackets may be installed if needed.	North Carolina State approval Date: 6-04-07 Liquid Capacity 5044 Gallons Reinfocing Schedule: See Engineer Drawing 19 4 Yds. 4500 PSI Concrete w/ State Approved Structural Fiber Est Weight 77,600 lbs.

PL-68 Effluent Filter

POLYLOK Inc. — Innovations in Precast, Drainage & Wastewater Products — Zabel® A Division of Polylok Inc.

PL-68 Filter and Tee

PL-68 is much more than just an effluent filter. The housing can also be used as an inlet baffle (tee) or an outlet baffle. The housing is designed to accept Polylok's snap in gas deflector to deflect gas bubbles away from the tee and to keep the solids in the tank.

Features:

- Offers 68 linear feet of 1/16" filter slots, which significantly extends time between cleaning.
- Accepts 3/4" PVC handle.
- Locks in any 360° position when used with PL-68 Tee.
- PL-68 Housing can be used as an inlet or outlet tee.
- Gasket prevents bypass.

PL-68 Installation:

Ideal for residential waste flows up to 800 gallons per day (GPD). Easily installs in any new or existing 4" outlet tee.

1. Locate the outlet of the septic tank.
2. Remove the tank cover and pump tank if necessary.
3. Glue the filter housing to the outlet pipe, or use a Polylok Extend & Lok if not enough pipe exists.
4. Insert the PL-68 filter into tee.
5. Replace and secure the septic tank cover.

PL-68 Maintenance:

The PL-68 Effluent Filter will operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped, or at least every three years.

1. Do not use plumbing when filter is removed.
2. Pull PL-68 out of the tee.
3. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
4. Insert filter back into tee/housing.

Related Products:

PL-68 Filter Concrete Baffle
Extend & Lok™



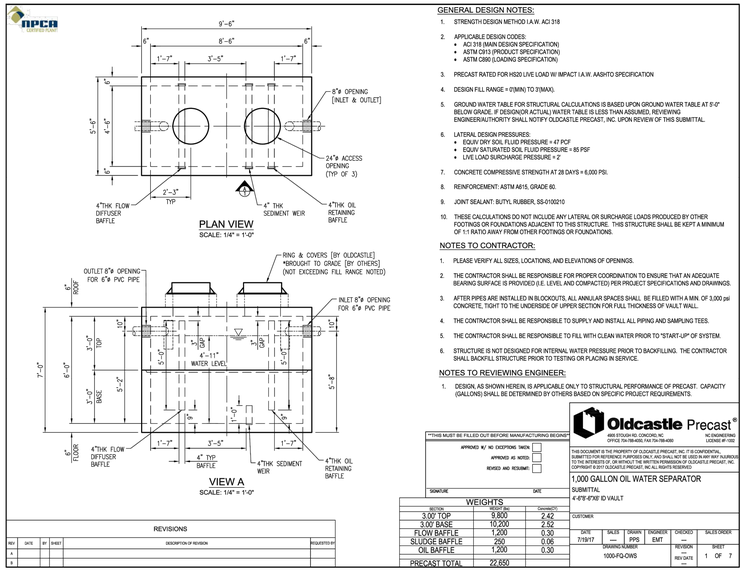

Extend & Lok™
Easily installs into existing tanks.

Spacer Bushing 4" SCHD 40 to SDR 35

Spacer Bushing 4" SCHD 40 to 110mm Pipe

2" Extender

Polylok, Inc. 3 Fairfield Blvd. Wallingford, CT 06492 Toll Free: 877.765.9565 Fax: 203.284.8514 www.polylok.com



GENERAL DESIGN NOTES:

1. STRENGTH DESIGN METHOD I.A.W. ACI 318
2. APPLICABLE DESIGN CODES
   - ACI 318 (MAIN DESIGN SPECIFICATION)
   - ASTM C913 (PRODUCT SPECIFICATION)
   - ASTM C890 (LOADING SPECIFICATION)
3. PRECAST RATED FOR HS20 LIVE LOAD W/ IMPACT I.A.W. AASHTO SPECIFICATION
4. DESIGN FILL RANGE = 0'(MIN) TO 3'(MAX).
5. GROUND WATER TABLE FOR STRUCTURAL CALCULATIONS IS BASED UPON GROUND WATER TABLE AT 5'-0" BELOW GRADE. IF DESIGN/OR ACTUAL) WATER TABLE IS LESS THAN ASSUMED, REVIEWING ENGINEER/AUTHORITY SHALL NOTIFY OLDCASTLE PRECAST, INC. UPON REVEIW OF THIS SUBMITTAL.
6. LATERAL DESIGN PRESSURES:
   - EQUIV DRY SOIL FLUID PRESSURE = 47 PCF
   - EQUIV SATURATED SOIL FLUID PRESSURE = 85 PSF
   - LIVE LOAD SURCHARGE PRESSURE = 2'
7. CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS = 6,000 PSI.
8. REINFORCEMENT: ASTM A615, GRADE 60.
9. JOINT SEALANT: BUTYL RUBBER, SS-0100210
10. THESE CALCULATIONS DO NOT INCLUDE ANY LATERAL OR SURCHARGE LOADS PRODUCED BY OTHER FOOTINGS OR FOUNDATIONS ADJACENT TO THIS STRUCTURE. THIS STRUCTURE SHALL BE KEPT A MINIMUM OF 1:1 RATIO AWAY FROM OTHER FOOTINGS OR FOUNDATIONS.

NOTES TO CONTRACTOR:

1. PLEASE VERIFY ALL SIZES, LOCATIONS, AND ELEVATIONS OF OPENINGS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER COORDINATION TO ENSURE THAT AN ADEQUATE BEARING SURFACE IS PROVIDED (I.E. LEVEL AND COMPACTED) PER PROJECT SPECIFICATIONS AND DRAWINGS.
3. AFTER PIPES ARE INSTALLED IN BLOCKOUTS, ALL ANNULAR SPACES SHALL BE FILLED WITH A MIN. OF 3,000 psi CONCRETE, TIGHT TO THE UNDERSIDE OF UPPER SECTION FOR FULL THICKNESS OF VAULT WALL.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO SUPPLY AND INSTALL ALL PIPING AND SAMPLING TEES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE TO FILL WITH CLEAN WATER PRIOR TO "START-UP" OF SYSTEM.
6. STRUCTURE IS NOT DESIGNED FOR INTERNAL WATER PRESSURE PRIOR TO BACKFILLING. THE CONTRACTOR SHALL BACKFILL STRUCTURE PRIOR TO TESTING OR PLACING IN SERVICE.

NOTES TO REVIEWING ENGINEER:

1. DESIGN, AS SHOWN HEREIN, IS APPLICABLE ONLY TO STRUCTURAL PERFORMANCE OF PRECAST. CAPACITY (GALLONS) SHALL BE DETERMINED BY OTHERS BASED ON SPECIFIC PROJECT REQUIREMENTS.

REVISIONS				
REV	DATE	BY	SHEET	DESCRIPTION OF REVISION / REQUESTED BY
A				
B				

WEIGHTS		
SECTION	WEIGHT (lbs)	Cubic Yards
3.00' TOP	9,800	2.42
3.00' BASE	10,200	2.52
FLOW BAFFLE	1,200	0.30
SLUDGE BAFFLE	250	0.06
OIL BAFFLE	1,200	0.30
PRECAST TOTAL	22,650	

Oldcastle Precast
4065 STEVENS RD. CONCORD, NC — NC ENGINEERING OFFICE: 704.789.4062, Ext 704-490-6005 — NC ENGINEERING LICENSE # P-1192

*** THIS MUST BE FILLED OUT BEFORE MANUFACTURING BEGINS ***
APPROVED W/ NO EXCEPTIONS TAKEN ☐
APPROVED AS NOTED ☐
REVISED AND RESUBMIT ☐
SIGNATURE DATE

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1,000 GALLON OIL WATER SEPARATOR
SUBMITTAL
4'-6"ø-6"X0' ID VAULT

CUSTOMER

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
7/19/17	—	PPS	EMT	—	

DRAWING NUMBER: 1000-FO-OWS — REVISION: OL — REV DATE: — — SHEET: 1 OF 7

GENERAL NOTE

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Project No.
56400

Date:
03/29/2024
Drawn by:
J GLAS
Checked by:
W ALTMAN
Revisions:
Addendum 02
5/10/2024

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VIRGINIA | NORTH CAROLINA
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SHEET 777

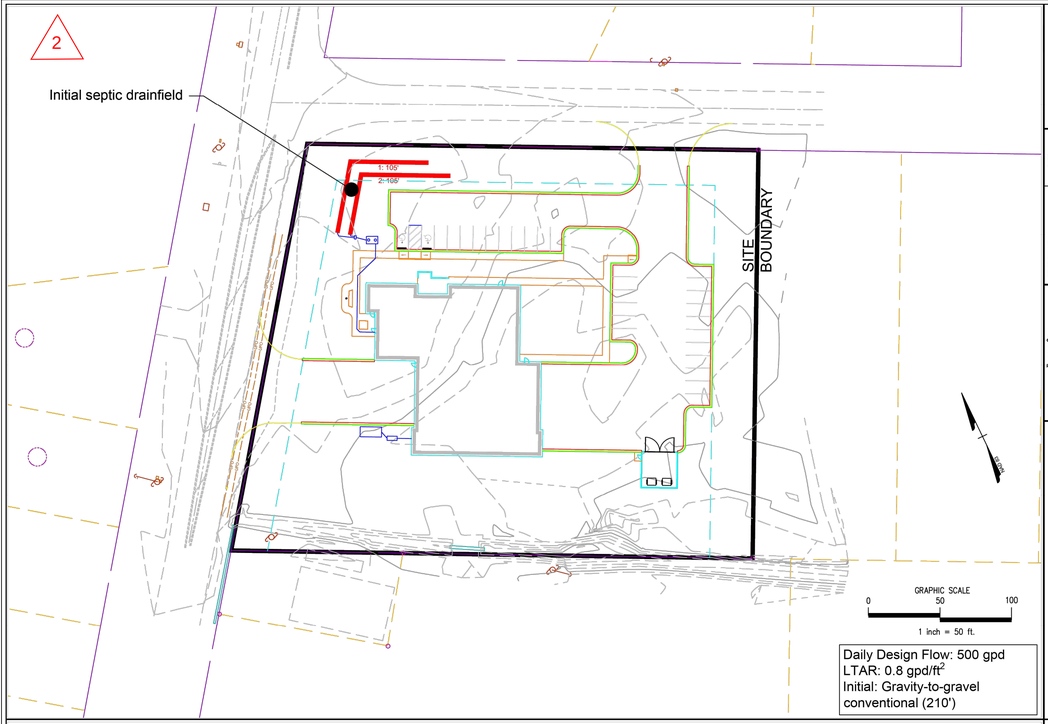
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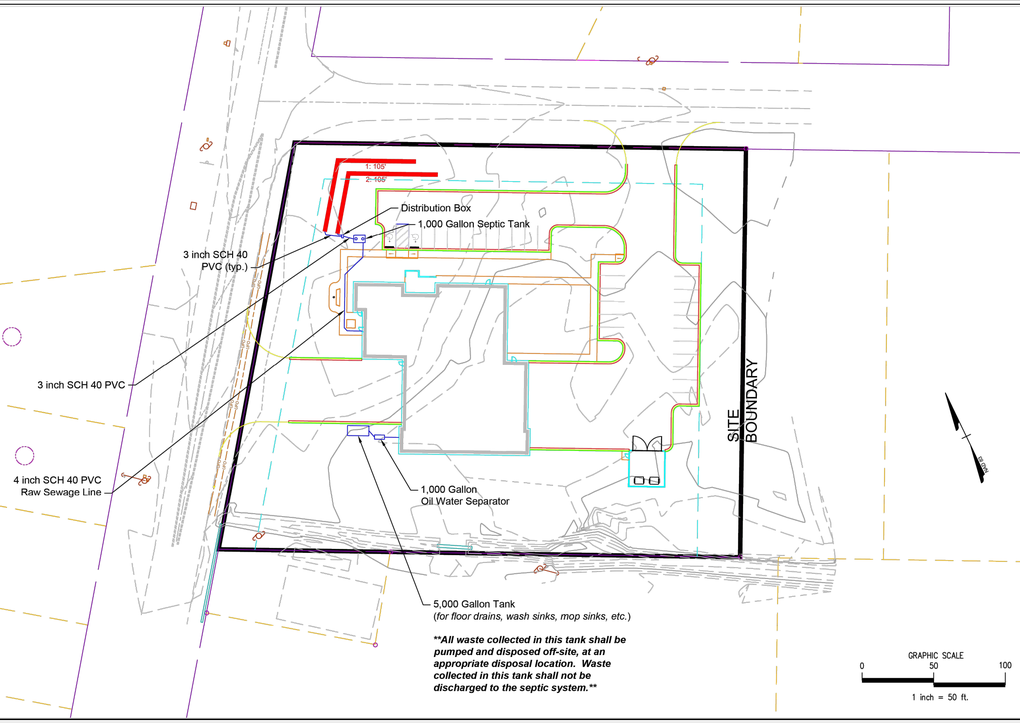
NORTH CAROLINA PROFESSIONAL SEAL 045892 ENGINEER William P. Altman

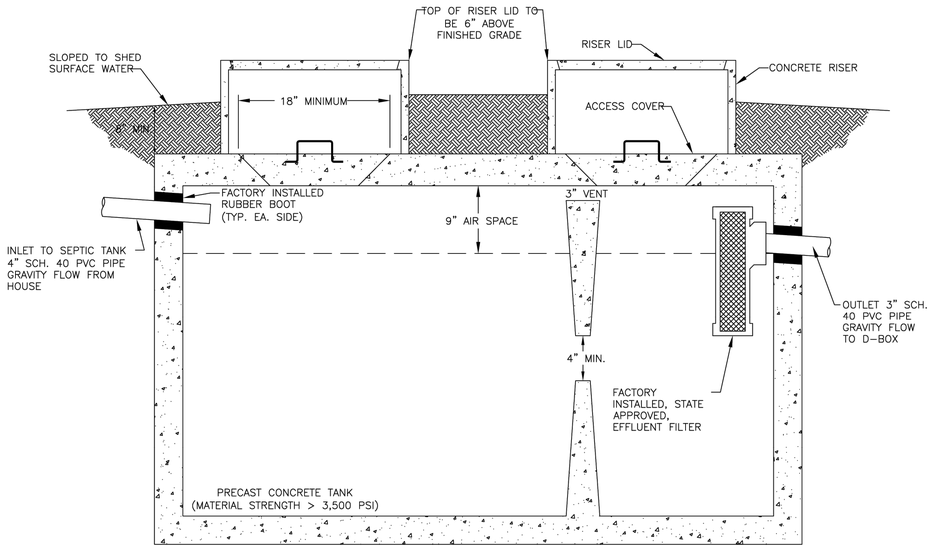
CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

SEPTIC PLAN

Sheet No.
C6.0

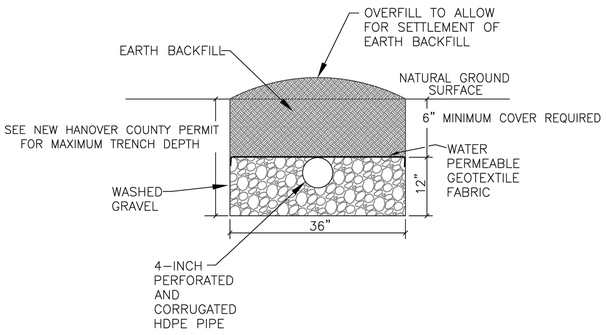






SEPTIC TANK DETAIL
N.T.S.

NITRIFICATION TRENCH DETAIL FOR CONVENTIONAL GRAVEL



NOTES:

1. PERFORATED CORRUGATED PLASTIC PIPE SHALL MEET REQUIREMENTS OF ASTM D 2729.
2. PIPE SHALL BE LEVEL.
3. TRENCH BOTTOM SHALL BE LEVEL
4. WASHED GRAVEL SHALL BE CLASSIFICATION #3, 4, 5, 57 OR 6 OF ASTM D-448
5. HAND RAKE TRENCH WALLS PRIOR TO PLACEMENT OF TRENCH MEDIA IF SOIL SMEARING IS PRESENT.

GENERAL NOTE

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SHEET NUMBER 1 of 4 — Castle Hayne Fire Station — Overall Septic

SHEET NUMBER 2 of 4 — Castle Hayne Fire Station — Initial Nitrification Field

SHEET NUMBER 3 of 4 — Castle Hayne Fire Station — Septic Tank Detail

SHEET NUMBER 4 of 4 — Castle Hayne Fire Station — Trench Detail

REVISION NO.	DATE
Original Submittal	March 27, 2024
Revision 1	-----
Revision 2	-----
Revision 3	-----
Master Set	-----

PREPARED FOR: Timmons Group, 5410 Trinity Rd, Ste 102, Raleigh, NC 27607
DATE: March 27, 2024
ENGINEER AND SOIL SCIENTIST CONTACT: SCOTT MITCHELL, PE, LSS
DRAWN BY: ADAM AYCOCK, EI

MITCHELL ENVIRONMENTAL, PA
C-2911
1501 LAKESTONE VILLAGE LANE
SUITE 205
FUQUAY VARINA, NC 27526

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Addendum 02
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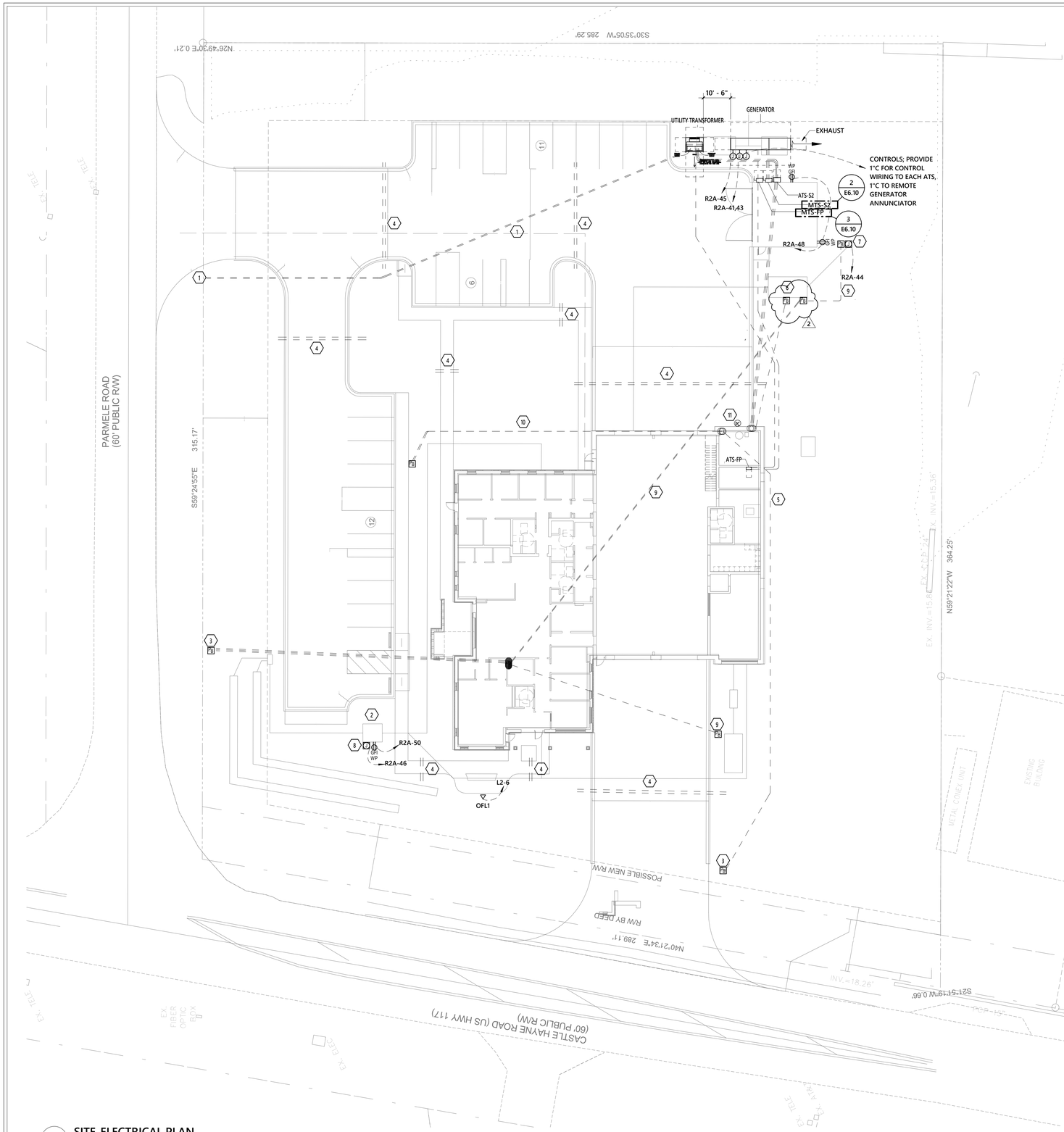
NORTH CAROLINA PROFESSIONAL SEAL 045892 ENGINEER William P. Altman

CASTLE HAYNE FIRE STATION
NEW HANOVER COUNTY FIRE DEPARTMENT

SEPTIC PLAN

Sheet No.
C6.1

ELECTRICAL



1 **SITE-ELECTRICAL PLAN**
1" = 20'-0"

GENERAL NOTES:

1. ALL UNUSED IN-GROUND CONDUIT RUNS SHALL BE PROVIDED WITH DETECTABLE UNDERGROUND WARNING TAPE AND APPROPRIATE PULL STRING FOR FUTURE USE.
2. SITE LIGHTING SHALL BE PROVIDED BY LOCAL UTILITY, LOCAL UTILITY SHALL BE RESPONSIBLE FOR CONDUIT RUNS AND LIGHT POLE INSTALLATIONS. COORDINATE LOCATION FOR CCTV SYSTEM WITH LOCAL UTILITY AND OWNER.
3. G.C. SHALL SET UP A MEETING WITH THE LOCAL TELCOM PROVIDER TO VERIFY SERVICE ENTRANCE LOCATION PRIOR TO INSTALLATION OF ANY CONDUIT AND/OR PULL BOXES.
4. G.C. SHALL SET UP A MEETING WITH THE LOCAL UTILITY COMPANY (DUKE) PRIOR TO INSTALLATION OF ANY CONDUIT W/ PULL STRING FOR THE PRIMARY FEEDER. COORDINATE CONDUIT SIZE, INTERCONNECTION POINT, AND PULL BOXES AS REQUIRED.

KEYED NOTES:

1. PROVIDE (2)-6" CONDUIT FROM PAD MOUNTED TRANSFORMER TO DESIGNATED POINT AT EDGE OF PROPERTY FOR LOCAL POWER UTILITY USE. CONDUIT LOCATION, SIZE, AND BENDING RADIUS SHALL BE COORDINATED WITH UTILITY BEFORE INSTALLATION. PULLBOXES AS REQUIRED BY CODE/LOCAL UTILITY. E.C. TO PROVIDE UP TO 150' OF ADDITIONAL (2)-6" CONDUIT AND COMPLETE INSTALLATION BASED ON UTILITY COORDINATION.
2. PROVIDE (2)-4" CONDUITS FROM MAIN TELECOM ROOM TO PROPERTY LINE FOR LOW VOLTAGE TELECOM SERVICE. CONDUIT LOCATION, SIZE, AND BENDING RADIUS SHALL BE COORDINATED WITH UTILITY BEFORE INSTALLATION.E.C. TO PROVIDE UP TO 150' OF ADDITIONAL (2)-4" CONDUIT AND COMPLETE INSTALLATION BASED ON UTILITY COORDINATION.
3. ALL LOW VOLTAGE CONDUIT RUNS SHALL HAVE HAND HOLES/PULL BOXES SUPPLIED AT 150' INTERVALS UNLESS OTHERWISE INDICATED BY LOCAL UTILITY. MINIMUM SIZE SHALL BE 36" X 36".
4. PROVIDE (2)-4" C FOR FUTURE SITE LIGHTING BY LOCAL UTILITY.
5. FUTURE FIRE STATION SIGNAGE, COORDINATE EXACT LOCATION WITH CIVIL PLANS. PROVIDE (1)-2"C TO LOCATION SHOWN ON PLANS FROM SECOND FLOOR MEZZ (ELEC) ROOM.
6. WATER HOLDING TANK, E.C. SHALL PROVIDE (2) - 1"C CONDUIT FROM RESPECTIVE (18"X18"X12") OPEN BOTTOM HANDHOLES FOR POWER AND DATA. POWER CONDUIT SHALL BE ROUTED BACK TO LOCAL ELECTRICAL PANEL AND DATA CONDUIT SHALL BE ROUTED BACK TO IT ROOM, 3/4" TO FACP. POWER AND DATA REQUIREMENTS FOR WATER HOLDING TANK SHALL BE COORDINATED WITH MANUFACTURER AND CIVIL ENGINEER. PROVIDE PHENOLIC LABEL DENOTING "POWER HANDHOLE" AND "TELECOM HANDHOLE" ON THE TOP OF EACH BOX.
7. COORDINATE EXACT LOCATION WITH CIVIL PLANS (WATER MET). PROVIDE (1) - 20A CIRCUIT FOR PUMP. PROVIDE 1" CONDUIT TO FACP FOR TAMPER SWITCHES. COORDINATE EXACT QUANTITY AND LOCATION WITH CIVIL PLANS.
8. SEPTIC TANK, PROVIDE (1)-20A CIRCUIT FOR PUMP. COORDINATE EXACT LOCATION WITH CIVIL PLANS.
9. PROVIDE (1)-1"C CONDUIT BACK TO DATA ROOM FOR MONITORING. COORDINATE MONITORING REQUIREMENTS WITH OWNER AND CIVIL.
10. PROVIDE (2)-2"C FOR FUTURE EV CHARGING.
11. FIELD LOCATE ON NORTH SIDE OF THE BUILDING. TIE BACK TO CONTACTOR SEE LIGHTING CONTACTOR DETAIL.

Ref North

Project No.
1738

Date:
5/9/2024 2:19:11 PM
Drawn by:
JDW
Checked by:
BKL
Revisions:

#	Description	Date
2	ADDENDUM #2	05/08/24

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www.optimaengineering.com
North Carolina License Number C-0914

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www.scn-architects.com

NORTH CAROLINA PROFESSIONAL SEAL 051825 ENGINEER BRANDON K. LEE
05/08/24

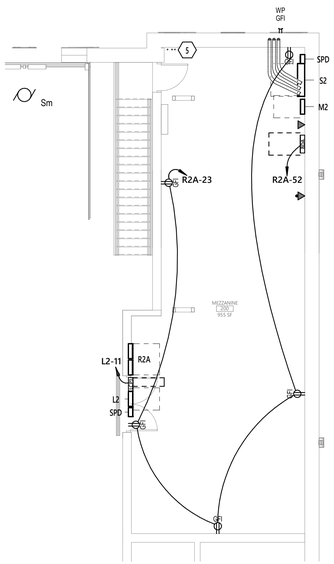
CASTLE HAYNES FIRE DEPARTMENT

ELECTRICAL SITE PLAN

Sheet No.
E0.10

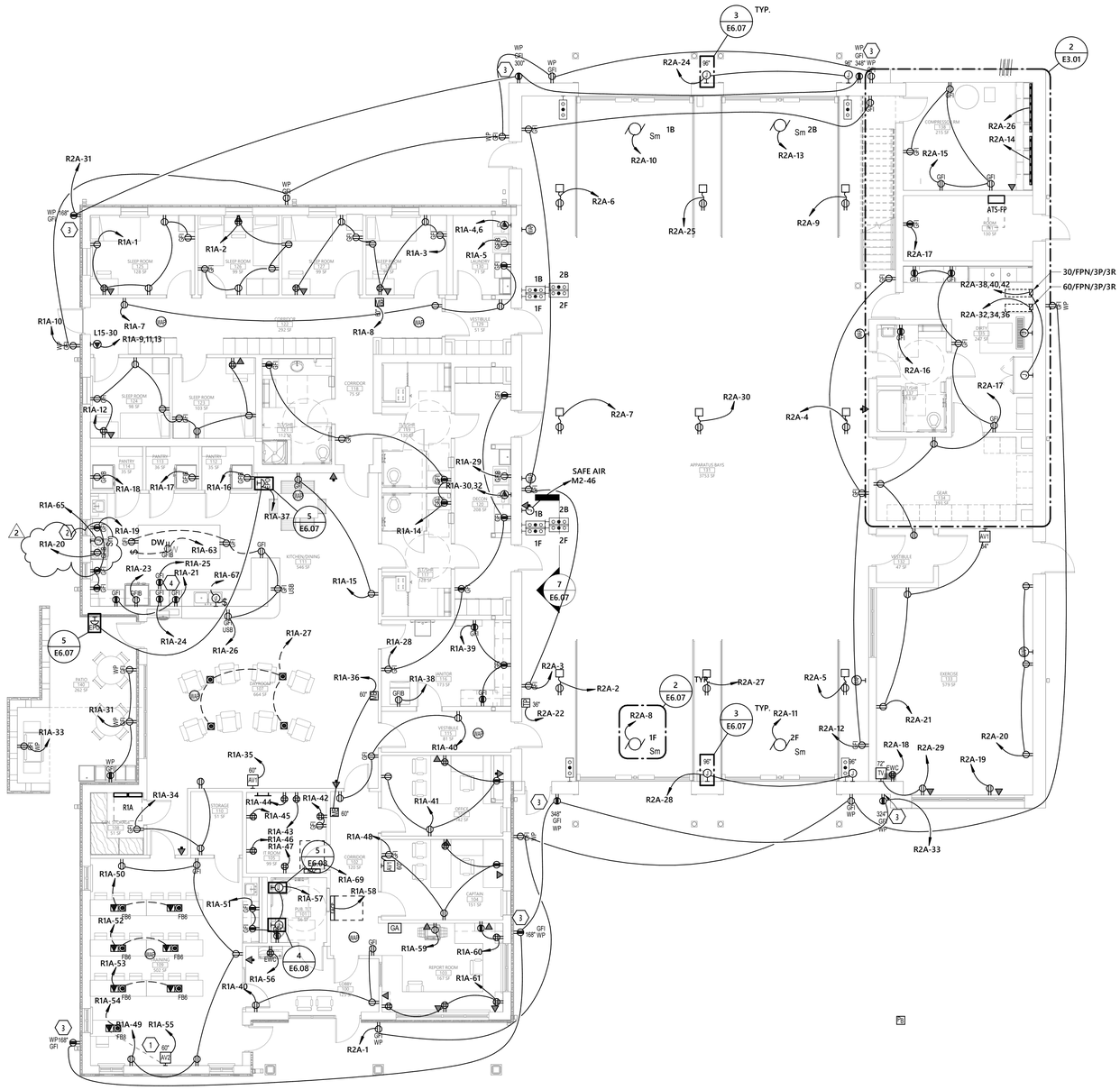
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Opt # 22-0368



2 MEZZANINE POWER FLOOR PLAN

1/8" = 1'-0"



1 FIRST FLOOR POWER FLOOR PLAN

1/8" = 1'-0"

Ref North

GENERAL NOTES:

1. BACK TO BACK INSTALLATION SHALL NOT BE ALLOWED. WHERE DEVICES ARE SHOWN BACK TO BACK, DEVICE SHALL BE OFFSET 3".
2. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS NOTED OTHERWISE, WITH NO EXPOSED CONDUIT.
3. COORDINATE RECEPTACLE LOCATIONS WITH CASEWORK ELEVATIONS PRIOR TO ROUGH-IN.
4. ALL WALL MOUNTED DEVICES (POWER, DATA, SYSTEMS, ETC...) WITHIN CMU WALLS ARE TO BE FLUSH MOUNTED AND FED WITH CONCEALED CONDUIT.
5. WHERE CONNECTED TO A 20A. BRANCH CIRCUIT SUPPLYING AN INDIVIDUAL RECEPTACLE (SIMPLEX OR DUPLEX), THE RECEPTACLE SHALL BE RATED AT 20A.
6. CIRCUIT NUMBERS AT DEVICES CORRESPOND TO PANELBOARD BREAKERS (SEE PANELBOARD SCHEDULE). BRANCH CIRCUITS SHALL BE SIZED ACCORDING TO THE CIRCUIT BREAKER RATING, UNLESS INDICATED OTHERWISE ON THE ELECTRICAL EQUIPMENT SCHEDULE.
7. ALL WALL APPARATUS BAY UNELEVATED RECEPTACLES SHALL BE GFI AND INSTALLED AT 24" A.F.F.
8. VERIFY MOUNTING HEIGHT OF ALL TV'S WITH OWNER PRIOR TO ROUGH-IN. PROVIDE A MARK-UP FOR OWNER APPROVAL PRIOR TO BOX AND CONDUIT INSTALLATION.
9. APPARATUS BAY IN THIS FACILITY ARE UNCLASSIFIED PER NEC 511.3(A); PER OWNER, NO VEHICLES ARE SERVICED OR REPAIRED IN THIS FACILITY.
10. TELECOM OUTLETS LOCATED IN MECHANICAL ROOMS AND ELECTRICAL ROOMS SHALL HAVE CONTINUOUS CONDUIT FROM THE OUTLET BOX TO THE NEAREST CABLE TRAY, TELECOM ROOM OR ACCESSIBLE CEILING. NO FREE RUN CABLING IS PERMITTED IN THESE ROOMS.
11. EWH WIRING TO METAL BOX AND METAL CONDUIT AND CONCEALED WITH THE WALL DIRECTLY TO THE WALL HEATER. COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT LOCATIONS.

KEYED NOTES:

1. 1"CONDUIT ROUTED TO LOCAL FLOOR BOX. DEVICE "AV2" BASIS OF DESIGN SHALL INCLUDE (1 DATA) (1 RECEPTACLE) AT MOUNTING HEIGHT SHOWN WITH (1 DATA) (1 QUAD) BELOW MOUNTED AT +18" AFF AND BASIS OF DESIGN SHALL BE CHEIF PAC501B (IN-WALL BACK BOX)
2. RANGE HOOD COORDINATE MOUNTING HEIGHT WITH OWNER AND ARCHITECT.
3. MOUNT OUTLETS AT UNDER SIDE OF EAVES FOR POWER. COORDINATE EXACT LOCATION PRIOR TO ROUGH-IN WITH ARCHITECT.
4. COORDINATE MOUNTING HEIGHTS OF ELEVATED MICROWAVE LOCATIONS WITH ARCHITECTUAL PLANS.
5. SEE SITE PLAN FOR CONDUITS RUNS. CONDUITS SHALL STUB UP +18" ABOVE SLAB. PROVIDE PHENOLIC LABEL FOR EACH CONDUIT TO FINAL LOCATION.

Project No.
1738

Date:
5/8/2024 4:02:07 PM
Drawn by:
JDW
Checked by:
BKL
Revisions:

#	Description	Date
2	ADDENDUM #2	05/08/24

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NORTH CAROLINA PROFESSIONAL SEAL 051825 ENGINEER BRANDON K. LEE
05/08/24

CASTLE HAYNES FIRE DEPARTMENT

POWER FLOOR PLANS

Sheet No.
E2.01

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Opt # 22-0368

PANEL: R2A

VOLTAGE: 208Y/120 3Ø | **FED FROM:** S2

MOUNTING: SURFACE | **MAIN TYPE:** MCB | **MFR:**
ENCLOSURE: NEMA1 | **PHASE:** 3 | **TYPE:**
MAIN: 225.0 A | **WIRE:** 4 | **AIC:** 22 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	B	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	REC - OUTDOOR	12	20 A	1	1	0.72 1.00			1	2	20 A	12	REC - CORD REEL (NOTE 8)	R
R	REC - APPARATUS BAY	12	20 A	3	1		0.72 1.00		1	4	20 A	12	REC - CORD REEL (NOTE 8)	R
R	REC - CORD REEL (NOTE 8)	12	20 A	5	1			1.00 1.00	1	6	20 A	12	REC - CORD REEL (NOTE 8)	R
R	REC - CORD REEL (NOTE 8)	12	20 A	7	1	1.00 1.50			1	8	25 A	10	MOTORIZED DOOR - APP BAY	MS
R	REC - CORD REEL (NOTE 8)	12	20 A	9	1		1.00 1.50		1	10	25 A	10	MOTORIZED DOOR - APP BAY	MS
MS	MOTORIZED DOOR - APP BAY	10	25 A	11	1			1.50 0.54	1	12	20 A	12	REC - APPARATUS BAY	R
MS	MOTORIZED DOOR - APP BAY	10	25 A	13	1	1.50 1.08			1	14	20 A	12	REC - RACE COMP. RM	Ot...
R	REC - COMPRESSOR ROOM	12	20 A	15	1		0.72 0.18		1	16	20 A	12	REC - TLT/SHR 137	R
R	REC - TOILET/CLEAN ROOM	12	20 A	17	1			1.44 1.00	1	18	20 A	12	REC - EWC (NOTE 8)	MS
R	REC - GEAR	12	20 A	19	1	0.18 0.54			1	20	20 A	12	REC - EXERCISE	R
R	REC - EXERCISE	12	20 A	21	1		1.36 0.36		1	22	20 A	12	PRINTER - APP BAY 131	Ot...
R	REC - MEZZANINE	12	20 A	23	1			0.90 0.72	1	24	20 A	12	LTG - STOP GO (ENTRANCE)	MI...
R...	REC - CORD REEL (NOTE 8)	12	20 A	25	1	1.00 1.08			1	26	20 A	12	REC - RACE COMP. RM	Ot...
R...	REC - CORD REEL (NOTE 8)	12	20 A	27	1		1.00 0.72		1	28	20 A	12	LTG - STOP GO (EXIT)	MI...
R...	REC - EXERCISE 133	12	20 A	29	1			0.18 1.00	1	30	20 A	12	REC - CORD REEL (NOTE 8)	R...
R...	REC - EXT. HIGH	12	20 A	31	1	0.54 2.67				32				
R...	REC - EXT. HIGH	12	20 A	33	1		0.72 2.67		3	34	50 A	6	EXTRACTOR- (DIRECT)	MISC.
Sp...	SPARE (NOTE 8)	-	20 A	35	1			0.00 2.67		36				
Sp...	SPARE (NOTE 8)	-	20 A	37	1	0.00 2.67				38				
Sp...	SPARE (NOTE 8)	-	20 A	39	1		0.00 2.67		3	40	30 A	10	TOG DRYER - (DIRECT)	MISC.
HEATI...	GEN - HEATER (NOTE 7)	10	20 A	41	2			0.50 2.67		42				
				43		0.50 1.00			1	44	20 A	12	MISC. - WELL PUMP	Ot...
H...	GEN - CHARGER	8	20 A	45	1		1.00 1.00		1	46	20 A	12	MISC - SEPTIC	Ot...
Sp...	SPARE	-	20 A	47	1			0.00 0.36	1	48	20 A	12	RCPT - MAINTENCE SITE	R...
Sp...	SPARE	-	20 A	49	1	0.00 0.18			1	50	20 A	12	RCPT - MAINTENCE SEPTIC	R...
Sp...	SPARE	-	20 A	51	1		0.00 0.50		1	52	20 A	12	BDA (NOTE 7)	MI...
Sp...	SPARE	-	20 A	53	1			0.00 0.00	2	54	20 A	-	SPARE	Spare
Sp...	SPARE	-	20 A	55	1	0.00 0.00				56				
Sp...	SPARE	-	20 A	57	1		0.00 0.00		2	58	20 A	-	SPARE	Spare
Sp...	SPARE	-	20 A	59	1			0.00 0.00		60				
Sp...	SPARE	-	20 A	61	1	0.00 0.00			1	62	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	63	1		0.00 0.00		1	64	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	65	1			0.00 0.00	1	66	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	67	1	0.00 0.00			1	68	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	69	1		0.00 0.00		1	70	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	71	1			0.00 0.00	1	72	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	73	1	0.00 0.00			1	74	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	75	1		0.00 0.00		1	76	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	77	1			0.00 0.00	1	78	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	79	1	0.00 --			1	80	--	-	SPACE ONLY	
Sp...	SPARE	-	20 A	81	1		0.00 --		1	82	--	-	SPACE ONLY	
Sp...	SPARE	-	20 A	83	1			0.00 --	1	84	--	-	SPACE ONLY	

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA
H	HEATING	2.00 kVA	100.00%	2.00 kVA
C	COOLING	0.00 kVA	0.00%	0.00 kVA
V	VENTILATION	0.00 kVA	0.00%	0.00 kVA
M	MOTORS	6.00 kVA	100.00%	6.00 kVA
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA
R	RECEPTACLES	17.28 kVA	78.94%	13.64 kVA
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA
MS	MISC.	19.94 kVA	100.00%	19.94 kVA
S	Spare	0.00 kVA	0.00%	0.00 kVA
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA
EV	EV CHARGING	0.00 kVA	0.00%	0.00 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. PROVIDE BREAKER WITH RED HANDLE LOCK-ON DEVICE.
8. PROVIDE CLASS A GFI (6mA PERSONNEL) BREAKER (250' MAX).
9. PROVIDE FEED THRU LUGS.
10. PROVIDE CLASS B GFI (30mA-EQUIPMENT) BRKR.

TOTAL KVA...	49.74 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	46.10 kVA	145.0 A	144.7 A	128.9 A
TOTAL AMP....	138 A			
TOTAL AMP. (DEMAND):	128 A	**TOTAL AMP. (DEMAND) x 125%**		160.0 A

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

PANEL: R1A

VOLTAGE: 208Y/120 3Ø | **FED FROM:** S2

MOUNTING: SURFACE | **MAIN TYPE:** MCB | **MFR:**
ENCLOSURE: NEMA1 | **PHASE:** 3 | **TYPE:**
MAIN: 400.0 A | **WIRE:** 4 | **AIC:** 10 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	B	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	REC - SLEEP ROOM 125	12	20 A	1	1	1.08 1.08			1	2	20 A	12	REC - SLEEP ROOM 126	R...
R	REC - SLEEP ROOM	12	20 A	3	1		1.62 2.75		2	4	30 A	10	DRYER - LAUNDRY	MS
MS	WASHER - LAUNDRY (NOTE 8)	12	20 A	5	1			1.00 2.75		6				
R	REC - CORRIDOR	12	20 A	7	1	0.72 0.36			1	8	20 A	12	MB - CORR 122	Ot...
MS	REC - CORRIDOR (AC)	10	30 A	9	3		0.33 0.90		1	10	20 A	12	REC - OUTDOOR	R
				11		0.33 0.90			1	12	20 A	12	REC - SLEEP ROOM	R
				13		0.33 0.72			1	14	20 A	12	REC - TOILETS/SHOWER	R
R	REC - DINING	12	20 A	15	1		0.36 1.00		1	16	20 A	12	REFRIGERATOR (NOTE 8)	MS
MS	REFRIGERATOR (NOTE 8)	12	20 A	17	1			1.00 1.00	1	18	20 A	12	REFRIGERATOR (NOTE 8)	MS
R...	REC - KITCHEN	12	20 A	19	1	0.54 0.18			1	20	20 A	12	RANGE (NOTE 8)	MI...
R	REC - KITCHEN	12	20 A	21	1		0.36 0.00		1	22	20 A	-	SPARE (NOTE 8)	Sp...
MS	REFRIGERATOR (NOTE 8)	12	20 A	23	1			1.00 1.20	1	24	20 A	12	MICROWAVE - KITCHEN (NOTE 8)	MI...
MI...	MICROWAVE - KITCHEN (NOTE 8)	12	20 A	25	1	1.20 0.90			1	26	20 A	12	REC - KITCHEN	R
R...	REC - DAYROOM 107	12	20 A	27	1		0.72 0.72		1	28	20 A	12	REC - JANITOR/DECON	R
MS	WASHER - DECON (NOTE 8)	12	20 A	29	1			1.00 2.75	2	30	30 A	10	DRYER - DECON (NOTE 8)	MS
R	REC - PATIO	12	20 A	31	1	0.54 2.75				32				
MS	GRILL - PATIO	12	20 A	33	1		1.00 0.54		1	34	20 A	12	REC - STORAGE	R
MS	TV - DAYROOM	12	20 A	35	1			1.00 0.72	1	36	20 A	12	MB - RM 102, 107	Ot...
MI...	EPO - KITCHEN/EXT. 111	12	20 A	37	1	0.36 0.18			1	38	20 A	12	ICE MACHINE - JAN 116 (NOTE 8)	R...
R...	RCPT - JANITOR 116	12	20 A	39	1		0.54 1.08		1	40	20 A	12	REC - LOBBY/VESTIBULE	R
R	REC - OFFICE	12	20 A	41	1			0.90 1.18	1	42	20 A	12	REC - IT ROOM 105	MS
MS	REC - IT ROOM 105	12	20 A	43	1	1.00 1.00			1	44	20 A	12	REC - IT ROOM 105	MS
MI...	RCPT - IT ROOM 105	12	20 A	45	1		1.00 1.00		1	46	20 A	12	REC - IT ROOM 105	MS
MS	REC - IT ROOM 105	12	20 A	47	1			1.00 1.90	1	48	20 A	12	REC - CAPTAIN	R
R	REC - TRAINING	12	20 A	49	1	1.72 0.36			1	50	20 A	12	REC - TRAINING	R
R	REC - KITCHENETTE/TOILET	12	20 A	51	1		0.54 0.36		1	52	20 A	12	REC - TRAINING	R
R	REC - TRAINING	12	20 A	53	1			0.36 0.18	1	54	20 A	12	REC - TRAINING	R...
MS	TV - TRAINING	12	20 A	55	1	1.00 1.00			1	56	20 A	12	EWC (NOTE 8)	MS
MI...	SENSORS - PUB TLT 101	12	20 A	57	1		0.72 0.50		1	58	20 A	12	FACP (NOTE 7)	MI...
MS	PRINTER - REPORT ROOM	12	20 A	59	1			1.00 0.54	1	60	20 A	12	REC - REPORT ROOM	R
R	REC - REPORT ROOM	12	20 A	61	1	1.08 0.00			1	62	20 A	-	SPARE	Sp...
MI...	DISHWASH - KIT 111 (NOTE 8)	12	20 A	63	1		1.00 0.00		1	64	20 A	-	SPARE	Sp...
MI...	KITCHEN HOOD (NOTE 8)	12	20 A	65	1			0.36 0.00	1	66	20 A	-	SPARE	Sp...
MI...	G. DISPL - KIT/DIN 111	12	20 A	67	1	1.00 0.00			1	68	20 A	-	SPARE	Sp...
MI...	NAC (NOTE 7)	12	20 A	69	1		0.50 0.00		1	70	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	71	1			0.00 0.00	1	72	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	73	1	0.00 0.00			1	74	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	75	1		0.00 0.00		1	76	20 A	-	SPARE	Sp...
Sp...	SPARE	-	20 A	77	1			0.00 0.00	1	78	20 A	-	SPARE	Sp...
	SPACE ONLY	-	--	79	1	-- --			1	80	--	-	SPACE ONLY	
	SPACE ONLY	-	--	81	1		-- --		1	82	--	-	SPACE ONLY	
	SPACE ONLY	-	--	83	1			-- --	1	84	--	-	SPACE ONLY	

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA
H	HEATING	0.00 kVA	0.00%	0.00 kVA
C	COOLING	0.00 kVA	0.00%	0.00 kVA
V	VENTILATION	0.00 kVA	0.00%	0.00 kVA
M	MOTORS	0.00 kVA	0.00%	0.00 kVA
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA
R	RECEPTACLES	20.34 kVA	74.58%	15.17 kVA
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA
MS	MISC.	38.20 kVA	100.00%	38.20 kVA
S	Spare	0.00 kVA	0.00%	0.00 kVA
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA
EV	EV CHARGING	0.00 kVA	0.00%	0.00 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. PROVIDE BREAKER WITH RED HANDLE LOCK-ON DEVICE.
8. PROVIDE CLASS A GFI (6mA PERSONNEL) BREAKER (250' MAX).
9. PROVIDE FEED THRU LUGS.
10. PROVIDE LOCKABLE BREAKER.

TOTAL KVA...	59.62 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	54.45 kVA	161.2 A	146.2 A	193.4 A
TOTAL AMP....	165 A			
TOTAL AMP. (DEMAND):	151 A	**TOTAL AMP. (DEMAND) x 125%**		188.9 A

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

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Project No.
1738

Date:
5/8/2024 4:02:07 PM
Drawn by:
JDW
Checked by:
BKL
Revisions:

#	Description	Date
2	ADDENDUM #2	05/08/24

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NORTH CAROLINA PROFESSIONAL SEAL 051825 ENGINEER BRANDON K. LEE
05/08/24

CASTLE HAYNES FIRE DEPARTMENT

PANEL SCHEDULES

Sheet No.
E8.02

Opt # 22-0368

FIRE PROTECTION

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	0.05	PER NFPA	PER LISTING	100	-	LIMITED-AREA RESIDENTIAL SPRINKLER SYSTEM

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 PREVENTION CODE - 2018 EDITION
2. NFPA 13R - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS - 2013 EDITION

NOTES:
1. DURING DESIGN CALCULATIONS, AN ALLOWANCE SHALL BE MADE FOR A 100 GPM HOSE STREAM.
2. SPRINKLER AREA OF COVERAGE SHALL BE PER LISTING.
3. SPACING AND POSITIONING OF SPRINKLERS SHALL MEET ALL THE PERTINENT REQUIREMENTS OF NFPA 13 OR 13R AS APPLICABLE.
4. DESIGN DENSITY.
   PROVIDE AT LEAST THE FLOW REQUIRED FOR THE MULTIPLE AND SINGLE SPRINKLER OPERATING CRITERIA SPECIFIED BY THE SPRINKLER'S LISTING OR PER NFPA 13 OR NFPA 13R AS APPLICABLE.
5. NUMBER OF DESIGN SPRINKLERS:
   UNDER SMOOTH FLAT CEILINGS, THE DESIGN SHALL INCLUDE ALL SPRINKLERS WITHIN A COMPARTMENT, UP TO A MAXIMUM OF FOUR SPRINKLERS, THAT REQUIRE THE GREATEST HYDRAULIC DEMAND.

SPRINKLER SCHEDULE

1. PROVIDE ADJUSTABLE CONCEALED PENDENT SPRINKLERS ALL LAY-IN ACOUSTICAL TILE AND GYPBOARD CEILINGS. COORDINATE COLOR OF CONCEALED SPRINKLER HEAD COVER-PLATE WITH ARCHITECT.
2. LOCATE SPRINKLERS TO AVOID OBSTRUCTIONS BY CEILING MOUNTED DEVICES. WHERE CEILING DEVICES OBSTRUCT SPRINKLER DISCHARGE, ADD ADDITIONAL SPRINKLERS SPACED AROUND THE OBSTRUCTION.
3. PROVIDE BRASS UPRIGHT SPRINKLERS IN EXPOSED AREAS WITH NO FINISH CEILING.
4. PROVIDE BRASS PENDENT SPRINKLERS WITH SHIELDS IN AREAS WHERE EXPOSED SPRINKLERS ARE SUBJECT TO DAMAGE.
5. PROVIDE RECESSED DRY STEM PENDENT SPRINKLER WITH WHITE PLATE IN AREAS SUBJECT TO FREEZING.
6. PROVIDE INTERMEDIATE TEMPERATURE SPRINKLERS (175º F - 225ºF ACTIVATION TEMPERATURE) IN ELEC. ROOMS, BOILER ROOMS, DATA CLOSETS AND WHEN SPRINKLER IS LOCATED WITHIN 18" OF HVAC DIFFUSER.

* INSTALL SPRINKLERS IN ACCORDANCE WITH NFPA 13 AND THE MANUFACTURERS APPROVAL LISTING.
* PROVIDE QUICK RESPONSE SPRINKLERS.

2

FIRE PUMP SCHEDULE

SYM	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA				SELECTION BASED ON		REMARKS
			GPM	PSI	HP	VOLTS	PH	HZ	MANUFACTURER	MODEL	
FP1	ELECTRIC FIRE PUMP	VERTICAL TURBINE	250	75	15	208	3	60	A-C FIRE PUMP	FP10WALC	1
JP1	JOCKEY PUMP	IN-LINE	-	--	5 MAX	208	3	60	GOULDS	--	2

REMARKS:
1. PROVIDE SERVICE ENTRANCE RATED WYE DELTA CLOSED FIRE PUMP CONTROLLER WITH SERVICE ENTRANCE RATED AUTOMATIC TRANSFER SWITCH.
2. PROVIDE JOCKEY PUMP CONTROLLER.

FIRE PROTECTION GENERAL NOTES

1. THE INTENT OF THESE PLANS IS TO PROVIDE INFORMATION TO THE REVIEWING AUTHORITIES THAT THE BUILDING WILL BE PROTECTED BY A SPRINKLER SYSTEM.
2. GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT APPLY TO THE FIRE PROTECTION SCOPE OF WORK. THE FIRE PROTECTION DRAWINGS AND SPECIFICATIONS SHALL NOT BE INTERPRETED AS WAIVING OR OVERRULING ANY REQUIREMENTS EXPRESSED IN GENERAL CONDITIONS.
3. SCOPE: PROVIDE DESIGN, FABRICATION AND INSTALLATION OF A HYDRAULICALLY CALCULATED AUTOMATIC SPRINKLER SYSTEM INCLUDING ALL SERVICES, MATERIALS, LABOR AND EQUIPMENT REQUIRED FOR A COMPLETE WORKING SPRINKLER SYSTEM IN FULL COMPLIANCE WITH THE REQUIREMENTS OF THE 2013 EDITION OF NFPA 13, THE OWNER'S INSURANCE UNDERWRITER, THE 2018 NORTH CAROLINA STATE FIRE CODE AND THE LOCAL AUTHORITY HAVING JURISDICTION.
4. PERMITS: APPLY AND PAY FOR ALL NECESSARY PERMITS, FEES AND INSPECTIONS REQUIRED BY ANY PUBLIC AUTHORITY HAVING JURISDICTION. ACREAGE CHARGES, FACILITIES CHARGES AND BOND PROPERTY ASSESSMENTS ARE NOT TO BE CONSTRUED TO BE A PART OF THIS CONTRACT.
5. WARRANTY: PROVIDE A ONE YEAR WARRANTY, FROM THE DATE OF ACCEPTANCE OF WORK BY THE OWNER, FOR ALL SPRINKLER SYSTEM MATERIALS AND EQUIPMENT.
6. COORDINATE ALL SPRINKLER PIPING LOCATIONS, SPRINKLER LOCATIONS AND EQUIPMENT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES. FINAL PIPING AND EQUIPMENT LOCATIONS SHALL BE A CODE COMPLIANT INSTALLATION FOR ALL TRADES.
7. DO NOT SCALE THE DRAWINGS, REFERENCE THE ARCHITECTURAL PLANS FOR DIMENSIONAL INFORMATION.
8. WHERE DISCREPANCIES ARE FOUND IN THE DRAWINGS AND SPECIFICATIONS THE MORE STRINGENT SHALL APPLY. CONTACT ENGINEER FOR CLARIFICATION.
9. OBTAIN A NEW FLOW TEST, LESS THAN 1 MONTH OLD, PRIOR TO STARTING THE DESIGN OF THE SPRINKLER SYSTEM. THE FLOW TEST CRITERIA SHALL INCLUDE THE STATIC PRESSURE, RESIDUAL PRESSURE, FLOW IN GPM, HORIZONTAL AND VERTICAL DISTANCE OF TEST FROM BASE OF FIRE RISER, THE NAME OF THE PERSON AND COMPANY WHOM PERFORMED THE FLOW TEST, THE TESTING COMPANY'S PHONE NUMBER, AND THE DATE AND TIME THE TEST WAS PERFORMED.
10. DESIGN AND HYDRAULICALLY CALCULATE THE SPRINKLER SYSTEM UTILIZING THE CURRENT FLOW TEST DATA. MEET ALL NFPA 13 REQUIREMENTS WHETHER OR NOT SPECIFICALLY INDICATED WITHIN THESE DOCUMENTS. TERMINATE THE HYDRAULIC CALCULATIONS AT THE CITY CONNECTION MINIMUM. INDICATE ON DRAWINGS ALL UNDERGROUND PIPE AND FITTINGS BOTH NEW AND EXISTING.
11. THE CONTRACTOR SHALL HAVE A DESIGNER ON STAFF WITH A CURRENT N.I.C.E.T. LEVEL III CERTIFICATION OR HIGHER TO PREPARE THE WORKING PLANS AND HYDRAULIC CALCULATIONS IN ACCORDANCE WITH NFPA 13 CHAPTER 23 "PLANS AND CALCULATIONS". THE N.I.C.E.T. DESIGNERS NAME, SIGNATURE AND CERTIFICATE NUMBER SHALL APPEAR ON THE WORKING DRAWINGS AND HYDRAULIC CALCULATIONS.
12. SUBMIT WORKING PLANS, HYDRAULIC CALCULATIONS AND MATERIALS DATA AND ACCESSORIES IN ELECTRONIC FORMAT (PDF) TO THE ARCHITECT / ENGINEER FOR REVIEW AND OBTAIN APPROVAL BEFORE STARTING THE INSTALLATION OF THE SPRINKLER SYSTEM.
13. THE CONTRACTOR SHALL SUBMIT WORKING PLANS AND HYDRAULIC CALCULATIONS EXPEDIENTLY TO THE AUTHORITIES HAVING JURISDICTION. APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION SHALL BE OBTAINED BEFORE STARTING THE INSTALLATION OF THE SPRINKLER SYSTEM.
14. AT THE COMPLETION OF THE PROJECT, PROVIDE TWO SETS OF RECORD DRAWINGS TO THE OWNER, CLEARLY SHOWING ANY CHANGES AND/OR MODIFICATIONS, ADDITIONS OR DELETIONS TO AND FROM THE CONSTRUCTION DOCUMENTS. THESE SETS SHALL BE REVIEWED BY THE ARCHITECT / ENGINEER BEFORE BEING TURNING OVER TO THE OWNER.

INSTALLATION REQUIREMENTS:

1. PROVIDE ALL NECESSARY OFFSETS, RISES OR DROPS IN THE PIPING AND AUXILIARY DRAINS AS REQUIRED BY ALL APPLICABLE CODES WHETHER OR NOT SHOWN ON THE PLANS.
2. CONNECT ALL SPRINKLER ALARM, TAMPER AND DETECTION SYSTEMS TO THE BUILDINGS CENTRAL FIRE ALARM SYSTEM, COORDINATE LOCATIONS AND REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
3. PIPE PENETRATIONS THRU WALLS, PARTITIONS AND FLOORS SHALL BE SLEEVED. CORE DRILLING THRU WALLS AND PARTITIONS IS PERMITTED IF PERFORMED IN A NEAT CRAFTSMAN LIKE MANNER. PIPES PENETRATING THRU EXTERIOR WALLS SHALL BE SEALED WATER TIGHT. INSTALL ESCUTCHEONS IN ALL EXPOSED AREAS.
4. CONCEAL PIPING ABOVE CEILINGS OR TIGHT TO UNDERSIDE OF STRUCTURE IN EXPOSED AREAS.
5. SPRINKLER LOCATIONS ARE TO BE IN THE CENTER OF THE CEILING TILE USING THE REFLECTED CEILING PLANS AND AS COORDINATED WITH THE CEILING CONTRACTOR.
6. 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 ARCHITECT / ENGINEER AND REPLACE OR REPAIR ANY DEFECTIVE WORKMANSHIP, EQUIPMENT AND MATERIALS AT NO ADDITIONAL COST TO THE OWNER.

TESTING AND FLUSHING:

1. 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.

FIRE PROTECTION LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
F	F	FIRE PROTECTION SUPPLY PIPING
WP	WP	WET PIPE SPRINKLER
	-	PIPING ELBOW DOWN
	-	PIPING ELBOW UP
	-	PIPING CONTINUES

ADDITIONAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MFG	MANUFACTURER
AFG	ABOVE FINISHED GRADE	PSI	POUNDS PER SQUARE INCH
BAS	BUILDING AUTOMATION SYSTEM	TS	TAMPER SWITCH
BFF	BELOW FINISHED FLOOR	TYP	TYPICAL
CLG	CEILING	WMG	WATER MOTOR GONG
CONT	CONTINUATION	WC	WATER COLUMN
DN	DOWN		
FS	FLOW SWITCH	EC	ELECTRICAL CONTRACTOR
FHV	FIRE HOSE VALVE	FSC	FOOD SERVICE CONTRACTOR
GPM	GALLONS PER MINUTE	GC	GENERAL CONTRACTOR
HP	HORSE POWER	MC	MECHANICAL CONTRACTOR
INV	INVERT ELEVATION	PC	PLUMBING CONTRACTOR
KW	KILOWATT		

FIRE PROTECTION MATERIALS

1. ALL PIPING SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.
2. ABOVE GRADE PIPING: BLACK STEEL PIPING (ASTM A53, ASTM A135, OR ASTM A795) 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 WELDED, OR ROLL GROOVED FOR MECHANICAL FITTINGS.
3. THREADED FITTINGS: UL-LISTED, STANDARD WEIGHT SUITABLE FOR PRESSURE UP TO 175 PSIG, CAST IRON MEETING ASTM A126 OR MALLEABLE IRON MEETING ASTM A197. THREADED CAST IRON FITTINGS SHALL MEET ANSI B16.4; FLANGED CAST IRON FITTINGS SHALL MEET ANSI B16.1. THREADED MALLEABLE IRON FITTINGS SHALL MEET ANSI B16.3.
4. GROOVED FITTINGS AND COUPLINGS: UL-LISTED, DUCTILE IRON MEETING ASTM A536, UTILIZING AN EDPM GASKET. PLAIN-END FITTINGS AND COUPLINGS, OR WELDED-SEGMENTED FITTINGS SHALL NOT BE USED. CHANGES IN PIPE DIAMETER SHALL BE MADE USING TAPERED REDUCING FITTINGS. BUSHINGS OR GROOVED-END REDUCING COUPLINGS SHALL NOT BE USED UNLESS STANDARD REDUCING FITTINGS ARE NOT REGULARLY AVAILABLE.
5. USE HOT-DIPPED GALVANIZED PIPING AND FITTINGS FOR COMPRESSED AIR PIPING, WATER MOTOR ALARM PIPING, BALL DRIP DISCHARGES AND TEST / DRAIN PIPING SUBJECT TO ALTERNATE WETTING AND DRYING.
6. PIPE HANGERS: UL-LISTED SWIVEL LOOP TYPE WITH PRE-GALVANIZED CARBON STEEL BAND, HANGER RODS SIZED PER NFPA 13, UL-LISTED STEEL OR MALLEABLE IRON BEAM CLAMPS, UL-LISTED ANCHORS. POWER DRIVEN ANCHORS SHALL NOT BE USED. REFER TO THE STRUCTURAL PLANS AND DETAILS FOR ACCEPTABLE LOCATIONS TO ATTACH HANGERS AND SUPPORTS TO THE BUILDING STRUCTURE. HANGERS SHALL NOT ATTACH TO THE ROOF DECK.
7. 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.
8. ESCUTCHEON PLATES: PROVIDE CHROME PLATED ESCUTCHEON PLATES WHERE PIPES PASS THROUGH FINISHED WALLS, FLOORS, OR CEILING. PROVIDE PRIME COAT PAINTED ESCUTCHEON PLATES WHERE PIPES PASS THROUGH WALLS, CEILINGS, ETC. IN UNFINISHED EXPOSED AREAS.

FIRE PROTECTION SHEET INDEX

SHEET NUMBER	SHEET NAME
FP0.01	FIRE PROTECTION LEGEND, NOTES, AND DETAILS
FP1.01	FIRE PROTECTION FLOOR PLANS
FP5.01	FIRE PROTECTION DETAILS

Ref North

Project No.
1738

Date:
5/10/2024 3:07:10 PM
Drawn by:
Author
Checked by:
Checker
Revisions:

#	Description	Date
2	ADDENDUM #2	05/08/24

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05/08/24

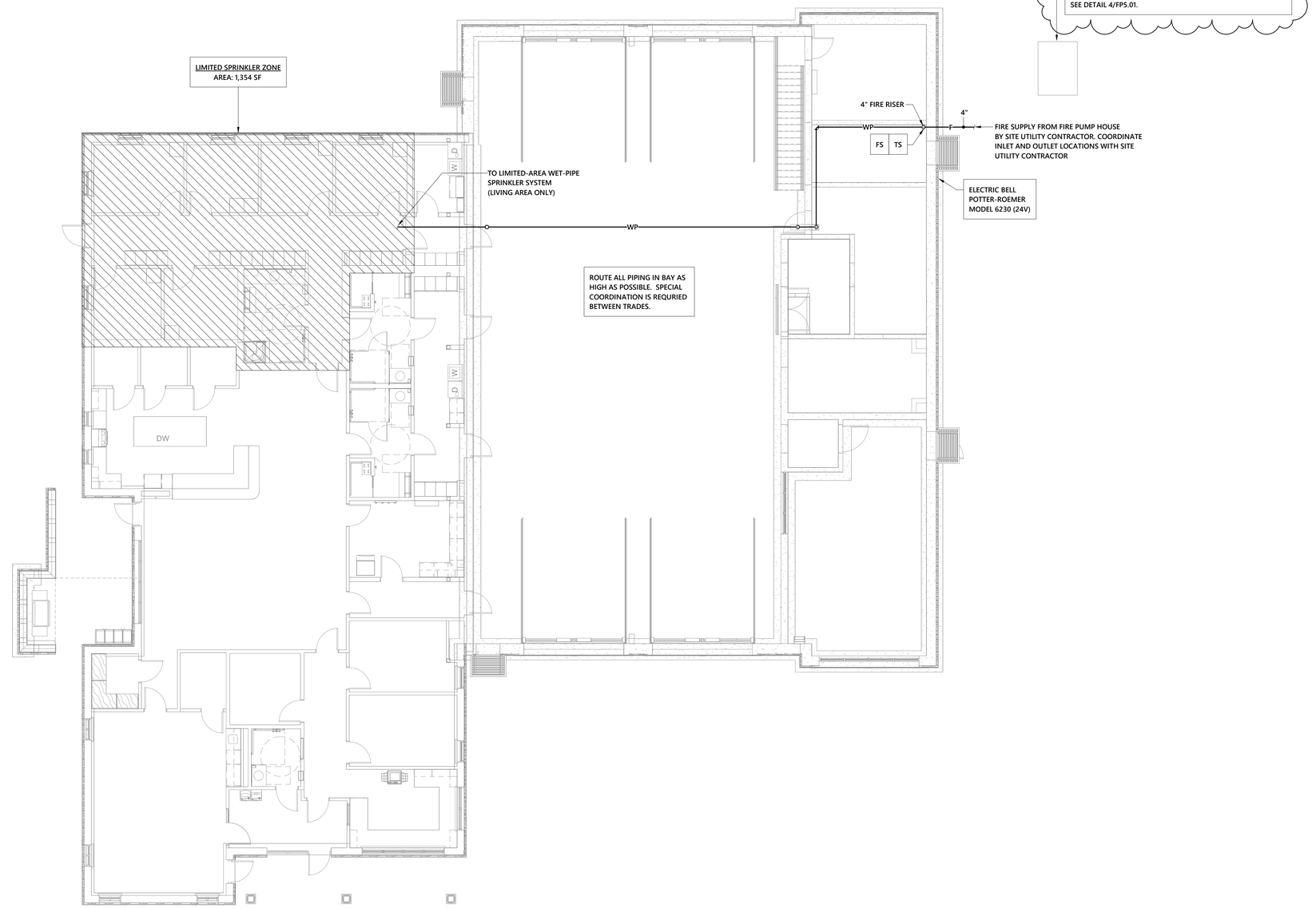
CASTLE HAYNES FIRE DEPARTMENT

FIRE PROTECTION LEGEND, NOTES, AND DETAILS

Sheet No.
FP0.01

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2

NOTE: PREFABRICATED FIRE PUMP HOUSE BY SPRINKLER CONTRACTOR, LOCATED ABOVE FIRE STORAGE WATER TANK. SEE SITE UTILITY PLAN FOR EXACT LOCATION. COORDINATE THE FIRE PUMP HOUSE LOCATION, STORAGE TANK AND FIRE MAIN ROUTING WITH THE SITE UTILITY CONTRACTOR. SEE DETAIL 4/FP5.01.

1 **FIRST FLOOR FIRE PROTECTION PUMP HOUSE**
1/8" = 1'-0"

Ref North

Project No.
1738

Date:
5/10/2024 3:07:14 PM
Drawn by:
Author
Checked by:
Checker
Revisions:

#	Description	Date
2	ADDENDUM #2	05/08/24

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05/08/24

CASTLE HAYNES FIRE DEPARTMENT

FIRE PROTECTION FLOOR PLANS

Sheet No.
FP1.01

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ADDENDUM NO. 2

May 10, 2024

1738-NEW HANOVER COUNTY FIRE AND RESCUE-CASTLE HAYNE STATION

Each Contractor shall be responsible for each item of the Addendum as stated herein and shall coordinate each item with his particular portion of work. Each Contractor shall coordinate with all other Contractors for satisfactory completion of each item of the addendum and the total project. The Prime Contractor shall be responsible for seeing that his subcontractors/material suppliers are properly apprised of the contents of this Clarification. The following clarifications, amendments, additions, deletions, revisions, and/or modification are hereby made a part of the Contract Documents, and change the original documents only in the manner and to the extent stated herein.

GENERAL:

1. **Whenever there are discrepancies between Drawings, or between the Drawings and Specifications, or conflicts within the Specifications and/or Drawings, and such discrepancy is not called to the Architect's attention in time to permit clarification by Addendum, the Contractor shall base his Bid upon providing the better quality or greater of work or material called for, shall submit a written statement with his proposal noting such discrepancies, and shall so furnish and install such better quality or greater quantity unless otherwise ordered in writing.**
2. Inquiries and responses will be listed at the end of this document, prior to the attachment of other documents in the Addendum. See revisions listed below:

SPECIFICATIONS:

1. Refer to Table of Contents TOC-1
   a. Removal of Sections from Table of Contents and Specbook, indicated as ~~struck through~~.
   b. Addition of Section 071416 Cold Fluid-Applied Waterproofing (Below Grade Applications) to Table of Contents and Specbook
   c. Revision of Section 072726.03 to include “Vapor Permeable”
   d. Removal of Section 096510 Luxury Vinyl Tile (LVT), replaced with Section 096519 Resilient Tile Flooring to Table of Contents and Specbook
   e. Removal of Section 096536 Static Control Resilient Flooring from Table of Contents
   f. Addition of Section 096566 – Resilient Athletic Flooring to Table of Contents
   g. Revision of Section numbering for 0113013 Residential Appliances
   h. Revision of Section Title for 114510.1 Appliance Schedule
   i. Revision of Section 230000 Fire Pumps
   j. Addition of Section 230000.1 Fire Pumps – Vertical Turbine
   k. Addition of Section 230000.2 Fire Pumps - House
   l. Addition of Section 331600 Underground Storage Tank (Fire Suppression)
      i. Refer to Electrical Drawings for power and data requirements
2. Refer to Contract and Bond Requirements C-1
   a. Revision to language
3. Refer to 012100 Allowances
   a. Revision to listed Allowances
   b. Removal of Unit Price quantities
4. Refer to 012200 Unit Prices
   a. Revisions to named Unit Prices
5. Refer to 012300 Alternates

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   a. Addition of ERRS System as Alternate A-2
6. Refer to 014001 Special Inspections
   a. Revision to Statement of Special Inspections and Schedule of Special Inspections
7. Refer to Section 033000 Cast In Place Concrete
   a. Revisions to 2.15
8. Refer to Section 042000 Unit Masonry
   a. Removed 3.7.D
   b. Removed mention of Division 07 Section “Modified Bituminous Sheet Air Barriers”
   c. Added Division 07 Section “Cold Fluid Applied Waterproofing” to 3.7.F
9. Refer to Section 042002 Arch. Concrete Masonry Units
   a. Revisions to 2.1B
10. Refer to Section 044313 Manufactured Stone Veneer
   a. Basis of Design revised to reflect drawings
11. Refer to Section 054000 Cold Formed Metal Framing
   a. Revisions to base metal thicknesses and flange widths
12. Refer to Section 054400 Cold Formed Metal Trusses
   a. Revisions to 2.2
13. Refer to Section 114510.1 Appliance Schedule
   a. Revision to Appliance Schedule list
14. Refer to Section 122113 Horizontal Aluminum Blinds (2 Inch)
   a. Revision to Cord options
15. Refer to Sections 231123 Facility Natural Gas Piping and 232300 Refrigerant Piping
   a. Addition of Submittal requirements
16. Refer to Section 263600 Transfer Switches
   a. 2.3.E Automatic Delayed Transition Transfer Switches removed

DRAWINGS:

GENERAL

1. Refer to sheet 0.00
   a. Revision to Index of Drawings

ARCHITECTURAL

1. Refer to sheet 4.12
   a. Revision to Doors 104, 106
2. Refer to sheet 4.70
   a. Revision to Door frames F6, F7, F8
3. Refer to sheet 5.10 and 5.11
   a. Revision to Exterior Finish Materials; Azek Trim color and Signage Information
4. Refer to sheet 5.33
   a. Corrected pipe bollard detail reference
5. Refer to sheet 6.10
   a. Revision to Finish Legend – Corrected Bambusa tile sizing
6. Refer to sheet 7.10
   a. Revision to Finish Plan, locating window blinds
   b. Revision to Finish Tags for Medium Decon 120 and Laundry 130
   c. Revision to Finish Legend – Corrected Bambusa tile sizing
7. Refer to sheet 7.11
   a. Revision to Detail 1/7.11 – Schluter Jolly trim adjusted to Schluter QUADEC
8. Refer to Attached ASI #2

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a. Reissued sheets 4.11, 5.10, 5.11, 5.32 pertaining to Signage Details and Porch Entry Columns
b. Issued new sheet 5.12 pertaining to Signage Details and Porch Entry Columns

CIVIL

1. Refer to sheet C0.0
   a. Revision to Index of Drawings
2. Refer to sheet C3.1
   a. Revision to domestic and fire suppression water line routing
3. Refer to sheet C5.0
   a. Heavy Duty Concrete detail revised to include joints and sealant
4. Refer to sheet C5.1
   a. Revised to show sealant along wall at sidewalk detail
5. Refer to sheets C6.0 and C6.1
   a. Reissued details on sheets to locate Septic System

STRUCTURAL

1. Refer to sheet 3.00
   a. Revised concrete notes
2. Refer to sheet 3.02
   a. Column C8 details provided
   b. Revised column schedule
3. Refer to sheet 3.10
   a. Revision to shower slab depression
4. Refer to sheet 3.70 and 3.71
   a. Revision of light gauge studs
5. Refer to sheet 3.74
   a. Revision to Section 1/3.74

PLUMBING

1. Refer to sheet P0.02
   a. Revision to Plumbing Fixture Schedule
2. Refer to P0.03
   a. Revision to Gas Load Summary
3. Refer to sheet P2.01
   a. Added gas piping to range in Kitchen/Dining 111

FIRE PROTECTION

1. Refer to sheet FP0.01
   a. Updated the fire pump schedule.
2. Refer to sheet FP1.01
   a. Updated the note regarding the fire pump house.

ELECTRICAL

3. Refer to sheet E0.10
   a. Revision to electrical requirements for water holding tank
4. Refer to sheet E2.01 and E8.02
   a. Revision to electrical requirements for Range

INQUIRIES:

1. General
    a. Q: It appears both stations will have the same layout from what I see. Is this true?
        i. A: Station layouts are different.
    b. Q: Misc. – There is no mention of a monument sign on the site. Is this expected to come later, and not at all?
        i. A: Not in Project
    c. Q: Please clarify if the required cast metal plaque is Aluminum or Bronze
        i. A: Aluminum
    d. Q: Please provide the overall size of the required cast metal plaque
        i. A: 30” x 36”
    e. Q: Table of contents references 088853, not defined in specifications. - Both FS
        i. A: Spec section removed. See Specifications above.
    f. Q: Table of contents references 096536, not defined in specifications. - Both FS
        i. A: Spec section removed. See Specifications above.
    g. Q: Specifications refer to as: 113013, table of contents refer to as 113100. Please advise. - Both FS
        i. A: 113013 is the correct numbering. See Specifications above.
    h. Q: Specifications: 230500, 230513, 232300, & 231152 do not have submittals in specs. - Both FS
        i. A: 231152 does not exist. 230500 and 230513 would not require submittals. 232300 and 231123 updated with submittal section.
    i. Q: Welding certificates are a submittal requirment for multiple spec sections. Please confrim which specs actually require a welding certificate such as Div. 05
        i. A: Welding certificates are required in multiple spec sections. Subs should read through the specs to determine requirements.
    j. Q: Requestng to remove Div. 02 from the spec and all submittals.
        i. A: Division 02 will not be removed
    k. Q: 013300: Is this going to be a requirement.
        i. A: Electronic Submittals are required
    l. Q: Divisions: 31, 32, & 33 is missing from Castle Haynes Spec Book. Please provide.
        i. A: Sections should have been provided.
2. Architectural
    a. Q: The bunk rooms only are protected. No other areas are protected. Is this system an option?
        i. A: The full building is sprinkled
    b. Q: The specifications for the FF Doors show an International Door as the basis of design and the drawing calls for the Door Engineering FF30. The FF30 is not available with an arched top. The FF300 would be the model from Door Engineering that would need to be used. Also, when pricing the FF Doors as an alternate, do we need to quote (4) doors total or just (2) for the front elevation?
        i. Alternate A-1 is for (2) front doors to be Four-Fold Doors. Doors should be squared off to the max height and width of the opening, without arched tops; Doors to shut flush. Only glass should be arched.
    c. Q: There is no indication on the drawings concerning the ice machine or coffee machine. It does state "under counter ice machine" on the appliance schedule but does not mention which size is needed. We are able to get this in a 15" or 18" version. They also make ice machines with and without pumps. It will most likely need to have a pump but I wanted to clarify. I'll also need to know where the built-in coffee machine will be mounted. They typically require a dedicated waterline plumbed to the area they will be mounted

   i. A: No Under Counter Ice Machine in Project; No dedicated line for Coffee Maker

d. Q: Will water repellent in spec section 071900 be necessary with CMU with integral water-proofing ? Spray stone only?
   i. A: Spray on Stone veneer only
e. Q: Can we apply bituminous dampproofing to CMU below grade instead of two parge coats of mortar?
   i. A: See Sepc Sections above for Section 42000 Unit Masonry
f. Q: Where is seat wall detail 10/A4.21 located on projects?
   i. A: Seat wall detail location is on Civil Site plans
g. Q: Is stone veneer to be Coronado as per plan, or Boral as per specs
   i. A: Stone veneer to be per Drawings. See Specifications Section 044313 above
h. Q: It appears masonry scope has bituminous damp proofing on CMU behind veneer ? is this damp proofing or fluid applied vapor barrier?
   i. A: Bituminous damp proofing has been written out of the Specifications. See Specifications remarks above.
i. Q: 1-Is there a detail clearly showing the waterproofing/fluid applied vapor barrier as it passes below grade? Is it the intent to run the WRB down to the footer? There are spec sections for Bit DampProofing and Sheet applied Waterproofing but I don't see either called out. 2-If the Architect intends the area below grade to be waterproofing, would they accept a fluid applied product such as Tremco Tremproof that would work with the air barrier?
   i. A: 1. Intent is to run WRB to footer 2. Tremco TREMproof is acceptable. Below grade product such as TREMproof 260 required for applications below grade. Refer to Specifications section above.
j. Q: Would the Architect consider accepting Polyroof Protec FW 25, fluid applied Membrane as an alternate to the PVC Shown in the plans. The product is cold-applied and comes with a 25 year guarantee.
   i. A: No
k. Q: Shower Pan Depressions – Shower Pan Detail 5 sheet A7.11 shows a 2" slab depression at showers, structural drawings do not appear to show any slab depressions and spec Section 093013 lists a raised prefabricated shower curb from Schluter. Please confirm if shower stalls will be depressed for a zero-entry or if showers will receive a shower curb.
   i. A: Showers to be at recessed slab conditions with the exception of the Shower Unit in the Decon Toilet Room. Refer to Structural Drawings Section above.
l. Q: Outside Vertical Corners at Tiled Walls – Detail 1 Sheet A7.11 lists Schluter JOLLY trim at outside vertical corners and Detail 16 Sheet A7.11 lists Schluter QUADEC trim at outside wall corners, please confirm that Detail 16 Schluter QUADEC is the correct trim to include as there is a price difference.
   i. A: Schluter QUADEC is the correct trim. See Architectural Drawing Heading above.
m. Q: Drawing 7.11/1 call out Schluter Jolly at outside tiled corners, however, 7.11/16 call out Schluter Quadec-TSDA at outside tiles corners. Please confirm correct Transition to be used.
   i. A: Schluter QUADEC. See Architectural Drawing Heading above.
n. Q: Exterior Signage – 101418 Does not mention illumination requirements for Dimensional Letters on Drawing Sheet 5.10. Sheet 5.10 requires backlit letters on 2" spacers. Is this requirement in addition to the 101418 Part 2.3 requirements?
   i. A: Yes; Color temperature to match the color temperature of exterior lighting (3500K)

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o. Q: Exterior Signage – No dimensions are provided for exterior Dimensional Lettering, shall we scale the drawing to get dimensions for the bid, or do we need to check the zoning code for allowable square footage and size appropriately per code requirements?
    i. A: Refer to Architectural Drawing Heading above for ASI-2
p. Q: Exterior Signage – No font is given for Dimensional Lettering. Will vector artwork or a font be provided for us to create our files for production?
    i. A: Refer to Architectural Drawing heading above for ASI-2.
q. Q: Exterior Signage – There are no dimensions provided for the Fire Emblem Plaques (4 front façade, 4 rear façade). Same question as #4, do we need to scale those based on the drawings?
    i. A: Refer to Architectural Drawing heading above for ASI-2.
r. Q: Exterior Signage – For Fire Emblems, same question as number 3 above. There are no illumination requirements for the plaques in 101418 Part 2.4. Are the illumination requirements on sheet 5.10 in addition to 2.4?
    i. A: Yes; Color temperature to match the color temperature of exterior lighting (3500K)
s. Q: Exterior Signage – there are no placement dimensions provided that we could find on any drawings for dimensional lettering or the fire emblems. Will this be provided later, or is placement to be calculated based on the scaled drawings and added to our proof sheet for approval?
    i. A: Refer to Architectural Drawing heading above for ASI-2
t. Q: Does Architect want the Schluter Shower kits (which comes with all parts and pieces including drain) vs individual Schluter system pieces?
    i. A: Kits
u. Q: Are any of the showers going to be ADA? IF “Yes”, what RR will that be?
    i. A: Yes, all showers to be ADA transfer type
v. Q: Do they want to use the Schluter - Kerdi on Shower floors and the Schluter Dietra outside the shower floors?
    i. A: Kerdi @ showers, Ditra on all other tiled floors
w. Q: Specs call for Shower curb – Schluter Kerdi, but drawings 7.11/19 shows Corian Quartz Threshold. Please clarify what transition will be used where.
    i. A: Quartz threshold
x. Q: Medium Decon 120 – Indicates both PTF-1 & PFT-2 on floors. Finish Fl plan shows no dual hatching - Can you clarify for the PTF-2 will go?
    i. A: Only PFT-1 this location. Refer to Architectural Drawing heading above
y. Q: Laundry 130 – Indicated LVT-1 & LVT-2 on Fl. Finish Fl plan shows no dual hatching - Can you clarify for the LVT-1 will go?
    i. A: Only LVT-2 this location. Refer to Architectural Drawing heading above
z. Q: PWT-2/PWT-3 – The 2.5” x 19” tile size listed does not appear to be one of the available sizes for the Bambusa Tile series, please confirm the tile selection for PWT-2 and PWT-3.
    i. A: Tile size should be 2.5"x24". Refer to Architectural Drawing heading above
aa. Q: 0784443 Section 1.6 – Confirm FM Global or UL qualified firestop installer qualfications
    i. A: Provide UL
bb. Q: 092216 Section 1.3.B and 1.3.C – Shop Drawings and Delegated Design; Is this required for Non-structural Metal Framing? This is typically for 054000 cold-formed metal framing only.
    i. A: Required
cc. Q: Specification 122113 specifies an Aluminum Corded Blind. This product cannot be quoted due to a new WCMA and ANSI Standard
    i. A: Spec section revised. See Specifications above

dd. Q: Question regarding the storefront doors/frames on sheet number 4.70. Are the storefront openings with door tag E and frame tags F6 & F7 aluminum? I am assuming they are because they are storefronts, but I wanted to make sure that they are not hollow metal.
    i. A: F6 (Door 109A) to be hollow metal; F7 & F8 are Storefront; See revised Architectural sheets above
ee. Q: The architect would have to be willing to change the specification from 123213 Manufactured Wood Casework to 064116 Plastic Laminate Clad Architectural Cabinets. If you would like to submit an RFI asking if that would be acceptable I'd be willing to price the jobs based on that spec. The architect does list alternate manuf. in the 123213 specs, but the issue is we don't purchase casework boxes, we custom build everything in house.
    i. A: No
ff. Q: 6400 specification 1.6 Quality Assurance it states: Licensed participant in AWI's Quality Certification Program. We are not AWI members-Can we remove?
    i. A: This is required
gg. Q: Specifications references a "light house" for wood sheathing, additionally no wood sheathing observed per drawings. - Both FS
    i. A: Spec section has been removed. See specifications above.
hh. Q: Specifications reference 096519, not on table of content. No clearly define submittal requirements. - Both FS
    i. A: Submittal requirements are listed in sections 1.3 and 1.4
ii. Q: Is the intent to use Quartz Countertops instead of solid surface? Solid surface would be more cost effective. Would you like to add Solid Surface as an alternate?
    i. A: Quartz intended; no to Solid Surface
jj. Q: Is the GC providing the turnout gear lockers?
    i. A: Yes
kk. Q: On 1/5.33 references steel pipe bollard detail on 5.32, but there is no pipe bollard detail on 5.32. Do you mean to reference the pipe bollard detail on 5.33?
    i. A: Yes
ll. Q: Misc. – There are no mentions of door lettering (vinyl) for front entryways or garage identification. Will this be needed, and shall it be included in our bid?
    i. A: Refer to attached ASI #2

3. Civil
    a. Q: Is irrigation on either of these? It mentions irrigation but does not specifically state there is to be irrigation.
        i. A: Sleeve to be provided under concrete to facilitate irrigation by Owner.
    b. Q: C5.0- Heavy Duty Concrete Pavement. Is there a detail of the Joint in the HD Concrete? Does it require Joint Sealant? Is there supposed to be sealant at site concrete to base of wall intersection?
        i. A: The heavy duty concrete pavement detail on Sheet C5.0 has been updated to include joints and sealant. The sidewalk detail on Sheet C5.1 has been updated to show sealent along the wall.
    c. Q: Where are the specifications for the septic system located?
        i. A: Located in Civil set.
    d. Q: Castle Hayne Station 5,000 GAL holding tanks; Where can I find these details referenced on the civils to be in the Arch.; Do these tanks have pumps in them to pump the water from the tank to the bldg? These are all things that I am assuming the details will answer for us, just need to know where to find it or if it does not exist please provide one.

i. A: Basis of Design: National Storage Tank - Underground Fire Water Storage Tank w/ Horizontal Drain. See added Spec Section 331600 Underground Storage Tank (Fire Suppression)

e. Q: We also need a pump station detail
   i. A: Well and pump to be in same package during construction phase. Samet to assist with providing an Allowance amount for labor and material to install and commission well

4. Structural
   a. Q: 054000 Section 1.4.C calls for Delegated Design on the Cold-Formed Metal Framing 054000 Section 2.5 calls out a minimum base metal thickness as .0677 or .0966 (14 ga and 12 Ga Respectively). Minimum Flange width as 1-5/8"; 3.7 Series of drawings call out a 600S350-67 Field Stud (14 ga stud with 3-1/2" Flange); Are we to treat this as delegated design in it's entirety or are we required to use the 600S350-67 field stud called out in the drawings?
      i. A: Structural sections corrected to 600S162-54MIL studs at 16"oc. This is to be taken as a minimum for serviceability for delegated design.
   b. Q: 054000 Section 2.6 calls out a minimum of .0966 for the Exterior Soffit Framing. This is 12 Gauge Material and is very expensive. Is this required?
      i. A: Exterior soffit framing may be other than 12 gauge as long as adequate by delegated design for deflection from wind loading.
   c. Q: Columns C8, plan right of Apparatus Bays sheet 3.10, 3.11, 3.12 not sized. No base plates given or detailed.
      i. A: See revised sheet 3.02
   d. Q: Cast-In-Place Spec calls for 4000psi on SOG, the structural drawings call for 3000psi. Please advise which is correct?
      i. A: See revised concrete notes on sheet 3.00 to match concrete spec 4000psi
   e. Q: 1/3.72, 2/3.72, 3/3.72, 4/3.72, & 1/3.73 do not show the same header block detail as the slab-on-grade in the "common area" is this correct? Should there be a turn-down or a header block detail here?
      i. A: Different slab edge condition intended for continuous load path in apparatus bay for load bearing masonry walls
   f. Q: Columns C8, plan right of Apparatus Bays sheet 3.10, 3.11, 3.12 not sized. No base plates given or detailed
      i. A: See revised column schedule on sheet 3.02
   g. Q: 2 columns labeled C8 on page S3.10. There is no C8 on the column schedule can you advise on this please
      i. A: See revised column schedule on sheet 3.02
   h. Q: 2/3.74 is a cut through the upper portion of the building and not the footing/foundation. Please provide a cut through this area at the footing/foundation.
      i. A: See revised 3.74

5. Plumbing
   a. Q: I only see one drawing in 05 Architectural that shows the kitchen with dimensions. It appears the range will need to be 36". This means the hood will also need to be 36". I see in Mechanical the range hood duct will be an 8" round duct. I don't see a gas line going to the range in the plumbing section, so I'm assuming the range needs to be electric. This is odd because we've primarily supplied gas ranges in the fire stations. Are you able to clarify and/or confirm these observations?
      i. A: A 3/4" gas line and ball valve was added to supply the range. See Plumbing Drawing adjustments.
   b. Q: The most common garbage disposal we sell is a 1/2 hp Whirlpool. Will this need to be any larger than 1/2 hp
      i. A: 1 HP min w/ Stainless Steel body and internal components

c. Q: P6A/P6B Schluter Kerdi Shower System – The Schluter Shower system uses a specific drain flange that is typically installed with the tile system because it has to sit on top of the subfloor after it is sloped to the drain, do we include the supply and install of the complete Schluter Shower drain system as part of the 09D Tiling Bid Package? This would require the plumber to provide a 2" stub up only at locations with a Schluter Drain.
    i. A: Include complete system
d. Q: FD1/Floor Drains at Tile Floors Over Schluter Ditra/Kerdi System – To be able to provide a watertight connection between floor drains and the specified Schluter Ditra uncoupling membrane/Kerdi waterproofing system a specific floor drain is required – typically the Schluter Kerdi Drain F (info sheet attached). Will the Schluter-Drain-F be used at Floor Drain locations in tiled floors? Would the supply and install of the Schluter Kerdi-Drain-F be included as part of the 09D Tiling Bid package?
    i. A: Floors that are note being sloped will get specified FD-1

6. Mechanical
    a. Q: Advise on coordination between Samet and Owner regarding installation of Apparatus Venting System. - Both FS
        i. A: Coordination Drawings Required
    b. Q: Is Trane an acceptable manufacturer for the Dedicated Outside Air System on this project?
        i. A: Trane is acceptable
7. Electrical
    a. Q: I did a quick take off and noticed that this project has many multi criteria devices with sounder bases throughout the building. Each MC device will require a sounder base as well. This will increase the cost of the project. It might be a good idea to ask whether if all these MC devices will be required or reasoning.
        i. A: NCFC Section 915, requires sleeping units to be provided with CO detection. Contractor can contact local AHJ for confirmation of an approved location for the exception outlined in 915.1.4 EX.2.1 or 915.1.5 Ex.4 for removal or reduction of devices shown in the sleeping unit area.
    b. Q: I need some clarification of what systems you need us to provide. Please let me know which to provide 100% and which require only raceway and boxes.
        1. Telecommunications/Data System
        2. Purvis /PA System
        3. Security Camera System
        4. Access Control System
        5. Audio/Visual System
        ii. A: Contractor shall be responsible for providing and installing all systems/components/pathways as indicated on drawings and specs with exception of certain security components to be provided by the owner (see Security General Notes on sheet T0.01).
    c. Q: The riser E7.01 shows a 1200A current rating, the notes speak to 800A. Which should it be?
        i. A: Permit set dated 03/28 calls for 100% 800A main breaker on E7.01. E0.160 could not be located.
    d. Q: The ATS specs call for both open transition and delayed transition (Page #4, D & E), which should it be?
        i. A: Open. Refer to Specifications section above for Spec Section 263600
    e. Q: The MTS/Docking Stations are also either 4X-SS enclosure (Notes) or N3R (Drawing).. Which should it be?
        i. A: Shall be 3RX per specifications.

f. Q: IS MC CABLE ALLOWED PER CODE? DRAWING E0.02, 2. RACEWAY, NOTE T. STATES THAT IT IS, HOWEVER, MC CABLE IS NOT MENTIONED IN THE ELECTRICAL SPECIFICATIONS SUPPLIED. Please clarify.
    i. A: MC cable is outlined in 260519 2.2. We typically allow it where it is permitted by the NEC. Confirm with owner if MC is acceptable.
g. Q: IS THE PURVIS SYSTEM PROVIDED BY THE OWNER
    i. A: EC to review Detail #3/E6.08 for scope of work
h. Q: IS THE SECURITY SYSTEM PROVIDED BY OWNER?
    i. A: Refer to “SECURITY GENERAL NOTES” on sheet T0.01 for security scope
i. Q: IS THE TELECOMM/ DATA CABLING AND EQUIPMENT PROVIDED BY THE OWNER?
    i. A: Contractor is responsible for all telecom/AV work indicated on drawings. This includes all pathways, cabling, terminations, testing, and labeling per drawings and specs
j. Q: IS THE AUDIO/VISUAL SYSTEM PROVIDED BY THE OWNER?
    i. A: Contractor is responsible for all telecom/AV work indicated on drawings. This includes all pathways, cabling, terminations, testing, and labeling per drawings and specs
k. Q: Detail on E6.05 states that a duct smoke detector or an area smoke detector is to be installed at each location. Is there a preference on which to use as there is quite a significant price difference between the 2
    i. A: Per systems plans there are no duct detectors on this job.
l. Q: Is there specs for the “Wiring Devices and Lighting control Devices “
    i. A: Yes. This should have been provided, but can be found attached.
m. Q: Can Siemens Desigo Fire Alarm be added to Division 28 Section 3A under manufacturers as an approved alternate?
    i. A: No

8. Technology
    a. Q: Also, are there any Specs for the Security System? I see a cover sheet 28000, but there are no specs to follow
        i. A: Refer to Security General Notes on T0.01

PLUMBING

PLUMBING SPECIALTIES SCHEDULE

SYMBOL	DESCRIPTION	CONNECTION SIZE				SPECIFICATION	REMARKS
		W	V	CW	HW		
WB1	WASHING MACHINE CONNECTION BOX; 14"x 9"x 3.5", 20 GAUGE STEEL WITH WHITE POWDER COATING, RECESSED IN WALL	3"	2"	1/2"	1/2"	FIXTURE: GUY GRAY T200TPPVCHA WITH WATER HAMMER ARRESTOR STOPS: INTEGRAL 1/4 TURN SUPPLIES: (2) 5/8" BRAIDED S.S. FLEXIBLE HOSES	2" DRAIN OUTLET, 2" STANDPIPE WITH 2" P-TRAP. SEE 9/P5.01
WB2	INDIRECT DRAIN CONNECTION BOX; 14"x 9"x 3.5", 20 GAUGE STEEL WITH WHITE POWDER COATING, RECESSED IN WALL	2"	1-1/2"	-	-	FIXTURE: GUY GRAY T200LV WITH KNOCK-OUTS IN TOP OF BOX 2" DRAIN OUTLET WITH 2" DEEP SEAL P-TRAP	PROVIDE 2" TRAP GUARD EQUAL TO RECTORSEAL "SURE-SEAL". SEE 9/P501
IMB1	WATER CONNECTION BOX; 7"X 7"X 3.5", 20 GAUGE STEEL WITH WHITE POWDER COATING, RECESSED IN WALL	-	-	1/2"	-	FIXTURE: GUY GRAY MIB1AB STOP: QUARTER TURN WITH SHOCK ARRESTOR SUPPLY: 1/4" FLEXIBLE HOSE	PROVIDE INLINE DOUBLE CHECK VALVE WILKINS SERIES 700
CS-x	BALANCING VALVE, THERMOSTATIC, AUTOMATIC, SUFFIX INDICATES PIPE SIZE, SEE FLOOR PLANS	-	-	-	**	EQUIPMENT: CIRCUIT SOLVER CS SERIES, SIZES 1/2" THRU 2", NSF 61 CERTIFIED.	PROVIDE 110°F MODEL
SA-x	SHOCK ARRESTOR, SUFFIX INDICATES PDI SIZE	-	-	x	-	EQUIPMENT: SIOUX CHIEF 650 SERIES, SIZES 1/2" THRU 2", NSF 61 CERTIFIED.	SEE SHOCK ARRESTOR TABLE THIS SHEET
HB1	HOSE BIBB, EXTERIOR, EXPOSED, STAINLESS STEEL FACE PLATE, FREEZELESS, ANTI-SIPHON	-	-	3/4"	-	EQUIPMENT: ZURN Z1310-34EL, PROVIDE VACUUM BREAKER AND METAL LOOSE KEY FOR EACH HOSE BIBB	MOUNT 18" AFF
HB2	HOSE BIBB, INTERIOR, EXPOSED, STAINLESS STEEL FACE PLATE, ANTI-SIPHON	-	-	3/4"	-	EQUIPMENT: ZURN Z1333-C-34EL, PROVIDE VACUUM BREAKER AND METAL LOOSE KEY FOR EACH HOSE BIBB	MOUNT 18" AFF
HB3	HOSE BIBB, INTERIOR, EXPOSED, AUTOMATIC DRAINING, ANTI-SIPHON, VACUUM BREAKER, HOT & COLD	-	-	3/4"	3/4"	EQUIPMENT: ZURN Z1327-EZ-VB, DUAL HANDLE, PROVIDE VACUUM BREAKER	MOUNT 18" AFF
WCO	WALL CLEANOUT, CAST IRON BODY, STAINLESS STEEL WALL PLATE	**	-	-	-	CLEANOUT: ZURN Z-1446-BP, BRONZE PLUG, CLEANOUT SIZE SHALL MATCH PIPE SIZE	GAS / WATER TIGHT
FCO	FLOOR CLEANOUT, CAST IRON BODY, NICKEL BRONZE TOP, ADJUSTABLE	**	-	-	-	CLEANOUT: ZURN ZN-1400-BP, BRONZE PLUG CLEANOUT SIZE SHALL MATCH PIPE SIZE	GAS / WATER TIGHT, INSTALL TOP FLUSH WITH FINISHED FLOOR
YCO	YARD CLEANOUT, CAST IRON BODY, NICKEL BRONZE TOP, ADJUSTABLE, INSTALLED IN 18"x18"x6" CONCRETE PAD	**	-	-	-	CLEANOUT: ZURN ZN-1400-BP, BRONZE PLUG INSTALL IN 18"x 18"x 6" DEEP CONCRETE PAD	GAS / WATER TIGHT, INSTALL TOP FLUSH WITH FINISHED GRADE
HDCO	FLOOR CLEANOUT, HEAVY DUTY, CAST IRON BODY, ADJUSTABLE TOP	**	-	-	-	CLEANOUT: ZURN ZN1474-DC, BRONZE PLUG CLEANOUT SHALL MATCH PIPE SIZE	GAS / WATER TIGHT, INSTALL TOP FLUSH WITH FINISHED GRADE
FD1	FLOOR DRAIN (PUBLIC AREAS), CAST IRON BODY, ROUND NICKEL BRONZE GRATE, ADJUSTABLE	3"	2"	-	-	DRAIN: ZURN ZN-415-B, 6" DIAMETER GRATE P-TRAP: 3" DEEP SEAL.	INSTALL TOP FLUSH WITH FINISHED FLOOR. SEE NOTE 1 BELOW.
FD2	FLOOR DRAIN (MECHANICAL ROOMS), CAST IRON BODY, ROUND NICKEL BRONZE GRATE, ADJUSTABLE	3"	2"	-	-	DRAIN: ZURN ZN-415-I, 9" DIAMETER RECESSED GRATE P-TRAP: 3" CAST IRON, DEEP SEAL.	INSTALL TOP OF DRAIN LIP FLUSH WITH FLOOR. SEE NOTE 1 BELOW.
TD1	TRENCH DRAIN, GLASS REINFORCED POLYESTER (GRP) BODY, GALVANIZED STEEL EDGE RAIL, PROVIDE W/ T200-PGE-4-HP GRATE	3"	2"	-	-	DRAIN: MIFAB T2000-PB-13, 8" INTERNAL WIDTH, 39.4" LONG, INTERNALLY SLOPED P-TRAP: 3" CAST IRON, DEEP SEAL.	INSTALL TOP OF DRAIN LIP FLUSH WITH FLOOR. SEE NOTE 1 BELOW.
FS1	FLOOR SINK, 12"x 12"x 6" DEEP, STAINLESS STEEL BODY AND GRATE	3"	2"	-	-	DRAIN: ZURN Z1750 P-TRAP: 3" CAST IRON, DEEP SEAL	

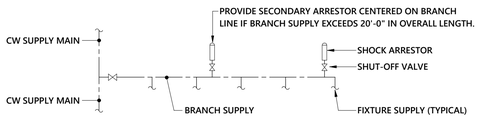
NOTES:
1. PROVIDE WATERLESS INLINE TRAP GUARD FOR EACH FLOOR DRAIN CONFORMING TO ASSE 1072 AND EQUAL TO RECOTORSEAL"SURE-SEAL" MODEL SS3009V. INSTALL TRAP GUARDS IN THE OUTLET OF THE FLOOR DRAIN BODY (NOT IN THE STRAINER).

** MATCH PIPE SIZE SHOWN ON PLANS, SEE PLANS.

APPROVED EQUALS:	PRODUCT TYPE:	ACCEPTED MANUFACTURERS:
THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	SHOCK ARRESTOR HOSE BIBBS DRAINS BACKFLOW PREVENTER	SIOUX CHIEF, PPP INC., ZURN, WATTS ZURN, WOODFORD, ZURN, J.R. SMITH ZURN, J.R. SMITH, WADE WILKINS, WATTS, APOLLO

SHOCK ARRESTOR TABLE

DRAWING SYMBOL	FIXTURE UNITS	P.D.I. WH201 DESIGNATION	ARRESTOR SIZE	REMARKS
SA-A	1 - 11	A	1/2"	INSTALL SHOCK ARRESTORS PER THE PLUMBING DRAINAGE INSTITUTE (P.D.I.) GUIDELINES. ACCEPTED MANUFACTURERS: SIOUX CHIEF, WATTS, PPP INC., ZURN
SA-B	12 - 32	B	3/4"	
SA-C	33 - 60	C	1"	
SA-D	61 - 113	D	1-1/4"	
SA-E	114 - 154	E	1-1/2"	



PLUMBING FIXTURE SCHEDULE

SYMBOL	DESCRIPTION	CONNECTION SIZE				SPECIFICATION	REMARKS
		W	V	CW	HW		
P1	TOILET ELONGATED, WHITE VITREOUS CHINA, FLOOR MOUNTED (1.28 GPF) HARD WIRED SENSOR OPERATED FLUSH VALVE	4"	2"	1-1/4"	-	FIXTURE: AMERICAN STANDARD 2234.001 "MADERA" FLUSH VALVE: SLOAN REGAL 111-1.28 DIAPHRAGM TYPE SEAT: BEMIS 1955CT ANTI-MICROBIAL (WHITE)	15" RIM HEIGHT. COORDINATE SENSOR JUNCTION BOX LOCATIONS WITH E.C. SEE NOTE 5 & 6 BELOW
P1A	TOILET, A.D.A. COMPLIANT ELONGATED, WHITE VITREOUS CHINA, FLOOR MOUNTED (1.28 GPF) MANUAL OPERATED FLUSH VALVE	4"	2"	1-1/4"	-	FIXTURE: AMERICAN STANDARD 3043.001 "MADERA 16.5 HIGH" FLUSH VALVE: SLOAN REGAL 111-1.28 DIAPHRAGM TYPE SEAT: BEMIS 1955CT ANTI-MICROBIAL (WHITE)	16.5" RIM HEIGHT. COORDINATE SENSOR JUNCTION BOX LOCATIONS WITH E.C. SEE NOTE 5 & 6 BELOW
P1B	TOILET, A.D.A. COMPLIANT ELONGATED, WHITE VITREOUS CHINA, FLOOR MOUNTED (1.28 GPF) HARD WIRED SENSOR OPERATED FLUSH VALVE	4"	2"	1-1/4"	-	FIXTURE: AMERICAN STANDARD 3043.001 "MADERA 16.5 HIGH" FLUSH VALVE: SLOAN 111-1.28 ESS TMO "OPTIMA" HARD WIRED SENSOR, WITH TRUE MECHANICAL OVERRIDE AND CHLORAMINE RESISTANT DIAPHRAGM SEAT: BEMIS 1955CT ANTI-MICROBIAL (WHITE)	16.5" RIM HEIGHT. COORDINATE SENSOR JUNCTION BOX LOCATIONS WITH E.C. SEE NOTE 5 & 6 BELOW
P3A	LAVATORY, A.D.A. COMPLIANT, 17"x14" OVAL BOWL, WHITE VITEROUS CHINA, UNGLAZED RIM, SINGLE CONTROL CENTER SET FAUCET, (0.5 GPM) VANDAL RESISTANT AERATOR, OPTIONAL DECK PLATE 2000.102P PER OWNER/ARCHITECT APPROVAL	2"	1-1/2"	1/2"	1/2"	FIXTURE: AMERICAN STANDARD OVALYN MODEL 0496221.020 FAUCET: MOEN M-DURA MODEL 9419F12 GRID DRAIN: ZURN 8743; P-TRAP: ZURN Z-8701 (1-1/4"x1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-XL-LR-LK	SEE NOTES 2 & 4 BELOW
P3B	LAVATORY, A.D.A. COMPLIANT, 17"x14" OVAL BOWL, WHITE VITEROUS CHINA, UNGLAZED RIM, CENTER SET FAUCET, SENSOR OPERATED, HARDWIRED, WITH (0.5 GPM) VANDAL RESISTANT AERATOR	2"	1-1/2"	1/2"	1/2"	FIXTURE: AMERICAN STANDARD OVALYN MODEL 0496221.020 FAUCET: MOEN M-POWER MODEL 8553AC GRID DRAIN: ZURN 8743; P-TRAP: ZURN Z-8701 (1-1/4"x1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-XL-LR-LK	SEE NOTES 2 & 4 BELOW
P4	BOTTLE FILLER, ADA COMPLIANT, STAINLESS STEEL FINISH, SINGLE BOTTLE, CARRIER MOUNTED, INTEGRAL WATER FILTER, SENSOR OPERATED BOTTLE FILLER WITH AUTO SHUT-OFF	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LZ8WSSSMC, ELEC: 15 WATT, 115 VOLT, SINGLE PHASE P-TRAP: ZURN Z-870 (1-1/4"x1-1/2", 17 GA.) SUPPLY/STOP: ZURN 8806-XL-LR-LK	SEE NOTE 1 BELOW
P4A	WATER COOLER & BOTTLE FILLER, A.D.A. COMPLIANT, STAINLESS STEEL FINISH, BI-LEVEL DOUBLE BOWL, VANDAL RESISTANT, CARRIER MOUNTED, INTEGRAL WATER FILTER, SENSOR OPERATED BOTTLE FILLER WITH AUTO SHUT-OFF.	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LVRCGRNTL8WSK, ELEC: 260 WATT, 120 VOLT, SINGLE PHASE P-TRAP: ZURN Z-870 (1-1/4"x1-1/2", 17 GA.) SUPPLY/STOP: ZURN 8806-XL-LR-LK	PROVIDE CANE APRON WHEN WATER COOLER IS LOCATED ON AN EXPOSED WALL. SEE NOTE 3 BELOW
P5	MOP SINK, 24"x 24"x 10", MOLDED STONE, 12" STAINLESS STEEL WALL GUARDS, SERVICE FAUCET, HOSE, MOP HANGER BRACKET	3"	2"	1/2"	1/2"	FIXTURE: FIAT MSBID2424-100, 830AA, 832AA, (2) MSG3624, 889CC, E88A FAUCET: FIAT 830-AA DRAIN: FIAT 1453-BB P-TRAP: 3" DEEP SEAL, CAST IRON	
P5A	SINK, A.D.A. COMPLIANT, 19"x19"x6" RECTANGULAR SINGLE BOWL, 18 GAUGE STAINLESS STEEL, COUNTER MOUNTED, SELF RIMMING, 8" GOOSENECK SENSOR FAUCET, HARDWIRED, 1 HOLE DRILLING, (1.5 GPM) VANDAL RESISTANT AERATOR	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY LRAD1919 FAUCET: MOEN RILEY MODEL 7402EW BASKET STRAINER: ZURN Z-8740 P-TRAP: ZURN 8703 (1-1/2"x2", 17 GA.) SUPPLY/STOP: ZURN 8806-XL-LR-LK	SEE NOTE 4 BELOW
P5B	SINK, DOUBLE COMPARTMENT, 33"x22"x12-1/8", RECTANGULAR, DOUBLE BOWL, 18 GAUGE STAINLESS STEEL, COUNTERTOP, SENSOR FAUCET, HARDWIRED, 1.5 GPM, 1 HOLE DRILLING, BASKET STRAINER, GARBAGE DISPOSAL	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY DLR332212 FAUCET: MOEN RILEY MODEL 7402EW BASKET STRAINER: ZURN Z-8740 P-TRAP: ZURN 8703 (1-1/2"x2", 17 GA.) SUPPLY/STOP: ZURN 8806-XL-LR-LK DISPOSAL: INSINKERATOR EVOLUTION 1.0, 1 HP, W/ POWER CORD	PROVIDE WATER AND WASTE CONNECTIONS FOR ADJACENT DISHWASHER SEE NOTE 4 BELOW
P5C	SINK, SINGLE, FLOOR MOUNTED, UTILITY 23"x21-1/2"x33-1/2", RECTANGULAR, SINGLE BOWL, DUAL HANDLE FAUCET	2"	1-1/2"	1/2"	1/2"	FIXTURE: FIAT FL-1 FAUCET: FIAT A1, 4" CENTERSET WITH CP BLADE HANDLES P-TRAP: ZURN 8703 (1-1/2"x2", 17 GA.) SUPPLY/STOP: ZURN 8806-XL-LR-LK	
P5D	SINK, SCULLERY, FLOOR MOUNTED, DOUBLE BOWL WITH 24" DRAINBOARDS, 84-1/4" x 27-1/2", STAINLESS STEEL, DUAL HANDLE FAUCET	2"	1-1/2"	1/2"	1/2"	FIXTURE: EAGLE GROUP 412-16-2-24 FAUCET: T&S BRASS B-0230-187XWSC4, 8" CENTERS, GOOSNECK STYLE BASKET STRAINER: ZURN Z-8740 SUPPLY/STOP: ZURN 8806-XL-LR-LK	INDIRECTLY DRAIN TO FLOOR SINK, PROVIDE CONNECTION TO P7A
P5E	SINK, SCULLERY, FLOOR MOUNTED, SINGLE BOWL, NO DRAINBOARDS, 21" x 25-13/16" x 43-3/4", STAINLESS STEEL, DUAL HANDLE FAUCET WITH HANDHELD SPRAY	2"	1-1/2"	1/2"	1/2"	FIXTURE: EAGLE GROUP 412-16-1 FAUCET: T&S BRASS B-0230-187XWSC4, 8" CENTERS, GOOSNECK STYLE BASKET STRAINER: ZURN Z-8740 SUPPLY/STOP: ZURN 8806-XL-LR-LK	INDIRECTLY DRAIN TO FLOOR SINK
P5F	FAUCET, WALL MOUNTED, CHROME FINISH, 5.5 GPM, LEVER HANDLES, MANUAL OPERATION, ADA COMPLIANT			1/2"		FAUCET: MOEN POT FILLER MODEL S665	SEE ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT
P6A	SHOWER, JOB-BUILT, ADA COMPLIANT, PUBLIC, FLOOR DRAIN, PRESSURE BALANCED SHOWER VALVE, 1.5 GPM WALL MOUNTED SHOWER HEAD WITH HAND HELD SHOWER AND SLIDE BAR	2"	1-1/2"	1/2"	1/2"	FIXTURE: AQUATIC MODEL 16037BFSD-WH SHOWER VALVE & HEAD : MOEN MODEL T9342EP15 PROVIDE W/ MODEL 3360 VALVE DRAIN: SCHULTER KERDI MODEL KD2, CHROME FINISH P-TRAP: 2" DEEP SEAL TRAP	COORDINATE RIGHT OR LEFT HAND CONTROLS WITH ARCHITECTURAL PLANS AND ELEVATIONS, MOUNT SHOWER HEAD AT 7'-4" A.F.F.
P6B	SHOWER, JOB-BUILT, ADA COMPLIANT, PUBLIC, FLOOR DRAIN, PRESSURE BALANCED SHOWER VALVE, 1.5 GPM WALL MOUNTED SHOWER HEAD WITH HAND HELD SHOWER AND SLIDE BAR	2"	1-1/2"	1/2"	1/2"	FIXTURE: AQUATIC MODEL 1363BFC2P-WH SHOWER VALVE & HEAD : MOEN MODEL T9342EP15 PROVIDE W/ MODEL 3360 VALVE DRAIN: SCHULTER KERDI MODEL KD2, CHROME FINISH P-TRAP: 2" DEEP SEAL TRAP	COORDINATE RIGHT OR LEFT HAND CONTROLS WITH ARCHITECTURAL PLANS AND ELEVATIONS, MOUNT SHOWER HEAD AT 7'-4" A.F.F.
P7A	EMERGENCY EYEWASH, WALL MOUNTED EYEWASH, SWING DOWN STYLE, STAINLESS STEEL FINISH, WITH FLIP TOP DUST COVER	-	-	1/2"	1/2"	EYEWASH: GUARDIAN G1848 THERMOSTATIC MIXING VALVE: GUARDIAN G6020	PROVIDE WITH ANSI COMPLIANT SIGNAGE.

NOTES:
1. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED PLATE STYLE CARRIER EQUAL TO ZURN Z1222-EZ (-SL) SERIES. WHEN CARRIER IS LOCATED BEHIND A BLOCK WALL, PROVIDE EXTENDED STUD LENGTHS TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
2. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED, ADJUSTABLE CONCEALED ARM CARRIER EQUAL TO ZURN Z1231-EZ (-SL) SERIES. WHEN CARRIER IS LOCATED BEHIND BLOCK WALL, PROVIDE EXTENDED CONCEALED ARM SLEEVES TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
3. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED PLATE STYLE CARRIER EQUAL TO ZURN Z1225-EZ (-SL) SERIES. WHEN CARRIER IS LOCATED BEHIND A BLOCK WALL, PROVIDE EXTENDED STUD LENGTHS TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
4. PROVIDE PRE-MANUFACTURED A.D.A. COMPLIANT INSULATION KIT FOR EXPOSED P'TRAP AND SUPPLY TRIM UNDER SINK.
5. PROVIDE HEAVY DUTY CAST IRON CLOSET FLANGE WITH COMPRESSION SEAL AND TEST CAP EQUAL TO ZURN CF2980-CI4. OFFSET FLANGES ARE NOT ACCEPTABLE.
6. PROVIDE SLOAN EL-154 TRANSFORMER (120V TO 24V) AND FINAL LOW VOLTAGE CONNECTIONS FROM TRANSFORMER TO FLUSHVALVE(S). WHERE GROUP RESTROOMS OCCUR PROVIDE A MINIMUM OF TWO TRANSFORMERS PER RESTROOM TO SERVE MULTIPLE FLUSHVALVES.

** MATCH PIPE SIZE SHOWN ON PLANS, SEE PLANS.

APPROVED EQUALS:	PRODUCT TYPE:	ACCEPTED MANUFACTURERS:
THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	VITREOUS CHINA	KOHLER, AMERICAN STANDARD, SLOAN
	FLUSH VALVES	SLOAN, ZURN, DELANEY
	ENAMELED CAST IRON	KOHLER, AMERICAN STANDARD, ZURN
	CARRIERS	ZURN, J.R. SMITH, WADE
	STAINLESS STEEL SINKS	ELKAY, JUST, ADVANCE TABCO
	FAUCETS	MOEN
	WATER COOLERS	ELKAY, HAWS, MURDOCK
	SUPPLIES, STOPS	ZURN, MCGUIRE, BRASSCRAFT
	HOSE BIBBS	ZURN, J.R. SMITH, WOODFORD
	UTILITY SINKS	FIAT, FLORESTONE, STERN WILLIAMS
	SHOWER VALVES	MOEN

Ref North

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05/08/24

CASTLE HAYNES FIRE DEPARTMENT

PLUMBING SCHEDULES

Sheet No.
P0.02

Opt # 22-0368

GREASE INTERCEPTOR - GI1

SCHIER GREASE INTERCEPTOR GB-50 OR APPROVED EQUAL BY ZURN OR XERXES, 50 GPM FLOW, 60 GALLON GREASE
CAPACITY, 3" INLET AND OUTLET, 2" VENTS, PROVIDE MANWAY TO MEET INVERT DEPTH AND STANDARD PEDESTRIAN-RATED MANHOLE COVER INSTALLED FLUSH WITH FINISHED FLOOR. REFER TO SCHEMATIC 5/P5.02.

OIL INTERCEPTOR - OI1

STRIEM OIL TANKER MODEL OT-500-SS. MAX FLOW RATE: 314 GPM, 562 GALLON LIQUID CAPACITY, 285 GALLON OIL CAPACITY, 162 SOLIDS CAPACITY, HIGH DENSITY CONSTRUCTION, 4" INLETS AND OUTLETS AND 3" VENTS. PROVIDE MANWAY TO MEET INVERT DEPTH AND H-20 TRAFFIC RATED MANHOLE COVERS AND FRAMES INSTALLED FLUSH WITH FINISHED GRADE. PROVIDE REINFORCED CONCRETE RELIEVING SLAB WHEN INTERCEPTOR IS LOCATED IN AREAS WITH VEHICLE ACCESS. INSTALL PER THE MANUFACTURERS INSTRUCTIONS. COORDINATE EXACT LOCATION WITH SITE UTILITY CONTRACTOR. SEE MANUFACTURERS INSTALLATION INSTRUCTIONS FOR ADDITIONAL INFORMATION. REFER TO SCHEMATIC 4/P5.02.

LINT INTERCEPTOR - LI-1

STRIEM TUFF TROUGH MODEL TT-3, 21 GALLON CAPACITY, 3/4" POLYETHYLENE CONSTRUCTION, 3'(L)x18"(W) x12"(H) WITH INTERNALLY SLOPED FLOOR AT 1/8" PER FOOT. PREINSTALLED COVER WITH MAXIMUM 450 LBS. LOAD CAPACITY WITH REMOVABLE PRIMARY AND SECONDARY FILTER SCREENS WITH 0.500" PERFORATIONS. PROVIDE WITH PLAIN END OUTLET AND 4" FIELD INSTALLED INLET. REFER TO SCHEMATIC 11/5.01.

GAS LOAD SUMMARY

LOAD	CONSUMPTION (CFH)
DOMESTIC WATER HEATER: WH1	200
DOMESTIC WATER HEATER: WH2	200
INFRARED HEATER: IH-1, IH-2 @ 60 CFH EACH	120
INFRARED HEATER: IH-3	20
OUTDOOR GRILL	100
RANGE	150
TOTAL	790

2

NOTES:
FARTHEST POINT OF DELIVERY FROM GAS METER (TO 2 PSI GAS PRESSURE REGULATOR AT FARTHEST GAS-FIRED FIXTURE) = ±250 FT.

FUEL GAS CODE TABLE FOR ABOVE GRADE 2 PSI PIPING: 2018 NCFGC - TABLE 402.4(5)
SCHEDULE 40 METALLIC PIPE, 2 PSI INLET PRESSURE, 1 PSI PRESSURE DROP.

FUEL GAS CODE TABLE FOR ABOVE GRADE LOW PRESSURE PIPING: 2018 NCFGC - TABLE 402.4(4)
SCHEDULE 40 METALLIC PIPE, 0.5 PSI INLET PRESSURE, 0.5" W.C. PRESSURE DROP.

*-AVAILABLE AT PRESSURE REGULATOR

PLUMBING EQUIPMENT SCHEDULE

SYM.	DESCRIPTION	CONN. SIZE INLET	CONN. SIZE OUT	SPECIFICATION	REMARKS
WH1	WATER HEATER, COMMERCIAL, GAS-FIRED, 100 GALLONS, DIRECT-VENT	1-1/2"	1-1/2"	EQUIPMENT: A.O. SMITH BTH-199 GAS INPUT: 199,000 BTUH ELEC: 120V, 15A BREAKER RECOVERY: 235 GPH AT 100° RISE	SET OUTLET TEMP TO 140°F SEE NOTES 1 - 4 SEE 7/P5.02
WH2	WATER HEATER, COMMERCIAL, GAS-FIRED, 100 GALLONS, DIRECT-VENT	1-1/2"	1-1/2"	EQUIPMENT: A.O. SMITH BTH-199 GAS INPUT: 199,000 BTUH ELEC: 120V, 15A BREAKER RECOVERY: 235 GPH AT 100° RISE	SET OUTLET TEMP TO 140°F SEE NOTES 1 - 4 SEE 7/P5.02
ET1	THERMAL EXPANSION TANK 6.4 GALLON CAPACITY	3/4"	-	EQUIPMENT: AMTROL ST-12	SEE NOTE 5
ET2	THERMAL EXPANSION TANK 6.4 GALLON CAPACITY	3/4"	-	EQUIPMENT: AMTROL ST-12	SEE NOTE 5
RCP1	CIRCULATION PUMP, STAINLESS STEEL	3/4"	3/4"	PUMP: B&G NBF-25, 1/8 HP, 120V RATED FOR 6 GPM AT 8' HD	SEE NOTES 6 & 7
RCP2	CIRCULATION PUMP, STAINLESS STEEL	3/4"	3/4"	PUMP: B&G NBF-25, 1/8 HP, 120V RATED FOR 6 GPM AT 8' HD	SEE NOTES 6 & 7
MV1	THERMOSTATIC MIXING VALVE CONTROL STATION, BUILDING FIXTURES	1"	1"	TMV: LEONARD 3NB-LF MIN. GPM: 1.0 MAX GPM: 40 (AT 10 PSI LOSS) PRESSURE LOSS: 5 PSI (26 GPM) LEAVING TEMP: SEE NOTE 8	SEE NOTE 8 SEE 6/P5.02
MV2	THERMOSTATIC MIXING VALVE CONTROL STATION, BUILDING FIXTURES	1"	1"	TMV: LEONARD 3NB-LF MIN. GPM: 1.0 MAX GPM: 40 (AT 10 PSI LOSS) PRESSURE LOSS: 5 PSI (26 GPM) LEAVING TEMP: SEE NOTE 8	SEE NOTE 8 SEE 6/P5.02
MV3	THERMOSTATIC MIXING VALVE MECHANICAL, PUBLIC LAVATORIES	1"	1"	TMV: SYMMONS 7-225-CK SERIES MIN. GPM: 0.5 MAX GPM: 4.5 PRESSURE LOSS: 5 PSI LEAVING TEMP: 105 DEG. F	SEE NOTE 9
AC1	AIR COMPRESSOR, SIMPLEX, TWO-STAGE	1"	1"	EQUIP: QUINCY QT5-XTREME ELECTRICAL: 5 HP, 480V, 3P CFH: 17.4 @ 175 PSIG RECEIVER: 80 GAL.	SEE NOTES 10 - 13 SEE 8/P5.02
HR1	HOSE REEL, AIR OR WATER, SPRING RETRACABLE, 35 FT HOSE, 300 PSI MAX.	1/2"	1/2"	REEL CRAFT 5635 OLP	SEE NOTE 14

NOTES:
1. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF ASHRAE 90.1.
2. PROVIDE WATER HEATER WITH ACID NEUTRALIZATION KIT FOR CONDENSATE.
3. INSTALL DIRECT-VENT PIPING PER MANUFACTURER'S DIRECTION. CPVC OR STAINLESS STEEL SHALL BE USED FOR VENT PIPING MATERIAL. PVC IS NOT ACCEPTABLE.
4. PROVIDE CARBON MONOXIDE DETECTOR ADJACENT TO WATER HEATER. INTERLOCK CARBON MONOXIDE DETECTOR WITH BAS.
5. EXPANSION TANK SHALL BE CHARGED TO MEET FINAL OPERATING PRESSURE FOR DOMESTIC WATER SYSTEM.
6. PUMP SHALL BE ALL BRONZE CONSTRUCTION.
7. INTERLOCK WITH FULLY ADJUSTABLE AQUASTAT AND 7-DAY, 24 HOUR TIMER OR PROVIDE 7-DAY, 24 HOUR ACCESS CONTROL VIA BAS.
8. PROVIDE TEMPERATURE MIXING VALVE FOR THE BUILDING HOT WATER SYSTEM TO TEMPER 140 DEGREE STORED HOT WATER TO 120 DEGREES TO THE BUILDING FIXTURES.
9. PROVIDE POINT-OF-USE TMV AT EACH PUBLIC ACCESSIBLE HAND-WASHING LAVATORY TO TEMPER HOT WATER TO A MAXIUM OF 105 DEGREES. INSTALL BELOW SINK IN AN ACCESSIBLE LOCATION.
10. PROVIDE REFRIGERATED AIR DRYER EQUAL TO AURORA MODEL RDV-0030, 30 SCFM @ 100 PSIG, 1/4 HP, 115V, SINGLE PHASE, 60 HZ.
11. PROVIDE COMPRESSOR WITH LOW SOUND ATTENUATING ENCLOSURE (64 DBA).
12. PROVIDE AIR COMPRESSOR WITH BLOW DOWN MUFFLER.
13. VERIFY HOSE REEL INSTALLATION LOCATIONS WITH OWNER PRIOR TO PERFORMING ANY WORK.

** MATCH PIPE SIZE SHOWN ON PLANS, SEE PLANS.

APPROVED EQUALS:	PRODUCT TYPE:	ACCEPTED MANUFACTURERS:
THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	WH - GAS-FIRED EXPANSION TANKS PUMPS MIXING VALVES AIR COMPRESSOR AC DRYER	A.O. SMITH, BRADFORD WHITE, LOCHINVAR AMTROL, A.O. SMITH, WATTS, WESSLES B&G, TACO, ARMSTRONG ARMSTRONG, LAWLER, LEONARD, SYMMONS CHAMPION, CURTIS, QUINCY AURORA, PNEUMATECH, HANKINSON

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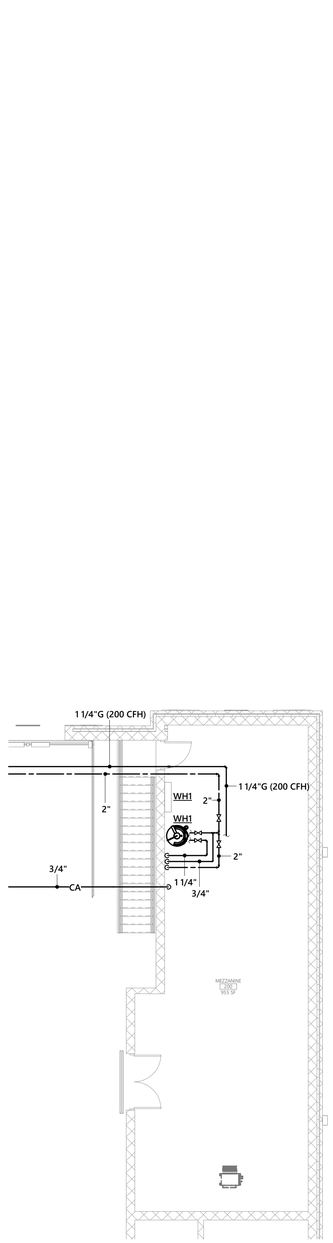
CASTLE HAYNES FIRE DEPARTMENT

PLUMBING EQUIPMENT SCHEDULES

Sheet No.
P0.03

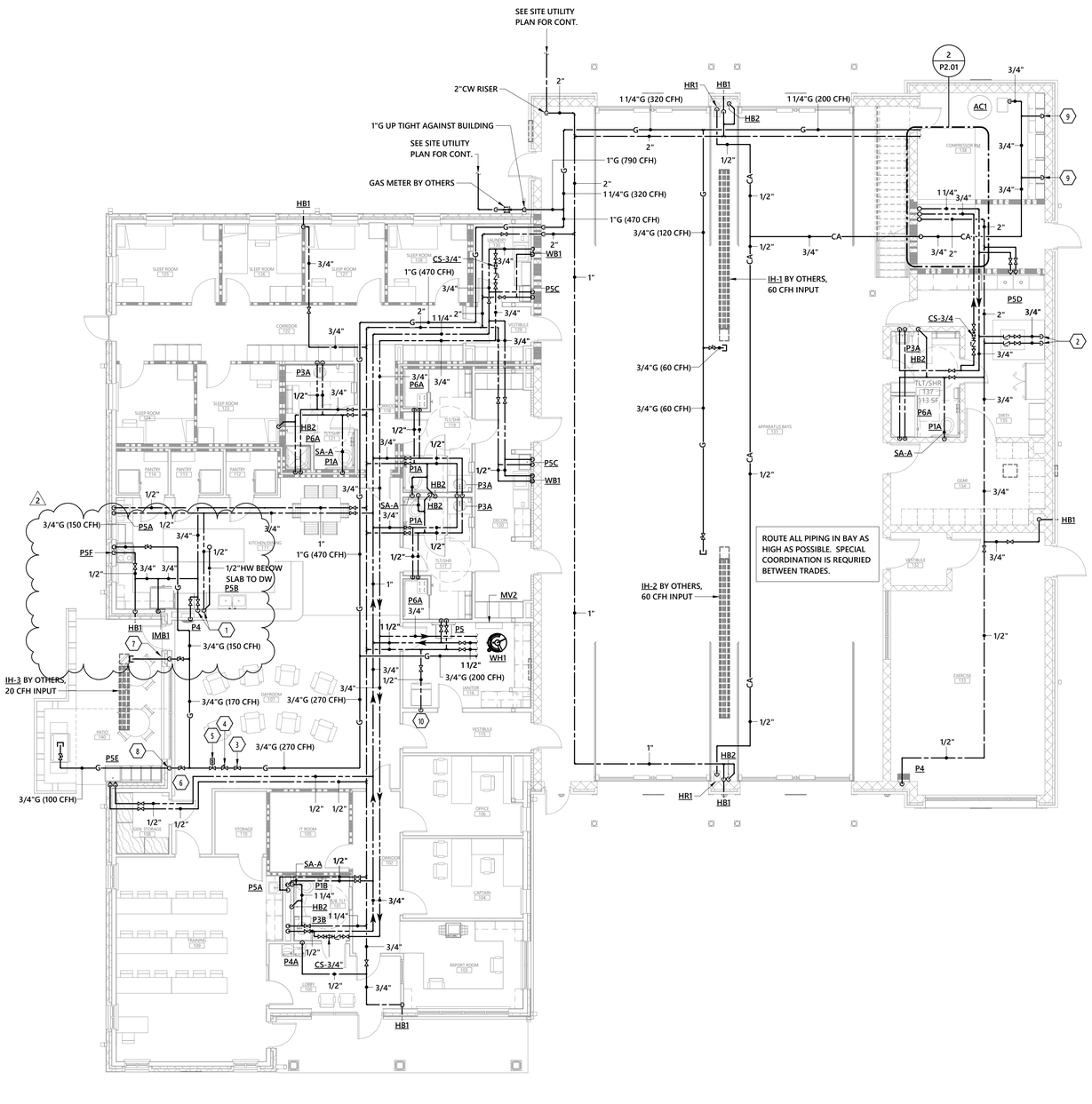
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Opt # 22-0368



2 MEZZANINE SUPPLY PIPING FLOOR PLAN

1/8" = 1'-0"



1 FIRST FLOOR SUPPLY PIPING FLOOR PLAN

1/8" = 1'-0"

KEYED NOTES THIS SHEET: (#)

1. DROP 1/2" HW AND CW PIPING DOWN IN WALL TO BELOW CASEWORK. ROUTE 1/2" HW & CW PIPING BELOW CASE WORK TO FIXTURE P5B.
2. PROVIDE 3/4"CW & 3/4"HW SUPPLIES, SHUT-OFF VALVES, CHECK VALVES, TWO SA-A SHOCK ARRESTORS AND FULL SIZE FLEXIBLE CONNECTIONS TO WASHER PER MFG. INSTRUCTIONS.
3. MANUAL GAS SHUTOFF VALVE. PROVIDE LUBRICATED VALVE OR AGA LISTED BALL VALVE.
4. VENTLESS PRESSURE REDUCING VALVE, EQUAL TO MAXITROL 325 SERIES, WITH AN OUTPUT DELIVERY PRESSURE OF 7" W.C., 15 FEET DEVELOPED LENGTH.
5. PROVIDE EMERGENCY SHUTOFF VALVE AND INTERLOCK WITH FIRE ALARM CONTROL PANEL. SOLENOID VALVE SHALL BE FAIL-CLOSE TYPE.
6. ISIMET FLA SERIES FIRE HOUSE UTILITY CONTROLLER PANEL. REFER TO ELECTRICAL DRAWINGS.
7. ISIMET FLA-1 REMOTE OPERATOR FOR GAS SUPPLY TO GRILL, PATIO HEATER, AND RANGE. REFER TO ELECTRICAL DRAWINGS.
8. DROP 3/4"G PIPING BELOW GRADE. ROUTE 3/4"G PIPING TO GAS GRILL AND PROVIDE WITH SHUT-OFF VALVE 12" ABOVE GRADE.
9. PROVIDE COMPRESSED AIR DROP -REFER TO SCHEMATIC 9/5.02.
10. DROP 1/2" CW PIPING DOWN IN WALL TO ICE MACHINE. REFER TO SCHEMATIC 8/P5.01.

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05/08/24

CASTLE HAYNES FIRE DEPARTMENT

SUPPLY PIPING FLOOR PLANS

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CONTRACT AND BOND REQUIREMENTS

CONTRACT

The Successful Bidder shall sign a Contract with the Owner on the Standard Form Of Agreement Between Owner And Contractor, provided by the Owner.

PERFORMANCE BOND

The Contractor shall attach to the Contract an executed Performance Bond, approved by the Owner.

LABOR AND MATERIAL PAYMENT BOND

The Contractor shall attach to the Contract an executed Labor And Material Payment Bond, approved by the Owner.

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.

1.2 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 LUMP-SUM, UNIT-COSTS AND QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.6 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect with Owner’s approval for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit as specified under section 012600 Contract Modification Procedures.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. Provide explanation and documentation to substantiate distribution of overhead costs and other markups.
3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. General Construction (This Allowance includes material cost receiving, handling, and installation and Contractor overhead and profit)

3.4 SCHEDULE OF ALLOWANCES (CMAR to stipulate Allowance amounts)

Underground Water Tank (Fire Suppression): $_____ Dollars.

Fire Pump and Prefabricated Fire Pump House for Fire Suppression System:
$_____Dollars.

Testing, Delegated Design, Drilling, and Commissioning of Water Well:
$_____Dollars.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.

1.2 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Should the Contractor be required to perform work over and above that required by the Contract Documents, or should he be ordered to omit work required by the Contract Documents, he will be paid an extra, or shall credit the Owner, as case may be on the basis of unit prices quoted on the Bid Form, prices quoted being the sum total compensation payable or creditable for such item in place.

3.2 SCHEDULE OF UNIT PRICES:

A. Unit Price No. 1: **Unsuitable soils removal and disposal off-site**.

1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
2. Unit of measurement: cubic yard measured before removal.
3. Include the following in the unit price:
   a. Excavation, loading and transport of all materials.
   b. Placement and compaction of materials in on-site disposal or fill area.
   c. Disposal fees.
   d. Overhead and profit.
4. Include all other related costs in the contract sum.
5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on measured volume of excavation.

B. Unit Price No. 2: **Replacement of unsuitable soils removal with off-site suitable soil in-place**.
   1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
   2. Unit of measurement: cubic yard of void to be filled.
   3. Include the following in the unit price:
      a. Suitable soil materials from contractor's off-site source.
      b. Excavation, loading, transport, placement and compaction of soil into void remaining from removed rock or unsuitable soil.
      c. Overhead and profit.
   4. Include all other related costs in the contract sum.
   5. Include costs related to removal of rock or unsuitable soil in other Unit Prices.
   6. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on volume of void to be filled.

C. Unit Price No. 3: **Replacement of unsuitable soils removal with Aggregate Base Course in-place**.
   1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
   2. Unit of measurement: cubic yard of void to be filled.
   3. Include the following in the unit price:
      a. NCDOT approved quarry source of ABC materials from contractor's off-site source.
      b. Excavation, loading, transport, placement and compaction of ABC into void remaining from removed rock or unsuitable soil.
      c. Overhead and profit.
   4. Include all other related costs in the contract sum.
   5. Include costs related to removal of rock or unsuitable soil in other Unit Prices.
   6. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on volume of void to be filled.

D. Unit Price No. 4: **Replacement of unsuitable soils removal with No.57 washed stone in-place.**
   1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
   2. Unit of measurement: cubic yard of void to be filled.
   3. Include the following in the unit price:
      a. Certified #57 washed stone from contractor's off-site source.
      b. Excavation, loading, transport, placement and compaction of #57 washed stone into void remaining from removed rock or unsuitable soil.
      c. Overhead and profit.
   4. Include all other related costs in the contract sum.
   5. Include costs related to removal of rock or unsuitable soil in other Unit Prices.
   6. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on volume of void to be filled.

E. Unit Price No. 5: **Geo-Grid in place**.
   1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
   2. Unit of measurement: square yard of surface to be covered.
   3. Include the following in the unit price:

a. Materials and transport to site.
b. Unloading, handling, and placement.
c. Overhead and profit.

4. Include all other related costs in the contract sum.
5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on the area of ground covered by the fabric. Excess and/or overlap shall not be included in the measurement.

F. Unit Price No. 6: **Biaxial Geo-Grid in place**.

1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
2. Unit of measurement: square yard of surface to be covered.
3. Include the following in the unit price:
   a. Materials and transport to site.
   b. Unloading, handling, and placement.
   c. Overhead and profit.
4. Include all other related costs in the contract sum.
5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on the area of ground covered by the fabric. Excess and/or overlap shall not be included in the measurement.

G. Unit Price No. 7: **Woven Geo-Textile (Separation) Fabric in place**.

1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
2. Unit of measurement: square yard of surface to be covered.
3. Include the following in the unit price:
   a. Materials and transport to site.
   b. Unloading, handling, and placement.
   c. Overhead and profit.
4. Include all other related costs in the contract sum.
5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on the area of ground covered by the fabric. Excess and/or overlap shall not be included in the measurement.

H. Unit Price No. 8: **Non-Woven Geo-Textile (Separation) Fabric in place**.

1. Purpose: To adjust the contract sum in case a quantity different from that indicated in the allowance is required.
2. Unit of measurement: square yard of surface to be covered.
3. Include the following in the unit price:
   a. Materials and transport to site.
   b. Unloading, handling, and placement.
   c. Overhead and profit.
4. Include all other related costs in the contract sum.
5. Method of measurement: Quantities will be verified by a soils and materials engineer employed by the Owner based on the area of ground covered by the fabric. Excess and/or overlap shall not be included in the measurement.

NOTE: Please note the allowance quantities indicated for each unit price above are **TO BE INCLUDED AS PART OF THE BASE BID.**

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 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.

1.4 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

ALTERNATES:

The undersigned further agrees to perform all work in the Alternates for the sums stated herein resulting in Additions or Deletions to the Base Bid. Additions or Deletions shall include any modifications of work or additional work that may reasonably be included as part of the Alternates.

A-1: State Change in Base Bid Sum to provide all General Construction work for two bifold doors and all components as listed in drawings and specifications in lieu of two overhead doors located at front elevation.

A-2: State Change in Base Bid Sum to provide all General Construction work for an Emergency Responder Radio System (ERRS). Note: The ERRS System Survey is to be included in the Base Bid. Refer to Electrical Drawings

A-3: Not used.

A-4: Not used.

A-5: Not used.

A-6: Not used.

END OF SECTION 012300

SECTION 014001 – STRUCTURAL TESTS AND SPECIAL INSPECTIONS (NCSBC)
(NORTH CAROLINA STATE BUILDING CODE)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements required for compliance with the International Building Code, Chapter 17, Structural Tests and Special Inspections.

B. Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with other construction document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the construction document requirements.
3. Requirements for contractor to provide quality-assurance and -control services required by architect, owner, or authorities having jurisdiction are not limited by provisions of this section.

C. The owner will engage one or more qualified special inspectors and / or testing agencies to conduct structural tests and special inspections specified in this section and related sections and as maybe specified in other divisions of these specifications.

1.3 DEFINITIONS

A. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official.

B. Construction Documents: Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction Documents include all supplemental instructions, sketches, addenda, and revisions to the drawings and specifications issued by the registered design professional beyond those issued for a building permit.

C. Shop Drawings / Submittal Data: Written, graphic and pictorial documents prepared and / or assembled by the contractor based on the Construction Documents.

D. Structural Observation: Visual observation of the structural system by a representative of the registered design professional’s office for general conformance to the approved construction documents. Structural observations are not considered part of the structural tests and special inspections and do not replace inspections and testing by the testing agency or special inspector.

E. Special Inspector: A qualified person who demonstrating competence, to the satisfaction of the code enforcement official and registered design professional in responsible charge, for inspection of the particular type of construction or operation requiring special inspection. The special inspector shall be a licensed professional engineer or engineering intern or a qualified representative from the testing agency.

F. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

G. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.

H. Testing Agency: A qualified materials testing laboratory under the responsible charge of a licensed professional engineer, approved by the code enforcement official and the registered design professional in responsible charge, to measure, examine, test, calibrate, or otherwise

determine the characteristics or performance of construction materials and verify confirmation with construction documents.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications:
   1. Minimum qualifications of inspection and testing agencies and their personnel shall comply with ASTM E329-03 Standard Specification for Agencies in the Testing and / or Inspection of Materials Used in Construction.
      a. Inspectors and individuals performing tests shall be certified for the work being performed as outlined in the appendix of the ASTM E329. Certification by organizations other than those listed must be submitted to the building official for consideration before proceeding with work.
   2. In addition to these requirements, local jurisdiction may have additional requirements. It is the responsibility of the testing and inspection agencies to meet local requirements and comply with local procedures.

1.5 CONFLICTING REQUIREMENTS, REPORTS, AND TEST RESULTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the registered design professional in responsible charge for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the registered design profession in responsible charge for a decision before proceeding.

C. The special inspector’s reports and testing agencies results shall have precedence over reports and test results provided by the contractor.

D. Where a conflict exists between the construction documents and approved shop drawings / submittal data, the construction documents shall govern unless the shop drawings / submittal data are more restrictive. All conflicts shall be brought to the attention of the registered design professional in responsible charge.

1.6 SUBMITTALS BY SPECIAL INSPECTOR AND / OR TESTING AGENCY

A. Special inspectors shall keep and distribute records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge, contractor, architect, and owner. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.
   1. Special inspection reports and test results shall include, but not be limited to, the following:
      a. Date of inspection.
      b. Description of inspections or tests performed including location (reference grid lines, floors, elevations, etc.).
      c. Statement noting that the work, material, and / or product conforms or does not conform to the construction document requirements.

1) Name and signature of contractor's representative who was notified of work, material, and / or products that do not meet the construction document requirements.

d. Name and signature of special inspector and / or testing agency representative performing the work.

B. Schedule of Non-Compliant Work: Each agent shall maintain a log of work that does not meet the requirements of the construction documents. Include reference to original inspection / test report and subsequent dates of re-inspection / retesting.

C. Reports and tests shall be submitted within 1 week of inspection or test. Schedule of Non-Compliant Work shall be updated daily and submitted at monthly intervals.

D. Final Report of Special Inspections. Submitted by each agent listed in the schedule of Structural Testing and Special Inspections.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY

A. The contractor shall coordinate the inspection and testing services with the progress of the work. The contractor shall provide sufficient notice to allow proper scheduling of all personnel. The contractor shall provide safe access for performing inspection and on site testing.

B. The contractor shall submit schedules to the owner, registered design professionals and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.

C. Each contractor responsible for the construction of a seismic-force-resisting system, designated seismic system, or component listed in the quality assurance plan shall submit a written contractor's statement of responsibility to the building official and to the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgment of awareness of the special requirements contained in the quality assurance plan.
2. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official.
3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.
4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

D. Each contractor responsible for the construction of a main windforce-resisting system or a wind-resisting component listed in the quality assurance plan shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgment of awareness of the special requirements contained in the quality assurance plan.
2. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official.
3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.
4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

E. The contractor shall repair and / or replace work that does not meet the requirements of the construction documents.

1. Contractor shall engage an engineer / architect to prepare repair and / or replacement procedures.

2. Engineer / architect shall be registered in the state in which the project is located. Engineer shall be acceptable to the registered design professional in responsible charge, code enforcement official, and owner.
3. Procedures shall be submitted for review and acceptance by the registered design professional in responsible charge, code enforcement official, and owner before proceeding with corrective action.

F. The contractor shall be responsible for costs of:
1. Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the construction documents and shop drawings / submittal data.
2. Review of proposed repair and / or replacement procedures by the registered design professional in responsible charge and the inspectors and testing agencies.
3. Repair or replacement of work that does not meet the requirements of the construction documents.

3.2 STRUCTURAL OBSERVATIONS

A. Structural observations may be made periodically as determined by the registered design professional in responsible charge.

3.3 TESTING AND INSPECTION

A. Testing and inspection shall be in accordance with the attached Schedule of Special Inspections.
B. Reference related specifications for the minimum level of inspections and testing. Provide additional inspections and testing as necessary to determine compliance with the construction drawings.

PART 4 - SCHEDULES AND FORMS (ATTACHED)

4.1 STATEMENT OF SPECIAL INSPECTIONS.
4.2 SCHEDULE OF SPECIAL INSPECTIONS.
4.3 CONTRACTOR'S STATEMENT OF RESPONSIBILITY

END OF SECTION 01410

Statement of Special Inspections

Project:
Location:
Owner's Representative:
Owner's Address:

Architect of Record:
Structural Engineer of Record: William D. Laatsch

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection requirements of the North Carolina State Building Code. It includes a Schedule of Special Inspection Services applicable to this project as well as the name of the Special Inspector and the identity of other approved agencies intended to be retained for conducting these inspections.

The Special Inspector shall keep records of all inspections and shall furnish inspection reports to the Building Official, Owner's Representative, Structural Engineer and Architect of Record. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Structural Engineer and Architect of Record. The Special Inspections program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official, Owner's Representative, Structural Engineer and Architect of Record.

Interim Report Frequency: Monthly

A Final Report of Special Inspections documenting completion of all required Special Inspections and correction of any discrepancies should be submitted prior to issuance of a Certificate of Use and Occupancy.

Job Site safety and means and methods of construction are solely the responsibility of the Contractor.

Statement of Special Inspections Prepared by (Structural Engineer of Record):

William D. Laatsch

(Type or print name)

Signature Date

Owner's Authorization

Signature Date

Schedule of Special Inspection Services

The following sheets comprise the required schedule of special inspections for this project. The construction divisions which require special inspections for this project are as follows.

- [X] Structural Steel
- [X] Cold-Formed Steel Framing
- [X] Cast-in-Place Concrete
- [X] Masonry
- [ ] Wood Construction
- [X] Soils
- [X] Envelope (May require separate Specialized Inspector)
- [ ] Special Foundations (Piles or Piers)
- [ ] Wall Panels/Veneer
- [ ] Sprayed Fire Resistant Material
- [ ] Exterior Insulation & Finish System
- [ ] Smoke Control
- [X] Seismic Requirements
- [ ] Fire Rated Penetrations

Inspection Agents	Qualifications	Address
1. Special Inspector	SI	
2. Structural Engineer of Record	SER	
3. Testing Laboratory	ITL	
4. Other		

Note: The inspection and testing agent shall be engaged by the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Structural Engineer and Architect of Record, prior to commencing work.

Seismic Design Category: As Indicated on Drawings

Basic Wind Speed: As Indicated on Drawings

Wind Exposure Category: As Indicated on Drawings

Schedule of Special Inspection Services
Structural Steel

Item	Qualifications	Scope
1. Fabricator Certification/Quality Control Procedures	SI	• Ensure fabricator meets requirements of NCSBC 1704.2.2 • Collect Certificate of Compliance from fabricator at completion of fabrication
2. Welding	SI	• Continuous Inspection of welding in accordance with NCSBC Table 1704.3 • Collect certificate of compliance for weld filler material • Identify use of approved filler material and in accordance with AWS D1.1
3. Metal Deck	SI SER / SI	• Collect material data sheets for decking and connectors or fasteners • Periodic inspection of connections of decking
4. Structural Details	SER / SI	• Periodic inspection of steel framing and joint details
5. Bolting	SI SI SER / SI	• Collect material data sheets for bolts, nuts, and washers • Collect certificate of compliance from bolt supplier • Periodic inspection of bolted connections
6. Material Certification	SI	• Collect Certified mill test reports

Schedule of Special Inspection Services
Cold-Formed Steel Framing

Item	Qualifications	Scope
1. Plant Certification/ Quality Control Procedures	SI	• Ensure fabricator meets requirements of NCSBC 1704.2.2 • Collect certificate of compliance from fabricator at completion of fabrication
2. Mechanical Connections	SER / SI	• Periodic inspection of all field connections including anchorage to the structural frame
3. Welding	SER / SI	• Periodic inspection of all field connections including anchorage to the structural frame
4. Framing Details	SER / SI	• Periodic inspection framing and details

Schedule of Special Inspection Services
Cast-in-Place Concrete

Item	Qualifications	Scope
1. Mix Design/Material Certifications	SER / SI	• Collect mix designs and verify appropriate mix use during specific installation
2. Reinforcement Installation	SER / SI SI	• Periodic inspection of reinforcing steel and welded wire fabric • Collection of certified mill test reports
3. Concrete Placement/Monitoring Fresh Concrete, Sampling & prep of test samples	SI SI / ITL SI	• Continuous inspection of cast-in-place concrete placement • Continuous monitoring of sampling of fresh concrete, slump test, air content test, temperature of concrete and creation of strength test specimens • Continuous inspection of bolts to be installed in concrete prior to and during placement
4. Curing & Protection	SI	• Periodic inspections of curing techniques
5. Structural Precast Concrete Members	SER / SI	• Periodic inspection of attachment of precast members

Schedule of Special Inspection Services
Masonry

Item	Qualifications	Scope
1. Material Certification	SI SI SI	• Collect mix design for mortar • Collect mix design for grout • Certificates of Compliance for masonry constituents
2. Mixing of Mortar & Grout	SI	• Periodic inspection of site prepared mortar
3. Installation of Masonry	SI SER / SI	• Inspection of construction of mortar joints, prior to beginning masonry construction and during construction • Verify size and location of structural elements
4. Reinforcement Installation	SER / SI SER / SI	• Verify location of reinforcement and connections to structure prior to construction • Prior to grouting verify size, grade, and placement of reinforcement and connection of masonry to structural frame
5. Grouting Operations	SI	• Continuous observation of the placement of all grout, conforming cleanliness of grout space placement of the reinforcing connectors.
6. Weather Protection	SI	• Periodically verify protection techniques for construction of masonry below 40ºF and above 90ºF
7. Observation of the Evaluation of Masonry Strength	SI / ITL	• Continuous observation of the preparation of grout specimens, mortar specimens and or prisms.

Schedule of Special Inspection Services
Wood

Item	Qualifications	Scope
1. Inspection of Fabricators	SI SI SER / SI	• Verify quality control procedures for fabrication of wood structural elements • Continuous inspection during field gluing operations. • Periodic inspection for nailing, bolting, anchoring and other fastening of components including struts, braces and hold-downs

Schedule of Special Inspection Services
Soils

Item	Qualifications	Scope
1.Site Preparation	SI	• Determine that site has been prepared in accordance with the approved soils report
2. Fill Placement	SI	• Determine that material used and maximum lift thickness comply with approved soils report
3. Density Evaluation	SI / ITL	• Determine that in-place dry density of the compacted fill complies with approved soils report

Schedule of Special Inspection Services
Special Foundations (Piles or Piers)

Item	Qualifications	Scope
1.Pile Foundations	SI / SER SI	• Inspect to verify when pile foundations are being installed and during load tests. • Record cutoff and tip elevation of each pile relative to a permanent reference
2. Pier Foundations	SI / SER	• Inspect placement and location of pier foundations

Schedule of Special Inspection Services
Wall Panels and Veneers

Item	Qualifications	Scope
1. Anchorage	SI	• Inspect size and location of anchorage of veneer.
2. Material Certification	SI SI SI	• Collect mix design for mortar • Collect mix design for grout • Certificates of Compliance for masonry constituents
3. Mixing of Mortar & Grout	SI / ITL	• Periodic inspection of site prepared mortar
4. Installation of veneer	SI SI / SER	• Inspection of construction of mortar joints, prior to beginning masonry construction and during construction • Verify size and location of structural elements
5. Reinforcement Installation	SI / SER SI / SER	• Verify location of reinforcement and connections to structure prior to construction • Prior to grouting verify size, grade, and placement of reinforcement and connection of masonry to structural frame
6. Grouting Operations	SI	• Continuous observation of the placement of all grout, conforming cleanliness of grout space placement of the reinforcing connectors.
7. Weather Protection	SI	• Periodically verify protection techniques for construction of masonry below 40ºF and above 90ºF
8. Observation of the Evaluation of Masonry Strength	SI	• Continuous observation of the preparation of grout specimens, mortar specimens and or prisms.

Schedule of Special Inspection Services
Sprayed On Fire Resistant Materials

Item	Qualification	Scope
1. Fireproofing of Steel	SI / ITL	• Inspect preparation of substrate prior to installation in accordance with approved fire resistance design and approved manufacturer's written instructions • Inspect that substrate has minimum ambient temperature before and after application as specified by the fire resistance design and approved manufacturer's written instructions • Test thickness of sprayed on material per fire resistance design and approved manufacturer's written instructions • Test Density of sprayed on material per fire resistance design and approved manufacturer's written instructions • Test bond Strength to ensure a value greater than 150 pounds per square foot.

Schedule of Special Inspection Services
Exterior Insulation and Finish Systems (EIFS)

Item	Qualifications	Scope
1. Fabrication	SI	• Verify quality control program and inspect the fabrication plant as required to confirm that materials, methods, products and quality control comply with project specifications.
2. Application	SI	• Verify that EIFS is installed in conformance with project specifications

Schedule of Special Inspection Services
Smoke Control

Item	Qualifications	Scope
1. Smoke Evacuation System	SI / Independent Inspector	• During erection of ductwork and prior to concealment leak test and record locations of devices • Upon completion of smoke control system perform pressure difference testing, flow measurements and detection and control verification

Schedule of Special Inspection Services
Seismic Requirements

Item	Qualifications	Scope
1. Storage racks and access floors	SI	• Periodic inspection during the anchorage of access floors or storage racks 8 feet or greater in height
2. Architectural components	SI	• Periodic inspection during the erection and fastening of exterior cladding (weighing greater than 5 pounds per square foot), interior and exterior non-load bearing walls (greater than 30 feet in height), and veneer (weighing greater than 5 pounds per square foot)
3. Mechanical and electrical components	SI	• Periodic inspection during the anchorage of electrical equipment used for emergency power systems • Periodic special inspection of installation of electrical equipment • Periodic inspection of piping systems intended to carry flammable, combustible, or highly toxic contents and their associated mechanical units. • Periodic inspection of HVAC ductwork that will contain hazardous materials
4. Component and attachment testing	SI	• Periodic inspection of components with importance factor of 1.0 or 1.5 • Verify quality control plan • Inspect each piece of equipments label to ensure permanent identification of quality control program • Collect certificate of compliance for components with importance factor of 1.0 or 1.5
5. Seismic isolation system	SI	• Inspection of isolar units and energy dissipation devices during fabrication and installation
6. Seismic masonry testing	SI	• Verification of f ‘ m prior to construction • Verification of f ‘ m every 5000 square feet during construction • Verification of proportions of materials in mortar and grout as delivered to the site
7. Seismic steel reinforcing testing	SI	• Collect certified mill test reports for each shipment of reinforcing steel used to resist flexural, shear and axial forces.
8. Structural Steel	ITL	• Test requirements per AISC Seismic

CONTRACTOR'S STATEMENT OF RESPONSIBILITY

PROJECT: Project Name

LOCATION: Location

DATE: 00/00/00

OWNER: Owning Agency

DESIGNER: Designer

PRIME CONTRACTOR: _____

CONTRACTOR RESPONSIBLE: _____

SYSTEM/COMPONENT: Describe System Subject to QA Procedures

I (we) acknowledge the special requirements outlined in the quality assurance plan. I (we) also acknowledge that control will be exercised to obtain conformance with the construction documents as approved by the Building Official.

The following procedures will be established and strictly followed to maintain control within our organization:

_____

_____

_____

_____

The following reporting will be submitted to the Special Inspector, Owner's Representative, Structural Engineer, and Architect of Record at the following frequency:

Reporting method: _____

Frequency: _____

The following individuals(s) will be responsible for monitoring the procedures as set forth above:

Name: _____

Title: _____

Qualifications: _____

Signed this _____ day of _____ .

_____ _____

Name *Title*

SECTION 033000 - CAST-IN-PLACE CONCRETE

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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings.
   2. Foundation walls.
   3. Slabs-on-grade.
   4. Suspended slabs.

B. Related Sections:
   1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
   2. Division 32 Section "Concrete Paving" for concrete pavement and walks.
   3. walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more components; subject to compliance with requirements.

1.4 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings (As Required): Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
   1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Location of construction joints is subject to approval of the Architect.

F. Samples: For waterstops/vapor retarder.

G. Welding certificates.

H. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Waterstops.
   6. Curing compounds.
   7. Floor and slab treatments.
   8. Bonding agents.
   9. Adhesives.
   10. Vapor retarders.
   11. Semirigid joint filler.
   12. Joint-filler strips.
   13. Repair materials.

I. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates.

J. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

K. Field quality-control reports.

L. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5. Sections 1 through 5 and Section 7, "Lightweight Concrete."
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

H. Preinstallation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete subcontractor.
   2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS (When Required)

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    a. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars, assembled with clips.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I.
    a. CALCIUM CHLORIDE: NOT ALLOWED.

B. Normal-Weight Aggregates: ASTM C 33, Class 3Mcoarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C 330, 1/2-inch (13-mm) nominal maximum aggregate size.

D. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 WATERSTOPS (WHERE REQUIRED)

A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. BoMetals, Inc.
   b. Greenstreak.
   c. Paul Murphy Plastics Company.
   d. Vinylex Corp.
2. Profile: Ribbed without center bulb.
3. Dimensions: 9 inches by 3/8 inch thick (225 mm by 10 mm thick); nontapered.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Fortifiber Building Systems Group; Moistop Ultra 10.
   b. Meadows, W. R., Inc.; Perminator 10 mil.
   c. Raven Industries Inc.; Vapor Block 10.
   d. Stego Industries, LLC; Stego Wrap 10 mil Class A.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 FLOOR AND SLAB TREATMENTS (WHERE REQUIRED)

A. Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Anti-Hydro International, Inc.; A-H Alox.
   b. BASF Construction Chemicals - Building Systems; Frictex NS.
   c. L&M Construction Chemicals, Inc.; Grip It AO.

2.9 LIQUID FLOOR TREATMENTS (WHERE REQUIRED)

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
   b. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
   c. L&M Construction Chemicals, Inc.; Seal Hard.
   d. Meadows, W. R., Inc.; LIQUI-HARD.
   e. Metalcrete Industries; Floorsaver.
   f. Symons by Dayton Superior; Buff Hard.

2.10 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Construction Chemicals - Building Systems; Confilm.
   b. ChemMasters; SprayFilm.
   c. Dayton Superior Corporation; Sure Film (J-74).
   d. Euclid Chemical Company (The), an RPM company; Eucobar.
   e. L&M Construction Chemicals, Inc.; E-CON.
   f. Meadows, W. R., Inc.; EVAPRE.
   g. Metalcrete Industries; Waterhold.
   h. Sika Corporation; SikaFilm.
   i. Symons by Dayton Superior; Finishing Aid.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Anti-Hydro International, Inc.; AH Clear Cure WB.
   b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
   c. ChemMasters; Safe-Cure & Seal 20.
   d. Conspec by Dayton Superior; Cure and Seal WB.
   e. Dayton Superior Corporation; Safe Cure and Seal (J-18).
   f. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
   g. Meadows, W. R., Inc.; Vocomp-20.
   h. Metalcrete Industries; Metcure.

2.11 CONCRETE SEALER

A. Where indicated on the drawings provide a liquid applied concrete sealer.

B. Clear, Waterborne, synthetic modified, silane-siloxane concrete sealer. Provide the following:

1. SpecChem All Shield WB as basis of design or prior approved equal.
2. If traffic lines are indicated on the drawings, confirm compatibility of traffic line paint with concrete sealer.

2.12 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 or romatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets (Where Indicated): Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots (Where Indicated): Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.13 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.14 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. CALCIUM CHLORIDE: NOT ALLOWED.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.15 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 3 inches (100 mm) plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 4 inches (100 mm, plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd. (320 kg/cu. m).
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

D. Suspended Slabs (Where Indicated): Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd. (320 kg/cu. m).
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

E. Suspended Slabs (Where Indicated): Proportion structural lightweight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Calculated Equilibrium Unit Weight: 115 lb/cu. ft. (1842 kg/cu. m) plus or minus 3 lb/cu. ft. (48.1 kg/cu. m) as determined by ASTM C 567.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch (10 mm) or less.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

F. Building Walls: Proportion normal –weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

G. Site Walls: Normal-weight concrete.
1. Minimum Compressive Strength: **4000** psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: **3** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch maximum aggregate size.

2.16 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.17 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS (WHERE INDICATED)

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Granular Course: Cover vapor retarder with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS (WHERE INDICATED)

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
   1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
   2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent

formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
    a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for suspended slabs.
3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

G. Slip-Resistive Finish (Where Indicated): Before final floating, apply slip-resistive aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:

1. Uniformly spread 25 lb/100 sq. ft. (12 kg/10 sq. m)of dampened slip-resistive aluminum granules over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
2. After broadcasting and tamping, apply float finish.
3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aluminum granules.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-

place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs (Where Indicated): Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.14 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least **six** months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SEALER

A. Provide concrete sealer were indicated on the drawings.
   1. Prepare and apply concrete sealant per manufacturers recommendation, at a minimum:
   2. Concrete must be cured (21 day minimum) prior to application.
   3. Surface must be free of all moisture, curing residue (all curing compound must be removed from the floor), dust and debris.
   4. If traffic lines are indicated on the drawings, confirm compatibility and installation sequencing of traffic line paint prior to installation of concrete sealer.
   5. All patching, joint sealants and caulking must be in place prior to application of sealant.
   6. Apply uniformly to floors and slabs indicated in a continuous operation according to manufacturer's written instructions.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:
1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two (2) sets of two standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

3.18 **IMPORTANT MATERIALS NOTE:**

A. THE FOLLOWING MATERIALS WILL NOT BE ALLOWED FOR USE IN THE CONCRETE MIX.

1. CALCIUM CHLORIDE.

B. IF THESE MATERIALS ARE USED, THE CONTRACTOR WILL BE REQUIRED TO REMOVE THE CONCRETE FROM THE PROJECT AND REPLACE IT AT HIS OWN EXPENSE.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY (Non Coastal Areas)

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. Concrete masonry units.
   2. Concrete building brick.
   3. Face brick.
   4. Building (common) brick.
   5. Mortar and grout.
   6. Steel reinforcing bars.
   7. Masonry joint reinforcement.
   8. Ties and anchors.
   9. Embedded flashing.
   10. Miscellaneous masonry accessories.
   11. Masonry-cell insulation.
   12. Cavity-wall insulation.

B. Related Sections:
   1. Division 05 Section "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
   2. Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
   3. Division 07 Section "Water Repellents" for water repellents applied to unit masonry.
   4. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
   5. Division 08 Section "Louvers and Vents" for wall vents (brick vents).

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
   1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
   2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 SUBMITTALS

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

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

C. Samples for Initial Selection:
   1. Face brick, in the form of straps of five or more bricks.
   2. Colored mortar.
   3. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:
   1. Face brick, in the form of straps of five or more bricks.
   2. Special brick shapes.
   3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
   4. Weep holes and vents.
   5. Accessories embedded in masonry.

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

F. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include data on material properties and material test reports substantiating compliance with requirements.
      b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
      c. For exposed brick, include test report for efflorescence according to ASTM C 67.
      d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing per ASTM C 67 or a list of addresses of buildings in Project's area where proposed brick has been used successfully and with a history of durability.
      e. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   6. Joint reinforcement.
   7. Anchors, ties, and metal accessories.

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

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

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

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

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. Build mockup of typical wall area as shown on Drawings.
2. Build mockups for each type of exposed unit masonry construction in sizes approximately 72 inches (1800 mm) long by 72 inches (1800 mm) high by full thickness, including face and backup wythes and accessories.
    a. Include a sealant-filled joint at least 16 inches (400 mm) long in each exterior wall mockup.
    b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
    c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
    d. Include metal studs, sheathing, building wrap sheathing joint-and-penetration treatment air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
    e. Additional panels or a larger size panel may be required to show multiple masonry types/colors and details required on the drawings.
3. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
4. Clean exposed faces of mockups with masonry cleaner as indicated.
5. Protect accepted mockups from the elements with weather-resistant membrane.
6. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

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

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

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

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

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

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

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

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

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

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners unless otherwise indicated.

B. Integral Water Repellent: Provide units made with integral water repellent for all exterior exposed units.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
    a. Products: Subject to compliance with requirements, provide one of the following:
        1) ACM Chemistries; RainBloc.
        2) BASF Aktiengesellschaft; Rheopel Plus.
        3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.

C. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
2. Density Classification: Lightweight unless otherwise indicated.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

D. Concrete Building Brick: ASTM C 55.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3750 psi (25.86 MPa).
2. Density Classification: Lightweight.
3. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.

2.3 CONCRETE AND MASONRY LINTELS (WHERE INDICATED)

A. General: Provide one of the following:

B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than CMUs.

C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: Facing brick complying with ASTM C 216.
    a. Products: Subject to compliance with requirements, provide the brick as scheduled on the drawings.
2. Grade: SW.
3. Type: FBS.
4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 8250 psi (56.88 MPa).
5. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.

6. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
7. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet (3 m) or shall have a history of successful use in Project's area.
8. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
9. Application: Use where brick is exposed unless otherwise indicated.
10. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.
11. Color and Texture: Match Architect's samples or as scheduled on the drawings.

C. Building (Common) Brick: ASTM C 62, Grade SW.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 8250 psi (56.88 MPa).
2. Size: Match size of face brick.
3. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
4. Application: Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

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

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

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

E. Mortar Cement: ASTM C 1329.
1. Products: Subject to compliance with requirements, provide the following:
a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Products: Subject to compliance with requirements, provide the following:
a. Davis Colors; True Tone Mortar Colors.
b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
c. Solomon Colors, Inc.; SGS Mortar Colors.

G. Colored Cement Product: Packaged blend made from portland cement and hydrated lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Colored Portland Cement-Lime Mix:
         1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
         2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
         3) Lafarge North America Inc.; Eaglebond Portland & Lime.
         4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
      b. Colored Masonry Cement:
         1) Capital Materials Corporation; Flamingo Color Masonry Cement.
         2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
         3) Essroc, Italcementi Group; Brixment-in-Color.
         4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
         5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
         6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
         7) National Cement Company, Inc.; Coosa Masonry Cement.
   2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
   3. Pigments shall not exceed 10 percent of portland cement by weight.

H. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. White-Mortar Aggregates: Natural white sand or crushed white stone.
   3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Aggregate for Grout: ASTM C 404.

J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Euclid Chemical Company (The); Accelguard 80.
      b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
      c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

K. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with masonry containing integral water repellent by same manufacturer.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. ACM Chemistries; RainBloc for Mortar.
      b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
      c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.

L. Water: Potable.

2.6 REINFORCEMENT – SEISMIC DESIGN IS REQUIRED FOR ALL REINFORCING, TIES AND ANCHORS

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

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized, carbon steel.
   2. Exterior Walls: Hot-dip galvanized, carbon steel.
   3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.

4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
5. Wire Size for Veneer Ties: 0.187-inch (4.76-mm) diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

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

D. Masonry Joint Reinforcement for Multiwythe Masonry:
1. In all areas Seismic design is required. Use adjustable (two-piece) type, truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
a. Products:
1. Hohmann & Barnard, Inc.; #165 S.I.S. Truss; Seismiclip Interlock System.
2. Heckmann Building Products, Inc.
3. Wire-Bond.

E. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized, carbon steel continuous wire.

2.7 TIES AND ANCHORS

A. Seismic masonry – Veneer anchors and ties are required for all conditions.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 316.
3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
4. Stainless-Steel Sheet: ASTM A 666, Type 316.
5. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
6. Stainless-Steel Bars: ASTM A 276 or ASTM a 666, Type 304.

C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units.
2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
3. Wire: Fabricate from 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel.

E. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized steel. **(**

F. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 01.05-inch- (2.66-mm-) thick, steel sheet, galvanized after fabrication.
    a. 0.108-inch- (2.74-mm-) thick, galvanized sheet may be used at interior walls unless otherwise indicated.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.35-mm-) diameter, hot-dip galvanized steel.

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

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

I. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs and designed to engage a continuous wire embedded in the veneer mortar joint.and as follows:
    a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
    a. Products: Subject to compliance with requirements, provide one of the following:
        1) Heckmann Building Products Inc.; Pos-I-Tie with #75-TC Thermal Clip and Seismic Clip
        2) Hohmann & Barnard, Inc.; Thermal 2-Seal Wing Nut Anchor w/ Compressed Seismic Hook.
        3) Equal products are acceptable with prior approval.
    b. Anchor Section: Corrosion-resistant, self-drilling screw within exterior barrel designed with thermal break to receive wire tie. Screw has barrel / spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.
    c. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.

2.8 MISCELLANEOUS ANCHORS

A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.

B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch (0.86-mm), galvanized steel sheet.

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

D. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 unless otherwise indicated.
3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.9 EMBEDDED FLASHING MATERIALS – WHERE INDICATED

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" Division 07 Section "Sheet Metal Flashing and Trim"" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
3. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
4. Fabricate through-wall metal flashing embedded in masonry from stainless steel or copper, as indicated on drawings, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Cheney Flashing Company; Cheney Flashing (Dovetail) or Cheney 3-Way Flashing (Sawtooth).
      2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
      3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
6. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
7. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
8. Metal Expansion-Joint Strips: Fabricate from stainless steel or copper to shapes as indicated.

B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Advanced Building Products Inc.; Copper Fabric Flashing Copper Sealtite 2000.
      2) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
      3) Phoenix Building Products; Type FCC-Fabric Covered Copper.
      4) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
      5) York Manufacturing, Inc.; Multi-Flash 500.
2. Asphalt-Coated Copper Flashing: 7-oz./sq. ft. (2-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Advanced Building Products Inc.; Cop-R-Cote.
      2) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
      3) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.

4) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.

3. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
4. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

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

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

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

D. Weep/Vent Products: Use one of the following unless otherwise indicated:

1. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.
2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
    a. Products: Subject to compliance with requirements, provide one of the following:
        1) Advanced Building Products Inc.; Mortar Maze weep vent.
        2) Blok-Lok Limited; Cell-Vent.
        3) Heckmann Building Products Inc.; No. 85 Cell Vent.
        4) Hohmann & Barnard, Inc.; Quadro-Vent.
        5) Wire-Bond; Cell Vent.
3. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.
    a. Products: Subject to compliance with requirements, provide the following:
        1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide one of the following:
    a. Advanced Building Products Inc.; Mortar Break or Mortar Break II.
    b. Archovations, Inc.; CavClear Masonry Mat.
    c. Hohmann & Barnard; Mortar Trap.
    d. Mortar Net USA, Ltd.; Mortar Net.
2. Provide one of the following configurations:
    a. Strips, not less than 1-1/2 inches (38 mm) thick and 10 inches (250 mm) high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

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

a. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
b. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.11 MASONRY-CELL INSULATION – WHERE INDICATED

A. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Concrete Block Insulating Systems; Korfil.
b. Shelter Enterprises Inc.; Omni Core.

2.12 CAVITY-WALL INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV closed-cell product extruded with an integral skin.
1. Products: Subject to compliance with requirements, provide the following:
a. Styrofoam brand Cavitymate by Dow Chemical Company
B. Adhesive: Type recommended by insulation board manufacturer for application indicated.
C. Tape: Dow Weathermate straight flashing tape.

2.13 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.14 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
2. Use masonry cement mortar unless otherwise indicated.
3. For exterior masonry, use masonry cement mortar.
4. For reinforced masonry, use masonry cement mortar.
5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
   1. Pigments shall not exceed 10 percent of portland cement by weight.
   2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
   3. Mix to match Architect's sample.
   4. Application: Use pigmented mortar for exposed mortar joints with the following units:
      a. Decorative CMUs.
      b. Pre-faced CMUs.
      c. Concrete facing brick.
      d. Face brick.
      e. Hollow brick.
      f. Stone trim units.
      g. Cast stone trim units.

E. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
   3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

F. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.
   1. Application: Use epoxy pointing mortar for exposed mortar joints with the following units:
      a. Pre-faced CMUs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

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

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
   1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
   2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
   3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
   5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
   6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
   7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:
   1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
   2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
   3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
   4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
   5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

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

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches (100-mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

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

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

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

H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and CMUs as follows:

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

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

C. Set stone or cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Allow cleaned surfaces to dry before setting.
3. Wet joint surfaces thoroughly before applying mortar.

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

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

3.6 COMPOSITE MASONRY – WHERE INDICATED

A. Bond wythes of composite masonry together using one of the following methods:

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 1.77 sq. ft. (0.16 sq. m) of wall area spaced not to exceed 16 inches (406 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (914 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
    a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
    b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
3. Header Bonding: Provide masonry unit headers extending not less than 3 inches (76 mm) into each wythe. Space headers not over 8 inches (203 mm) clear horizontally and 16 inches (406 mm) clear vertically.

B. Bond wythes of composite masonry together using bonding system indicated on Drawings.

C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
1. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
2. Provide rigid metal anchors not more than 24 inches (610 mm) 48 inches (1220 mm) o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.7 CAVITY WALLS – WHERE INDICATED

A. Bond wythes of cavity walls together using one of the following methods:
1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 1.77 sq. ft. (0.16 sq. m) of wall area spaced not to exceed 16 inches (406 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
    a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
    b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
    a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
    b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
    c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

3. Header Bonding: Provide masonry unit headers extending not less than 3 inches (76 mm) into each wythe. Space headers not over 8 inches (203 mm) clear horizontally and 16 inches (406 mm) clear vertically.
4. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

~~D. Parge cavity face of backup wythe in a single coat approximately 3/8 inch (10 mm) thick. Trowel face of parge coat smooth.~~

E. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

F. Apply air barrier to face of backup wythe to comply with Division 07 Section "~~Modified Bituminous Sheet Air Barriers or~~ Cold Fluid Applied Waterproofing or Fluid-Applied Membrane Air Barriers."

G. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.8 MASONRY-CELL INSULATION – WHERE INDICATED

A. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.9 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

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

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

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

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.10 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE – WHERE INDICATED

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
1. Provide an open space not less than 1 inch (25 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.11 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
   1. Fasten screw-attached and seismic anchors through sheathing or directly to wall framing and to concrete and masonry backup with metal fasteners of type indicated.
   2. Embed tie sections connector sections and continuous wire in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
   3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
   4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 16 inches (406 mm) o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.12 CONTROL AND EXPANSION JOINTS – WHERE INDICATED

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows using one of the following methods:
   1. Install preformed control-joint gaskets designed to fit standard sash block.
   2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
   3. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:
   1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
   2. Build flanges of factory-fabricated, expansion-joint units into masonry.
   3. Build in compressible joint fillers where indicated.
   4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch (10 mm).
   1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.13 LINTELS

A. Install steel lintels where indicated.

B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.14 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on

sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and through inner wythe to within 1/2 inch (13 mm) of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches (50 mm) on interior face.
3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and 1-1/2 inches (38 mm) into the inner wythe. Form 1/4-inch (6-mm) hook in edge of flashing embedded in inner wythe.
4. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under building paper or building wrap, lapping at least 4 inches (100 mm).
5. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
6. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
7. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
8. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
9. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
   1. Use specified weep/vent products or open head joints to form weep holes.
   2. Space weep holes formed from plastic tubing 16 inches (400 mm) o.c.

E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products or open head joints to form vents.
   1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.15 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

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

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.16 FIELD QUALITY CONTROL

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

B. Inspections: Level 2 special inspections according to the "International Building Code."
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

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

D. Testing Frequency: One set of tests for each 5000 sq. ft. min of wall area or portion thereof or more frequently as required by Special Inspections or Concrete specification sections.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

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

G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

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

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

J. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.17 PARGING – WHERE INDICATED

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3 mm per 300 mm). Form a wash at top of parging and a cove at bottom.

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

3.18 REPAIRING, POINTING, AND CLEANING

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

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

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

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
8. Clean stone trim to comply with stone supplier's written instructions.
9. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.19 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 042002 – ARCHITECTURAL CONCRETE MASONRY UNITS
(SMOOTH FACE SINGLE SCORE UNITS)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Decorative concrete masonry units.

B. See Division 5 Section "Structural Steel" for installing anchor sections of adjustable masonry anchors for connecting to structural frame.

C. See Division 5 Section "Metal Fabrications" for furnishing steel lintels and shelf angles installed in unit masonry assemblies.

D. See Division 7 Section "Sheet Metal Flashing and Trim" for furnishing manufactured reglets installed in masonry joints for metal flashing.

1.2 SUBMITTALS

A. Product Data: For each masonry unit, accessory, and other manufactured product indicated.

B. Samples: Showing the full range of colors and textures available for exposed masonry units and colored mortars.

C. Material Test Reports: For each type of masonry unit, mortar, and grout required.

D. Material Certificates: For each type of masonry unit required.

1.3 QUALITY ASSURANCE

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on each type of unit required per test method indicated.
   1. Concrete Masonry Units: ASTM C 140.
   2. Mortar: For properties per ASTM C 270.

B. Mockups: Build sample panels for each type of exposed unit masonry assembly to verify selections made under sample Submittals and to demonstrate aesthetic effects.
   1. Build mockups in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.

1.4 PROJECT CONDITIONS

A. Cold-Weather Requirements: See Specification Section 042000 – Unit Masonry Assemblies for Requirements.

B. Hot-Weather Requirements: See Specification Section 042000 – Unit Masonry Assemblies for Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide the products specified.
   1. Adams Products Company
   2. Cemex USA
   3. Metromont Materials Corporation
   4. Johnson Concrete Products Company
   5. Tarmac America Inc.
   6. Southeastern Concrete Products Company

B. Architectural Concrete Masonry Units: Provide CMU units **as Indicated on Drawings**

C. Integral Water-Repellent Admixture: Provide an integral liquid polymeric admixture mixed with concrete during production of all block units as specified above which cross links and becomes permanently locked into the block to provide resistance penetration. Admixture shall be “Dry Block Water Repellent Admixture” manufactured by Forrer Industries, a unit or W.R. Grace & Company, Addiment, or approved equal.
   All CMU Block Material: To include integral water repellent meeting ASTM 514-74, Class C. Absorption not to exceed 8 lbs. per cubic foot.

2.2 COLORS AND TEXTURES

A. Exposed Masonry Units: As indicated on the drawings by manufacturer's designations.

2.3 MASONRY UNITS

A. Concrete Masonry Units: ASTM C 90.

1. Unit Compressive Strength: 3000-psi- minimum, average net-area compressive strength.
2. Weight Classification: Normal weight.
3. Type: I, moisture-controlled units. Moisture content at time of delivery shall not exceed 35% of total absorption and shall be in equilibrium with the average relative humidity at the time of laying the wall. The masonry subcontractor shall keep all units covered as they are received on the job.
4. Size: Provide Manufacturer's standard units or special units as shown or detailed on the drawings. Actual size of unit face shell thickness and web thickness to be as follows:

MINIMUM THICKNESS OF FACE SHELL AND WEBS WHERE INDICATED

Nominal Size Of Units	Face Shell Minimum Thickness	Web Minimum Thickness
4" x 8" x 16"	Solid	Solid
4" x 8" x 16"	.75	.75
8" x 8" x 16"	1.25	1.00
12" x 8" x 16"	1.50	1.25

5. Special Shapes: Provide for lintels, outside single miter corners, outside double miter corners, inside corners (3 ribs), solid sill units, cut sloping units, jambs, headers, sash, control joints, bonding and other special conditions.
6. Physical Properties:
   a. Water Permeance: ASTM E 514-74, achieves Class E rating with no water visible on back of wall above flashing at end of 72 hours, not more than 25 percent of wall area above flashing damp at end of three days, and no leaks (a leak is a flow of water from flashing at a rate equal to or greater than 0.0132 gallons per hour) through wall at end of one day.
   b. Water Vapor Transmission: ASTM E 96, passes.
   c. Bond Strength: ASTM E72 and /or C 1072, minimum equal to bond strength without admixture.
   d. CMU Sampling and Testing: ASTM C 140, surpasses normal weight CMU for compressive strength, absorption, weight, moisture content, and dimensional stability.
   e. Water Mixability: Full dispersible in water.
   f. Specific Gravity: Minimum 1.0.

2.4 MORTAR AND GROUT MATERIALS

A. Mortar Materials and Mixes: Provide mortar complying with ASTM C 270, Type S. Proportion Specification, for materials and mortar types of composition indicated below:

1. Cementitious Material: Premixed natural or colored masonry cement of formulation required to produce mortar color indicated. See Drawings for Color. Manufacturer to provide matching colored mortar for use in all exposed masonry using the Smooth Faced CMU Units.

   Use Type S mortar for all masonry. Mortar to include integral water repellent meeting ASTM 514-74, Class C. Do not add other admixtures. Machine mix to match Architect's sample for color.

B. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.

C. Colored-Mortar Aggregates: Natural-colored sand, natural white sand, or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

D. Water Repellent Admixture: Liquid water –repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer. All mortar to receive water repellant admixture.
   1. Products:
      a. ACM Chemistries, RainBloc for Mortar.
      b. BASF Akitengesellschaft; Rheopel Mortar Admixture.
      c. Grace Construction Products, W. R. Grace & Co. – Conn; Dry-Block Mortar Admixture.

E. Water: Potable.

2.5 REINFORCING

A. See Specification Section 04200 Unit Masonry Assemblies for Requirements.

2.6 TIES AND ANCHORS

A. See Specification Section 04200Unit Masonry Assemblies for Requirements.

2.7 EMBEDDED FLASHING MATERIALS

A. See Specification Section 04200 Unit Masonry Assemblies for Requirements.

B. Metal Flashing and Accessories: Fabricated to complying with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

C. Concealed Flashing: See Specification Section 042000 Unit Masonry Assemblies for Requirements.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

2.9 MASONRY CLEANERS

A. Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, unless otherwise indicated. Do not use calcium chloride in mortar or grout.

2.11 SOURCE QUALITY CONTROL

A. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cut masonry units with motor-driven saws. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

C. Wetting of Masonry: Wet masonry before laying if the initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

D. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
   1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.
   2. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet (6 mm in 6 m), nor 1/2 inch (12 mm) maximum.

3.2 LAYING MASONRY WALLS

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

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

C. Bond Pattern for Exposed Masonry: Lay exposed masonry in bond pattern indicated; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

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

E. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

B. Lay concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.
3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.

C. Tool exposed joints as directed by the Architect.

3.4 CAVITIES

A. Keep cavities clean of mortar droppings and other materials during construction.

1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.

3.5 MASONRY JOINT REINFORCEMENT

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

3.6 ANCHORING MASONRY

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

3.7 LINTELS

A. Provide masonry lintels where shown. Provide precast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated.

3.8 FLASHING, WEEP HOLES, AND VENTS

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

3.9 REINFORCED UNIT MASONRY INSTALLATION

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

3.10 FIELD QUALITY CONTROL

A. See Specification Section 042000 Unit Masonry Assemblies for Requirements.

3.11 CLEANING

A. Clean unit masonry by dry brushing to remove mortar fins and smears before tooling joints, as work progresses.

B. After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Protect adjacent surfaces from contact with cleaner.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
4. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces.

3.12 MASONRY WASTE DISPOSAL

A. Masonry Waste Disposal: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
   1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
   2. Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042002

SECTION 044313 - MANUFACTURED STONE VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manufactured stone veneer, Manufactured stone trim, and application materials.

B. Related Sections:

1. Division 07 – Moisture Protection.
2. Division 04 – Unit Masonry for mock-up panel requirements.

1.2 SUBMITTALS

A. Reference Section 01 33 00–Submittal Procedures; submit following items:

1. Product Data: Manufactured masonry and application materials.
2. Samples: Panel containing full-size samples of specified manufactured masonry showing full range of colors and textures **complete with specified mortar**.
   a. Actual size of masonry sample approximately 12 by 12 inches (300 by 300 mm).
3. Quality Assurance/Control Submittals:
   a. Qualifications:
      1) Proof of manufacturer qualifications.
      2) Proof of installer qualifications.
   b. Certificates: ICC-ES Report.
   c. Test Reports for physical properties.
   d. Manufacturer's Installation Instructions.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications:
   a. Minimum five years experience in producing manufactured masonry.
   b. Member of following organizations:
      1) MSJC.
      2) ACI.
      3) ASTM.
2. Installer Qualifications: Company with documented experience in installation of manufactured masonry including minimum 5 projects within 400 mile radius of this Project.

B. Certifications:

1. Current ICC-ES Report.
2. UL: Listing in Material Approval Guide.
3. Building Materials Evaluation Commission.
4. HUD: Material Release Number.
5. City of Los Angeles: Research Report.
6. Texas Department of Insurance Product Evaluation.
7. Florida Product Approval Number.

C. Sample Panels: Provide in a location selected by Architect showing representative sample of installed product including penetration and termination details, corner detail, and mortar color and tooling.

1. Reference Section 01400 – Quality Control.
2. Minimum Size: 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.

D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Reference Section 01600–Product Requirements.

B. Follow manufacturer's instructions.

C. Store moisture-sensitive materials in weather protected enclosures.

1.5 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Maintain materials and ambient temperature in area of installation at minimum 40 degrees F (4 degrees C) prior to, during, and for 48 hours following installation.

1.6 WARRANTY

A. Special Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing for a period of 50 years following date of Substantial Completion.

1.7 MAINTENANCE

A. Manufacturer's maintenance instructions including recommendations for cleaning and repair of components to be included in closeout submittals.

B. Extra Materials: Furnish extra manufactured stone material in a variety of shapes and sizes in quantity equal to three percent of the installed stone.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design: As indicated on Drawings

~~Cultured Stone by Boral~~
~~200 Mansell Court E. Suite 305~~
~~Roswell, GA 30076~~
~~Tel: (800) 255-1727~~
~~Fax: (866) 552-9022~~
~~Website: www.culturedstone.com~~

2.2 MANUFACTURED MASONRY MATERIALS

A. Stone Veneer Textures:

1. Single Texture to match: Southern Ledgestone "Chardonnay" by Boral Cultured Stone.
   a. Include matching corner pieces.

B. Architectural Trim:

1. Watertable/Sill-Cast Stone – Standard watertable/sill-cast stone by Boral Cultured Stone.
   a. Color: To match Southern Ledgestone "Chardonnay" by Boral Cultured Stone
   b. Right & Left corner Watertable/Sills are also required.
   c. Provide Simpson A-21 or similar galvanized metal support bracket with holding capacity of 5 lbs./lf.
   d. Provide sloped top surface and drip edge.
2. Single Receptacle Stones –
   a. Color: To match Southern Ledgestone "Chardonnay" by Boral Cultured Stone
   b. Size: 6" long x 8" high.
   c. Location: To be used in Stone Veneer where power, water and/or gas outlets occur about the perimeter of the exterior of the building and where items related to the AC condensers penetrate the stone veneer. Check with HVAC contractor for exact locations.

C. Manufactured Masonry Physical Properties:

1. Compressive Strength: ASTM C 192 and ASTM C39, 1800 psi (12.4 MPa), 5 specimen average, 1500 psi (10.3 MPa) minimum for individual unit.
2. Bond Between Stone Unit and main wall construction material, metal lath, Type S Mortar, and Backing: ASTM C 482, 50 psi (345 kPa).
3. Thermal Resistance: ASTM C 177, R-factor, 0.355 per inch (25.4 mm) of thickness.
4. Freeze/Thaw: ASTM C 67, no disintegration and less than 3 percent weight loss.
5. Fire Hazard Test, UL 723:
   a. Flame spread: 0.

b. Smoke Development: 0.

6. Maximum Veneer Unit Weight: 15 psf (73 kg/m^2).

2.3 RELATED MATERIALS

A. Mortar: Premixed Type N or mortar mixed using components and proportions following manufactured masonry manufacturer's installation instructions. Comply with ASTM C 270.

1. Mortar Color: US San Tan 75U by Blue Circle.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which manufactured masonry will be installed.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.2 PREPARATION

A. Protection: Prevent work from occurring on the opposite of walls to which manufactured masonry is applied during and for 48 hours following installation of the manufactured masonry.

B. Surface Preparation: Follow manufacturer's instructions designated below for the appropriate type of manufactured masonry and substrate.

3.3 INSTALLATION

A. Install Stone Veneer products in accordance with manufacturer's installation instructions using grouted joints.

B. Install architectural trim products in accordance with manufacturer's installation instructions.

3.4 FIELD QUALITY CONTROL

A. Manufacturer’s Field Services: Provide periodic site visits as required by the Architect. Report any discrepancies to the Contractor with copies to the Architect within 24 hours of each visit.

3.5 CLEANING AND PROTECTION

A. Clean manufactured masonry in accordance with manufacturer's installation instructions.

B. Protect finished work from rain and work on either side of the wall during and for 48 hours following installation.

C. Protect installed products from damage during remainder of construction period.

END OF SECTION 044313

SECTION 054000 - COLD-FORMED METAL FRAMING

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 the following (where indicated on the drawings):
   1. Load-bearing wall framing.
   2. Exterior non-load-bearing wall framing.
   3. Soffit framing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings:
   1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
   2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: Engage a qualified professional engineer, as defined in Section 014000 – “Quality Requirements”, to design cold-formed metal framing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
   1. Steel sheet.
   2. Expansion anchors.
   3. Power-actuated anchors.
   4. Mechanical fasteners.
   5. Vertical deflection clips.
   6. Horizontal drift deflection clips
   7. Miscellaneous structural clips and accessories.

D. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified independent testing agency, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

D. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. ClarkWestern Building Systems, Inc.
2. Dietrich Metal Framing; a Worthington Industries Company.
3. MarinoWARE.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/720 of the wall height.
      b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
      c. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/720 of the wall height.
   3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
   4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 1-1/2 inches (38 mm).
   5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

C. Cold-Formed Steel Framing Design Standards:
   1. Floor and Roof Systems: AISI S210.
   2. Wall Studs: AISI S211.
   3. Headers: AISI S212.
   4. Lateral Design: AISI S213.

D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: ST33H (ST230H) or ST50H (ST340H) As required by structural performance.
   2. Coating: G60 (Z180), A60 (ZF180), or equivalent.

C. Steel Sheet for Vertical Deflection and/or Drift Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: 33 (230) or 50 (340), Class 1 As required by structural performance.
   2. Coating: G60 (Z180).

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
   2. Flange Width: **1-5/8 inches (41 mm).**

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
   1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil)** Matching steel studs.
   2. Flange Width: 1-1/4 inches (32 mm).

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
   2. Flange Width: **1-5/8 inches (41 mm).**

D. Steel Single- or Double-L Headers: Manufacturer's standard L-shapes used to form header beams, of web depths indicated, and as follows:
   1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
   2. Top Flange Width: **1-5/8 inches (41 mm).**

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **Minimum 0.0329 inch (33 mil).**
   2. Flange Width: 1-5/8 inches (41 mm), 2 inches (51 mm) or 2-1/2 inches (63 mm) as indicated.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: **Minimum 0.0329 inch (33 mil).**
   2. Flange Width: 1-1/4 inches (32 mm).

C. Vertical Deflection Clips: Manufacturer's standard bypass and/or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. ClarkWestern Building Systems, Inc.
      b. Dietrich Metal Framing; a Worthington Industries company.
      c. MarinoWARE.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
   1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
   2. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
   1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
      a. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
      b. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
   2. Inner Track: Of web depth indicated, and as follows:

a. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
b. Flange Width: width plus 1 inch (25 mm).

F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: **0.0329 inch (33 mil).**
2. Flange Width: 1-5/8 inches (41 mm) or 2 inches (51 mm), minimum.

2.7 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B ASTM A 780.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and

plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.10 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
   1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
   1. Cut framing members by sawing or shearing; do not torch cut.
   2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
   1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
   1. Anchor Spacing: 24 inches (610 mm) To match stud spacing as shown on Shop Drawings.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
   1. Stud Spacing: 12 inches (305 mm) or 16 inches (406 mm) As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
   1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
   2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
   1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically as indicated and as indicated on Shop Drawings. Fasten at each stud intersection.
   1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
   2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
   1. Stud Spacing: 12 inches (305 mm) or 16 inches (406 mm) As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install single deep-leg deflection tracks and anchor to building structure.
   2. Install double deep-leg deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
   4. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

a. Install solid blocking at 96-inch (2440-mm) centers, centers indicated or centers indicated on Shop Drawings.

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.

3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

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

3.7 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

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SECTION 054400 - COLD-FORMED METAL TRUSSES (ROOF)

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. Cold-formed steel trusses for roofs.

B. Related Requirements:
   1. Section 054000 "Cold-Formed Metal Framing" for cold-formed steel studs, joists, and rafters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:
   1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel trusses; fabrication; and fastening and anchorage details, including mechanical fasteners.
   2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel trusses.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.
   1. Steel sheet.
   2. Expansion anchors.
   3. Power-actuated anchors.
   4. Mechanical fasteners.
   5. Miscellaneous structural clips and accessories.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel trusses from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Aegis Metal Framing.
   2. Genesis Worldwide Inc.
   3. Marino/WARE.

4. Nuconsteel, A Nucor Company.
5. Steel Construction Systems.
6. TrusSteel; an ITW company.
7. USA Frametek.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional, as defined in Section 014000 "Quality Requirements," to design cold-formed steel trusses.

B. Structural Performance: Provide cold-formed steel trusses capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on drawings and in accordance with the 2018 **North** Carolina Building Code.
2. Deflection Limits: Design trusses deflections in accordance with the 2018 **North** Carolina State Building Code.
3. Design trusses to provide for movement of truss members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).

C. Cold-Formed Steel Framing Design Standards:
1. Floor and Roof Systems: Design according to AISI S210.
2. Lateral Design: Design according to AISI S213.
3. Roof Trusses: Design according to AISI S214.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL TRUSS MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of grade and coating weight as follows:
1. Grade: ST50H (ST340H) As required by structural performance.
2. Coating: G60 (Z180).

2.4 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard C-shaped steel sections.
1. Connecting Flange Width: 1-5/8 inches (41 mm) OR AS INDICATED, minimum at top and bottom chords connecting to sheathing or other directly fastened construction.
2. Section Properties: ASTM – Grade 55,000 PSI.

2.5 ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of same grade and coating weight used for truss members.

B. Provide accessories of manufacturer's standard thickness and configuration unless otherwise indicated.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36 or Grade 55, threaded carbon-steel hex-headed bolts, headless, hooked bolts as indicated and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and Appendix D in ACI 318, greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Fasteners: Fastener system of type suitable for application, fabricated from corrosion-resistant materials, with capability to sustain, without failure, allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Shims: Load bearing, of high-density multimonomer plastic, non-leaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

2.8 FABRICATION

A. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate trusses using jigs or templates.
2. Cut truss members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
4. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting cold-formed steel trusses for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed steel trusses without reducing thickness of fire-resistive materials below that is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

A. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened.

1. Fasten cold-formed steel trusses by welding or mechanical fasteners.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings; comply with requirements for spacing, edge distances, and screw penetration.

C. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

D. Truss Spacing: As indicated.

E. Do not alter, cut, or remove framing members or connections of trusses.

F. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

G. Erect trusses without damaging framing members or connections.

H. Coordinate with wall framing to align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

I. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to CFSEI's TechNote 551e, "Design Guide: Permanent Bracing of Cold-Formed Steel Trusses.".

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
    1. Space individual trusses no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
    1. As required by the Building Code and / or Special Inspections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Field and shop welds will be subject to testing and inspecting.

D. Prepare test and inspection reports.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal trusses are without damage or deterioration at time of Substantial Completion.

END OF SECTION 054400

SECTION 07 14 16 – COLD FLUID-APPLIED WATERPROOFING (BELOW GRADE APPLICATIONS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold fluid-applied waterproofing, vertical.
2. [Protection course] [Drainage panels] [Insulation] [Insulation drainage panels].

1.2 RELATED REQUIREMENTS

1. Section 03 31 00 "Cast-in-Place Concrete" for moisture curing of concrete waterproofing substrate.
2. Section 04 20 00 "Unit Masonry" for compatibility with flashing components.
3. Division 07 air barrier section for wall waterproofing and interface coordination.
4. Section 07 92 00 "Joint Sealants" for joint sealants and accessories and joint preparation.

1.3 REFERENCES

A. References, General: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.

B. ASTM International (ASTM): www.astm.org:

1. ASTM C 836 – Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
2. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
3. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
4. ASTM E96/E96M – Standard Test Methods for Water Vapor Transmission of Materials

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project Site.

1. Review requirements for waterproofing products and installation, including surface preparation, substrate conditions, expansion joints as required, project and manufacturer's details, installation procedures, mockups, testing and inspection requirements, protection and repairs, and coordination and sequencing of waterproofing work with work of other Sections.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of waterproofing product (and expansion joint accessory if applicable) specified, including:

1. Technical data indicating compliance with requirements.
2. Substrate preparation instructions and recommendations.

B. Shop Drawings: Show locations for waterproofing system components. Show details for each type of substrate, joints, corners, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer, and waterproofing Inspector.

1. Certification of manufacturer's approval of Installer.

B. Product Test Reports: Test data for waterproofing products and waterproofing system, by qualified testing agency, indicating proposed waterproofing meets performance requirements, when requested by Architect.

C. Warranty: Sample of unexecuted manufacturer and installer special warranties.

D. Field quality control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A manufacturer-approved firm with minimum three years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years experience installing similar work, and able to communicate verbally with Contractor, Architect, and employees.

B. Manufacturer Qualifications: A qualified manufacturer with minimum five years experience in manufacture of waterproofing as one of its principal products.

1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
2. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Completed and signed Substitution Request form.
b. Product data, including certified independent test data indicating compliance with requirements.
c. Sample shop drawings from similar project.
d. Project references: Minimum of five installations of similar system not less than five years old, with Owner and Architect contact information.
e. Name and resume of proposed qualified Inspector.
f. Sample warranty.

C. Testing Agency Qualifications: Qualified independent agency experienced in the installation of the specified waterproofing system, and qualified to perform observation and inspection specified in Field Quality Control Article to determine Installer’s compliance with the requirements of this Project, acceptable to Architect, retained by the Contractor.

D. Mockups: Provide waterproofing mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 sq. ft. (14 sq. m) of surface where directed by Architect for each type of substrate condition. Include examples of surface preparation, crack and joint treatment, waterproofing application, and flashing, transition, and termination conditions, to set quality standards for execution.

1. Include intersection of deck waterproofing with adjacent vertical waterproofing and moisture control system.

2. If applicable, include no less than 13 ft (3.96m) including a minimum of one splice joint of Willseal® Expansion Joint System.

1.8 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturer's unopened original packaging.

B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by waterproofing manufacturer.

C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section "Construction Waste Management", "Temporary Facilities and Controls."

1.9 ENVIRONMENTAL REQUIREMENTS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer.

1. Protect substrates from environmental conditions that affect waterproofing performance.
2. Do not apply waterproofing during snow, rain, fog, or mist.

1.10 SCHEDULING

A. Coordinate installation of waterproofing with completion of roofing and other work requiring interface with waterproofing.

B. Schedule work so waterproofing applications may be inspected prior to concealment.

C. Ensure waterproofing materials are cured before covering with other materials.

1.11 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which waterproofing manufacturer agrees to furnish waterproofing material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the waterproofing system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding and overburden materials upon completion of repair.
2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
3. Warranty Period: 5 years date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Provide waterproofing products manufactured by **Tremco, Inc., Commercial Sealants and Waterproofing Division,** Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, [or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements]. If applicable, provide expansion joint products manufactured by Willseal, Hudson, NH; www.willseal.com .

B. Source Limitations: Provide waterproofing system materials and accessory products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Waterproofing system shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Waterproofing shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.

B. Compatibility: Provide waterproofing system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by waterproofing manufacturer based on testing and field experience.

2.3 WATERPROOFING MEMBRANE

A. Cold Fluid-Applied Waterproofing: polymer-enhanced, single component, fluid-applied, asphalt emulsion, below-grade waterproofing membrane.

1. Basis of Design Product: **Tremco, Inc., TREMproof 260**.
2. VOC Content: No more than 72 g/L
3. Hardness, ASTM D 2240: 50 minimum; Pass.
4. Low Temperature Crack Bridging, ASTM C836; Modified ASTM C1305: Pass.
5. Adhesion-in-Peel after Water Immersion, ASTM C836; ASTM C794: Exceeds
6. Elongation, ASTM D412: 800%
7. Peel adhesion, ASTM D903: Passes
8. Low-Temp Flexibility, ASTM C836: Pass
9. Water resistance, ASTM C836, AATC-127: Pass
10. Water Vapor Permeance E96 Dry Cup: 0.028 US Perms
11. Water Vapor Permeance E96 Wet Cup: 0.032 US Perms
12. Stability (80°F/26.7°C): 6 months Minimum 1 year
13. Solids 64%, Density 8.1 lb/gal

2.4 ACCESSORY MATERIALS

A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete waterproofing system meeting performance requirements, and compatible with waterproofing material and adjacent materials.

B. Elastomeric Detail Sheet: Blended thermoset elastomeric sheet reinforced with polyester woven scrim.

1. Basis of Design Product: **Tremco, TRA Elastomeric Sheeting**.

C. Elastomeric transition flashing to above-grade: polyurethane liquid-applied coating system with ultraviolet protective topcoat.

1. Basis of Design Product: **Vulkem 350/351; Tremco Inc.**
2. Basis of Design Product: **Vulkem 801; Tremco Inc.**

D. Metal Termination Bars: Waterproofing manufacturer's standard aluminum or stainless steel termination bar, with stainless steel fasteners.

E. Joint Sealant: ASTM C 719, high performance, medium-modulus, low-VOC, UV-stable, non-sag polyurethane sealant approved by waterproofing manufacturer for adhesion and compatibility with waterproofing and accessories.

1. Basis of Design Product: **Tremco, Dymonic 100**.

F. Basis of Design Product: **Tremco, TREMproof 260.**

G. Expansion Joint Pre-compressed or Closed Cell, Monolithic Foam System. Foam Structure Must not Contain Unbonded Foam Laminations;
1. **Willseal® Coreseal** for use in both vertical and horizontal below grade system applications requiring +/-25% movement capability, closed cell, and a lightweight seal.
2. **Willseal® Color Coreseal** for use in both vertical and horizontal below grade system applications requiring +/-25% movement capability, closed cell, and a lightweight seal.
3. **Willseal® Color Coreseal – CM** for use in both vertical and horizontal below grade Tremco system applications requiring +/-25% movement capability, closed cell, and a lightweight seal with an integrated waterproofing membrane.
4. **Willseal® 250 BG** for use in below grade applications, requiring +/- 50% movement capability

2.5 PROTECTION COURSE

A. Protection Course: Waterproofing manufacturer's standard protection course material recommended for application.

2.6 DRAINAGE PANELS

A. Drainage Mat: Composite mat with drainage core, filter fabric, and protective polymeric film, recommended by waterproofing manufacturer for application.

2.7 INSULATION

A. Insulation, General: Comply with Section 07 21 00 "Thermal Insulation."

B. Board Insulation: Extruded-polystyrene board insulation according to ASTM C 578, square or shiplap edged.
1. Type VI, 40-psi (276-kPa) minimum compressive strength.

2.8 INSULATION DRAINAGE PANELS

A. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; with shiplap or channel edges and with one side having grooved drainage channels.

B. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation, ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Surface Condition: Before applying waterproofing materials and accessories, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from

high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

1. Verify concrete and masonry surfaces are free from release agents, curing agents, laitance, and other contaminates. Test for waterproofing adhesion per manufacturer's recommended method. Notify Architect of unsatisfactory conditions.
2. Verify masonry joints are filled with mortar and struck flush.

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

3.2 INTERFACE WITH OTHER WORK

A. Sequencing of Work: Coordinate sequencing of waterproofing work with work of other sections that form portions of building envelope moisture control to ensure that expansion joints, flashings and transition materials can be properly installed and inspected.

B. Subsequent Work: Coordinate waterproofing work with work of other sections installed subsequent to waterproofing to ensure complete inspection of installed waterproofing and sealing of waterproofing penetrations necessitated by subsequent work.

3.3 PREPARATION

A. Clean, prepare, and treat substrates in accordance with waterproofing manufacturer's written instructions.

1. Mask adjacent finished surfaces.
2. Remove contaminants and film-forming coatings from substrates.
3. Remove projections and excess materials and fill voids with substrate patching material.
4. Prepare and treat joints and cracks in substrate per ASTM D 4258 and waterproofing manufacturer's written instructions.
5. For accessory materials, follow manufacturers application instructions.

B. Detail Preparation: Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in accordance with waterproofing manufacturer's written instructions and details, using accessory materials specified. The following are two acceptable options for detail preparation:

1. Adhere strips of elastomeric sheet to moving expansion joints on both sides in conjunction with a metal termination bar embedded in a layer of cold fluid-applied waterproofing and overlay with coat of cold fluid-applied waterproofing.
2. Apply single-component urethane within moving expansion joints and overlay with a coat of cold fluid-applied waterproofing.

C. Transitions to Adjacent Materials: Apply Tremco Approved Primer to transition cold fluid-applied waterproofing membrane to adjacent components of the building envelope.

3.4 WATERPROOFING INSTALLATION

A. General: Apply waterproofing material to form a seal to achieve a continuous waterproofing according to waterproofing manufacturer's written instructions. Apply waterproofing material within manufacturer's recommended application temperature ranges.

B. Apply waterproofing to footings and foundation walls from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches (150 mm) over outside face of footing.

C. Cold Fluid-Applied Waterproofing: Apply waterproofing in total wet film thickness and with methods recommended in writing by waterproofing manufacturer.

D. Terminations: Install terminations of waterproofing membrane in accordance with ASTM C 898 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course and ASTM C 1471 Standard Guide for Use of High Solids Content Cold Liquid-Applied Elastomeric Waterproofing Membrane on Vertical Surfaces, as applicable to application, at not less than minimum height recommended by waterproofing manufacturer.

E. Coordination of Testing:

1. Coordinate application of waterproofing membrane with installation of membrane leak detection system specified in Section 07 72 73 "Membrane Leak Detection System."
2. Do not cover waterproofing until it has been tested and inspected by Owner's testing agency.

F. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates and reapply waterproofing components.

3.5 PROTECTION INSTALLATION

A. Protection Course: Cover waterproofing with protection course following curing of waterproofing and prior to backfilling. Overlap protection course joints.

B. Drainage Panel: Place and secure drainage panels using methods that do not penetrate waterproofing. Lap edges or abut ends of geotextile.

C. Insulation: Install one or more layers of board insulation as required, staggering joints. Fit within 1/2 inch (12 mm) of projections and penetrations.

3.6 FIELD QUALITY CONTROL

A. Contractor's Inspector: Contractor shall engage manufacturer's qualified Inspector full-time during the Work to perform tests and inspections, including documenting of waterproofing prior to concealment.

1. Contractor's Inspector shall measure membrane thickness with a wet film gauge during the application process at least once for every 100 sq. ft. (10 sq. m).
2. Provide written report of tests and inspections.
3. Where applicable, inspect transitional material such as expansion joints, flashings, insulation are installed per manufacturers recommendations.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, waterproofing application, protection, and drainage components, and to furnish reports to Architect.

1. Testing includes EFVM inspection prior to concealing deck waterproof membrane as specified in Section 07 72 73 "Membrane Leak Detection System."

D. Coordination of Inspection: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

1. Do not cover Work until testing and inspection is completed and accepted.

E. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

F. Correction of Work: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.7 CLEANING AND PROTECTING

A. Clean spills, stains, and overspray resulting from application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

B. Protect waterproofing from damage from subsequent work. Protect waterproofing materials from exposure to UV light for period in excess of that acceptable to waterproofing manufacturer; replace overexposed materials and retest.

END OF SECTION

APPLIANCE SCHEDULE

Appliance/Equipment	Manufacturer/ Model number/ Color	Purchased by	Installed by
COMPRESSOR	TBD	OWNER	GENERAL CONTRACTOR
COFFEE MACHINE	BUNN COFFEE MAKER (no direct water line)	OWNER	GENERAL CONTRACTOR
REFRIGERATORS	(3) PANTRY: WHIRLPOOL 20.5 cu-ft w/ TOP FREEZER (No ice maker/water) KITCHEN: WHIRLPOOL 24.7 FRENCH DOOR SS (w/ ice maker and water)	OWNER	GENERAL CONTRACTOR
KITCHEN RANGE	KITCHEN AID 30” 5 BURNER 5.8 cu-ft (GAS)	OWNER	GENERAL CONTRACTOR
KITCHEN RANGE HOOD	SEE MECHANICAL	OWNER	GENERAL CONTRACTOR
MICROWAVE COUNTERTOP	(2) WHIRLPOOL 2.2 cu-ft 1200 watt, black	OWNER	GENERAL CONTRACTOR
KITCHEN DISHWASHER	KITCHEN AID 24” BUILD IN, SS (front control)	OWNER	GENERAL CONTRACTOR
KITCHEN GARBAGE DISPOSAL	SEE PLUMBING	GENERAL CONTRACTOR	GENERAL CONTRACTOR
RESIDENTIAL WASHER	WHIRLPOOL 3.5 cu-ft (high efficiency)	OWNER	GENERAL CONTRACTOR
RESIDENTIAL DRYER	MATCH WASHER	OWNER	GENERAL CONTRACTOR
EXTRACTOR	DOMUS DLU 50-65 TOUCH II	OWNER	GENERAL CONTRACTOR
GEAR DRYER	ADC ECODRY ADFG-6	OWNER	GENERAL CONTRACTOR
OUTDOOR GAS RANGE	WILMINGTON GAS GRILL	OWNER	GENERAL CONTRACTOR

SECTION 122113 - HORIZONTAL ALUMINUM BLINDS (2” BLINDS)

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. Horizontal louver blinds with aluminum slats.
B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.
C. Samples for Verification: For each type and color of horizontal louver blind indicated.
   1. Slat: Not less than 12 inches (300 mm) long.
   2. Tapes: Full width, not less than 6 inches (150 mm) long.
   3. Horizontal Louver Blind: Full-size unit, not less than 16 inches (400 mm) wide by 24 inches (600 mm) long.
   4. Valance: Full-size unit, not less than 12 inches (300 mm) wide.
   5. Cornice: Full-size unit, not less than 12 inches (300 mm) wide.
D. Window Treatment Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.
E. Product Certificates: For each type of horizontal louver blind, signed by product manufacturer.
F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for each type of horizontal louver blind.
G. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain horizontal louver blinds through one source from a single manufacturer.
B. Fire-Test-Response Characteristics: Provide horizontal louver blinds with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
   1. Flame-Resistance Ratings: Passes NFPA 701.
C. Product Standard: Provide horizontal louver blinds complying with WCSC A 100.1.
D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and dirty finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation

hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Horizontal Louver Blinds: Before installation begins, for each size, color, texture, pattern, and gloss indicated, full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Products: Subject to compliance with requirements, provide one of the following:
   1. Levolor, a Newell Rubbermaid Company; Riviera Dustguard 2" Blind
   2. Hunter Douglas; Macro 2" Aluminum Blinds.
   3. Springs Window Fashions Division, Inc.; Bali 2" Aluminum Blind

B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radiused corners.
   1. Width: 2 inches (51 mm).
      a. Spacing: Manufacturer's standard
   2. Thickness: Manufacturer's standard but not less than 0.008 inch (0.20 mm)
   3. Finish: One color as indicated on drawings.
      a. Ionized Coating: Antistatic, dust-repellent, baked polyester finish.

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled; fully enclosing operating mechanisms on three sides and end plugs and the following:
   1. Capacity: One blind per headrail.
   2. Integrated Headrail/Valance: Curved face.
   3. Light-blocking lower back lip.
   4. Tilt limiter with preselected degree settings.

D. Bottom Rail: Formed-steel or extruded-aluminum tube, with plastic or metal capped ends top contoured to match crowned shape of slat, bottom contoured for minimizing light gaps with enclosed ladders and tapes to prevent contact with sill.

E. Ladders: Evenly spaced to prevent long-term slat sag.
      a. For Blinds with Nominal Slat Width 2 Inches (51 mm) or More: Braided string

F. Lift Cords: Cordless Lift.

G. Tilt Control: Enclosed worm-gear mechanism, slip clutch or detachable wand preventing overrotation, and linkage rod, and the following:
   1. Tilt Operation: Manual with clear plastic wand.
   2. Length of Tilt Control: Manufacturer's standard.
   3. Tilt: Full.

H. Lift Operation: Manual, lift bottom rail to raise, pull down on bottom rail to lower

I. Tilt-Control and Cord-Lock Position: Right and left side of headrail, respectively

J. Valance: Manufacturer's standard
   1. Finish Color Characteristics: Match color, texture, pattern, and gloss of slats
   2. Mounting: Wall, Ceiling or End mounting as required, permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.
   3. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.

K. Mounting: Wall, Ceiling or End mounting as required, permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.
   1. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.

L. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.
M. Colors, Textures, Patterns, and Gloss: As indicated on drawings.

2.2 HORIZONTAL LOUVER BLIND FABRICATION

A. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
B. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
1. Blind Units Installed between (inside) Jambs: Width equal to 1/4 inch (6 mm) per side or 1/2 inch (13 mm) total, plus or minus 1/8 inch (3.1 mm), less than jamb-to-jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm), less than head-to-sill dimension of opening in which each blind is installed.
2. Blind Units Installed outside Jambs: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
C. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail, valance, and operating hardware, and for hardware position and blind mounting method indicated.
D. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
E. Color-Coated Finish:
1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
F. Component Color: Provide rails, cords, ladders, and exposed-to-view metal and plastic matching or coordinating with slat color, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior slat edges in any position are not closer than 2 inches (51 mm) to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware if any.
B. Flush Mounted: Install horizontal louver blinds with slat edges flush with finish face of opening if slats are tilted open.
C. Jamb Mounted: Install headrail flush with face of opening jamb and head.
D. Head Mounted: Install headrail on face of opening head.
E. Recessed: Install headrail concealed within blind pocket.
F. Connections: Connect motorized operators to building electrical system.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free of binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 122113

SECTION 21 30 00 - ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS (DESIGN-BUILD SPECIFICATIONS)

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 electric-drive, in-line centrifugal fire pumps and the following:

1. Full-service fire-pump controllers.
2. Fire-pump accessories and specialties.
3. Pressure-maintenance pumps, controllers, accessories, and specialties.
4. Alarm panels.
5. Flowmeter systems.

1.3 PERFORMANCE REQUIREMENTS

A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: 175-psig minimum working-pressure rating, unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.

B. Shop Drawings: For fire pumps and drivers, fire-pump controllers, fire-pump accessories and specialties, pressure-maintenance pumps, pressure-maintenance-pump controllers, and pressure-maintenance-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that fire pumps and drivers and fire-pump controllers, pressure-maintenance pumps, accessories, and specialties will withstand seismic forces defined in Division 21 Section "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment." 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 unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. 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 and the unit will be fully operational 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. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.

E. Source quality-control test reports.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For fire pumps and drivers, pressure-maintenance pumps, controllers, accessories and specialties, alarm panels, and flowmeter systems to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain fire pumps, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of fire pumps, pressure-maintenance pumps, and controllers and are based on specific systems indicated. Refer to Division 01 Section "Product Requirements."

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

D. Comply with standards of authorities having jurisdiction pertaining to materials, hose threads, and installation.

E. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 VERTICAL TURBINE FIRE PUMPS

A. See supplemental specification sections 213000.1

2.3 FIRE PUMP HOUSE

A. See supplemental specification sections 213000.2.

2.4 FIRE-PUMP CONTROLLERS

A. Fire-Pump Controllers, General: UL 218 and NFPA 20; listed for electric-drive, fire-pump service and service entrance; combined automatic and manual operation; factory assembled and wired; and factory tested for capacities and electrical characteristics.

   1. Manufacturers:

      a. Cutler-Hammer.
      b. Firetrol, Inc.
      c. Hubbell Industrial Controls, Inc.
      d. Joslyn Clark.
      e. Master Control Systems, Inc.
      f. Metron, Inc.

   2. Rate controllers for scheduled fire-pump horsepower and short-circuit withstand rating at least equal to short-circuit current available at controller location, taking into account cable size and distance from substation or supply transformers.
   3. Enclosure: UL 50, Type 2, drip proof, indoor, unless special-purpose enclosure is indicated. Include manufacturer's standard red paint applied to factory-assembled and -tested unit before shipping.
   4. Controls, devices, alarms, functions, and operations listed in NFPA 20 as required for drivers and controller types used, and specific items listed.

      a. Isolating means and circuit breaker.
      b. "Power on" pilot lamp.
      c. Fire-alarm system connections for indicating motor running condition, loss-of-line power, and line-power phase reversal.
      d. Automatic and manual operation, and minimum run-time relay to prevent short cycling.

e. Water-pressure-actuated switch with independent high and low calibrated adjustments responsive to water pressure in fire-suppression piping.
f. Automatic and manual shutdown.
g. System pressure recorder, electric ac driven with spring backup.

5. Nameplate: Complete with capacity, characteristics, approvals and listings, and other pertinent data.
6. Controller Sensing Pipes: Fabricate pipe and fittings per NFPA 20 with nonferrous-metal sensing piping, NPS 1/2, with globe valves for testing controller mechanism from system to pump controller as indicated. Include bronze check valve with 3/32-inch orifice in clapper or ground-face union with noncorrosive diaphragm having 3/32-inch orifice.

B. Full-Service Fire-Pump Controllers:

1. Type Starting: Wye delta, closed transition.
2. Mounting: Wall type for field electrical connections.

2.5 FIRE-PUMP ACCESSORIES AND SPECIALTIES

A. Match fire-pump suction and discharge ratings as required for fire-pump capacity rating. Include the following:

1. Automatic air-release valve.
2. Circulation relief valve.
3. Suction and discharge pressure gages.
4. Eccentric-tapered reducer at suction inlet.
5. Concentric-tapered reducer at discharge outlet.
6. Test-Header Manifold: Ductile-iron or brass body for hose valves. Include nozzle outlets arranged in single line; horizontal, flush-wall mounting attachment; and rectangular, polished chrome-plated brass finish escutcheon plate with lettering equivalent to "PUMP TEST CONNECTION."
7. Hose Valves: UL 668, straightway pattern, and bronze with cap and chain. Include NFPA 1963 hose thread that complies with local fire department standards and finish same as for test-header-manifold escutcheon plate.
8. Ball Drip Valve: UL 1726.
9. Main Relief Valve: UL 1478.
10. Finish: Manufacturer's standard factory-applied red paint unless brass or other finish is specified.

2.6 PRESSURE-MAINTENANCE PUMPS

A. Pressure-Maintenance Pumps, General: Factory-assembled and -tested pumps with electric-motor driver, controller, and accessories and specialties. Include cast-iron or stainless-steel casing and bronze or stainless-steel impellers, mechanical seals, and suction and discharge flanges machined to ASME B16.1, Class 125 dimensions unless Class 250 flanges are indicated and except that connections may be threaded in sizes where flanges are not available.

1. Finish: Manufacturer's standard color paint applied to factory-assembled and -tested unit before shipping.
2. Nameplate: Complete with capacity, characteristics, and other pertinent data.

B. Multistage, Pressure-Maintenance Pumps: Multiple-impeller type complying with HI 1.1-1.2 and HI 1.3 requirements for multistage centrifugal pumps. Include base.

1. Manufacturers:

   a. A-C Pump; ITT Industries.
   b. Grundfos Pumps Corp.
   c. Paco Pumps, Inc.
   d. Taco, Inc.

2. Driver: NEMA MG 1, open-dripproof, squirrel-cage, induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

C. Controllers: UL 508; factory-assembled, -wired, and -tested, across-the-line type for combined automatic and manual operation.

1. Manufacturers:

   a. Cutler-Hammer.
   b. Firetrol, Inc.
   c. Hubbell Industrial Controls, Inc.
   d. Joslyn Clark.
   e. Master Control Systems, Inc.
   f. Metron, Inc.

2. Enclosure: UL 508 and NEMA 250, Type 2, wall-mounting type for field electrical wiring.

   a. Finish: Manufacturer's standard color paint applied to factory-assembled and -tested unit before shipping.

3. Rate controller for scheduled horsepower and include the following:

   a. Fusible disconnect switch.
   b. Pressure switch.
   c. Hand-off-auto selector switch.
   d. Pilot light.
   e. Running period timer.

D. Accessories and Specialties: Match pressure-maintenance-pump suction and discharge ratings as required for pump capacity rating. Include the following:

1. Circulation relief valve.
2. Suction and discharge pressure gages.

E. Pressure-Maintenance-Pump Characteristics and Specialty Data: As indicated on Fire Protection Drawings

2.7 FLOWMETER SYSTEMS

A. Description: Fire-pump flowmeter system that indicates flow to not less than 175 percent of fire-pump rated capacity. Include sensor of size to match pipe, tubing, flowmeter, and fittings.

1. FMG-Approved Manufacturers:

    a. Dieterich Standard Inc.
    b. Gerand Engineering Co.
    c. Hyspan Precision Products, Inc.
    d. Meriam Instruments Div.; Scott Fetzer Co.
    e. Preso Meters Corporation.

2. UL-Listed Manufacturers:

    a. Fire Research Corp.
    b. Reddy-Buffaloes Pump Co.

3. Pressure Rating: 175-psig minimum.
4. Sensor: Venturi, annubar probe, or orifice plate, unless otherwise indicated.
5. Flowmeter: Compatible with flow sensor with dial not less than 4-1/2 inches in diameter or manufacturer's equivalent size.
6. Permanently Mounted Flowmeter: Suitable for wall mounting with copper tubing to connect to flow sensor.
7. Portable Flowmeter: With two 12-foot hoses, in carrying case.

2.8 PRESSURE GAGES

A. Description: UL 393, 3-1/2- to 4-1/2-inch- diameter dial with range of 0- to 250-psig minimum. Include caption "WATER" on dial face.

1. Manufacturers:

    a. AGF Manufacturing Co.
    b. AMETEK, Inc.; U.S. Gauge.
    c. Brecco Corporation.
    d. Dresser Equipment Group; Instruments Div.
    e. Marsh Bellofram.
    f. WIKA Instrument Corporation.

2.9 GROUT

A. Description: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Non-staining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

2.10 SOURCE QUALITY CONTROL

A. Test and inspect fire pumps with their controllers per NFPA 20 for certified shop tests.

B. Verification of Performance: Rate fire pumps per requirements indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, concrete bases, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of fire pumps.

B. Examine roughing-in for fire-suppression piping to verify actual locations of piping connections before fire-pump installation.

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

3.2 CONCRETE BASES

A. Install concrete bases of dimensions indicated for fire pumps, pressure-maintenance pumps, and controllers. Refer to Division 21 Section "Common Work Results for Fire Suppression."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of 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 supported equipment.

B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 INSTALLATION

A. Install and align fire pump, pressure-maintenance pump, and controller per NFPA 20.

B. Install pumps and controllers to provide access for periodic maintenance including removal of motors, impellers, couplings, and accessories.

C. Install suction and discharge piping equal to or greater than diameter of fire-pump nozzles.

D. Install valves that are same size as piping connecting fire pumps, bypasses, test headers, and other piping systems.

E. Install pressure gages on fire-pump suction and discharge at pressure-gage tappings.

F. Support pumps and piping separately so weight of piping does not rest on pumps.

G. Install piping accessories, hangers and supports, anchors, valves, meters and gages, and equipment supports.

H. Install flowmeters and sensors where indicated. Install flowmeter-system components and make connections per manufacturer's written instructions.

I. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.

3.4 CONNECTIONS

A. Piping installation requirements are specified in Division 21 Section "Water-Based Fire-Suppression Systems." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to pumps and equipment to allow service and maintenance.

C. Connect water supply and discharge piping to fire pumps. Connect water supply and discharge piping to pressure-maintenance pumps.

D. Connect relief-valve discharge to point of disposal.

E. Connect flowmeter-system sensors and meters per manufacturer's written instructions.

F. Connect controllers to pumps.

G. Connect fire-pump controllers to building fire-alarm system.

H. Ground equipment per Division 26 Section "Grounding and Bonding for Electrical Systems."

I. Connect wiring per Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform field tests for each fire pump when installation is complete. Comply with operating instructions and procedures in NFPA 20 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or

that does not perform as indicated, then retest to demonstrate compliance. Verify that each fire pump performs as indicated.

C. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:

    a. Lubricate oil-lubrication-type bearings.
    b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
    c. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
    d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.

3. Starting procedure for pumps is as follows:

    a. Prime pump by opening suction valve and closing drains, and prepare pump for operation.
    b. Open sealing-liquid supply valves if pump is so fitted.
    c. Start motor.
    d. Open discharge valve slowly.
    e. Observe leakage from stuffing boxes and adjust sealing-liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately, but let packing run in before reducing leakage through stuffing boxes.
    f. Check general mechanical operation of pump and motor.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Fire hoses are for field-acceptance tests only and are not property of Owner.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance pumps. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 213113

SECTION 213000.1 – FIRE PUMPS -VERTICAL TURBINE

DEFINITIONS

1. Fire Pump: Pump used to supply water at rated capacity and total rated head required for fire pump service.
2. Fire Pump Unit: Assembled unit consisting of fire pump, driver, controller, and accessories.
3. Pressure-Maintenance Pump: Pump used to maintain water pressure in sprinkler system.
4. Pressure-Maintenance Pump Unit: Assembled unit consisting of pressure-maintenance pump, driver, controller, and accessories.

SYSTEMS PERFORMANCE REQUIREMENTS

1. Provide fire pump systems that include fire pump units, pressure-maintenance pump units, accessories, and piping that comply with performance requirements specified and are compatible with building fire protection systems.
2. Pump, Equipment, Accessory, and Piping Pressure Rating: 250-psig minimum.

QUALITY ASSURANCE

1. Manufacturer Qualifications: Firms whose fire pumps, pressure-maintenance pumps, drivers, controllers, and accessories are listed by product name and manufacturer in the UL" Fire Protection Equipment Directory" and FM "Approval Guide" and that comply with requirements indicated. The following listings are not required:
2. UL listing and FM approval of pressure maintenance pump and controllers.
3. FM approval of pressure maintenance pump controllers.
4. Single-Source Responsibility: Obtain fire pump units and pressure maintenance pump units, components, and accessories from a single source. Include a source with responsibility and accountability to answer and resolve problems regarding compatibility, installation, performance, and acceptance of units.
5. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.
6. Comply with requirements of NFPA 20 "Standard for the Installation of Centrifugal Fire Pumps" for fire pumps, drivers, controllers accessories, and installation.
7. Comply with requirements of NFPA 70 " National Electric Code" for electrical materials and installation.
8. Manufacturer's Factory Tests: Perform factory test for each fire pump.
9. Design Criteria: **The fire pump shall be electric motor driven, rated to deliver 250 gallons per minute against a rated boost of 75 psi**. **The pressure maintenance pump shall be rated at least 5 gallons per minute against a rated boost of 90 psi**. The Drawings indicate, profiles, connections, and dimensional requirements of fire pump and pressure maintenance pump units.

DELIVERY, STORAGE, AND HANDLING

1. Preparation for Shipping: After assembling and testing fire pumps and pressure maintenance pumps, clean flanges and exposed machined metal surfaces and treat with an anticorrosion compound. Protect flanges, pipe openings and nozzles.
2. Store fire pumps, pressure maintenance pumps, drivers, controllers, and accessories in a clean, dry place.
3. Retain shipping flange protective covers and protective coatings during storage.
4. Protect bearings and couplings against damage from sand, grit, or other foreign matter.
5. Comply with manufacturer's rigging instructions for handling.

PRODUCTS-MANUFACTURERS

1. Available manufacturers: Horizontal Fire Pumps
   Xylem A-C PUMP

2. Pressure Maintenance Pumps:
   Xylem Red Jacket Pumps, Inc.

VERTICAL TURBINE FOR FIRE PUMP SERVICE

A. Scope

This specification covers a line shaft turbine pump with above ground discharge, the line shaft bearings lubricated by the water being pumped and furnished with suitable driver and accessories as specified herein. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute, NFPA-20, and UL/FM Standards.

B. Service Conditions

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a dependable and adequate water resource location. The pump shall be the product of and manufactured by AC Fire Pump. Other manufacturers will be considered providing the unit offered is an approved equal in all respects to the brand and model preferred by the customer. Factory pump curves for alternate pumps shall be submitted with the bid.

C. Operating Conditions:

The pump will provide a rated capacity of 250 GPM and a differential pressure of 75 PSI. At 150% of rated capacity, the pump shall develop at least 65% of its rated head and shall not exceed 140% of the rated head at zero capacity. The overall length of the pump will be _____ feet _____inches. The pump shall be tested at the factory and a test curve shall be submitted showing the performance and horsepower requirements based on this test before final acceptance.

D. Pump Construction

1. Bowl assembly: The intermediate bowls, suction bell, and discharge bowl shall be flanged type constructed of close grained cast iron, and shall conform to ASTM designation A48, class 30. They shall be free from sand holes, blowholes, or other faults and must be accurately machined and fitted to close tolerances. The intermediate bowls shall have enamel or epoxy lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. A discharge bowl shall be used to connect bowls to the discharge column. All the bowls shall be fitted with sleeve type bearings of bronze alloy C89835.

2. Impellers: The impellers shall be constructed from ASTM B584 Silicon Bronze and shall be the enclosed type. They shall be free from defects and must be accurately cast, machined for optimum performance and minimum vibration. Impellers are to be balanced to grade G6.3 of ISO 1940 as minimum. They shall be securely fastened to the bowl shaft with taper locks of C1018 steel and key and split thrust ring of SS. The impeller running position shall be adjustable by shaft adjusting nut in the discharge head or on top of the hollow shaft driver.

3. Suction: The suction bell shall be provided with a non-soluble grease packed bronze bearing, and a bronze sand collar shall be incorporated in the pump design to protect this bearing from abrasives. The bearing housing shall have sufficient opening at the bottom for easy removal of the bearing. A bronze basket type strainer shall be attached to the suction bell. It shall have a free area of at least four times the flow area of the suction connection size and the opening shall be sized to restrict the passage of ½" solids.

4. Wear Ring: Bowl assembly shall be fitted with replaceable wear rings of C95200 bronze material in the suction bowl and intermediate bowls. Wear rings shall have the minimum practical clearance to

the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers.

5. Shaft: The bowl shaft shall be constructed from ASTM 582 type 416 stainless steel. It shall be precision turned and ground with surface finish better than 40 RMS and shall be supported by water lubricated bearings of C89835 bronze alloy.

E. Column Assembly-Water Lubricated

1. Column pipe: The column pipe shall be furnished in sections not exceeding a nominal length of 10 ft and shall be connected by threaded-sleeve couplings or flanges. The length of the top and bottom sections shall not be more than 5 ft. It shall be of ASTM A53 grade A steel pipe and the weight shall be not less than schedule 30. The threaded pipe shall be with 8 threads per inch with 3/16" taper per foot thread and faced parallel to butt against the centering spiders to form accurate alignment. All column flange faces shall be parallel and machined for rabbet fit to permit accurate alignment. The inside diameter of the pipe shall be such that the head losses shall not be more than 5 feet per 100 feet of pipe.

2. Lineshaft: The lineshaft shall be furnished in interchangeable section not over ten feet in length, and shall be coupled with threaded steel couplings machined from solid steel bar. It shall have left-hand thread to tighten during pump operation. The diameter of the shaft shall be based on a combined shear stress of not more than 18% of the ultimate strength or not excess of 30% of the elastic limit in tension of the shafting material. The coupling shall be designed with higher safety factor than shaft. Lineshaft and coupling shall be of type 416 stainless steel. Centering spiders shall be furnished at each column pipe joint for shaft stabilization. Bearings shall be fluted rubber.

F. Discharge Head Assembly

1. Discharge Head: It shall be of the high profile type to allow shaft coupled above stuffing box and provided for mounting the driver and support the column and bowl assemblies it shall be of high-grade cast iron, ASTM A48 Class 30, or fabricated steel. The above ground outlet shall be flanged to match ___ inch ANSI class 125 (for cast iron) or class 150 (for steel). It shall have a 1/2" NPT connection for a pressure gauge.

2. Stuffing Box: The stuffing box shall be cast iron and shall contain a minimum of five rings of packing with lantern ring. It shall have a pressure relief connection. The packing gland shall be a 316SS split type secured in place with noncorrosive studs and nuts. The bearing shall be C89835 bronze. A rubber slinger shall be secured to the shaft above the packing gland.

FIRE PUMP TO XYLEM A-C PUMP MODEL FP10WALC/4 STAGE

PRESSURE MAINTENANCE PUMPS

1. Pressure Maintenance Pumps: Submersible type.
2. Construction: Stainless Steel
3. Impeller: Stainless steel.
4. Stainless steel.
5. Seals: Mechanical
6. Finish: Manufacturer’s standard paint applied to factory-assembled and -tested unit before shipping.

JOCKEY PUMP TO BE REDJACKET MODEL 6S-17

DRIVERS

1. Electric Motor: NEMA MG1, open-drip proof, squirrel-cage inductions motor, complying with with NFPA 20 and NFPA 70 and wiring compatible with controller.
2. Nameplates: Provide nameplates, complete with driver horsepower, characteristics, and other pertinent data.
3. Finish: Manufacturer's standard red paint applied to factory-assembled and -tested unit and ferrous metal accessories before shipping.
4. Electric Motor shall be UL listed for fire pump service.
5. 3/60/208 Volts, 15 HP.
6. Jockey pump to be 3/60/208 volts, 1/2 HP.

CONTROLLERS

1. Description: Combined automatic and non-automatic operation, complying with UL 508, UL listed and FM approved, factory assembled and wired, and factory tested for capacities and characteristics, and with features indicated.
2. Enclosure: NEMA ICS 6, Type 2, dripproof, indoor, except where special purpose enclosure is indicated.
3. Provide controls, devices, alarms, functions, and operations listed in NFPA 20, as required for the driver and controller, and the specific items listed for each controller type.
4. Nameplates: provide nameplate complete with capacity, characteristics, approvals, and listings, and other pertinent data on enclosure door.
5. Enclosure Mounting: Wall mounting, for field electrical connections.
6. Finish: Manufacturer's standard red paint applied to factory-assembled and -tested units before shipping.
7. Controller Sensing Pipes: Fabricate pipe and fittings according to NFPA 20 with nonferrous-metal sensing piping, 1/2 inch size, with globe valves for testing controller mechanism from system to pump controller, as indicated. Include a bronze check valve with a 3/32 inch orifice in the clapper or a ground-face union with a non-corrosive diaphragm having a 3/32 inch orifice.

FIRE PUMP CONTROLLERS

1. Description: Solid State Soft Start type, listed for electric-drive fire pump service. The controller shall be provided with a grounding lug, bonding and spacing required for use as UL listed service entrance equipment.
2. Rate controllers for scheduled horsepower. Include short-circuit withstand rating at least equal to short circuit current available at controller location. Take into account cable size and distance from substation or supply transformers
3. Provide, for monitoring be the building fire alarm system, contacts within the fire pump controller to indicate the following conditions:
   a) Loss of line power on line side of motor starter in any phase.
   b) Failure or disconnect of the control transformer.
   c) Phase reversal on the line side of the motor starter.
   d) Fire pump "running".
   e) Fire pump system trouble, which shall include controller "OFF".

FIRE PUMP CONTROL TO BE FIRETROL FTA 1930, SOLID STATE SOFT START

AUTOMATIC TRANSFER SWITCHES

1. The automatic transfer switch shall be listed by UL and approved by Factory Mutual for fire pump service. It shall be installed in a barriered compartment of the fire pump controller. The complete assembly, controller and transfer switch shall be shipped as a single unit. The transfer switch shall be supplied with a special circuit to prevent higher than normal starting currents when trans-

ferring from one source to the other. This circuit shall deactivate the fire pump motor 5 seconds prior to re-transfer in either direction.

2. The controller shall be factory tested prior to shipment. This test shall verify proper operation of all normal automatic and manual functions along with the continuity of all dry contacts for remote alarms. The test shall also include a high potential voltage test of all primary power circuits equal to twice the rated voltage plus 1000 volts for one minute.

*3. A contact must be supplied for load shedding when generator is started to allow elevators to reach normal position.

AUTOMATIC TRANSFER SWITCH TO BE FIRETROL FTA950

PRESSURE MAINTENANCE PUMP CONTROLLERS

1. Description: Across-the-line type, complying with UL 508, UL listed, factory assembled, wired and tested , combined automatic and non-automatic operation. Include types, capacities, characteristics, and features indicated for electric drive, pressure maintenance pump service.
2. Enclosure: NEMA ICS 6, Type 2, wall mounted, for field electrical wiring.
3. Include controls, devices, alarms, functions, and operations listed in NFPA 20, and specific items listed.
4. Rate controller for scheduled horsepower and provide the following itmes:
5. Fusible disconnect switch.
6. Pressure switch with independently adjustable high and low set points.
7. “HAND-OFF-AUTO” selector switch.
8. Nameplates: Complete with capacity, characteristics, approvals and listings, and other pertinent data on enclosure door.
9. Mounting: Wall type for field electrical connections.
10. Finish: Manufacturer’s standard paint applied to factory-assembled and -tested units before shipping.
11. Controller Sensing Pipes: Fabricate pipe and fittings according to NFPA 20 with nonferrous metal sensing piping, 1/2 inch size, with globe valves for testing controller mechanism from system to pump controller, as indicated. Include a bronze check valve with 3/32 inch orifice in the clapper or a ground-face union with a non-corrosive diaphragm having a 3/32 inch orifice.

JOCKEY PUMP CONTROL TO BE FIRETROL MODEL FTA 570

FIRE PUMP ACCESSORIES

1. Match fire pump discharge ratings as required for fire pump capacity rating. Include (but not limited to) the following accessories.
2. Automatic air release valve.
3. Casing relief valve.
4. Discharge gauge.
5. 3” Test Header complete with hose valves (NST) caps & chains.

INSTALLATION

1. Comply with manufacturer’s written installation and alignment instructions and with NFPA 20 and FM standards.
2. Install pumps in locations indicated and arrange to provide access for periodic maintenance, including removal of motors, impellers, couplings, and accessories.
3. Support pumps and piping separately so weight of piping system does not rest on pumps.
4. Install valves of types and at locations indicated that are same size as piping connecting fire pumps, test headers, and other piping systems.
5. Install pressure gauges on discharge of fire pump at integral pressure gauge taping provided.
6. Install piping accessories, hangers and supports, anchors, valves, meters and gauges, and

equipment supports as indicated for complete installation.

7. Electrical wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer.
8. Verify that electrical wiring installation is according to manufacturer's submittal and installation requirements. Do not proceed with equipment startup until wiring installation is acceptable.

CONNECTIONS

1. Connect fire pump and pressure maintenance pump discharge piping to building fire protection water systems.

FIELD QUALITY CONTROL

1. Manufacturer's Field Service: Provide services of factory authorized service representative to perform field acceptance tests for each fire pump unit and system piping, when unit installation is complete. Comply with operating instructions and procedures of NFPA 20 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or that does not perform as specified and as indicated, then retest to demonstrate compliance.

SECTION 213000.2 FIRE PUMPS - HOUSE

A. General

Each enclosure shall be supplied complete with all necessary component parts to form a complete enclosure system. All parts shall be new and free from any defects or imperfections.

The enclosure supplier shall supply a complete set of enclosure erection drawings showing a step-by-step construction sequence for the erection of the enclosure. The erection drawings shall be prepared specifically fort the enclosure covered by these specifications showing the location of all roof and wall accessories and the exact anchor bolt locations required for each accessory.

B. Design Criteria

All enclosures shall be designed in accordance with the applicable sections of the latest edition of the AISC "Specifications for Structural Steel Buildings" and the AISI "Specification for the Design of Cold-Formed Steel Structural Members".

Each enclosure shall be designed for the following loads, in addition to the stationary weight of the enclosure. Reduction of loads due to tributary loaded areas will not be permitted.

1. The vertical live load of the enclosure shall not be less than 40 pounds per square foot applied on the horizontal projection of the roof.

2. The horizontal wind load of the enclosure shall not be less than 110 MPH and shall be distributed and applied in accordance with the applicable edition of the Metal Building Manufactures Association (MBMA) publication titled "Low Rise Building Systems Manual".

3. The enclosure shall be designed to resist the effects of seismic ground motions which may be expected in seismic zone 4.

All combining and distributing of auxiliary equipment loads imposed on the enclosure system shall be done in accordance with the applicable section of the MBMA publication titled "Low Rise Building Systems Manual".

Upon request, the selected enclosure manufacturer shall provide the enclosure purchaser with a complete design certification signed and sealed by a registered professional engineer.

C. Roof Panel Design

Roof panels shall be supplied in a single continuous length from eave line to ridge line and shall be designed to tightly interlock so that no fasteners are required at intermediate points along the panel side laps.

Roof panels shall be 16" or 12" wide with a smooth surface between the interlocking side ribs. The interlocking ribs shall be a minimum 3" high and shall be turned upward. All roof panels shall be factory-punched for connection at the eave line of the enclosure.

There shall be no fastener penetrations through the roof covering except at eave lines, ridge lines and roof accessory openings such as skylights and ventilators.

Roof panels shall be nominal 24-gauge galvanized steel conforming to ASTM A-653 specifications with the galvanized coating conforming to G90 (1.25 oz. commercial) standards. Minimum yield strength of the panel material shall be 50,000 PSI.

Roof panels shall receive a factory, roller-applied, paint coating having an exterior coating thickness of 0.8 to 1.2 mils of dry film thickness.

The roof panel color coating shall carry a low fire hazard rating equal to a Class 1 material as defined by Factory Mutual. The Panel coating shall have achieved a Flame Spread Index of 0 and a Fuel Contributed Index of 5 or less when tested in accordance with ASTM E-84 test procedures.

The finish coat shall be a white siliconized polyester formulation that will meet the following performance standards after 10 years continuous exposure in "normal" atmospheric conditions not containing corrosive fumes such as chemicals or salt spray.

1. Panels shall show no evidence of blistering, peeling, or chipping.

2. Panels shall not show surface chalking in excess of the No. 4 rating D659 as established by the American Society of Testing Materials (ASTM).

3. Panels, after cleaning, shall not show color change in excess of 7 NBS units when measured in accordance with the ASTMD-2244 standard.

The above performance standards shall not apply where panels have been damaged by fire, radiation, or other physical damage.

Roof panels shall be a nominal ____ gauge steel coated on both sides with a coating of corrosion resistant aluminum-zinc alloy conforming to ASTM A 792 specification, with the coating conforming to AZ55 (55%) standard by a continuous hot dipping process. Coating weight shall be a minimum of 0.32 oz. of aluminum-zinc alloy per square foot of coated sheet equivalent to about 0.75 mil thickness on each side. Minimum yield strength of panel material shall be 50,000 PSI.

D. <u>Wall Panel Design</u>

Exterior wall panels of the enclosure shall be a single continuous length from the base channel to the roof line of the enclosure and at the side walls and end walls of the enclosure except where interrupted by wall openings.

Wall panels shall be 16" wide with a 3" deep inward turned interlocking side rib. Wall panels shall contain two 3/4" deep by 3-1/8" wide fluted recesses, each starting 2-7/16" from the panel edge.

Wall panels shall be fastened internally to the base channel and eave cap of the enclosure with 3/8" diameter electro-galvanized machine bolts placed within the panel interlock. The fastening system shall be designed so that no wall fasteners are exposed on the exterior surface of the walls.

Wall panels shall be nominal 24-gauge galvanized steel conforming to ASTM A-653 specifications with the galvanized coating conforming to G90 (1.25 oz. commercial) standards.

Minimum yield strength of panel material shall be 40,000 PSI. Panel material shall be embossed with a random pattern pebble embossed of approximately .007 - .008 depth.

All exterior surfaces of the galvanized steel wall covering, and exterior trim shall receive a factory, roller applied, paint coating having an exterior coating thickness of 0.8 to 1.2 mils of dry film thickness. The finish coat for wall panels shall be a siliconized polyester formulation.

The wall panel color coating shall carry a low fire hazard rating equal to a Class 1 material as defined by Factory Mutual. The panel coating shall have achieved a Flame Spread Index of 0 and a Fuel Contributed Index of 5 or less when tested in accordance with ASTM E-84 test procedures.

Exterior color coatings shall meet the following performance standards after 10 years continuous exposure in normal atmospheric conditions not containing corrosive fumes such as chemical fumes or salt spray.

1. Panels shall show no evidence of blistering, peeling, or chipping.

2. Panels shall not show surface chalking in excess of the No. 8 rating D659 as established by the American Society of Testing Materials (ASTM).

3. Panels, after cleaning, shall not show color change in excess of five (5) NBS units when measured in accordance with the ASTMD-2244 standard.

The above performance standards shall not apply where panels have been damaged by fire, radiation, or other physical damage.

E. Enclosure Type

Each enclosure roof shall have 1-1/2" pitch in enclosure width. Roof panels shall be interlocking and attached to the wall cap through factory punched holes with #14 corrosion resistant fasteners.

The roof system shall include a gutter and downspout system at the low side wall and matching rake trim at the enclosure end walls. All gutters and trim shall be nominal 26-gauge galvanized steel pre-painted.

Transmission of horizontal wind loads across the enclosure shall be made through the panel roof system and no separate roof or wall diagonal bracing shall be required.

Structural support and attachment of roof at existing enclosure shall be the responsibility of others. In snow prone areas, drifting should be considered.

Where required for proper transmission of lateral wind loads, structural frame wind belts shall be installed. Wind bents shall consist of a prime painted column and rafter bolted assembly of steel conforming to ASTM A-36 specifications.

F. Gutters, Downspouts and Eaves

The eaves of the enclosure shall have a gutter and downspout system of nominal 26-gauge factory painted gutters of the same configuration as the enclosure rake trim and 2" x 3" box type aluminum downspouts. Gutters and downspouts shall be the same color as the enclosure rake trim and shall be complete with all required outlet drops, elbows and connecting hardware.

The eaves of the enclosure shall have a nominal 26-gauge factory painted eave trim of the same configuration and color as the enclosure rake trim. The eave trim shall allow free passage of roof drainage.

G. Hollow Metal Doors

All doors shall be 1-3/4" thick flush-type. Door panels shall be nominal 20-gauge galvanized steel reinforced by lamination to a honeycomb core enclosed with 16 gauge end channel. The hinge reinforcements shall be nominal 7 gauge and the lock reinforcements shall be nominal 16 gauge.

Door frames shall be 4-3/4" deep double rabbeted type of nominal 16-gauge galvanized steel.

Doors and frames shall be factory painted with one coat of baked on primer. All doors shall be pre-assembled in their frames and hardware installed and tested prior to shipment. Field installation of single leaf door units shall not require any frame assembly or door hanging.

H. Door Hardware

Door hardware shall consist of 3 - 4-1/2" x 4-1/2" standard weight, plain bearing hinges per ANSI A5133 630 Satin Stainless Finish with non- rising pins.

3-11/16" wide x 5/8" high extruded aluminum threshold. (Out Swing)

1/4" x 1/2" silicone rubber weather-stripping.

Mortise lockset per ANSI A156.13, Series 100, Grade 1, Function F13, 626 Satin Chrome Finish (levers both sides).

Cylindrical key in knob lockset per ANSI A156.2, Series 4000, Grade 2, Function F81 630 Satin Stainless Steel Finish.

Passage set per ANSI A156.2, Series 4000, Grade 2, Function F75, 626 Satin Chrome Finish.

Door closer is certified to conform to ANSI 156.4 Grade 1 and meets exterior barrier free codes in 689 Aluminum Lacquer Finish.

Rim Type "Cross Bar" panic device per ANSI A156.3, Type 1, Grade 1, Function 05, with 627 Satin Aluminum Finish.

Rim type "Push Pad" panic device built to ANSI A156.3, Type 1, Grade 2, Function 08 with 689 Aluminum Lacquer Interior Finish and 626 Satin Chrome Exterior Finish.

I. Louver

The louver shall be of the flanged self-framing design. The louver frame shall be of nominal 14 gauge formed aluminum. The louver blades shall be nominal 12 gauge extruded aluminum. The finish shall be a natural mill finish and shall not require field painting.

The blades shall be pivoted to ½" diameter aluminum pivot pins through nylon flanged bearings and operated by means of a pull bar operating handle connected to a solenoid. All louvers shall be complete with an 18-14 aluminum mesh insect screen.

The solenoid operator is designed for use with a single panel wall louver. The unit opens the wall louver when the fan motor is activated. The spring returns the louver when deactivated. The solenoid operator is equipped with a mounting plate, linkage and mounting hardware.

J. Fans & Louvers

The exhaust fan shall consist of a shutter, fan assembly, wall sleeve and rear guard. The fan shall have a 115V, 1/6 hp direct drive totally enclosed motor for continuous duty with a thermal overload protection built in. The rear guard shall conform to OSHA specifications.

One louvered intake with motorized damper, 24V DC, filter rack and filter, insect screen and weather hood, to be supplied when a diesel engine is enclosed.

K. Formed Wall Liner

The interior of the metal walls shall be lined with 32” wide, nominal 26-gauge galvanized steel panels, pre-painted Arctic White with ¼” high by 1” wide flutes on 8” centers. The exterior panel void shall have 3” thick unfaced fiberglass insulation.

The liner system shall be furnished complete with White base molding and White trim.

The “U” value of the finished wall system shall be 0.16 BTUs per square foot when calculated in accordance with the “Zone Method” contained in the latest edition of ASHRAE “Handbook of Fundamentals”.

L. Wall Insulation

The enclosure walls shall be insulated with 3" thick, fiberglass faced on its exposed side with a white metalized polypropylene scrim kraft facing. The faced insulation shall have a UL Flame Spread Rating of 25 when tested in accordance with UL723 of ASTM E-84 procedures. The insulation shall be retained between the interlocking panel ribs with a white PVC hat clip over the panel ribs. Hat clips shall be of self-extinguishing material per UL Standard 651.

The "U" value through the insulated wall shall be a maximum of 0.19 BTUs per square foot when calculated in accordance with the "Zone Method" contained in the latest edition of ASHRAE "Handbook of Fundamentals.”

M. Ceilings

The metal ceiling system shall consist of 3" deep 16" wide interlocking panels of nominal 24 gauge embossed galvanized steel, factory painted Arctic White. The ceiling system shall be supported at its perimeter by concealed angles and hook bolts. The ceiling system shall be furnished complete with all necessary connectors and fasteners.

N. Roof Insulation

Roof insulation shall consist of 48" wide, 3" thick, .6# density fiberglass faced on its exposed side with a white metalized polypropylene scrim kraft facing. The faced insulation material shall have a UL Flame Spread Rating of 25 when tested in accordance with UL 723 or ASTM E-84 procedures.

Insulation shall be supported at the roof line by means of mechanical clips spaced on maximum 4' centers and shall be sealed by means of a 2" side tabs on the facing.

The "U" value through the insulated roof shall be a maximum of 0.10 BTUs per square foot when calculated in accordance with the "Zone Method" contained in the latest edition of ASHRAE "Handbook of Fundamentals.”

SECTION 231123 - FACILITY NATURAL-GAS PIPING

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. Pipes, tubes, and fittings.
   2. Piping specialties.
   3. Piping and tubing joining materials.
   4. Valves.
   5. Pressure regulators.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:
   1. Piping and Valves: 100 psig minimum unless otherwise indicated.
   2. Service Regulators: 65 psig minimum unless otherwise indicated.

B. Natural-Gas System Pressure within Buildings: More than 0.5 psig but not more than 2 psig.

C. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 0.5 psig but not more than 2 psig and is reduced to secondary pressure of 0.5 psig or less.

D. Delegated Design: Design restraints and anchors for natural-gas piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.5 SUBMITTALS

A. Product Data: For each type of the following:
   1. Piping specialties.
   2. Corrugated, stainless-steel tubing with associated components.
   3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
   4. Pressure regulators. Indicate pressure ratings and capacities.
   5. Service meters. Indicate pressure ratings and capacities. Include supports.
   6. Dielectric fittings.
   7. Mechanical sleeve seals.
   8. Escutcheons.

B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
   1. Shop Drawing Scale: 1/4 inch per foot.
   2. Detail mounting, supports, and valve arrangements for service meter assembly and pressure regulator assembly.

C. Delegated-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail fabrication and assembly of seismic restraints.
   2. Design Calculations: Calculate requirements for selecting seismic restraints.
D. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.
E. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.
F. Qualification Data: For qualified professional engineer.
G. Welding certificates.
H. Field quality-control reports.
I. Operation and Maintenance Data: For motorized gas valves, pressure regulators, and service meters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
C. 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.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
   1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
   2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
   3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
   4. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
      a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:
   1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
   2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
   3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
   4. Corrugated stainless-steel tubing with polymer coating.
   5. Operating-Pressure Rating: 0.5 psig.
   6. End Fittings: Zinc-coated steel.
   7. Threaded Ends: Comply with ASME B1.20.1.
   8. Maximum Length: 72 inches.
B. Quick-Disconnect Devices: Comply with ANSI Z21.41.
   1. Copper-alloy convenience outlet and matching plug connector.
   2. Nitrile seals.
   3. Hand operated with automatic shutoff when disconnected.
   4. For indoor or outdoor applications.
   5. Adjustable, retractable restraining cable.
C. Y-Pattern Strainers:
   1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.

2. End Connections: Threaded ends for NPS 2 and smaller.
3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig

D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.
B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL GAS SHUTOFF VALVES

A. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

2.5 PRESSURE REGULATORS

A. General Requirements:
1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller.

B. Appliance Pressure Regulators: Comply with ANSI Z21.18.
1. Body and Diaphragm Case: Die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber.
5. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
6. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
7. Regulator vent limiting device.
8. Maximum Inlet Pressure: 2 psig.

2.6 DIELECTRIC UNIONS

A. Minimum Operating-Pressure Rating: 150 psig.
B. Combination fitting of copper alloy and ferrous materials.
C. Insulating materials suitable for natural gas.
D. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.7 SLEEVES

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.

2.8 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
   1. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe and sleeve.
   2. Pressure Plates: Carbon steel.
   3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one nut and bolt for each sealing element.

2.9 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE 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 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 yellow.

PART 3 - EXECUTION

3.1 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches below finished grade. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.
   1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.

C. Install underground, PE, natural-gas piping according to ASTM D 2774.

D. Steel Piping with Protective Coating:
   1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
   2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
   3. Replace pipe having damaged PE coating with new pipe.

E. Install fittings for changes in direction and branch connections.

F. Exterior-Wall Pipe Penetrations: Seal penetrations using steel or cast-iron pipe 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.

G. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.2 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
G. Locate valves for easy access.
H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.
I. Install piping free of sags and bends.
J. Install fittings for changes in direction and branch connections.
K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
L. Verify final equipment locations for roughing-in.
M. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
N. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
    1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
O. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
P. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
R. Connect branch piping from top or side of horizontal piping.
S. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment.
T. Do not use natural-gas piping as grounding electrode.

3.3 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing or copper connector.
B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
C. Install earthquake valves aboveground outside buildings according to listing.

3.4 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.
B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
C. Threaded Joints:
    1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
    2. Cut threads full and clean using sharp dies.
    3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
    4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
    5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

G. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.5 HANGER AND SUPPORT INSTALLATION

A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
1. NPS 1 and Smaller: Maximum span, 96 inches minimum; rod size, 3/8 inch
2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.

3.6 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install natural-gas piping electrically continuous and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within view of each gas-fired appliance and equipment (72” max). Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.7 FIELD QUALITY CONTROL

A. Test, inspect, and purge natural gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.

B. Natural-gas piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 231123

SECTION 232300 – REFRIGERANT PIPING

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 refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-407C:
   1. Suction Lines for Air-Conditioning Applications: 230 psig.
   2. Suction Lines for Heat-Pump Applications: 380 psig.
   3. Hot-Gas and Liquid Lines: 380 psig.

B. Line Test Pressure for Refrigerant R-410A:
   1. Suction Lines for Air-Conditioning Applications: 300 psig.
   2. Suction Lines for Heat-Pump Applications: 535 psig.
   3. Hot-Gas and Liquid Lines: 535 psig.

1.4 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
   1. Thermostatic expansion valves.
   2. Solenoid valves.
   3. Hot-gas bypass valves.
   4. Filter dryers.
   5. Strainers.
   6. Pressure-regulating valves.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.
   1. Shop Drawing Scale: 1/4-inch equals 1 foot.
   2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

C. Welding certificates.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.6 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type K or L

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.
D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
E. Brazing Filler Metals: AWS A5.8.
F. Flexible Connectors:
1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.2 VALVES AND SPECIALTIES
A. Diaphragm Packless Valves:
1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
3. Operator: Rising stem and hand wheel.
4. Seat: Nylon.
5. End Connections: Socket, union, or flanged.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.
B. Packed-Angle Valves:
1. Body and Bonnet: Forged brass or cast bronze.
2. Packing: Molded stem, back seating, and replaceable under pressure.
3. Operator: Rising stem.
4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
5. Seal Cap: Forged-brass or valox hex cap.
6. End Connections: Socket, union, threaded, or flanged.
7. Working Pressure Rating: 500 psig.
8. Maximum Operating Temperature: 275 deg F.
C. Check Valves:
1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
3. Piston: Removable polytetrafluoroethylene seat.
4. Closing Spring: Stainless steel.
5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
6. End Connections: Socket, union, threaded, or flanged.
7. Maximum Opening Pressure: 0.50 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 275 deg F.
D. Service Valves:
1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.
E. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.
1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.

4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24 V ac coil.
6. Working Pressure Rating: 400 psig.
7. Maximum Operating Temperature: 240 deg F.
8. Manual operator.

F. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
2. Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Seat Disc: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Working Pressure Rating: 400 psig.
6. Maximum Operating Temperature: 240 deg F.

G. Thermostatic Expansion Valves: Comply with ARI 750.
1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg .
6. Superheat: Adjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 450 psig

H. Straight-Type Strainers:
1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig.
5. Maximum Operating Temperature: 275 deg F.

I. Angle-Type Strainers:
1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig.
6. Maximum Operating Temperature: 275 deg F.

J. Moisture/Liquid Indicators:
1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

K. Replaceable-Core Filter Dryers: Comply with ARI 730.
1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated charcoal.

4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Rated Flow: as indicated on the drawings.
9. Working Pressure Rating: 500 psig.
10. Maximum Operating Temperature: 240 deg F.

L. Permanent Filter Dryers: Comply with ARI 730.
1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated charcoal.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS ¼ connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Rated Flow: tons as indicated on the drawings.
9. Working Pressure Rating: 500 psig.
10. Maximum Operating Temperature: 240 deg F.

M. Liquid Accumulators: Comply with ARI 495.
1. Body: Welded steel with corrosion-resistant coating.
2. End Connections: Socket or threaded.
3. Working Pressure Rating: 500 psig.
4. Maximum Operating Temperature: 275 deg F.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

B. Suction Lines NPS 4 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

E. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications:
1. NPS 1-1/2 and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 1-1/2 and Smaller: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

F. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

G. Safety-Relief-Valve Discharge Piping:
1. NPS 1-1/2 and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
2. NPS 1-1/2 and Smaller: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

A. Install diaphragm packless valves in suction and discharge lines of compressor.

B. Install service valves for gage taps at strainers if they are not an integral part of strainers.

C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
E. Install a full-sized, three-valve bypass around filter dryers.
F. Install solenoid valves upstream from each expansion valve. Install solenoid valves in horizontal lines with coil at top.
G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
   1. Install valve so diaphragm case is warmer than bulb.
   2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
   3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
H. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
   1. Solenoid valves.
   2. Thermostatic expansion valves.
   3. Compressor.
K. Install filter dryers in liquid line between compressor and thermostatic expansion valve.
L. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
B. Install refrigerant piping in accordance with the equipment manufacturer’s recommendations.
C. Install refrigerant piping according to ASHRAE 15.
D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
G. Install piping adjacent to machines to allow service and maintenance.
H. Install piping free of sags and bends.
I. Install fittings for changes in direction and branch connections.
J. Select system components with pressure rating equal to or greater than system operating pressure.
K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
M. Install refrigerant piping in protective conduit where installed belowground.
N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:
   1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
   2. Install horizontal suction lines with a uniform slope downward to compressor.
   3. Install traps and double risers to entrain oil in vertical runs.
   4. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Install pipe sleeves at penetrations in exterior walls and floor assemblies.

R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

S. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

3.4 PIPE JOINT CONSTRUCTION

A. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

B. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
   2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
   2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.
   5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

B. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
   1. NPS 1/2: Maximum span, 60 inches minimum rod size, 1/4 inch
   2. NPS 5/8 Maximum span, 60 inches minimum rod size, 1/4 inch
   3. NPS 1 Maximum span, 72 inches minimum rod size, 1/4 inch
   4. NPS 1-1/4 Maximum span, 96 inches minimum rod size, 3/8 inch
   5. NPS 1-1/2 Maximum span, 96 inches minimum rod size, 3/8 inch

C. Support multi-floor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
   1. Comply with ASME B31.5, Chapter VI.
   2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of test.
      c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.

d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:
   1. Install core in filter dryers after leak test but before evacuation.
   2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
   3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
   4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
C. Adjust set-point temperature of air-conditioning controllers to the system design temperature.
D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

   1. Verify that compressor oil level is correct.
   2. Open compressor suction and discharge valves.
   3. Open refrigerant valves except bypass valves that are used for other purposes.
   4. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. Time switches.
   2. Photoelectric switches.
   3. Standalone daylight-harvesting switching and dimming controls.
   4. Indoor occupancy and vacancy sensors.
   5. Switchbox-mounted occupancy and vacancy sensors
   6. Digital timer light switches.
   7. High-bay occupancy and vacancy sensors.
   8. Outdoor motion sensors.
   9. Lighting contactors.

B. Related Requirements:
   1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 ACTION SUBMITTALS:

A. Product Data: For each type of product.

B. Shop Drawings:
   1. Show installation details for the following:
      a. Occupancy sensors.
      b. Vacancy sensors.
   2. Interconnection diagrams showing field-installed wiring.
   3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS:

A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Field quality-control reports.

C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS:

A. Operation and maintenance data.

B. Software and firmware operational documentation.

1.5 WARRANTY:

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.
   1. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TIME SWITCHES:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cooper Industries, Inc.
   2. Intermatic, Inc.
   3. Leviton Manufacturing Co., Inc.
   4. TE Connectivity Ltd.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Contact Configuration: DPDT.
   3. Contact Rating: 30-A inductive or resistive, 240-V ac.

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Standard-grade receptacles, 125 V, 15 and 20 A.
2. USB receptacles.
3. GFCI receptacles, 125 V, 20 A.
4. Toggle switches, 120/277 V, 15 A.
5. Decorator-style devices, 15 A.
6. Occupancy sensors.
7. Digital timer light switches.
8. Wall-box dimmers.
9. Wall plates.

1.2 ACTION SUBMITTALS:

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

1.3 INFORMATIONAL SUBMITTALS:

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS:

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Comply with NFPA 70.

C. RoHS compliant.

D. Comply with NEMA WD 1.

E. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Essential Electrical System: Red.
3. SPD Devices: Blue.
4. Isolated-Ground Receptacles: Orange.

F. Wall Plate Color: For plastic covers, match device color.

G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

A. Duplex Receptacles, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Eaton (Arrow Hart).
   b. Hubbell Incorporated; Wiring Device-Kellems.
   c. Leviton Manufacturing Co., Inc.
   d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Two pole, three wire, and self-grounding.
3. Configuration: NEMA WD 6, Configuration 5-20R.
4. Standards: Comply with UL 498 and FS W-C-596.

B. Weather-Resistant Duplex Receptacle, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Eaton (Arrow Hart).

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes automatic transfer switches rated 600 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Single-Line Diagram: Show connections between transfer switch, power sources, and load.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.

B. Source quality control reports.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. 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.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 99.

D. Comply with NFPA 110.

E. Comply with UL 1008 unless requirements of these Specifications are stricter.

F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

K. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.

L. Neutral Terminal: Solid and fully rated unless otherwise indicated.

M. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.

N. Battery Charger: For generator starting batteries.
   1. Float type, rated 2 A.
   2. Ammeter to display charging current.
   3. Fused ac inputs and dc outputs.

O. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."
   1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
   2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
   3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
   4. Accessible via front access.

P. Enclosures: Type 4X complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Caterpillar, Inc.; Electric Power Division.
   2. Cummins Power Generation.
   3. Eaton.
   4. GE Zenith Controls.
   5. Generac Power Systems, Inc.
   6. Hubbell Power Systems, Inc.
   7. Kohler Power Systems.

B. Comply with Level 1 equipment according to NFPA 110.

C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
   1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
   2. Switch Action: Double throw; mechanically held in both directions.
   3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
   4. Conductor Connectors: Suitable for use with conductor material and sizes.
   5. Material: Tin-plated aluminum.
   6. Main and Neutral Lugs: Mechanical type.
   7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
   8. Ground bar.
   9. Connectors shall be marked for conductor size and type according to UL 1008.

D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
   1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

E. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.

F. Automatic Transfer-Switch Controller Features:
   1. Controller operates through a period of loss of control power.

2. Undervoltage Sensing for Each Phase of NormalSource: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

G. Large-Motor-Load Power Transfer:
1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an

adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.

3. Programmed Neutral Switch Position: Switch operator with programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Adjustable pause from 0.5 to 30 seconds minimum, and factory set for 0.5 second unless otherwise indicated. Time delay occurs for both transfer directions. Disable pause unless both sources are live.

2.3 MOLDED-CASE-TYPE AUTOMATIC TRANSFER SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Caterpillar, Inc.; Electric Power Division.
   2. Cummins Power Generation.
   3. Eaton.
   4. GE Zenith Controls.
   5. Generac Power Systems, Inc.
   6. Kohler Power Systems.

B. Comply with Level 1 equipment according to NFPA 110.

C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
   1. Limitation: Switches using contactor-based components are unacceptable.
   2. Switch Action: Double throw; mechanically held in both directions.
   3. Contacts: Silver composition or silver alloy for load-current switching.
   4. Conductor Connectors: Suitable for use with conductor material and sizes.
   5. Material: Tin-plated aluminum.
   6. Main and Neutral Lugs: Mechanical type.
   7. Ground Lugs and Bus-Configured Terminators: Mechanical type.
   8. Ground bar.
   9. Connectors shall be marked for conductor size and type according to UL 1008.

D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
   1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

~~E. Automatic Delayed-Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer switch controller. Interlocked to prevent the load from being closed on both sources at the same time.~~
   ~~1. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals for alternative source. Adjustable from zero to six seconds, and factory set for one second.~~
   ~~2. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.~~
   ~~3. Fully automatic break-before-make operation with center off position.~~
   ~~4. Fully automatic break-before-make operation with transfer when two sources have near zero phase difference.~~

F. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.

G. Transfer Switches Based on Molded-Case-Switch Components: Comply with UL 489 and UL 869A.

H. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.
2. Undervoltage Sensing for Each Phase of NormalSource: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
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8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
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13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

I. Large-Motor-Load Power Transfer:
1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.

2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.
3. Programmed Neutral Switch Position: Switch operator with programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Adjustable pause from 0.5 to 30 seconds minimum, and factory set for 0.5 second unless otherwise indicated. Time delay occurs for both transfer directions. Disable pause unless both sources are live.

2.4 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
B. Prepare test and inspection reports.
1. For each of the tests required by UL 1008, performed on representative devices, for legally required systems. Include results of test for the following conditions:
a. Overvoltage.
b. Undervoltage.
c. Loss of supply voltage.
d. Reduction of supply voltage.
e. Alternative supply voltage or frequency is at minimum acceptable values.
f. Temperature rise.
g. Dielectric voltage-withstand; before and after short-circuit test.
h. Overload.
i. Contact opening.
j. Endurance.
k. Short circuit.
l. Short-time current capability.
m. Receptacles withstand capability.
n. Insulating base and supports damage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.
1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
4. Provide workspace and clearances required by NFPA 70.
B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
C. Identify components according to Section 260553 "Identification for Electrical Systems."
D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
E. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by

manufacturer. Increase raceway sizes at no additional cost to Owner if necessary, to accommodate required wiring.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
   1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."

F. Connect twisted pair cable according to Section 271513 "Communications Copper Horizontal Cabling."

G. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

H. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."

I. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Visual and Mechanical Inspection:
      a. Compare equipment nameplate data with Drawings and Specifications.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage, alignment, grounding, and required clearances.
      d. Verify that the unit is clean.
      e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
      f. Verify that manual transfer warnings are attached and visible.
      g. Verify tightness of all control connections.
      h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
         1) Use of low-resistance ohmmeter.
         2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
      i. Perform manual transfer operation.
      j. Verify positive mechanical interlocking between normal and alternate sources.
      k. Perform visual and mechanical inspection of surge arresters.
      l. Inspect control power transformers.
         1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
         2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
         3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
   2. Electrical Tests:
      a. Perform insulation-resistance tests on all control wiring with respect to ground.

b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
c. Verify settings and operation of control devices.
d. Calibrate and set all relays and timers.
e. Verify phase rotation, phasing, and synchronized operation.
f. Perform automatic transfer tests.
g. Verify correct operation and timing of the following functions:
1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

4. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for one pole deviating by more than 50 percent from other poles.
f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
a. Verify grounding connections and locations and ratings of sensors.

B. Coordinate tests with tests of generator and run them concurrently.
C. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
D. Transfer switches will be considered defective if they do not pass tests and inspections.
E. Remove and replace malfunctioning units and retest as specified above.
F. Prepare test and inspection reports.

G. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
   1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
   3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

331600 UNDERGROUND STORAGE TANK (FIRE SUPPRESSION)

1 GENERAL

2 SECTIONS – UNDERGROUND WATER & WASTEWATER TANKS

2.1 33 16 00 Underground Storage Tank (Fire Suppression)
2.2 02200 Earthworks
2.3 03300 Concrete

3 REFERENCES

3.1 ASTM D4097 Contact-Molded Glass-Fiber-Reinforced-Thermoset Resin/Corrosion – Resistant Tanks
3.2 ANSI / AWWA D 120/ Tanks and Materials
3.3 ACI 318 / American Concrete Institute
3.4 ASTM D3299 /Filament Wound Fiberglass Tanks

4 SUMMARY

4.1 The contractor shall provide materials, labor, and expertise to install the underground tank and accessories as represented on the plans and drawings. The tank shall be a single wall (SW) or double wall (DW) fiberglass storage tank as shown on plans. The tank shall be installed using the manufacturers engineered anti-flotation system. The tank and anti-flotation system shall be installed in accordance with the engineered plans, the manufacturers' installation guide, details, and drawings.

5 SUBMITTALS

5.1 Provide Tank Product Data Sheets with general tank application and lay-out.
5.2 Provide Anti-Flotation Product Data Sheets showing material properties.
5.3 Provide Tank Resin Conformity Letter, showing material properties, along with resin manufacturers letter of conformity for the tank's storage application.
5.4 Provide Finite Element Analysis for the tank structure and design features with P.E Stamp for State tank is installed.
5.5 Provide Buoyancy Calculations with P.E. Stamp for State tank is installed.
5.6 Provide Manufacturers' Installation Guide including comprehensive shipping, handling, and installation instructions.
5.7 Provide Bedding and Backfill Sieve Analysis, along with Supplier Delivery Tickets showing material description matching the sieve analysis.
5.8 Provide Scaled Shop Drawings in PDF and DWG Format, including all tank manufacturer
accessories.
5.9 Provide Contractors Project References of three or more similar successful installations of underground fiberglass tanks.
5.10 Provide Manufacturer's Quality Management Plan Outline for manufacturing process and procedures.

6 APPROVAL PROCESS

6.1 Throughout this document, the terms "or engineer-approved equal" and "or approved equal" are
used. For this project the terms "engineer-approved equal" or "approved equal" shall mean
equal in the judgment of the engineer. Bidders seeking approval of products as an "approved
equal" shall furnish written evidence that such product conforms in all respects to the specified
requirements, and that it has been used successfully elsewhere under similar conditions. Where

the specified requirements involve conformance to recognized codes or standards, the bidder shall furnish evidence of such conformance in the form of test or inspection reports. Bidders seeking approval of products as an “approved equal, shall provide submissions, meeting the specified product’s requirements, no fewer than 10 days prior to bid opening for review by the engineer. Failure to provide complete data prior to bid date will be cause for rejection of the product.

7 QUALITY ASSURANCE

7.1 Manufacturing shall comply with the Occupational Safety and Health Administration (OSHA) requirements.

7.2 The FRP tank manufacturer shall follow a QMP for materials, process, shipping, with a
comprehensive documentation that follow each tank throughout the submittal, manufacturing, shipping, and delivery process.

8 DESIGN CRITERIA

8.0 Products

Provide products from manufacturers listed below or approved equal:
Basis of Design:
National Storage Tank, Inc.

8.1 Manufacturing Process

8.1.1 (FRP) Fiberglass Reinforced Tanks shall be manufactured using a combination hoop winding, chop, and hand layup process. Tanks shall be built using a C-Veil interior resin rich layer, with a combination of chopped strand mat and mechanical winding process to achieve a multi layered laminate. Tanks utilizing a chop only process will not be accepted.

8.1.2 The chop / hoop wound tank body shall have a certifiable minimum flexural modulus of 2,000,000 PSI and the chopped reinforced heads no less than 1,000,000 PSI.

8.1.3 Both the shell and heads shall be built using a half round or hemispheric rib design utilizing a structural foam core.

8.1.4 Resin types shall be compatible for the tank application as referenced on plans and specifications per section 5.3.

8.2 Tank Size

8.2.1 The underground single wall or double wall tank shall have a diameter or 8 ft.

8.2.2 Total storage volume shall be 5,000 gallons.

8.2.3 Total storage to invert of outlet or overflow shall be 5,000 gallons.

8.3 Loading Conditions

8.3.1 The tank shall be installed with a total backfill over the top of the tank at an amount to be determined. Coordinate with Civil.

8.3.2 The tank shall be designed to handle pedestrian or H-20 axle loads (32,000 lbs. / axle) per the plans.

8.3.3 Tank risers and lids shall be designed for a maximum of 2500 # wheel load limits in common areas to accommodate mowing and maintenance equipment.

8.3.4 Tanks with H-20 load conditions shall be supplied with reinforced concrete or asphalt per the manufacturer’s Installation Guide.

8.3.5 All risers and lids, manways, or sumps, in H-20 load applications shall be fitted with appropriately sized steel manways and covers as manufactured by Universal Valve Company.

8.3.6 All tank penetrations shall be 100% watertight and installed by the manufacturer, no field inlet assembly allowed.

8.4 Product Storage

8.4.1 Tanks shall be design for atmospheric pressure only.

8.4.2 Tanks shall be designed to store Fire Suppression with a specific gravity up to 1.1.

8.4.3 Tanks shall be designed to operate at ambient temperatures not to exceed 100 F.

8.5 Testing

8.5.1 The tank shall be designed to be watertight and testable per the manufacturer's Installation Guide.

8.6 Accessories

8.6.1 PVC Pipe Stubs

8.6.1.1 PVC Pipe Stubs shall be Sch. 40 designed for drain, waste, or vent (DWV)

8.6.1.2 PVC Pipe Stubs shall be utilized for inlets up to 10", locations at tank top dead center or inlet hubs < 1/3 of tanks sidewall height.

8.6.2 FRP Pipe Stubs

8.6.2.1 FRP Pipe Stubs shall be a minimum of ¼" wall thickness, 4" thru 48".

8.6.2.2 FRP Pipe Stubs may be located at any location on the tank shell.

8.6.3 FRP Flanged Nozzles

8.6.3.1 Flanged nozzles shall be 2" thru 24" in size.

8.6.3.2 Cone or plate gussets shall be utilized on flanges over 4" for structural strength.

8.6.3.3 FRP Flanges shall be flat faced utilizing ANSI B 165, 150# bolt patterns.

8.6.3.4 Flanges shall be designed for atmospheric pressure only.

8.6.4 FRP Threaded Fittings

8.6.4.1 Threaded fittings shall be located on the tanks top dead center or on manway covers only.

8.6.5 Flexible Connectors

8.6.5.1 Flexible connectors and load isolation techniques should be utilized for all inlet or outlet connections that penetrate the tank on a horizontal or vertical plane.

8.6.5.2 Flexible connectors should be designed to provide movement to accommodate settlement.

8.6.5.3 Flexible connectors shall be designed to withstand needed soil burial depths.

8.6.6 FRP Riser Lids

8.6.6.1 FRP lids 24", 30", 36", 42", or 48" shall be of an FRP composite material with 316 S.S. bolts and latches.

8.6.6.2 FRP lids shall have a gasket connection that fits either a flat face flange or the riser pipe plain end connection.

8.6.6.3 FRP lids shall utilize a textured finish with UV inhibitors at finish grade.

8.6.6.4 FRP lids shall be rated for 300 # pedestrian rating for use in common foot traffic areas.

8.6.6.5 FRP lids shall be rated for 2500 # occasional wheel load.

8.6.6.6 FRP Risers in H-20 load areas shall utilizing steel or C.I. manhole ring and lids.

8.6.7 Hinged & Lockable Covers

8.6.7.1 Hinged and lockable covers shall be 100% FRP laminate in construction. Covers shall be hinged for easy inspection and sealed with a watertight gasket to keep out dirt, groundwater, or insects.

8.6.8 FRP Risers
8.6.8.1 FRP risers 24”, 30”, 36”, 42” or 48” may be either a flanged connection or plain end to fit tank access openings or FRP riser lids.
8.6.8.2 FRP risers will be a minimum of 1/4” wall thickness with a gelcoat finish when projected above finish grade.
8.6.8.3 FRP risers will utilize a structural adhesive or an FRP bonding kit when bonding to a FRP tank access collar.
8.6.9 PVC Risers
8.6.9.1 PVC risers 24” or 30” shall be made of a PVC profile construction, cut to length, and bonded to tank access opening collars with a structural adhesive.
8.6.9.2 For PVC riser lengths over 3’ tall, a grade ring insert (GRI) shall be utilized to ensure a proper seal is obtained at the tank access opening to riser connection.
8.6.10 Tank Access Openings
8.6.10.1 Tank access openings shall be 24”, 30”, 36”, or 48” in size.
8.6.10.2 Tank access openings shall utilize an FRP collar that is ½” less than the riser I.D.
8.6.10.3 Tank access collars shall be a minimum of 3” tall.
8.6.11 FRP Manways
8.6.11.1 FRP Manways shall provide a 24” or 30” I.D. opening and come complete with 304 S.S. bolts, nuts, and neoprene flat face gaskets.
8.6.12 Manway Extensions
8.6.12.1 FRP Manways shall provide a 24” or 30” I.D. opening and come complete with 304 S.S. bolts, nuts, and neoprene flat face gaskets. Manways shall provide lengths needed to extend 12” above grade for easy assembly of covers to top manway connection.
8.6.12.2 Manway extensions shall be gel-coated 12” at finish grade.
8.6.13 Ladders
8.6.13.1 Ladders shall be FRP or aluminum in material construction and shall be supplied by the tank manufacturer.
8.6.13.2 Ladders shall be mounted in a way to allow for a flexible connection to accommodate tank movement during filling and empty cycles.
8.6.14 Level Controls and Sensors
8.6.14.1 Interstitial dry double-wall fiberglass tank monitoring shall utilize an Omtec model LWF non-distinguishing sensor.
8.6.14.2 Product level sensors shall utilize an Omtec model L-Series to provide product-level alarms for high, caution, or low product levels.
8.6.14.3 The control panel for a combination DW monitoring and product level shall be an Omtec model LU NEMA 4X rated series.
8.6.14.4 Remote Annunciators shall be an Omtec unit compatible with LU controllers utilizing a NEMA 4X enclosure and non-external power type.

8.7 Anti-Flotation Systems
8.7.1 Precast Concrete Deadmen
8.7.1.1 Precast concrete deadmen shall be provided by the tank manufacturer and shall meet the following design criteria:
8.7.1.2 Manufactured with a reinforced concrete design with a minimum of a 4000-psi concrete.
8.7.1.3 Provide adjustable anchor points for hold down straps.

8.7.1.4 Provide multiple lengths to provide a full-length anchor to any sized tank, 6', 8', 10, or 12' in diameter.
8.7.1.5 Precast concrete deadmen for 4' – 8' diameter tanks shall be 12" wide.
8.7.1.6 Precast concrete deadmen for 10' & 12'' diameter tanks shall be 18" wide.
8.7.2 TankAnchor™ Geocomposite Anti-flotation System
8.7.2.1 Geocomposite deadman systems shall be provided by the tank manufacturer. The geocomposite anti-flotation system shall consist of a polyester geogrid with a nonwoven geotextile. TankAnchor™ shall be installed per the manufacturers recommendations and sizing based on buoyancy calculations and site conditions.
8.7.3 Fiberglass Deadmen
8.7.3.1 Fiberglass Deadmen shall be provided by the tank manufacturer and shall meet the following design criteria:
8.7.3.2 FRP Deadmen for 4' – 6' diameter tanks shall be 12" wide.
8.7.3.3 FRP Deadmen for 8' diameter tanks shall be 18" wide.
8.7.3.4 FRP Deadmen for 10' – 12' diameter tanks shall be 24" wide.
8.7.3.5 FRP Deadmen shall be full length of tank.
8.7.4 Deadman Anchor Straps
8.7.4.1 Anchor straps shall be supplied by the tank manufacturer and be composed of a pultruded fiberglass strap with engineered D-Rings for connection to turnbuckles.
8.7.4.2 Each anchor strap shall be rated for a maximum load of 25,000 lbs.
8.7.4.3 The qty. and location of the straps shall be noted by the tank manufacturer on the tank drawing.
8.7.5 Turnbuckles
8.7.5.1 Turnbuckles shall be provided by the tank manufacturer.
8.7.5.2 Turnbuckles shall be a Class 7 forged type, meeting performance requirements of Federal Specification F1145 Type 1, Form1 and ASTM FF-T-791B.
8.7.5.3 Design loads for turnbuckles shall be based on a design factor of 5:1

9 EXECUTION

9.1.1 Single wall fiberglass tanks shall be installed and tested in the methods established in the manufacturer's installation guide and checklist.
9.1.2 Tanks shall only store the products listed in the appropriate warranty and for which the tank is specified.
9.1.3 Failure to follow the installation guide will terminate the manufacturer's warranty.

10 AS-BUILT DOCUMENTATION

10.1.1 Provide Manufacturers Installation Check List, reference documentation including pictures, videos, and handwritten reports, for general points of interest regarding tank installation steps.
10.1.2 Provide picture & video documentation of tank installation for each step required per the manufacturer's installation guide.
10.1.3 Provide Supplier Delivery Tickets showing supplied bedding and backfill material description matching the sieve analysis.

11 WARRANTY

11.1.1 Warranty shall be the limited warranty in effect at the time of delivery, as provided by National Storage Tank, INC

STRUCTURAL

GENERAL NOTES

FOUNDATION NOTES:

AN ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF WAS USED FOR THE FOUNDATION DESIGN; BASED ON THE SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING REPORT DATED SEPTEMBER 1, 2023 AND PREPARED BY S&ME, Inc (S&ME PROJECT NUMBER 22060050).

IF EXISTING CONDITIONS OR TESTS INDICATE THAT THE SOIL IS SOFT OR OTHERWISE QUESTIONABLE, PLEASE CONTACT THE ENGINEER OR ARCHITECT BEFORE PLACING CONCRETE.

THE SOILS ENGINEER OR HIS REPRESENTATIVE SHALL INSPECT ALL SUBGRADE WORK PRIOR TO THE PLACEMENT OF ANY REINFORCING STEEL OR CONCRETE AND SHALL PERFORM TESTS TO VERIFY THAT SUCH WORK IS IN CONFORMANCE WITH THE PROCEDURES NOTED IN THE CONTRACT DOCUMENTS.

GENERAL NOTES:

COMPLETE SHOP DRAWINGS FOR CONSTRUCTION OF ALL SPECIALTY ITEMS INCLUDING, BUT NOT LIMITED TO: PRECAST CONCRETE, HOLLOWCORE CONCRETE PLANKS, CURTAIN WALL GLAZING SYSTEMS, LIGHT GAUGE STEEL ROOF AND WALL FRAMING, HEAVY TIMBER TRUSSES, GEOPIERS (FOUNDATIONS IMPROVEMENTS), GUARDRAILS AND STAIRS, SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA AND SHALL BE MADE AVAILABLE AT THE JOB SITE DURING TIMES OF INSPECTION.

STRUCTURAL DRAWINGS DEFER DESIGN AND CALCULATIONS FOR LIGHT GAUGE FRAMING, WOOD/METAL PAN FRAMED STAIRS, WOOD FLOOR I-JOISTS, AND WOOD ROOF TRUSSES.

SUBMITTALS:

SUBMIT FOR REVIEW: SUBMITTALS FOR SHOP DRAWINGS, PRODUCT DATA, AND MILL TESTS ARE REQUIRED FOR ITEMS NOTED IN THE INDIVIDUAL MATERIALS SECTIONS AND FOR BIDDER DESIGNED ELEMENTS.

SUBMITTAL REVIEW PERIOD: SUBMITTALS SHALL BE MADE IN TIME TO PROVIDE A MINIMUM OF (2) WEEKS OR (10) WORKING DAYS TO REVIEW BY THE ARCHITECT/ENGINEER PRIOR TO THE ONSET OF FABRICATION.

GENERAL CONTRACTORS PRIOR REVIEW: PRIOR TO THE SUBMISSION TO THE ARCHITECT/ENGINEER, THE CONTRACTOR SHALL REVIEW THE SUBMITTAL FOR COMPLETENESS. DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE EOR, AND THEREFORE, MUST BE VERIFIED BY THE GENERAL CONTRACTOR. CONTRACTOR SHALL PROVIDE ANY NECESSARY DIMENSIONAL DETAILS REQUESTED BY THE DETAILER AND PROVIDE THE CONTRACTOR'S REVIEW STAMP AND SIGNATURE BEFORE FORWARDING TO THE ARCHITECT/ENGINEER.

SHOP DRAWINGS DEVIATIONS: WHEN SHOP DRAWINGS (COMPONENT DESIGN DRAWINGS) DIFFER FROM OR ADD TO THE REQUIREMENTS OF THE STRUCTURAL DRAWINGS, THEY SHALL BE DESIGNED AND STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED.

DEFERRED SUBMITTALS:

BIDDER DESIGNED ELEMENTS: SUBMIT "BIDDER-DESIGNED" DEFERRED SUBMITTALS TO THE ARCHITECT AND STRUCTURAL ENGINEER OF RECORD FOR REVIEW. THE DEFERRED SUBMITTAL SHALL ALSO BE SUBMITTED TO THE CITY FOR APPROVAL, IF REQUIRED BY THE CITY.

DESIGN OF PREFABRICATED, "BIDDER-DESIGNED", MANUFACTURED, PRE-ENGINEERED, OR OTHER FABRICATED PRODUCTS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS.

1. DESIGN CONSIDERS TRIBUTARY DEAD, LIVE, WIND, AND EARTHQUAKE LOADS IN COMBINATIONS REQUIRED BY IBC 2015.
2. DESIGN WITHIN THE DEFLECTION LIMITS NOTED HEREIN AND AS SPECIFIED OR REFERENCED IN IBC 2015.
3. DESIGN SHALL CONFORM TO THE SPECIFICATIONS AND REFERENCE STANDARDS OF THE GOVERNING CODE.
4. SUBMITTAL SHALL INCLUDE:
   - 4.a. CALCULATIONS PREPARED, STAMPED, AND SIGNED BY THE SPECIALTY STRUCTURAL ENGINEER (SSE) DEMONSTRATING CODE CONFORMANCE.
   - 4.b. ENGINEERED COMPONENT DESIGN DRAWINGS, ARE PREPARED, STAMPED, AND SIGNED BY THE SSE.
   - 4.c. PRODUCT DATA, TECHNICAL INFORMATION, AND MANUFACTURER'S WRITTEN REQUIREMENTS AND AGENCY APPROVAL AS APPLICABLE.
   - 4.d. SSE MAY SUBMIT TO THE ARCHITECT/ENGINEER, A REQUEST TO UTILIZE RELEVANT ALTERNATE DESIGN CRITERIA OF SIMILAR NATURE AND GENERAL EQUIVALENCY WHICH IS RECOGNIZED BY THE CODE AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION. SUBMIT ADEQUATE DOCUMENTATION OF DESIGN.

DEFLECTION LIMITS FOR SSE/BIDDER DESIGNED ELEMENTS

VERTICAL	LIMIT
*ROOF MEMBERS, DEAD + LIVE OR RAIN, SNOW, OR WIND TOTAL LOAD (TL) DEFLECTION	L/240 (WHERE L IS SPAN LENGTH IN INCHES)
ROOF LIVE OR RAIN OR SNOW OR WIND LOAD (LLR) DEFLECTION	L/360 (WHERE L IS SPAN LENGTH IN INCHES)
FLOOR MEMBERS TOTAL LOAD (TL), UNLESS OTHERWISE NOTED, DEFLECTION	L/480 (WHERE L IS SPAN LENGTH IN INCHES)
FLOOR MEMBERS LIVE LOAD (LL), UNLESS OTHERWISE NOTED, DEFLECTION	L/600 (WHERE L IS SPAN LENGTH IN INCHES)
MEMBERS SUPPORTING MASONRY (DL ONLY)	L/1200 OR ¼" MAX. (WHERE L IS SPAN LENGTH IN INCHES)
OPERABLE PARTITION SUPPORT MEMBERS	L/600 OR ¼" MAX. (WHERE L IS SPAN LENGTH IN INCHES)

HORIZONTAL	LIMIT
MEMBERS SUPPORTING BRITTLE FINISHES	L/240 *(NOTE 1) (WHERE L IS SPAN LENGTH IN INCHES)
MEMBERS SUPPORTING FLEXIBLE FINISHES	L/180 *(NOTE 1) (WHERE L IS SPAN LENGTH IN INCHES)
MEMBERS SUPPORTING MASONRY AT 0.7 TIMES CLADDING WIND OR 0.7E	L/600 *(NOTE 1) (WHERE L IS SPAN LENGTH IN INCHES)
INTERSTORY DRIFT	0.020 x STORY HEIGHT (WHERE SPAN LENGTH IN INCHES)

*ROOF MEMBERS SHALL BE DESIGNED TO CONTROL PONDING SUCH THAT CHORD MEMBER STRESSES DO NOT EXCEED LIMITS INDICATED ON PLANS UNDER DEAD + RAIN LOADING.

(NOTE 1): WIND LOAD IS REDUCIBLE TO 0.42 TIMES COMPONENT AND CLADDING LOADS PER TABLE 1604.3, FOOTNOTE f.

GENERAL CONTRACTOR'S PRIOR REVIEW: ONCE THE CONTRACTOR HAS COMPLETED HIS REVIEW OF THE SSE COMPONENT DRAWINGS, THE EOR WILL REVIEW THE SUBMITTAL FOR GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING AND WILL STAMP THE SUBMITTAL ACCORDINGLY. REVIEW OF THE SPECIALTY STRUCTURAL ENGINEER'S (SSE) SHOP DRAWINGS (COMPONENT DESIGN DRAWINGS) IS FOR COMPLIANCE WITH DESIGN CRITERIA AND COMPATIBILITY WITH THE DESIGN OF THE PRIMARY STRUCTURE AND DOES NOT RELIEVE THE SSE OF RESPONSIBILITY FOR THAT DESIGN. ALL NECESSARY BRACING, TIES, ANCHORAGE, PROPRIETARY PRODUCTS SHALL BE FURNISHED AND INSTALLED PER MANUFACTURER'S INSTRUCTIONS OR THE SSE'S DESIGN DRAWINGS AND CALCULATIONS. THE ELEMENTS INCLUDE BUT ARE NOT LIMITED TO:

- STEEL STAIRS
- HANDRAIL, GUARDRAIL, CATWALK FRAMING, BALCONY RAIL ANCHORAGES
- METAL DECK EDGE FORMS
- EXTERIOR CLADDING SYSTEMS, CURTAIN WALL SYSTEMS, PRE-ENGINEERED PANELS
- WINDOW WASHING SYSTEM TIE-DOWN ANCHORAGE
- TEMPORARY SHORING SYSTEMS
- COLD-FORMED METAL STUDS – EXTERIOR WALL ASSEMBLIES
- COLD-FORMED METAL STUDS – FRAMING INTERIOR WALLS INCLUDING PARTIAL HEIGHT
- COLD-FORMED METAL STUDS & JOISTS FRAMING OVERHEAD SOFFITS
- TILT-UP WALL PANELS INCLUDING BUT NOT LIMITED TO PANEL-TO-PANEL CONNECTIONS, FOUNDATION CONNECTIONS, CONNECTIONS BETWEEN OTHER STRUCTURAL ELEMENTS (BEAMS, JOISTS, ETC.) AND EMBEDMENTS.
- SOIL IMPROVEMENTS (RAMMED-AGGREGATE PIERS, RIGID INCLUSIONS, GROUT INJECTIONS, ETC.) TO MEET THE REQUIREMENTS OF THE GEOTECHNICAL REPORT.

CONCRETE NOTES:

CONCRETE DESIGN IS IN ACCORDANCE WITH ACI 318-14 CONCRETE PLACEMENT AND QUALITY: PER RECOMMENDATIONS IN ACI SP-15.

RESULTS FOR ALL CONCRETE COMPRESSIVE STRENGTH TEST SHALL BE AVAILABLE ON THE THE JOB SITE FOR REVIEW BY THE INSPECTOR.

DEBRIS: REMOVE ALL DEBRIS FROM FORMS BEFORE PLACING CONCRETE.

SEGREGATION OF AGGREGATES: DO NOT DROP CONCRETE THROUGH REINFORCING STEEL SO AS TO CAUSE SEGREGATION OF AGGREGATES.

INSERTS: SECURELY POSITION ALL ITEMS TO BE CAST IN CONCRETE SUCH AS REINFORCING DOWELS, BOLTS, ANCHORS, PIPES AND SLEEVES IN THE FORMS BEFORE PLACING CONCRETE.

CONSTRUCTION JOINTS: OBTAIN THE ARCHITECTS APPROVAL OF JOINT LOCATIONS IN ALL SLABS, BEAMS, AND SHEAR WALLS. REMOVE LAITANCE AND CLEAN SURFACE OF CONCRETE CONSTRUCTION JOINTS

PIPES: DO NOT EMBED PIPES OTHER THAN ELECTRICAL CONDUITS IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY APPROVED BY THE ARCHITECT. MAXIMUM PIPE SIZE SHALL BE 1/3 OF THE SLAB THICKNESS AND LOCATED AT THE MID DEPTH. MINIMUM SPACING SHALL BE 3 TIMES THE PIPE DIAMETER. PIPES SHALL NOT IMPAIR THE STRENGTH OF THE MEMBER. ANY PIPES OF ALUMINUM ARE PROHIBITED IN STRUCTURAL CONCRETE.

PROVIDE WELDABLE REBAR AT ALL LOCATIONS WHERE REBAR IS ATTACHED TO STRUCTURAL STEEL BY MEANS OF WELDING. ANY REBAR THAT IS NOT DESIGNATED AS WELDABLE SHALL NOT BE WELDED. WELDED REBAR SHALL CONFORM TO THE REQUIREMENTS OF ASTM A706 AND SHALL BE WELDED IN ACCORDANCE WITH AWS D1.4, STRUCTURAL WELDING CODE.

WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 GRADE 60 OR 70. PLACEMENT IN CONCRETE SHALL BE IN THE CENTER OF THE SLAB.

REBAR GRADES: ALL REINFORCING STEEL TO BE NEW STOCK DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60. ALL ACCESSORIES ARE TO BE INCLUDED. BARS ARE TO BE COLD BENT IN SHOP. BAR SUPPORTS ARE TO BE SPACED IN ACCORDANCE WITH ACI 315 AND CRSI. ALL BAR SPLICES ARE TO BE CONSIDERED AS CLASS 'B' – CLASS 'B' SPLICES ARE TO BE LAPPED A DISTANCE OF 1.3 L_d. COMPRESSION REINFORCING SHALL BE LAPPED A MIN. OF 40 BAR DIAMETERS. SEE TABLE ON SHEET SO.1.

REBAR COVER: ALL DIMENSIONS SHOWING THE LOCATION OF REINFORCING STEEL NOT NOTED AS "CLEAR" ARE TO CENTER OF STEEL MINIMUM REBAR COVER (CLEAR) FOR NON-PRESTRESSED CONCRETE SHALL BE AS FOLLOWS:

LOCATION	MIN. COVER (CLEAR)	TOLERANCES
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:	3"	3/8"
EXPOSED TO EARTH OR WEATHER:		
#5 AND SMALLER BARS	1-1/2"	3/8"
#6 AND LARGER BARS	2"	3/4"
NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND:		
STRUCTURAL SLABS AND WALLS	3/4"	1/8"
BEAMS AND COLUMNS (PRIMARY REINFORCEMENT, TIES, STIRRUPS AND SPIRALS)	1-1/2"	3/8"
SLABS ON GRADE	1-1/2"	1/4"

TOLERANCES OF REBAR PLACEMENT: TOLERANCE FOR LONGITUDINAL LOCATION OF BENDS AND ENDS OF REINFORCEMENT SHALL BE PLUS OR MINUS 2" EXCEPT AT DISCONTINUING ENDS OF MEMBERS WHERE TOLERANCES SHALL BE ±½".

CONCRETE QUALITY:

CONCRETE USE	STRENGTH AT 28 DAYS	SLUMP	AIR	AGGREGATE SIZE	AGGREGATE TYPE
FOUNDATIONS	3000 psi	4"	–	1-1/2"	ASTM C33
EXTERIOR SLABS	3000 psi	4"	4-6%	1"	ASTM C33
STRUCTURAL WALLS	4000 psi	3"	–	1"	ASTM C33
YARD WALLS	4000 psi	3"	–	1-1/2"	ASTM C33
SLAB ON GRADE	4000 psi	4"	–	1"	ASTM C33
ELEVATED SLABS	4000 psi (NORMAL WT.)	4"	–	1"	ASTM C33

⚠

DO NOT ADD WATER TO CONCRETE MIX AT SITE UNLESS APPROVED BY ARCHITECT.

CONCRETE: NORMAL WEIGHT CONCRETE SHALL HAVE A MINIMUM UNIT WEIGHT OF 145 POUNDS PER CUBIC FOOT.

AGGREGATE: NORMAL WEIGHT AGGREGATE CONFORMING TO ASTM C33.
AGGREGATE SIZE CONFORMING TO:
3/4" ASTM C67
1" ASTM C67
1-1/2" ASTM C67

CEMENT: TYPE I

CONCRETE AGE: NO MORE THAN 90 MINUTES SHALL ELAPSE BETWEEN CONCRETE BATCHING AND CONCRETE PLACEMENT UNLESS APPROVED BY ARCHITECT.

STRUCTURAL STEEL:

THE DESIGN, DETAILING, FABRICATION, AND ERECTION OF STRUCTURAL AND MISCELLANEOUS STEEL SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS." AND "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS"

STEELS: STRUCTURAL STEEL IS TO CONFORM TO THE FOLLOWING SPECIFICATIONS:
STRUCTURAL W-SHAPES: ASTM A992
STRUCTURAL TUBING: ASTM A500 GRADE B Fy=46ksi
STRUCTURAL L-SHAPES: ASTM A36
STRUCTURAL PLATES: ASTM A36

WELDING: ALL WELDING IS TO CONFORM TO ANSI/AWS D1.1 STRUCTURAL WELDING CODE USING 370XX ELECTRODES. ALL WELDING IS TO BE DONE BY WELDERS QUALIFIED UNDER ANSI/AWS D1.1. EVIDENCE OF QUALIFICATION SHALL BE PROVIDED TO ARCHITECT AND SHALL BE AVAILABLE AT JOB SITE DURING TIMES OF INSPECTION.

ALL SHOP FABRICATED STAIRS SHALL BE DESIGNED, FABRICATED, AND INSTALLED IN ACCORDANCE WITH THE STANDARD BUILDING CODE. DESIGN AND FABRICATION DRAWINGS SHALL BE SEALED BY A REGISTERED ENGINEER LICENSED IN NORTH CAROLINA. THESE DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW BEFORE INSTALLATION OF THE MEMBERS. ALL SHOP DRAWINGS SHALL BE AVAILABLE ON SITE AT TIMES OF INSPECTION

BOLTS: ALL BOLTED CONNECTIONS ARE TO BE MADE USING ¾"ø A325 BOLTS IN BEARING TYPE CONNECTIONS UNLESS SHOWN OR NOTED OTHERWISE ON THE DRAWINGS. ALL BOLTED CONNECTIONS SHALL BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC-2000. A307 BOLTS MAY BE USED FOR ERECTION BOLTS.

ANCHOR RODS: ANCHOR RODS ARE TO BE OF ASTM F1554 GRADE 36 MATERIAL. ALL ANCHOR RODS ARE TO BE SET WITH A TEMPLATE PRIOR TO POURING CONCRETE.

ROOF METAL DECK:
ROOF DECK TO BE 1 1/2" DEEP, 6" WIDE RIB, PRIME PAINTED, VULCRAFT 1.5B 22 GA. OR EQUAL.

MEZZANINE COMPOSITE FLOOR DECK:
COMPOSITE FLOOR DECK TO BE VULCRAFT 2.0 VLI 20 GAUGE GALVANIZED OR EQAUL. ATTACH TO SUPPORTS BY WELDING THROUGH DECK TO SUPPORTS AT 12"oc WITH 5/8" DIAMETER PUDDLE WELDS or USE OF SHEAR STUDS. WHERE DECK SPANS ARE 5'-0" OR MORE PROVIDE SIDELAP FASTENERS AT 36"oc MAX. SIDELAP FASTENERS MAY BE WELDS, #10 SCREWS OR CRIMPS. ATTACH PERIMETER EDGES OF DECK TO SUPPORTS WITH 5/8" PUDDLE WELDS AT 12"oc.

APPENDIX B

OFFICE / LIVING QUARTERS

STRUCTURAL DESIGN IS BASED ON THE 2018 N.C. STATE BUILDING CODE

DESIGN LOADS:

IMPORTANCE FACTORS: SNOW (I_S) 1.20; SEISMIC (I_E) 1.50

LIVE LOADS: ROOF 20 psf; MEZZ. FLOOR N/A psf; MAIN FLOOR 100 psf

SNOW LOAD: 10 psf
FLAT-ROOF SNOW LOAD, P_f = 10 PSF
SNOW EXPOSURE FACTOR, C_e = 1.0
THERMAL FACTOR, C_t = 1.0

WIND LOAD: BASIC WIND SPEED 155 mph (ASCE 7-10); EXPOSURE CATEGORY C; WIND BASE SHEARS (FOR MWFRS): Vx = 50 KIPS Vy = 40 KIPS

SEISMIC DESIGN CATEGORY A
COMPLIANCE WITH SECTION 1616.4 ONLY? ☐ YES ☒ NO

SEISMIC DESIGN CATEGORY ☐ B ☐ C ☒ D

SEISMIC DESIGN CATEGORY B, C & D
PROVIDE THE FOLLOWING SEISMIC DESIGN PARAMETERS:
OCCUPANCY CATEGORY IV
SPECTRAL RESPONSE ACCELERATION S_S 21 %g S_1 9 %g
SPECTRAL RESPONSE COEFFICIENTS S_{DS} 22.4 %g S_{D1} 14.4 %g
SEISMIC RESPONSE COEFFICIENT, C_S = 0.075
RESPONSE MODIFICATION FACTOR, R = 4.5
SITE CLASSIFICATION D ☒ 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
X MOMENT FRAME ___ INVERTED PENDULUM
SEISMIC BASE SHEAR: CLASSROOMS: Vx = 25 KIPS Vy = 25 KIPS
ANALYSIS PROCEDURE ___ SIMPLIFIED X EQUIVALENT LATERAL FORCE ___ MODAL
ARCHITECTURAL, MECHANICAL, COMPONENTS ANCHORED? YES

LATERAL DESIGN CONTROL? EARTHQUAKE ___ WIND X

SOIL BEARING CAPACITIES:
FIELD TEST (PROVIDE COPY OF TEST REPORT): 2500 PSF
PRESUMPTIVE BEARING CAPACITY ___
PILE SIZE, TYPE, AND CAPACITY ___

APPARATUS BAY

STRUCTURAL DESIGN IS BASED ON THE 2018 N.C .STATE BUILDING CODE

DESIGN LOADS:

IMPORTANCE FACTORS: SNOW (I_S) 1.20; SEISMIC (I_E) 1.50

LIVE LOADS: ROOF 20 psf; MEZZ. FLOOR 100 psf; MAIN FLOOR 200 psf

SNOW LOAD: 10 psf
FLAT-ROOF SNOW LOAD, P_f = 10 PSF
SNOW EXPOSURE FACTOR, C_e = 1.0
THERMAL FACTOR, C_t = 1.0

WIND LOAD: BASIC WIND SPEED 155 mph (ASCE 7-10); EXPOSURE CATEGORY C; WIND BASE SHEARS (FOR MWFRS): Vx = 85 KIPS Vy = 50 KIPS

SEISMIC DESIGN CATEGORY A
COMPLIANCE WITH SECTION 1616.4 ONLY? ☐ YES ☒ NO

SEISMIC DESIGN CATEGORY ☐ B ☐ C ☒ D

SEISMIC DESIGN CATEGORY B, C & D
PROVIDE THE FOLLOWING SEISMIC DESIGN PARAMETERS:
OCCUPANCY CATEGORY IV
SPECTRAL RESPONSE ACCELERATION S_S 21 %g S_1 9 %g
SPECTRAL RESPONSE COEFFICIENTS S_{DS} 22.4 %g S_{D1} 14.4 %g
SEISMIC RESPONSE COEFFICIENT, C_S = 0.067
RESPONSE MODIFICATION FACTOR, R = 5
SITE CLASSIFICATION D ☒ FIELD TEST ☐ PRESUMPTIVE ☐ HISTORICAL DATA
BASIC STRUCTURAL SYSTEM (CHECK ONE)
X BEARING WALL ___ DUAL W/ SPECIAL MOMENT FRAME
___ BUILDING FRAME ___ DUAL W/ INTERMEDIATE R/C OR SPECIAL STEEL
___ MOMENT FRAME ___ INVERTED PENDULUM
SEISMIC BASE SHEAR: CLASSROOMS: Vx = 100 KIPS Vy = 100 KIPS
ANALYSIS PROCEDURE ___ SIMPLIFIED X EQUIVALENT LATERAL FORCE ___ MODAL
ARCHITECTURAL, MECHANICAL, COMPONENTS ANCHORED? YES

LATERAL DESIGN CONTROL? EARTHQUAKE X WIND ___

SOIL BEARING CAPACITIES:
FIELD TEST (PROVIDE COPY OF TEST REPORT): 2500 PSF
PRESUMPTIVE BEARING CAPACITY ___
PILE SIZE, TYPE, AND CAPACITY ___

MASONRY NOTES:

CODES: MASONRY DESIGN AND CONSTRUCTION IS BASED ON AND SHALL CONFORM TO THE PROVISIONS OF ACI A530-LATEST EDITION/ASCE 5-LATEST EDITION/TMS 402-LATEST EDITION INCLUDING SEISMIC REQUIREMENTS OF APPENDIX A.

MASONRY: TYPE "N" CONCRETE UNITS CONFORMING TO:
ASTM C90 FOR HOLLOW LOADBEARING UNITS
ASTM C145 FOR SOLID LOADBEARING UNITS
ASTM C55 FOR CONCRETE BRICK
MINIMUM F'm = 1900 psi

ANY CMU MASONRY WITH COMPRESSIVE STRENGTH OF GREATER THAN 1900 psi SHALL BE VERIFIED BY TEST ACCORDING TO ASTM C1314 OR BY ASTM C140. THESE TEST RESULTS SHALL BE AVAILBLE TO THE BUILDING INSPECTOR.

MASONRY COURSING TO BE A RUNNING BOND, PERPENDICULAR JOINTS SHALL BE TOOTHED TOGETHER.

8" CMU SHALL BE 7⅝"x7⅝"x15⅝" w/ ⅜" JOINTS

MORTAR AND GROUT: USE MORTAR FOR MASONRY CONFORMING TO ASTM C270 TYPE S. GROUT SHALL CONFORM TO ASTM C476 MIN. Fg = 3000psii GROUT SHALL CONSIST OF 1 PART PORTLAND CEMENT 2 PARTS SAND, 2 PARTS COARSE AGGREGATE (MAX SIZE ½") AND WATER AS REQUIRED TO BRING TO DESIRED CONSISTENCY.

REINFORCEMENT: COLD DRAWN STEEL WIRE CONFORMING TO ASTM A-82; MASONRY WALLS MADE OF CMU TO BE REINFORCED USING 9/8" TRUSS TYPE REINFORCEMENT (GALVANIZED AFTER FABRICATION) AT 16"oc REBAR SHALL CONFORM TO ASTM A-615 GRADE 60.

ALL FILLED CELL MASONRY TO BE BUILT TO PRESERVE THE UNOBSTRUCTED VERTICAL CONTINUITY OF OF THE CELLS TO BE FILLED. LAY UNITS WITH FULL FACE SHELL MORTAR BEDS AND CROSS WEBS ADJACENT TO VERTICAL CORES TO BE FILLED.

FILL CELLS WITH GROUT TO MAXIMUM OF 8 FEET. IF TOTAL POUR IS GREATER THAN 8 FEET, POUR IN FOUR FOOT LIFTS STOPPING 1½" BELOW OF UPPERMOST UNIT FOR CONSTRUCTION JOINTS.

BACK-FILL AT RETAINING WALLS SHALL BE DONE UNDER CONTROLLED CONDITIONS ONLY AFTER WALL HAS SETUP.

REINFORCING BARS SHOWN IN MASONRY WALLS SHALL BE LAPPED AS FOLLOWS, ALL LAP SPLICES SHALL BE ACCORDING TO IBC SECTION 2107.2.3
#3 BARS-LAP 18" MIN
#4 BARS-LAP 24" MIN
#5 BARS-LAP 36" MIN
#6 BARS-LAP 56" MIN
#7 BARS-LAP 76" MIN
#8 BARS-LAP 107" MIN

REINFORCING BARS SHALL CONFORM TO ASTM A-615 GRADE 60.

GENERAL LIGHT GAUGE METAL NOTES:

ALL LIGHT GAUGE METAL AND ACCESSORIES ARE TO BE DESIGNED BY AN ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA. ALL SIZES SHOWN ON STRUCTURAL DRAWINGS SHALL BE CONSIDERED A MINIMUM FOR THE LOCATION SHOWN. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL TO THE ARCHITECT AND ENGINEER OF RECORD PRIOR TO FABRICATION AND/OR ERECTION.

ALL STRUCTURAL MEMBERS SHALL BE DESIGNED IN ACCORDANCE w/ AISI "SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STRUCTURAL MEMBERS," LATEST ADDITION.

ALL FRAMING SHALL BE FORMED FROM CORROSION-RESISTANT STEEL, MEETING THE REQUIREMENTS OF ASTM A446 w/ A MINIMUM STRENGTH OF 40ksi FOR SJ STUDS AND 33ksi FOR CR RUNNERS.

FASTENING OF COMPONENTS SHALL BE MADE w/ SELF-DRILLING SCREWS OR WELDING. SCREWS TO BE OF SUFFICIENT SIZE TO INSURE THE STRENGTH OF THE CONNECTION. ALL WELDS TO BE TOUCHED UP w/ ZINC PAINT.

STUDS ARE TO BEAR DIRECTLY ON THE CR RUNNERS SO THAT FASTENERS DO NOT SUPPORT THE FULL SHEAR STRENGTH OF THE CONNECTION.

JOISTS AND RAFTERS TO BEAR DIRECTLY OVER BEARING STUDS.

END BLOCKING SHALL BE PROVIDED WHERE JOIST ENDS ARE NOT OTHERWISE RESTRAINED FROM ROTATION.

METAL STUDS & MASONRY BACKING SHALL MEET SBC TABLE 1604.3 REQUIREMENTS.

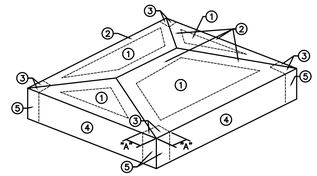
ALL HILTI "KU" POWDER ACTUATED FASTENERS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION AND HAVE A MIN. EMBEDMENT OF ¾" INTO CONCRETE.

TEMPORARY BRACING SHALL BE PROVIDED UNTIL ERECTION IS COMPLETE.

COMPONENTS AND CLADDING

	ROOF AND WALLS	
ZONE	ULTIMATE WIND PRESSURES	
1	33 (PSF)	-52 (PSF)
2	33 (PSF)	-90 (PSF)
3	33 (PSF)	-132 (PSF)
4	56 (PSF)	-61 (PSF)
5	52 (PSF)	-94 (PSF)

TABULATED PRESSURES ARE AT ULTIMATE LEVEL AND ASSUME AN EFFECTIVE WIND LOADED AREA OF 10 SQ. FT. TABULATED PRESSURES MAY BE MULTIPLIED BY 0.6 TO OBTAIN DP RATING.



HIP ROOF (h=20')

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NORTH CAROLINA PROFESSIONAL SEAL 056654 ENGINEER WILLIAM D. LAATSCH
05.10.2024

CASTLE HAYNE FIRE DEPARTMENT
NEW FIRE SUB-STATION
CASTLE HAYNE, NC

GENERAL NOTES

sheet
3.00

LINTEL SCHEDULE FOR MASONRY WALLS

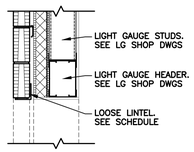
MARK	LINTEL SIZE	BEARING	DETAIL
L1	W8x15 & 3/8" x 11" BOTTOM PLATE w/ HEADED STUDS	8" MIN.	SEE DETAIL BELOW
L2	W8x18 & 3/8" x 19" BOTTOM PLATE w/ STIFFENERS AND HEADED STUDS	8" MIN.	SEE DETAIL BELOW
L3	W16x50 & 3/8" x 19" BOTTOM PLATE w/ STIFFENERS AND HEADED STUDS	10"	SEE DETAIL BELOW
L4	W16x26 & 3/8" x 11" BOTTOM PLATE w/ HEADED STUDS	10"	SEE DETAIL BELOW
L5	W8x15 & 3/8" x 7" BOTTOM PLATE w/ HEADED STUDS	8" MIN.	SEE DETAIL BELOW
LX[1]	W8x15 & 3/8" x (WALL WIDTH −1") BOTTOM PLATE w/ HEADED STUDS	8" MIN.	SEE DETAIL BELOW

1. 'LX' INDICATES LINTEL AT MECHANICAL OPENINGS UP TO 6'−0". COORDINATE OPENINGS AND LOCATIONS WITH MEP AND ARCH DWGS

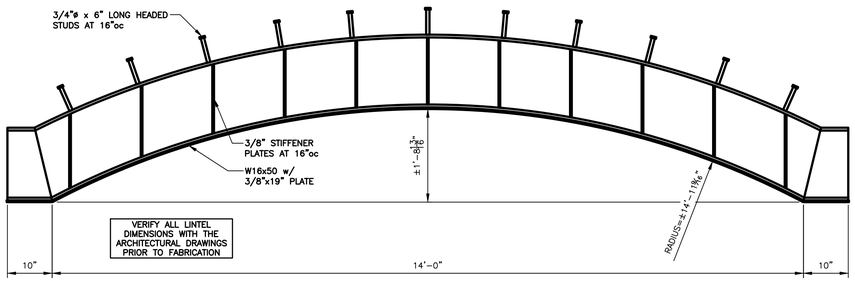
LOOSE LINTEL SCHEDULE FOR BRICK VENEER

OPENING	LINTEL SIZE	MIN. BEARING
<6'−0"	L3 1/2 x 3 1/2 x 5/16"	8" MIN.
<8'−6"	L6 x 3 1/2 x 5/16" LLV	8" MIN.

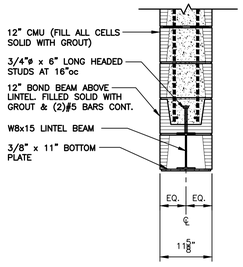
− SPANS GREATER THAN 8'−6" REQUIRE PL7 1/2 x 7 1/2 x 5/16" BENT PLATE w/ 5/8"ø THRU BOLTS AT 24"oc IN LIGHT GAUGE HEADER



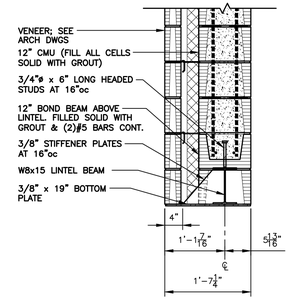
TYP. LOOSE LINTEL DETAIL



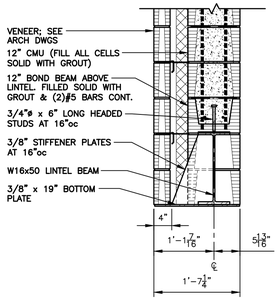
LINTEL 'L3'



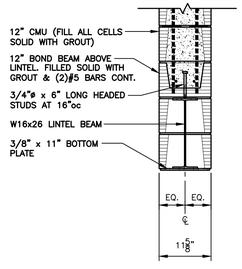
LINTEL 'L1'



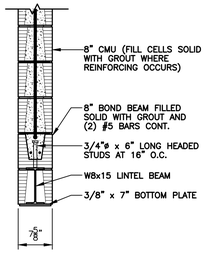
LINTEL 'L2'



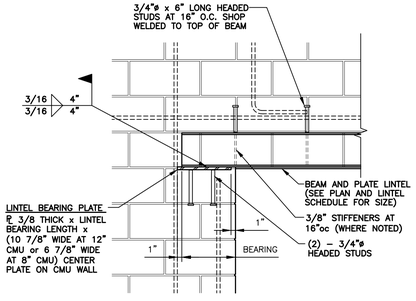
LINTEL 'L3'



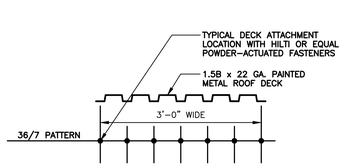
LINTEL 'L4'



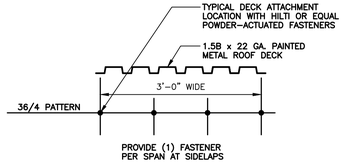
LINTEL 'L5'



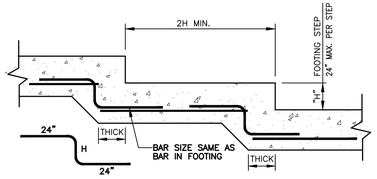
TYPICAL STEEL LINTEL BEARING DETAIL



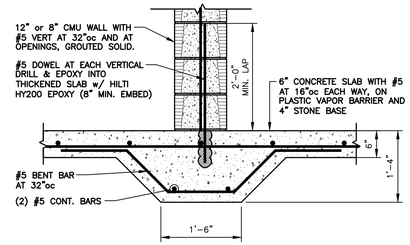
DECK ATTACHMENT AT APPARATUS BAY



DECK ATTACHMENT AT LIVING QUARTERS

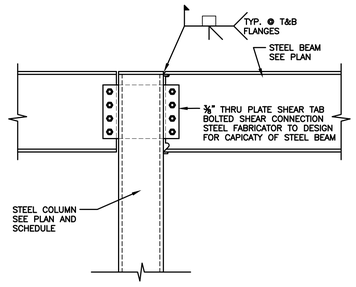


TYPICAL STEPPED FOOTING DETAIL



1 / 3.02 THICKENED SLAB 'TS1.5'

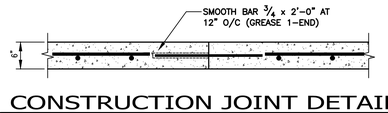
SCALE: 3/4" = 1'−0"



TYPICAL RIGID CONNECTION DETAIL

CONTROL JOINT DETAIL

CONTROL JOINT SPACING IS TO BE NO MORE THAN 24 - 36 x SLAB DEPTH

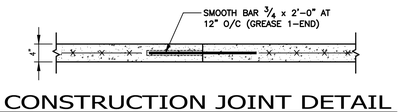


CONSTRUCTION JOINT DETAIL

CONSTRUCTION JOINTS ARE TO OCCUR WHERE CONCRETE POURS STOP AND START

CONTROL JOINT DETAIL

CONTROL JOINT SPACING IS TO BE NO MORE THAN 24 - 36 x SLAB DEPTH



CONSTRUCTION JOINT DETAIL

CONSTRUCTION JOINTS ARE TO OCCUR WHERE CONCRETE POURS STOP AND START

WALL FOOTING SCHEDULE

MARK	FOOTING SIZE	CONT. BARS	TRANSVERSE BARS
WF2.5	2'−6" WIDE x 14" DEEP	(3) #5 BARS CONT.	#5 BARS AT 32"oc
WF3.0	3'−0" WIDE x 14" DEEP	(4) #5 BARS CONT.	#5 BARS AT 32"oc
WF3.5	3'−6" WIDE x 18" DEEP	(4) #5 BARS CONT.	#5 BARS AT 32"oc
TS1.5	1'−6" WIDE x 16" DEEP	(2) #5 BARS CONT.	#5 BARS AT 32"oc

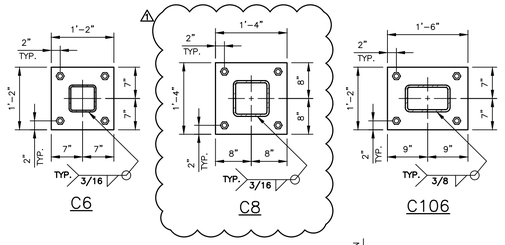
COLUMN FOOTING SCHEDULE

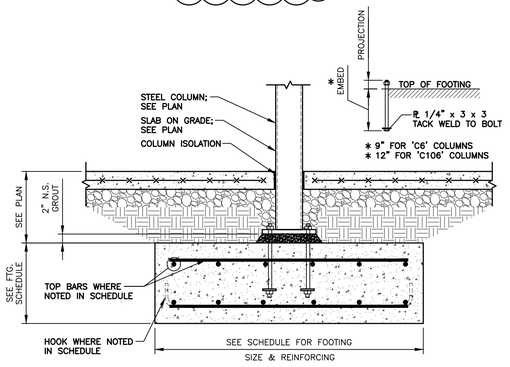
MARK	FOOTING SIZE	REINFORCING
F3	3'−0" x 3'−0" x 18" DEEP	(4) − #5 BARS E.W. HOOKED ENDS (BOTTOM)
F4	4'−0" x 4'−0" x 18" DEEP	(6) − #5 BARS E.W. (TOP) (6) − #5 BARS E.W. HOOKED ENDS (BOTTOM)
F5	5'−0" x 5'−0" x 18" DEEP	(7) − #5 BARS E.W. (TOP) (7) − #5 BARS E.W. HOOKED ENDS (BOTTOM)
F585	5'−0" x 8'−6" x 18" DEEP	(7) − #5 BARS T&B (SHORT FACE) (10) − #5 BARS T&B (LONG FACE)
F6	6'−0" x 6'−0" x 18" DEEP	(8) − #5 BARS E.W. TOP & BOTTOM
F7	7'−0" x 7'−0" x 18" DEEP	(9) − #5 BARS E.W. TOP & BOTTOM

COLUMN SCHEDULE

MARK	COLUMN SIZE	BASE PLATE SIZE	ANCHOR BOLTS
C6	HSS 6 x 6 x 1/2	PL 1" x 14" x 14"	(4) 1ø *
C8	HSS 8 x 8 x 1/2	PL 1" x 16" x 16"	(4) 1ø *
C106	HSS 10 x 6 x 1/2	PL 1−1/4" x 18" x 14"	(4) 1ø *
HP1	HSS 4 x 4 x 3/8	N/A	N/A

* SEE DETAILS BELOW FOR ANCHOR BOLT LENGTHS AND EMBEDMENT





TYPICAL COLUMN FOOTING DETAIL

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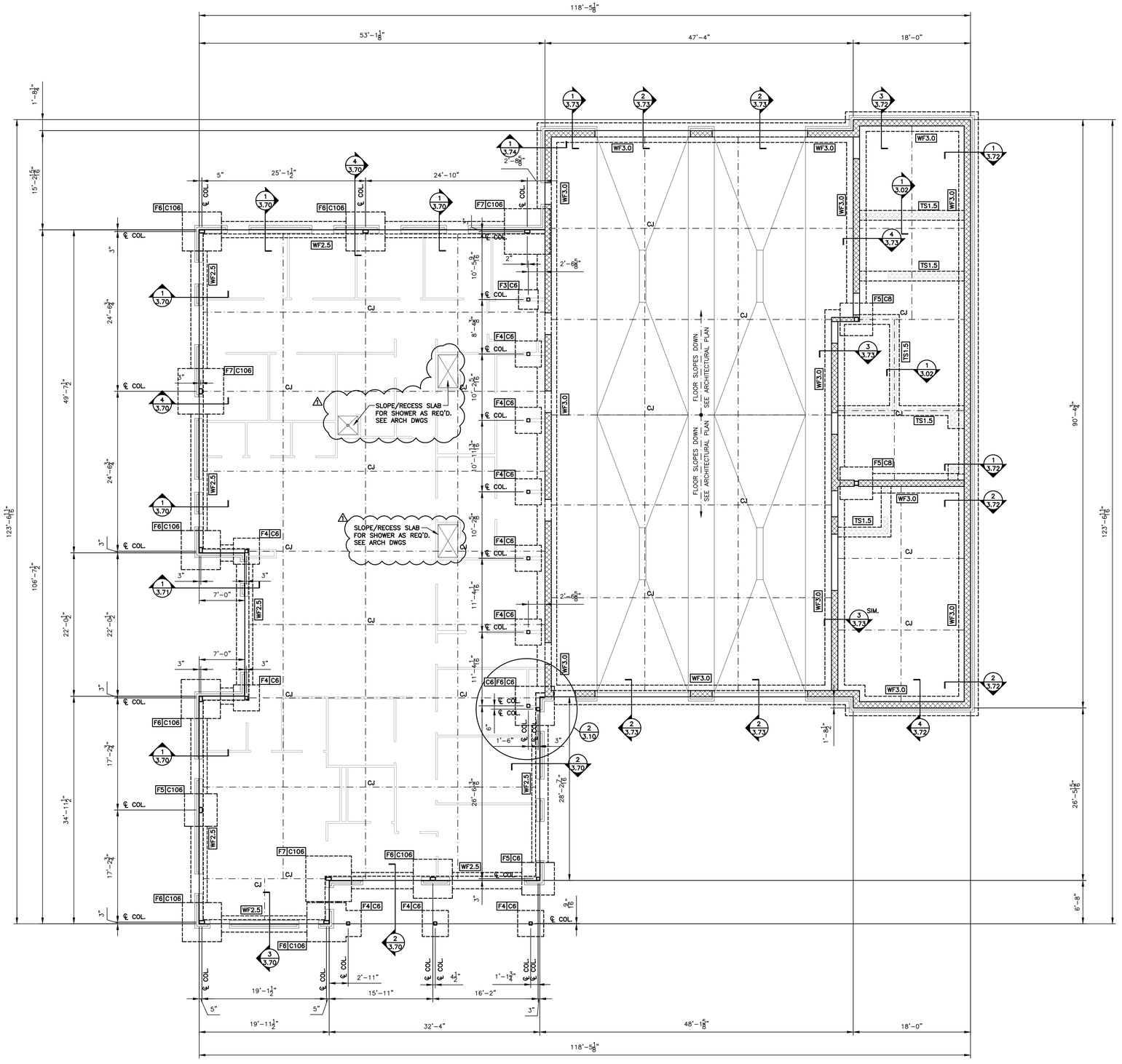
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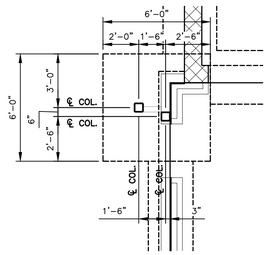
NORTH CAROLINA PROFESSIONAL SEAL 056634 ENGINEER WILLIAM D. LAATSCH
05.10.2024

CASTLE HAYNE FIRE DEPARTMENT
NEW FIRE SUB−STATION
CASTLE HAYNE, NC

SCHEDULES AND TYPICAL DETAILS

sheet
3.02





2 / 3.10 **FOOTING BLOWUP PLAN**
SCALE: 1/4" = 1'-0"

1 / 3.10 **FOUNDATION PLAN**
SCALE: 1/8" = 1'-0"

- TOP OF FOOTING ELEVATION TO BE (-1'-4") BELOW FINISHED FLOOR SLAB ON GRADE (+0'-0") UNLESS OTHERWISE NOTES THUS 'TF(-X'-X")'
- LIVING QUARTER SHALL BE 4" CONCRETE SLAB ON GRADE WITH 6x6-W1.4xW1.4 WWM ON VAPOR BARRIER PER ARCHITECT AND 4" STONE BASE.
- APPARATUS BAY SHALL BE 6" CONCRETE SLAB ON GRADE WITH #5 AT 12"oc E.W. ON VAPOR BARRIER PER ARCHITECT AND 4" STONE BASE.
- 'CJ' INDICATES CONSTRUCTION JOINT; SEE TYPICAL DETAIL ON SHEET 3.02.
- 'FX' INDICATES CONCRETE FOOTING; SEE FOOTING SCHEDULE ON SHEET 3.02 FOR SIZE AND REINFORCING, TYPICAL.
- 'CX' INDICATES STEEL COLUMN; SEE COLUMN SCHEDULE ON SHEET 3.02 FOR SIZE AND DETAILS, TYPICAL.
- 'WFX.X' INDICATES WALL FOOTING; SEE FOOTING SCHEDULE ON SHEET 3.02 FOR SIZE AND REINFORCING, TYPICAL.
- ALL DIMENSIONS TO BE VERIFIED/COORDINATED WITH ARCHITECTURAL DRAWINGS. IN EVENT OF CONFLICT, ARCHITECTURAL DRAWINGS TO GOVERN.
- GC COORDINATE FOOTING STEPS AND LOCATIONS WITH CIVIL AND ARCH DRAWINGS; SEE TYPICAL FOOTING STEP DETAIL ON SHEET 3.01
- GC TO STEP FOOTING SUCH THAT TOP OF FOOTING IS BELOW PLUMBING/MECH LINES. COORDINATE FOOTING ELEVATIONS WITH MECH/PLUMBING LINES. MAX FOOTINGSTEP IS 24" PER STEP, SEE SHEET 3.02 FOR TYPICAL FOOTING STEP DETAIL.

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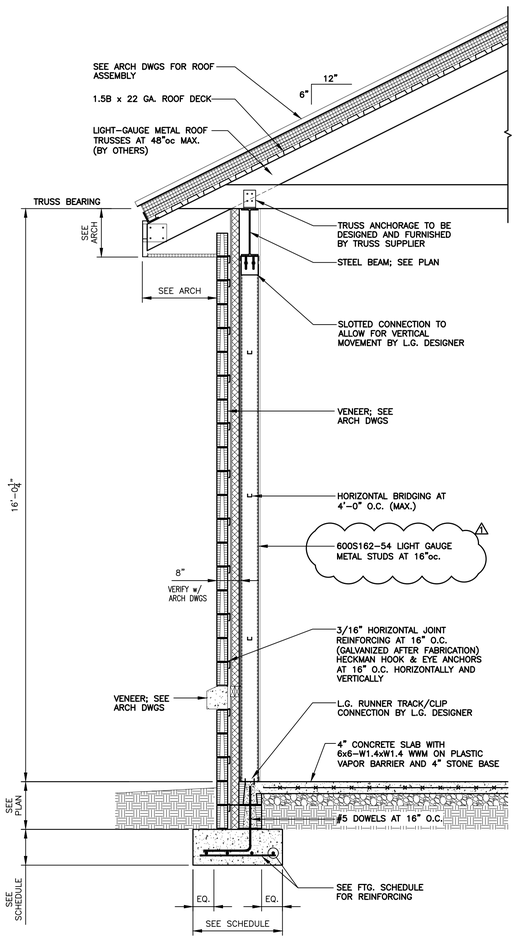
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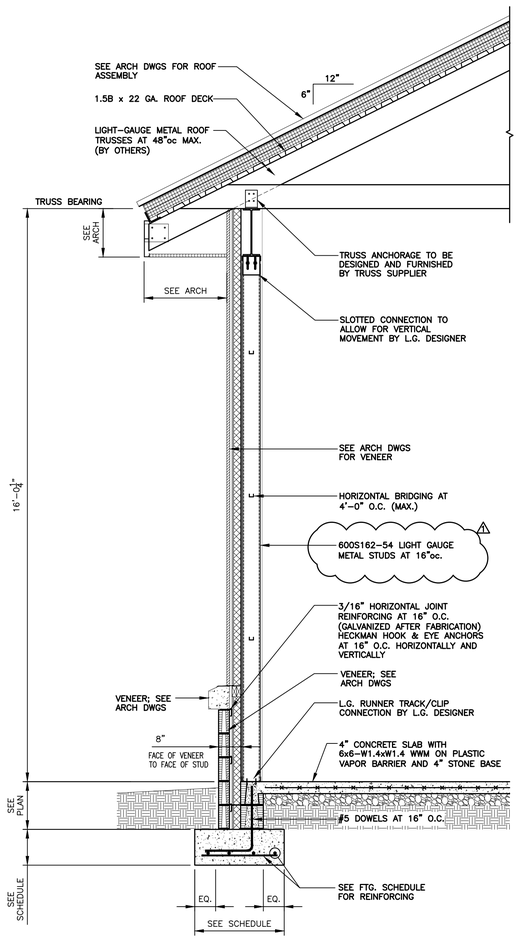
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FOUNDATION PLAN

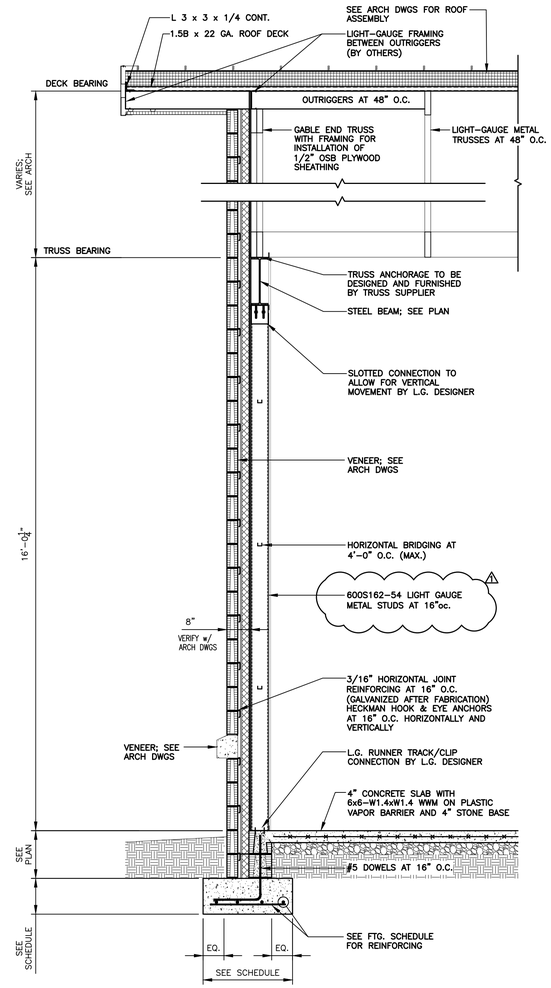
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3.10



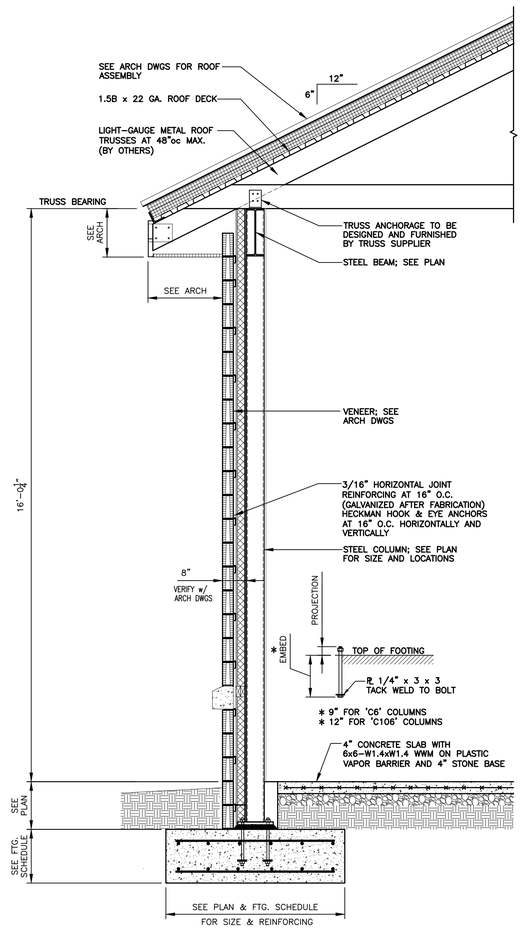
1 3.70 **WALL SECTION**
SCALE: 1/2" = 1'-0"



2 3.70 **WALL SECTION**
SCALE: 1/2" = 1'-0"



3 3.70 **WALL SECTION**
SCALE: 1/2" = 1'-0"



4 3.70 **WALL SECTION**
SCALE: 1/2" = 1'-0"

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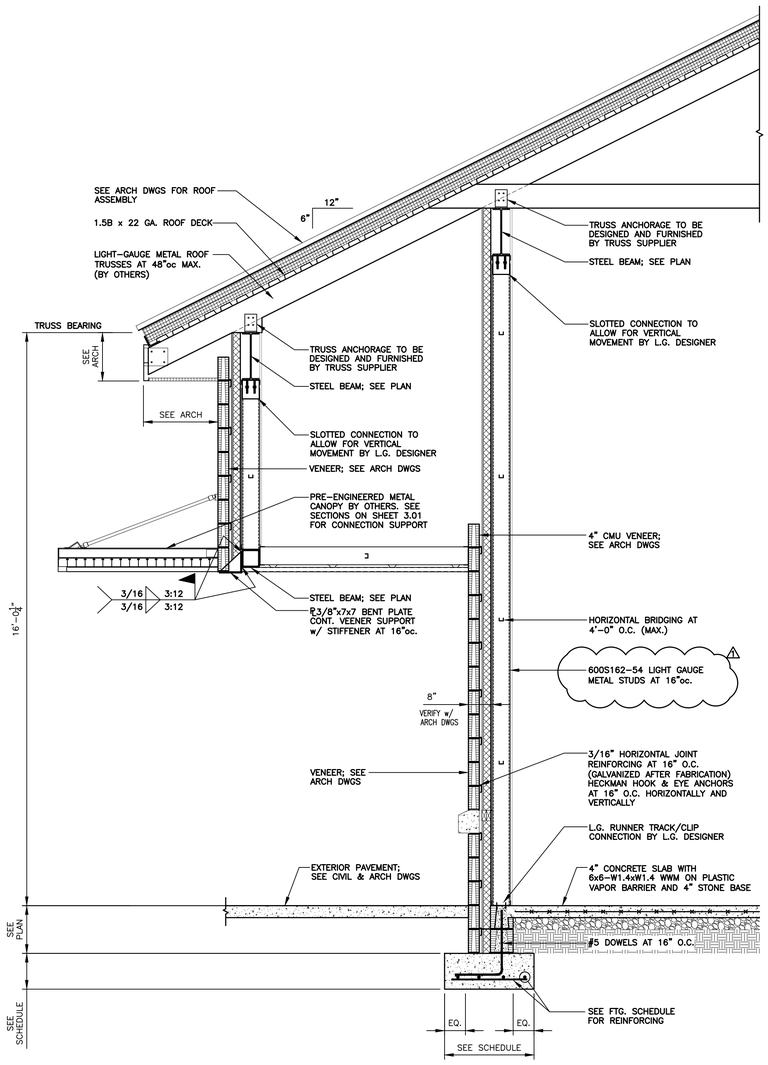
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NORTH CAROLINA PROFESSIONAL SEAL 036654 ENGINEER WILLIAM D. LAATSCH
05.10.2024

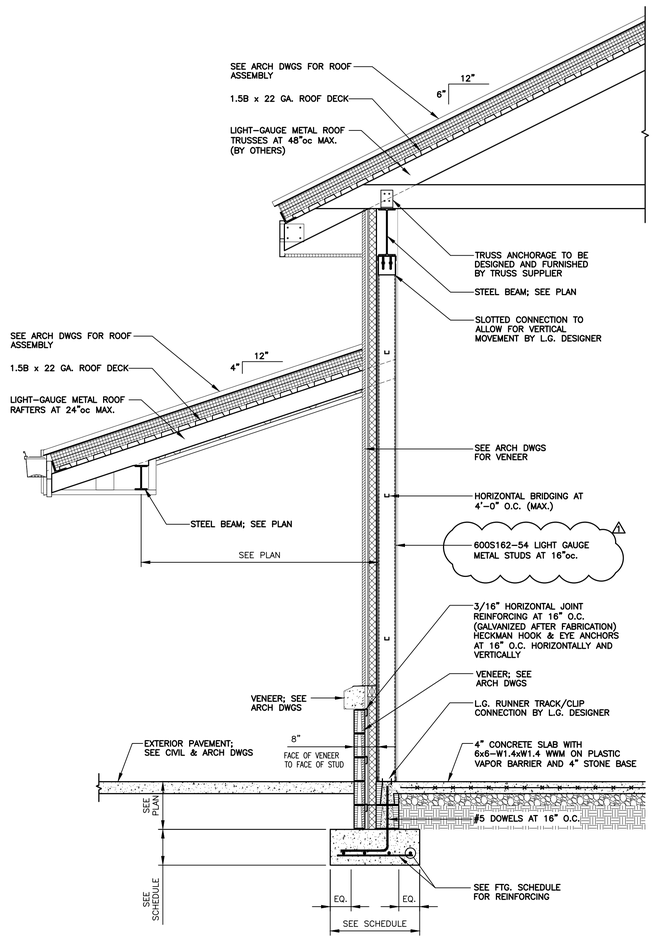
CASTLE HAYNE FIRE DEPARTMENT
NEW FIRE SUB-STATION
CASTLE HAYNE, NC

FRAMING SECTIONS

sheet
3.70



1 / 3.71 **WALL SECTION**
SCALE: 1/2" = 1'-0"



2 / 3.71 **WALL SECTION**
SCALE: 1/2" = 1'-0"

GENERAL NOTE

ALL NOTES APPLY TO ALL DRAWINGS AND TO ALL TRADES. IT IS THE RESPONSIBILITY OF ALL CONTRACTORS AND TRADES TO COORDINATE THE INSTALLATION OF THEIR WORK WITH THE INSTALLATION OF WORK BY ALL OTHER CONTRACTORS AND TRADES. THE REQUIREMENTS OF THE DRAWINGS, GENERAL REQUIREMENTS AND ALL ITEMS OF THE CONTRACT DOCUMENTS ARE EQUALLY BINDING ON ALL CONTRACTORS AND TRADES. EACH CONTRACTOR IS REQUIRED TO MAINTAIN FULL SETS OF THE CONTRACT DOCUMENTS FOR HIS EMPLOYEES USE ON THE PROJECT TO ASSURE THAT ALL WORK IS PROPERLY COORDINATED AND INSTALLED WITH THE WORK OF OTHER CONTRACTORS AND TRADES.

WHENEVER THERE ARE DISCREPANCIES BETWEEN DRAWINGS, OR BETWEEN THE DRAWINGS AND SPECIFICATIONS, OR CONFLICTS WITHIN THE SPECIFICATIONS AND/OR DRAWINGS, AND SUCH DISCREPANCY IS NOT CALLED TO THE ARCHITECT'S ATTENTION IN TIME TO PERMIT CLARIFICATION BY ADDENDUM, THE CONTRACTOR SHALL BASE HIS BID UPON PROVIDING THE BETTER QUALITY OR GREATER OF WORK OR MATERIAL CALLED FOR, SHALL SUBMIT A WRITTEN STATEMENT WITH HIS PROPOSAL NOTING SUCH DISCREPANCIES, AND SHALL SO FURNISH AND INSTALL SUCH BETTER QUALITY OR GREATER QUANTITY UNLESS OTHERWISE ORDERED BY ARCHITECT IN WRITING.

Project No.
1738

Date
05/10/2024
Drawn
WDL
Checked
WDL
Revisions
⚠Addendum 2 05/10/24

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STRUCTURAL ENGINEERS
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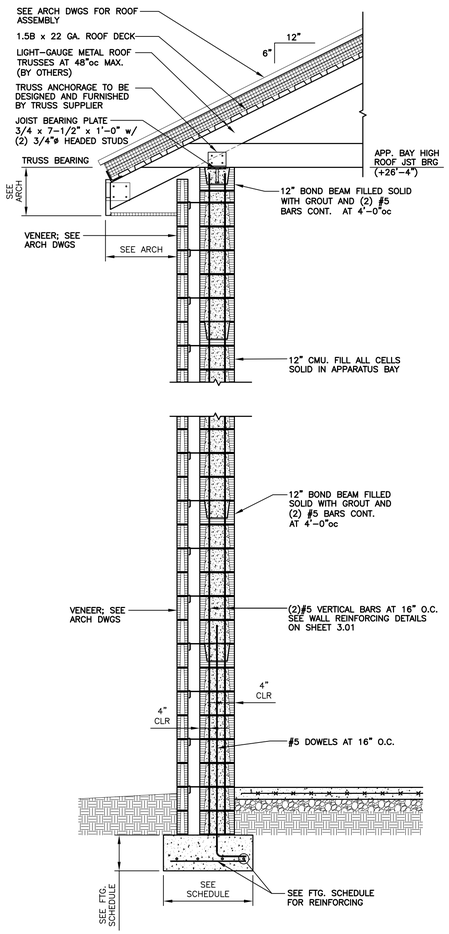
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NORTH CAROLINA PROFESSIONAL SEAL 056654 ENGINEER WILLIAM D. LAATSCH
05.10.2024

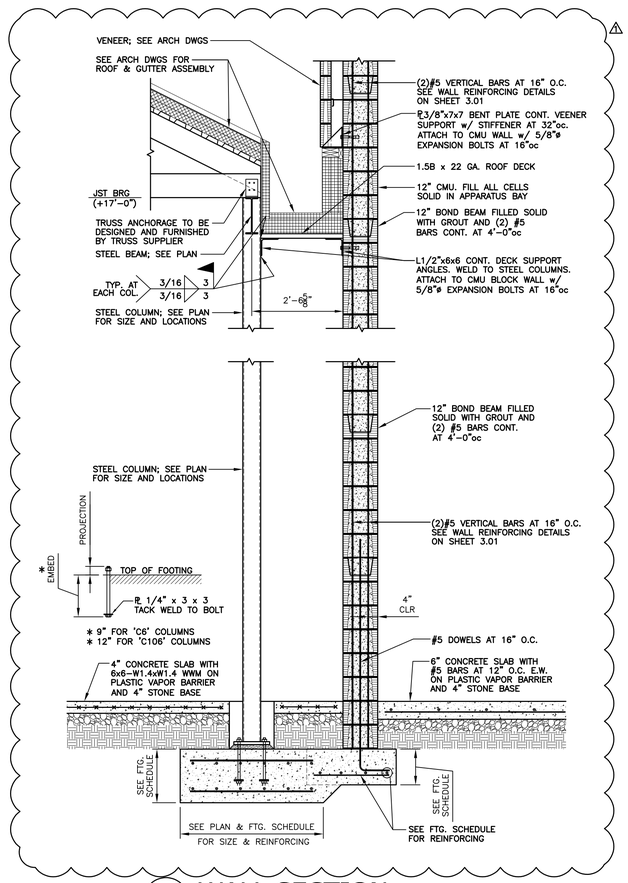
CASTLE HAYNE FIRE DEPARTMENT
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CASTLE HAYNE, NC

FRAMING SECTIONS

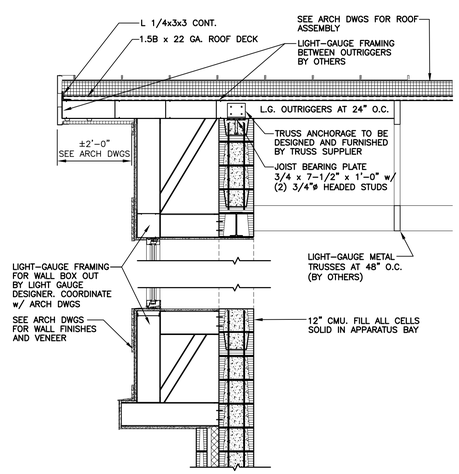
sheet
3.71



1 3.74 **WALL SECTION**
SCALE: 1/2" = 1'-0"



2 3.74 **WALL SECTION**
SCALE: 1/2" = 1'-0"



3 3.74 **BUMP-OUT SECTION**
SCALE: 1/2" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 056694 ENGINEER WILLIAM D. LAATSCH
05.10.2024

CASTLE HAYNE FIRE DEPARTMENT
NEW FIRE SUB-STATION
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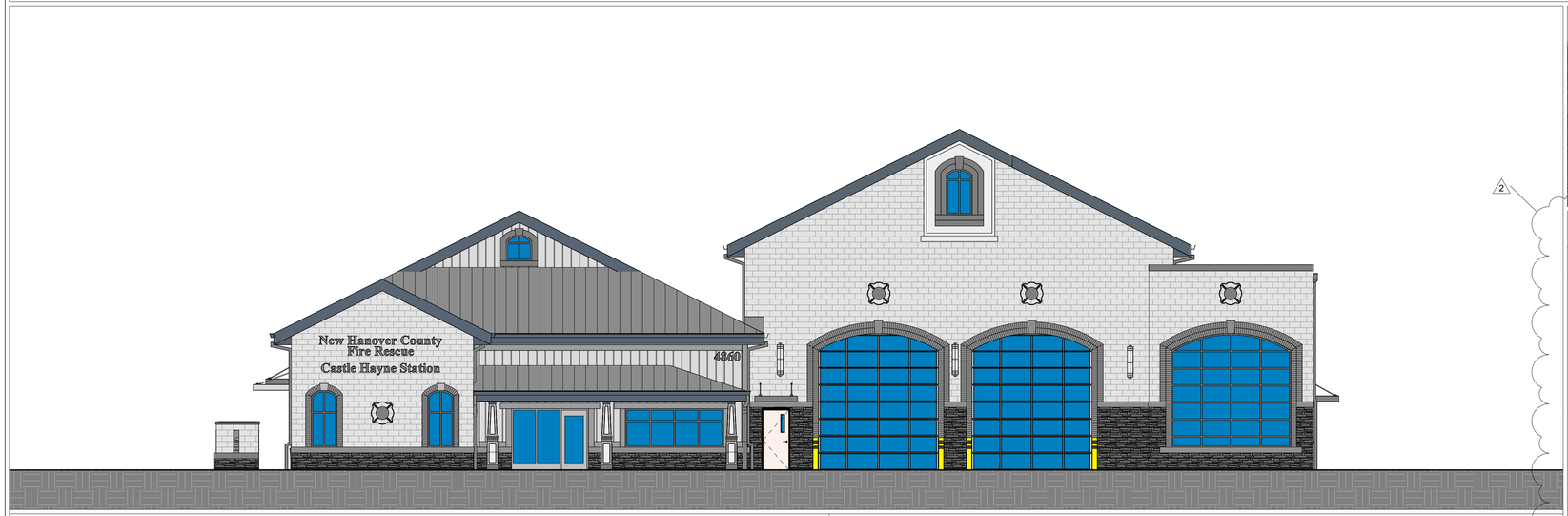
FRAMING SECTIONS

sheet
3.74

CASTLE HAYNES FIRE DEPARTMENT

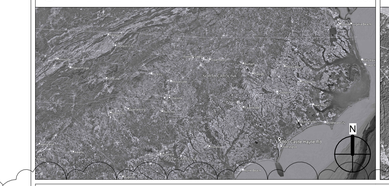
NEW HANOVER COUNTY

4860 CASTLE HAYNE RD, CASTLE HAYNE, NC



STATE MAP

N.T.S.



VICINITY MAP

N.T.S.



INDEX OF DRAWINGS

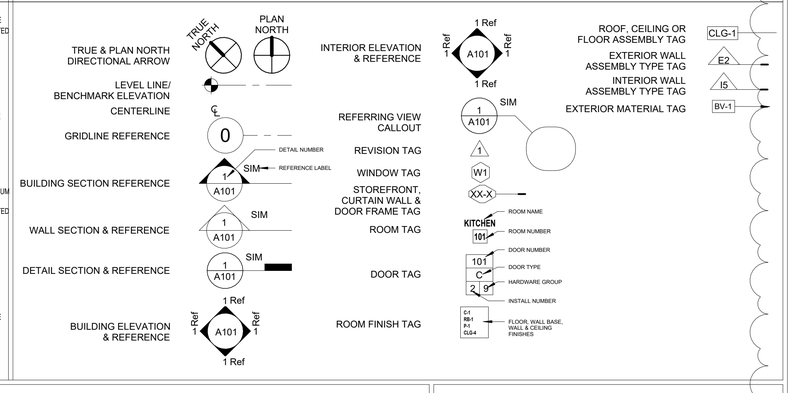
#	SHEET NAME
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0.00	COVER SHEET
1.00	APPENDIX B
1.10	LIFE SAFETY PLANS
1.70	UL DETAILS
1.71	UL DETAILS
1.72	UL DETAILS
1.73	UL DETAILS
1.74	UL DETAILS
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C2.2	PHASE III EC PLAN
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C3.0	SITE PLAN
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C4.0	GRADING PLAN
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C4.2	DRAINAGE AREA MAP
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C4.4	DRY DETENTION
C4.5	DRY DETENTION
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C4.7	STORMWATER PROFILES
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C5.1	NOTES AND DETAILS
C5.2	NOTES AND DETAILS
C5.3	NOTES AND DETAILS
C5.4	NOTES AND DETAILS
C5.5	NOTES AND DETAILS
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4.75	WALL TYPES, WINDOW & DOOR DETAILS
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5.31	WALL SECTION DETAILS

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T5.03	TELECOM DETAILS

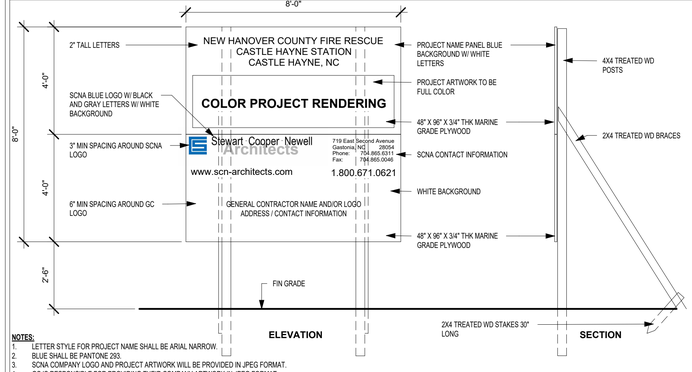
ARCHITECTURAL ABBREVIATIONS

A		DIA	DIAMETER	HC	HANDICAPPED, HOLLOW CORE	OC	ON CENTER	SC	SOLID CORE, SEALED CONCRETE
ABV	ABOVE	DIM	DIMENSION			OPNG	OPENING	SPA	SPACES
AFC	ABOVE FINISHED CEILING	DISP	DISPENSER	HDWR	HARDWARE	OPP	OPPOSITE	SB	SPLASH BLOCK
AFF	ABOVE FINISHED FLOOR	DIV	DIVISION	HWD	HARDWOOD	OPH	OPPOSITE HAND	SPFL	SPORT FLOORING
AP	ACCESS PANEL	DR	DOOR	HD	HEAD, HEADED, HEAVY DUTY	OD	OUTSIDE DIAMETER	SQ	SQUARE
ACOU	ACOUSTICAL	DBL	DOUBLE	HW	HEADWALL	ORD	OVERFLOW ROOF DRAIN	SF	SQUARE FEET
APC	ACOUSTICAL PANEL CEILING	DWLS	DOWELS	HT	HEIGHT	OH	OVERHEAD	SW	STAINED WOOD
ADJ	ADJUSTABLE	DN	DOWN	HCFV	HOLLOW CORE FINISHED VENEER	OCD	OVERHEAD COILING DOOR	SS	STAINLESS STEEL
ADMIN	ADMINISTRATIVE	DS	DOWNSPOUT			OCG	OVERHEAD COILING GRILLE	STL	STEEL
AGG	AGGREGATE	DWR	DRAWER	HM	HOLLOW METAL	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED	STD	STANDARD
A/C	AIR CONDITIONING	DWG	DRAWING	H, HORZ	HORIZONTAL			STL	STEEL
AHU	AIR HANDLING UNIT	E		HLB	HORIZONTAL LOUVER BLINDS	OFVI	OWNER FURNISHED VENDOR INSTALLED	STOR	STORAGE
ALT	ALTERNATE	EA	EACH	HB	HOSE BIB			SGFT	STRUCTURAL GLAZED FACING TILE
AL ST	ALUMINUM STOREFRONT	EA	EACH	HDG	HOT-DIPPED GALVANIZED	P		STRUCT	STRUCTURE, STRUCTURAL
ALUM	ALUMINUM	EW	EACH WAY	HR(S)	HOUR, HOURS	PNTGR	PAINT GRADE	SUS	SUSPENDED
A, AMP	AMPERES	EWC	ELECTRIC WATER COOLER	I		P	PAINT, PAINTED	SYS	SYSTEM
AB	ANCHOR BOLT	ELECT	ELECTRICAL	IAW	IN ACCORDANCE WITH	PR	PAIR	T	
ANOD	ANODIZED	EL, ELEV	ELEVATION	INC	INCANDESCENT	PNL	PANEL	TKS	TACK STRIP
APPROX	APPROXIMATELY	EQ	EQUAL	IN	INCH	PTD	PAPER TOWEL DISPENSER	TKSF	TACK SURFACE
ARCH	ARCHITECTURAL	EQUIP	EQUIPMENT	INCL	INCLUDING	PAR	PARALLEL	TKBD	TACKBOARD
AWI	ARCHITECTURAL WOODWORK INSTITUTE	ETC	ETCETERA	ID	INSIDE DIAMETER	PTN	PARTITION	TC	TEACHER CABINET
ASSY	ASSEMBLY	EXH	EXHAUST	INSUL	INSULATED	PVMT	PAVEMENT	TECH	TECHNICAL
@	AT	EF	EXHAUST FAN	IG	INSULATED GLAZING	PEN	PENETRATION	TEL	TELEPHONE
ATS	AUTOMATIC TRANSFER SWITCH	(E), EXIST	EXISTING	INT	INTERIOR	PERP	PERPENDICULAR	TEMP	TEMPERATURE
		EXGR	EXISTING GRADE	IBC	INTERNATIONAL BUILDING CODE	PLAS	PLASTER	TWC	TEXTILE WALL COVERING
AUX	AUXILIARY	EXP	EXPANSION			PLT	PLASTIC	TLT	TOILET
B		EJ	EXPANSION JOINT	IECC	INTERNATIONAL ENERGY CONSERVATION CODE	PLAM	PLASTIC LAMINATE	TP	TOILET PARTITION
BM	BEAM	EXPD	EXPOSED	IJ	ISOLATION JOINT	PL	PLATE	TTD	TOILET TISSURE DISPENSER
BLK	BLOCK	EXT	EXTERIOR	J		PG	PLATE GLASS	TO	TOP OF
BLKG	BLOCKING	ESSB	EXTERIOR GYPSUM SOFFIT BOARD	JAN	JANITOR	PLWD	PLYWOOD	TOC	TOP OF CURB
BD	BOARD	EIFS	EXTERIOR INSULATION FINISH SYSTEM	JT	JOINT	PVC	POLYVINYL CHLORIDE	TOD	TOP OF DRAIN
BLD	BOLLARD			JST	JOIST	PFT	PORCELAIN FLOOR TILE	TOM	TOP OF MASONRY
B, BOTT	BOTTOM	F		L		PCP	PORTLAND CEMENT PLASTER	TOS	TOP OF STEEL
BO	BOTTOM OF	FOC	FACE OF CONCRETE	L	ANGLE SHAPE	POS	POSITIVE	TYP	TYPICAL
BOS	BOTTOM OF STEEL	FOM	FACE OF MASONRY	LAM	LAMINATE	PEMB	PRE-ENGINEERED METAL BUILDING	U	
BTU	BRITISH THERMAL UNIT	F	FAHRENHEIT	LAV	LAVATORY	PREFIN	PRE-FINISHED	UBC	UNIFORM BUILDING CODE
BRZ	BRONZE	FT	FEET	LG	LENGTH	PREFAB	PREFABRICATED	UON	UNLESS OTHERWISE NOTED
BLDG	BUILDING	FRP	FIBER REINFORCED PLASTIC	LIB	LIBRARY	PT	PRESERVATIVE TREATED	URS	URINAL SCREEN
C		FV	FIELD VERIFY	LW	LIGHTWEIGHT	PA	PUBLIC ADDRESS	UTIL	UTILITY
CAB	CABINET	FIN	FINISH	LF	LINEAR FOOT	Q		V	
CR	CARD READER	FF	FINISHED FLOOR	LSD	LIQUID SOAP DISPENSER	QA	QUALITY ASSURANCE	VEND	VENDING
CPT	CARPET	FGD	FINISHED GRADE	LLH	LONG LEG HORIZONTAL	QC	QUALITY CONTROL	VTR	VENT THROUGH ROOF
CPTT	CARPET TILE	FA	FIRE ALARM	LLV	LONG LEG VERTICAL	QT	QUARRY TILE	VERT	VERTICAL
CI	CAST IRON	FC	FIRE CODE	LVR	LOUVER	R		VEST	VESTIBULE
CLG	CEILING	FE	FIRE EXTINGUISHER	LVT	LUXURY VINYL TILE	R	RADIUS	VCT	VINYL COMPOSITION TILE
CBB	CEMENTITIOUS BACKER BOARD	FEC	FIRE EXTINGUISHER CABINET	LB	POUND	REF	REFERENCE	VWC	VINYL WALL COVERING
CWFP	CEMENTITIOUS WOOD FIBER PLANK	FHC	FIRE HOSE CABINET	M		RCP	REINFORCED CONCRETE PIPE	V	VOLTS
		FRTWD	FIRE RETARDANT TREATED WOOD	MAINT	MAINTENANCE	REINF	REINFORCED, REINFORCEMENT	W	
CL	CENTERLINE	FLASH	FLASHING	MGR	MANAGER	REP	REPRESENTATIVE	WP	WATERPROOFING
C	CENTIGRADE	FLR	FLOOR	MH	MANHOLE	REQD	REQUIRED	W	WATTS
CT	CERAMIC TILE	FD	FLOOR DRAIN	MTS	MANUAL TRANSFER SWITCH	RAF	RESILIENT ATHLETIC FLOORING	WSTRIP	WEATHER-STRIP
CHBD	CHALKBOARD	FOLD PART	FOLDING PARTITION	MFR	MANUFACTURER			WP	WEATHERPROOF
CLR	CLEAR	FS	FOOT SCRAPER	MKBD	MARKERBOARD	RB	RESILIENT BASE	WT	WEIGHT
CLO	CLOSET	FUR	FURRING	MAS	MASONRY	RWAR	RESILIENT WOOD ATHLETIC FLOORING	WWF	WELDED WIRE FABRIC
CH	COAT HOOK	Fy	YEILD STRESS	MO	MASONRY OPENING			WWM	WELDED WIRE MESH
CSP	COBBLESTONE PAVERS	G		MAX	MAXIMUM	RD	ROOF DRAIN	WB	WIND BRACE
CFMF	COLD-FORMED METAL FRAMING	GALV	GALVANIZED	MECH	MECHANICAL	RV	ROOF VENT	WBBP	WIND BRACE BASE PLATE
		G	GAS	MC	MEDICINE CABINET	RM	ROOM	WNDW	WINDOW
COL	COLUMN	GEN	GENERAL	MMB	MEMBRANE	RO	ROUGH OPENING	W	WITH
CONC	CONCRETE	GC	GENERAL CONTRACTOR	MTL	METAL	S		WO	WITHOUT
CMU	CONCRETE MASONRY UNIT	GMMU	GLASS MESH MORTAR UNITS	MD	MIDDLE	SND	SANITARY NAPKIN DISPOSAL UNIT	WOM	WOMEN
CONNX	CONNECTION	GL	GLASS, GLAZING	MPH	MILES PER HOUR			WD	WOOD
CONST	CONSTRUCTION	GSFT	GLAZED STRUCTURAL FACING TILE	MM	MILLIMETER	SNV	SANITARY NAPKIN VENDOR		
CONT	CONTINUOUS			MIN	MINIMUM	SJ	SAWN JOINT		
CJ	CONTROL JOINT	GB	GRAB BAR	MIR	MIRROR	SCHED	SCHEDULE		
CG	CORNER GUARD	GD	GRADE	MISC	MISCELANEOUS	SNT	SEALANT		
CRDR	CORRIDOR	GND	GROUND	MB	MOP BASIN	SLD	SEALED		
CRS	COURSE	GA	GUAGE	MULL	MULLION	SEC	SECONDARY		
CU	CUBIC	GYP	GYPSUM	MTCS	MULTI-TONE COLOR SYSTEM	SHM	SECURE HOLLOW METAL		
CTK	CURTAIN TRACK	GYPBD	GYPSUM BOARD	N		SSK	SERVICE SINK		
CUST	CUSTOM	GDW	GYPSUM DRYWALL	NEG	NEGATIVE	SHT	SHEET		
D		GWB	GYPSUM WALL BOARD	NA	NOT APPLICABLE	SHWR	SHOWER		
DP	DAMPROOFING	H		NIC	NOT IN CONTRACT	SR	SHOWER ROD		
DEF	DEFORMED	HEWC	HANDICAPPED ELECTRIC WATER COOLER	NTS	NOT TO SCALE	SIM	SIMILAR		
DTL	DETAIL			NO, #	NUMBER	SGL	SINGLE		
DIAG	DIAGRAM			O		SD	SMOKE DETECTOR		
				OFF	OFFICE	SCFV	SOLID CORE FLUSH VENEER		

ARCHITECTURAL SYMBOLS



PROJECT SIGN



NOTES:

1. LETTER STYLE FOR PROJECT NAME SHALL BE ARIAL NARROW.
2. BLUE SHALL BE PANTONE 293.
3. SCNA COMPANY LOGO AND PROJECT ARTWORK WILL BE PROVIDED IN JPEG FORMAT.
4. GC IS RESPONSIBLE FOR PROVIDING THEIR COMPANY ARTWORK IN JPEG FORMAT.
5. SIGN MANUFACTURER SHALL SUBMIT SHOP DRAWING OF PROJECT SIGN TO ARCHITECT FOR APPROVAL PRIOR TO FABRICATION.
6. COORDINATE EXACT LOCATION IN FIELD WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
7. GC SHALL BE RESPONSIBLE FOR SECURING ANY TEMPORARY SIGN PERMITS REQUIRED BY THE AUTHORITY HAVING JURISDICTION PRIOR TO FABRICATION AND INSTALLATION.

PROJECT TEAM

ARCHITECT

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CIVIL

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STRUCTURAL

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Project No.
1738

Date:
03.29.2024
Drawn by:
AJP/GAS
Checked by:
KCN/GAS
Revisions: 2
05.10.2024
ADDENDUM 2

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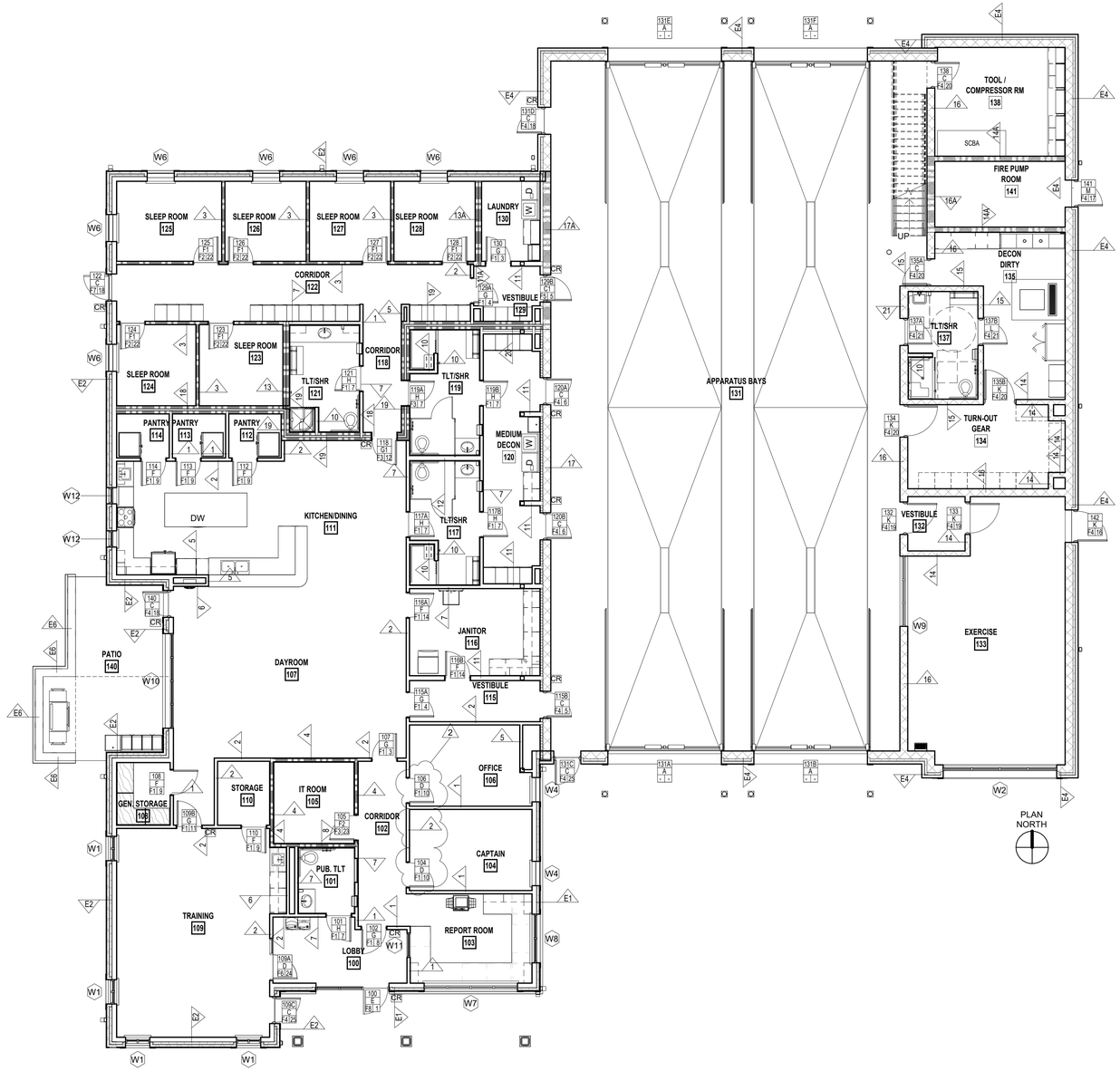
FRANCES C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA

03.29.2024

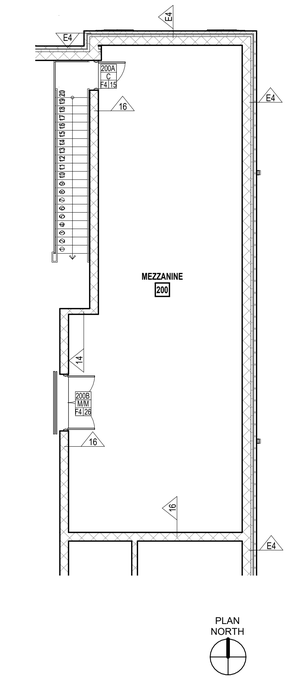
CASTLE HAYNES FIRE DEPARTMENT

COVER SHEET

Sheet No.
0.00



1 FIRST FLOOR DOORS, WINDOWS, WALL TAGS PLAN
1/8" = 1'-0"



2 MEZZANINE DOORS, WINDOWS, WALL TAGS PLAN
1/8" = 1'-0"

GENERAL NOTE

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Project No.
1738

Date:
03.29.2024
Drawn by:
AJP/GAS
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KCN
Revisions:
2
05.10.2024
ADDENDUM 2

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03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

DOOR, WINDOWS, AND WALL TAGS PLAN

Sheet No.
4.12

HARDWARE MANUFACTURERS:

LOCK - LATCH	SARGENT
HINGES	HAGAR, MCKINNEY, STANLEY
CLOSERS	LCN, SARGENT
CLOSER / HOLDERS	LCN, SARGENT
EXIT DEVICES	VON DUPRIN
PUSH - PULLS	ROCKWOOD
PUSH PLATES	ROCKWOOD
FLUSH BOLTS	GLYNN-JOHNSON, ROCKWOOD, IVES
STOPS	GLYNN-JOHNSON, ROCKWOOD, IVES, SARGENT
KICKPLATES	ROCKWOOD
SILENCERS	GLYNN-JOHNSON, IVES
LOCK GUARDS	GLYNN-JOHNSON, IVES
THRESHOLDS	ZERO, REESE, NATIONAL GUARD
WEATHERSTRIPPING	ZERO, NATIONAL GUARD

***G.C. ALL CORES TO COMPATIBILITY WITH EXISTING CORES USED BY OWNER ON CITY FACILITIES**

HARDWARE NOTES:

1. THE FOLLOWING LIST OF HARDWARE ITEMS AND THEIR RESPECTIVE MANUFACTURERS ARE REPRESENTED BY SPECIFIC CATALOG NUMBERS IN THE HARDWARE SCHEDULE. HARDWARE ITEMS NOT SHOWN HERE WILL BE SPECIFICALLY CALLED OUT BY MANUFACTURER AND CATALOG NUMBER IN THE ACTUAL HARDWARE GROUP.
2. WHERE REQUIRED, HARDWARE SHALL MEET THE REQUIREMENTS OF THE ADA.
3. WHERE REQUIRED, PROVIDE HARDWARE AND ACCESSORIES THAT COMPLY WITH THE FIRE RATINGS OF THE OPENINGS OR WALLS IN WHICH THEY ARE LOCATED WHETHER INDICATED OR NOT.
4. SUBMIT MANUFACTURERS CUT SHEETS FOR ALL HARDWARE. HARDWARE WILL NOT BE REVIEWED BY THE ARCHITECT WITHOUT CUT SHEETS FOR ALL ITEMS SCHEDULED OR PROVIDED.
5. ALL HARDWARE SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.
6. MISCELLANEOUS REQUIRED HARDWARE ITEMS: CONTRACTOR AND HARDWARE SUPPLIER SHALL FURNISH ALL THE ITEMS INCLUDED HEREIN AS REQUIRED EVEN IF NOT LISTED IN THE HARDWARE GROUP SCHEDULE.
   - A. HARDWARE FINISHES SHALL BE:
     1. INTERIOR - US26D
     2. EXTERIOR - US32D
   - B. HINGES SHALL BE:
     1. INTERIOR - HAGAR AB700 X US26D
     2. EXTERIOR - HAGAR AB800 X US32D
   - C. CLOSERS SHALL BE:
     1. LCN 4040 SERIES X US26D IN REGULAR MOUNT OR PARALLEL ARM AS REQUIRED.
     2. CLOSERS AND CLOSER / HOLDERS SHALL BE MOUNTED ON THE ROOM SIDE OF DOORS TO THE GREATEST EXTENT POSSIBLE. CLOSERS SHALL NOT BE MOUNTED ON CORRIDOR SIDE OF DOORS.
   - D. DOOR STOPS SHALL BE:
     1. WALL STOPS: IVES WS401CVX X US26D OR IVES WS402CVX X US26D
     2. FLOOR STOPS: IVES FS436 X US26D OR IVES FS438 X 426D AS REQUIRED
     3. EXTERIOR STOPS: IVES FS185 OR FS18, AS REQUIRED
     4. PROVIDE FLOOR OR WALL STOPS FOR ALL DOORS AS REQUIRED. PROVIDE OVERHEAD STOPS WHERE FLOOR OR WALL STOPS ARE NOT APPLICABLE OR PRACTICAL. PROVIDE FLOOR STOPS OR OVERHEAD STOPS FOR ALL OUTSWINGING EXTERIOR DOORS.
   - E. THRESHOLDS SHALL BE:
     1. ZERO 656A - PLACE IN FULL BED OF SILICONE SEALANT. PROVIDE THRESHOLD AT ALL EXTERIOR DOORS AND AT ALL INTERIOR DOORS THAT ARE SUBJECT TO WATER MIGRATION FROM ONE SPACE TO ANOTHER SUCH AS BETWEEN MECHANICAL ROOMS AND ADJACENT ROOMS OR SUCH AS BETWEEN VEHICLE BAYS AND ADJACENT ROOMS.
   - F. WEATHER STRIPPING SHALL BE:
     1. ZERO #328AA - PROVIDE WEATHER-STRIPPING AT HEADS AND JAMBS OF ALL EXTERIOR DOORS.
   - G. DOOR BOTTOM SWEEPS SHALL BE:
     1. ZERO 639A - PROVIDE DOOR BOTTOM SWEEPS AT ALL EXTERIOR OUTSWINGING DOORS.
   - H. WATER SHEDS SHALL BE:
     1. ZERO #142A - PROVIDE WATER SHEDS AT ALL EXTERIOR DOORS EXPOSED TO WEATHER. ATTACH TO HEAD OF DOOR FRAME AND SET IN FULL BED OF SILICONE SEALANT.
   - I. PROVIDE ZERO #188N DOOR SEALS FOR SMOKE STOPPING ON ALL RATED DOORS AS REQUIRED BY CODE.
   - J. PROVIDE IVES SR64 SILENCERS AT ALL HOLLOW METAL DOOR FRAMES IN QUANTITY AS REQUIRED.

DOOR & FRAME NOTES:

1. ALL WOOD DOORS SHALL HAVE GRAIN TO MATCH AND COLOR SHADE TO BE CONSISTENT IN APPEARANCE.
2. PROVIDE LABELED FRAMES AND HARDWARE TO MATCH LABELED DOORS.
3. ALL EXTERIOR HOLLOW METAL DOORS NOT COVERED BY OVERHANG SHALL HAVE PEMKO INTERLOCKING WATER SHED (EXTRUDED ALUMINUM) CONSISTING OF PEMKO #347 AR AND PEMKO #68 AR ATTACHED TO THE HEAD OF THE DOOR.
4. WHEN SUBMITTING HARDWARE SHOP DRAWINGS, HARDWARE SUPPLIER SHALL FURNISH CUT SHEETS ON ALL ITEMS THAT DIFFER FROM THE MANUFACTURER THAT HAS BEEN SPECIFIED IN THESE ARCHITECTURAL DOCUMENTS.
5. PROVIDE STOPS FOR ALL DOORS. PROVIDE OVERHEAD STOP WHERE WALL OR FLOOR STOP IS NOT PRACTICAL OR APPLICABLE.
6. PROVIDE LOCK GUARD FOR ALL EXTERIOR HOLLOW METAL DOORS.
7. ALL SOLID CORE WOOD VENEER DOORS SHALL BE ROTARY SLICED WHITE BIRCH WITH FINISH TO MATCH ARCHITECTURAL SAMPLE.
8. ALL HOLLOW METAL DOORS TO BE HEAVY DUTY 1 3/4" METAL W/ CLOSED TOP & BOTTOM (SEE SPECS).
9. ALL CLOSERS SHALL BE IN ROOM & NOT IN CORRIDOR UNLESS OTHERWISE NOTED.
10. PROVIDE LABELED HOLLOW METAL FRAMES WHERE SCHEDULED, WHERE INSTALLED IN RATED WALLS OR REQ'D BY CODE.
11. SPECIAL HOLLOW METAL FRAMES SHALL BE AS DETAILED OR AS NOTED.
12. HOLLOW METAL FRAMES, DOORS & HARDWARE SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

DOOR TAG LEGEND

GLASS NOTES:

THE FOLLOWING SCHEDULE OF GLAZING TYPES SHALL NOT BE DEEMED ALL INCLUSIVE. PROVIDE ANY OTHER ITEMS OF GLASS NOT LISTED HEREIN OR SHOWN ON THE DRAWINGS AS REQ'D FOR A COMPLETE PROJECT. GLASS IS DESIGNATED BY "G - " NUMBERS AND SHOWN ON THE PLANS AND ELEVATIONS.

1. PPG INDUSTRIES IS USED AS THE BASIS OF DESIGN.
2. ALL INTERIOR GLASS ON DOORS AND WINDOWS TO BE G - 2 (UNLESS NOTED OTHERWISE).
3. ALL EXTERIOR GLASS ON DOORS AND WINDOWS TO BE G - 1 (UNLESS NOTED OTHERWISE).
4. COORDINATE GLAZING BASED ON ALUMINUM STOREFRONT MANUFACTURER RECOMMENDATIONS.
5. CONSULT ARCHITECT ON TINTED GLAZING COLOR.
6. ALL EXTERIOR DOOR & WINDOW ASSEMBLIES TO BE THERMALLY BROKEN.

GLASS SCHEDULE

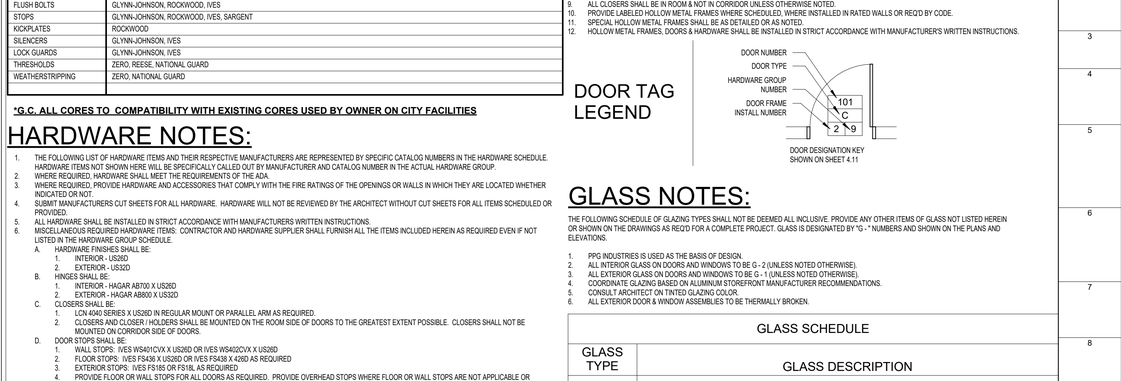
GLASS TYPE	GLASS DESCRIPTION
G-1	±5/16" LAMINATED INSULATED UNIT W/ TWO PIECES OF ±1/8" THICK, HEAT STRENGTHENED W/ A ±.090" POLYVINYL BUTYRAL INTERLAYER, ±1/2" AIR SPACE, AND ±3/16" THICK, HEAT STRENGTHENED SACRIFICIAL LITE. DELEGATED DESIGN MAY CHANGE DIMENSION OF MAKEUP SO THAT FINAL PRODUCT WITHSTANDS THE WINDLOAD AND IMPACT REQUIREMENTS. COLOR TO MATCH SOLARBAN 60 SOLARGRAY
G-2	1/4" THICK CLEAR TEMPERED POLISHED PLATE GLASS AS MANUFACTURED BY VITRO INDUSTRIES
G-3	OVERHEAD DOOR GLAZING - MANUFACTURER'S UV TINTED INSULATED LAMINATED UNITS TO MATCH VITRO GLAZINGS, TINTED LIGHT GRAY GLASS. GLASS SHALL BE DESIGNED TO WITHSTAND WIND LOADS AND IMPACT LOAD REQUIREMENTS FOR WIND ZONE.
G-4	±5/16" LAMINATED INSULATED UNIT W/ TWO PIECES OF ±1/8" THICK, HEAT STRENGTHENED W/ A ±.090" POLYVINYL BUTYRAL INTERLAYER, ±1/2" AIR SPACE, AND ±3/16" THICK, HEAT STRENGTHENED SACRIFICIAL LITE. DELEGATED DESIGN MAY CHANGE DIMENSION OF MAKEUP SO THAT FINAL PRODUCT WITHSTANDS THE WINDLOAD AND IMPACT REQUIREMENTS. COLOR TO MATCH SOLARBAN 60 SOLARGRAY. (INNER LITE TO RECEIVE OPACI-COAT-300 #3-1371 WEST LAKE - VITRO CLEAR 6mm OR APPROVED EQUAL)
G-5	SAFTI SUPERSECURE II-XLS 90 MIN FIRE RATED GLASS WITH LEVEL 3 BALLISTIC RATING IN 90 MIN RATED WINDOW/DOOR ASSEMBLY
G-6	SAFTI SUPERSECURE II-XLS 45 MIN FIRE RATED GLASS WITH LEVEL 3 BALLISTIC RATING IN 45 MIN RATED WINDOW/DOOR ASSEMBLY

HARDWARE SCHEDULE

HARDWARE GROUP	HARDWARE TYPE	SET	COMPONENTS
1	EXTERIOR ENTRANCE SINGLE DOOR STOREFRONT CARD READER	PIVOT CYLINDER EXIT DEVICE PULL CLOSER W/ STOP WEATHERSTRIPPING BOTTOM RAIL SWEEP WEATHER SWEEPS THRESHOLD STRIKE CARD READER	KAWNEER TOP, INTERMEDIATE & BOTTOM OFFSET PIVOTS X MATCH STOREFRONT FINISH CORBIN RUSSWIN AS REQUIRED TO WORK WITH EXIT DEVICE (US32D) (1) ADAMS RITE 8400 X US32D W/ CYLINDER DOGGING (1) ADAMS RITE 3080 X US32D (1) LCN 4040XP CUSH X US32D KAWNEER #69-177 CONT APPLIED DOOR STOPS W/ CONT PILE AND WEATHERSWEEPS KAWNEER #38-560 (MOUNT ON BOTTOM RAIL OF DOOR) X MATCH STOREFRONT FINISH KAWNEER TOP, INTERMEDIATE & BOTTOM X MATCH STOREFRONT FINISH KAWNEER ALUMINUM (SET IN WATERPROOF MASTIC) (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE
3	INTERIOR PASSAGE SINGLE DOOR WOOD	PUSH/PULL HINGES CLOSER W/HOLD OPEN SILENCERS	(1) SARGENT - 8215 LW1J X US26D (1-1/2" PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ HOLD OPEN (3) IVES - SR64
4	INTERIOR PASSAGE SINGLE DOOR WOOD CLOSER W/ STOP WEATHERSTRIPPING AUTO. DOOR BOTTOM	LOCK-LATCH HINGES 	(1) VON DUPRIN 9875 X 626AM (1) VON DUPRIN 996-L TRIM X 626AM (1-1/2" PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP KAWNEER #69-177 CONT APPLIED DOOR STOPS W/ CONT PILE AND WEATHERSWEEPS (1) ZERO #365AA
5	INTERIOR ENTRY SINGLE DOOR HOLLOW METAL CARD READER	LOCK-LATCH HINGES CLOSER W/ STOP STRIKE CARD READER THRESHOLD WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) VON DUPRIN 9875 X 626AM (1) VON DUPRIN 996-NL TRIM X 626AM (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE (1) ZERO 8566A ALUMINUM (1) ZERO 8328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
6	INTERIOR ENTRY SINGLE DOOR HOLLOW METAL CARD READER	LOCK-LATCH HINGES CLOSER W/ STOP STRIKE CARD READER THRESHOLD WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8255 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE (1) ZERO 8566A ALUMINUM (1) ZERO 8328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
7	TOILET ROOM SINGLE DOOR WOOD 	LOCK-LATCH HINGES CLOSER W/ STOP KICKPLATE WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8265 LW1J X US26D W/ OCCUPANCY DISPLAY (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (1) ROCKWOOD K1062 X 34" X 16" X US26D (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
8	INTERIOR ENTRANCE SINGLE DOOR WOOD CARD READER	LOCK-LATCH HINGES STOPS CLOSER W/ STOP SILENCERS STRIKE CARD READER	(1) SARGENT - 8256 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (3) IVES SR64 (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE
9	INTERIOR STOREROOM SINGLE DOOR WOOD	LOCK-LATCH HINGES SILENCERS	(1) SARGENT - 8255 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (3) IVES - SR64
10	OFFICE SINGLE DOOR WOOD	LOCK-LATCH HINGES STOPS SILENCERS	(1) SARGENT - 8255 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (3) IVES - SR64
11	INTERIOR ENTRANCE WOOD CARD READER	LOCK-LATCH HINGES CLOSER STOPS SILENCERS STRIKE CARD READER	(1) SARGENT - 8205 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (3) IVES - SR64 (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE
12	INTERIOR ENTRANCE WOOD CARD READER	LOCK-LATCH HINGES CLOSER STOPS WEATHERSTRIPPING AUTO. DOOR BOTTOM STRIKE CARD READER	(1) SARGENT - 8205 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE
14	INTERIOR STOREROOM SINGLE DOOR WOOD	LOCK-LATCH HINGES CLOSER W/ STOP WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8255 LW1J X US26D (1-1/2 PR.) HAGER - 5" X 5" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES W/ OVERHEAD STOP ZERO #188BIO GY (1) ZERO #365AA

HARDWARE SCHEDULE

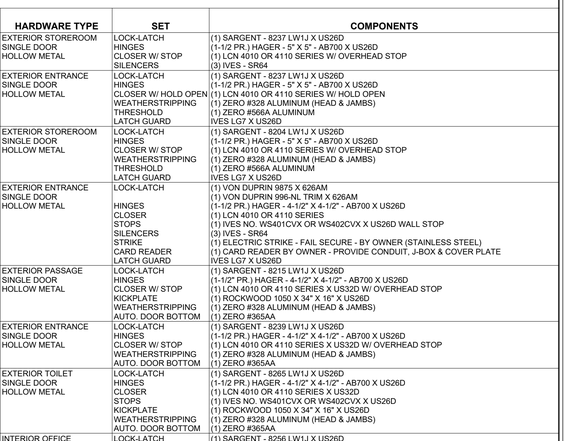
HARDWARE GROUP	HARDWARE TYPE	SET	COMPONENTS
15	EXTERIOR STOREROOM SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER W/ STOP SILENCERS	(1) SARGENT - 8237 LW1J X US26D (1-1/2 PR.) HAGER - 5" X 5" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES W/ OVERHEAD STOP (3) IVES - SR64
16	EXTERIOR ENTRANCE SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER W/ HOLD OPEN WEATHERSTRIPPING THRESHOLD LATCH GUARD	(1) SARGENT - 8237 LW1J X US26D (1-1/2 PR.) HAGER - 5" X 5" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES W/ HOLD OPEN (1) ZERO 8328 ALUMINUM (HEAD & JAMBS) (1) ZERO 8566A ALUMINUM IVES LG7 X US26D
17	EXTERIOR STOREROOM SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER W/ STOP WEATHERSTRIPPING THRESHOLD LATCH GUARD	(1) SARGENT - 8204 LW1J X US26D (1-1/2 PR.) HAGER - 5" X 5" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES W/ OVERHEAD STOP (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #566A ALUMINUM IVES LG7 X US26D
18	EXTERIOR ENTRANCE SINGLE DOOR HOLLOW METAL 	LOCK-LATCH HINGES CLOSER STOPS SILENCERS CARD READER LATCH GUARD	(1) VON DUPRIN 9875 X 626AM (1) VON DUPRIN 996-NL TRIM X 626AM (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES (3) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (3) IVES - SR64 (1) ELECTRIC STRIKE - FAIL SECURE - BY OWNER (STAINLESS STEEL) (1) CARD READER BY OWNER - PROVIDE CONDUIT, J-BOX & COVER PLATE IVES LG7 X US26D
19	EXTERIOR PASSAGE SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER W/ STOP KICKPLATE WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8215 LW1J X US26D (1-1/2" PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (1) ROCKWOOD 1050 X 34" X 16" X US26D (1) ZERO 8328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
20	EXTERIOR ENTRANCE SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER W/ STOP WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8239 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D W/ OVERHEAD STOP (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
21	EXTERIOR TOILET SINGLE DOOR HOLLOW METAL	LOCK-LATCH HINGES CLOSER STOPS KICKPLATE WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8265 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D (1) IVES NO. WS401CVX OR WS402CVX X US26D (1) ROCKWOOD 1050 X 34" X 16" X US26D (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
22	INTERIOR OFFICE SINGLE DOOR WOOD RATED	LOCK-LATCH HINGES CLOSER STOPS KICKPLATE WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8256 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D (1) IVES NO. WS401CVX OR WS402CVX X US26D (1) ROCKWOOD 1050 X 34" X 16" X US26D (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
23	INTERIOR STOREROOM SINGLE DOOR WOOD RATED	LOCK-LATCH HINGES CLOSER STOPS WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8255 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES X US32D (1) IVES NO. WS401CVX OR WS402CVX X US26D (1) ZERO #328 ALUMINUM (HEAD & JAMBS) (1) ZERO #365AA
24	INTERIOR CLASSROOM SINGLE DOOR WOOD	LOCK-LATCH HINGES STOPS SILENCERS	(1) SARGENT - 8238 LW1J X US26D (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (3) IVES - SR64
25	EXTERIOR ENTRANCE SINGLE DOOR HOLLOW METAL 	LOCK-LATCH HINGES CLOSER STOPS SILENCERS LATCH GUARD	(1) VON DUPRIN 9875 X 626AM (1) VON DUPRIN 996-NL TRIM X 626AM (1-1/2 PR.) HAGER - 4-1/2" X 4-1/2" - AB700 X US26D (1) LCN 4010 OR 4110 SERIES (1) IVES NO. WS401CVX OR WS402CVX X US26D WALL STOP (3) IVES - SR64 IVES LG7 X US26D
26	MEZZANINE PAIR OF DOORS HOLLOW METAL 	LOCK-LATCH HINGES STOPS THRESHOLD WEATHERSTRIPPING AUTO. DOOR BOTTOM	(1) SARGENT - 8227 LW1J X US32D (1) SARGENT - 8294 LW1J X US32D (PROVIDE IVES FP51P X US32D TOP & BOTTOM FLOOR BOLTS IN INACTIVE LEAF) (3 PR.) HAGER - 4-1/2" X 4-1/2" - AB750 X US32D (2) OVERHEAD - SARGENT 1540 SERIES (1) ZERO 8566A ALUMINUM (1) ZERO 8328 ALUMINUM (HEAD & JAMBS) (2) ZERO #365AA

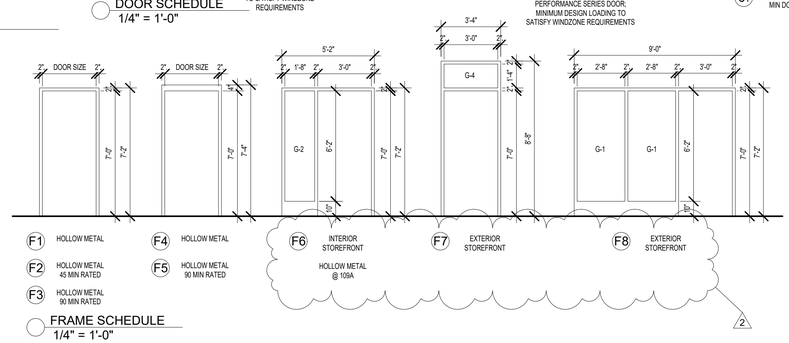


WINDOW SCHEDULE
1/4" = 1'-0"



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





FRAME SCHEDULE
1/4" = 1'-0"

NOTE:
FOR ALL HOLLOW METAL DOORS AND FRAMES: PRIME WITH SHERWIN WILLIAMS KEM BOND HS UNIVERSAL METAL PRIMER GRAY B50A218;

FRAMES: MARINE GRADE FINISH COAT TBD
DOORS: FINISH COAT TO MATCH FRAMES

GENERAL NOTE

ALL NOTES APPLY TO ALL DRAWINGS AND ALL TRADES. IT IS THE RESPONSIBILITY OF ALL CONTRACTORS AND TRADES TO COORDINATE THE INSTALLATION OF THEIR WORK WITH THE INSTALLATION OF WORK BY ALL OTHER CONTRACTORS AND TRADES. THE REQUIREMENTS OF THE DRAWINGS, GENERAL REQUIREMENTS AND ALL ITEMS OF THE CONTRACT DOCUMENTS ARE EQUALLY BINDING ON ALL CONTRACTORS AND TRADES. EACH CONTRACTOR IS REQUIRED TO MAINTAIN FULL SETS OF THE CONTRACT DOCUMENTS FOR HIS EMPLOYEES USE ON THE PROJECT TO ASSURE THAT ALL WORK IS PROPERLY COORDINATED AND INSTALLED WITH THE WORK OF OTHER CONTRACTORS AND TRADES.

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Project No.
1738

Date:
03.29.2024
Drawn by:
AJP/GAS
Checked by:
KCN
Revisions:
2
05.10.2024
ADDENDUM 2

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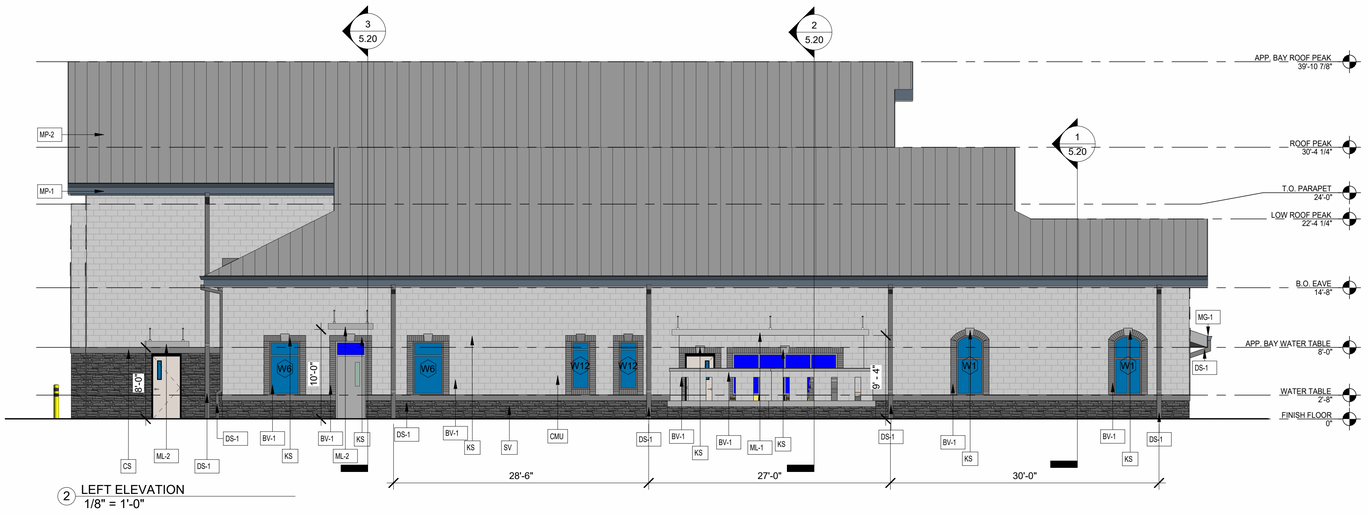
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KENNETH C. HAYNES REGISTERED ARCHITECT 6205 NORTH CAROLINA
03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

DOOR AND WINDOW SCHEDULE

Sheet No.
4.70



2 LEFT ELEVATION
1/8" = 1'-0"

EXTERIOR FINISH MATERIALS:

BRICK VENEER ACCENT TRIM
BV-1 INTERSTATE BRICK; COLOR: MIDNIGHT BLACK, MODULAR WIRECUT

WALL SIDING
WS-1 JAMES HARDIE PRODUCTS; PANEL VERTICAL SIDING (SMOOTH); COLOR: TBD

METAL ROOF
MP-1 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS; COLOR: SLATE GRAY (TRIMS)

MP-2 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS;COLOR: TUNDRA (ROOF PANELS)

CLG-1 METAL ROOFING SYSTEMS, INC. .040 ALUMINUM FLUSH PANEL METAL SOFFIT W/ CONCEALED FASTENERS; COLOR: MATCH MP-2

AZ -TRIM
AZ-TRIM TRIM TO BE AZEC TRADITIONAL 2X12 TRIM OR APPROVED EQUAL; COLOR: PAINT TO MATCH MP-1. FOLLOW MANUFACTUER'S GUDELINES FOR INSTALLATION TO E NSURE PROPER JOINT PLACEMENTS FOR EXPANSION AND CONTRACTION.

SIGNAGE
SG-1 BACKLIT REVESE PAN SIGNAGE; LETTER SIGNAGE ON 2" SPACES; PAINTED TO MATCH MP-2 . COLOR: TBD. LETTERS ARE TO BE INDIVIDUALLY MOUNTED WITHOUT A RAIL; FONT: TIMES NEW ROMAN

KEYSTONE
KS CAST STONE KEYSTONE; CUSTOM COLORED TO MATCH BV-1 (INTEGRAL WATER REPELLENT)

FIREFIGHTER EMBLEM
EMB REVERSE PAN BACKLIT METAL EMBLEM

CAST STONE
CS COLOR: TO MATCH BV-1 (INTEGRAL WATER REPELLENT & STONE ANCHORS REQUIRED)

STONE VENEER
SV CORONADO STONE ARTISAN LEDGE PANEL - COLOR: HURON HAND-LAID DRY STACKED

MORTAR - TYPE 'S'
FOR STONE AND BRICK: SUBMIT STANDARD COLOR SAMPLES FOR APPROVAL
FOR CAST STONE: MORTAR JOINT COLOR TO MATCH CAST STONE.
JOINTS TO BE CONCAVE ROUND TOOLED JOINTS

EXTERIOR MASONRY WALLS
CMU OLD CASTLE SMOOTH FACE BLOCK. COLOR: 4205
CMU TO HAVE INTEGRAL WATER REPELLANT. SEE SPECS

HOLLOW METAL EXTERIOR FRAMES
PRIMED WITH SHERWIN WILLIAMS KEM BOND HS UNIVERSAL METAL PRIMER GRAY B50AZ18; PRO INDUSTRIAL URETHANE ALKYD ENAMEL FINISH COAT COLOR:TBD

METAL GUTTERS & DOWNSPOUTS
MG-1 METAL ROOFING SYSTEMS "STYLE D" GUTTER. SIZE 7" X .040 ALUMINUM. FOLLOW PROFI;E SHOWN ON ELEVATIONS PROVIDE PERFORATED ALUMINIM LEAF GUARD FOR ALL GUTTERS

DS-1 DOWNSPOUT - SIZE 4" X 5" X .040 ALUMINUM. FOLLOW PROFILE SHOWN ON ELEVATIONS

FASCIA TRIM
FT COLOR: TO MATCH MP-1

OVERHEAD DOORS
COMMERCIAL SECTIONAL INSULATED OVERHEAD DOOR SEE SPECIFICATION WITH IMPACT GLASS. SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10).

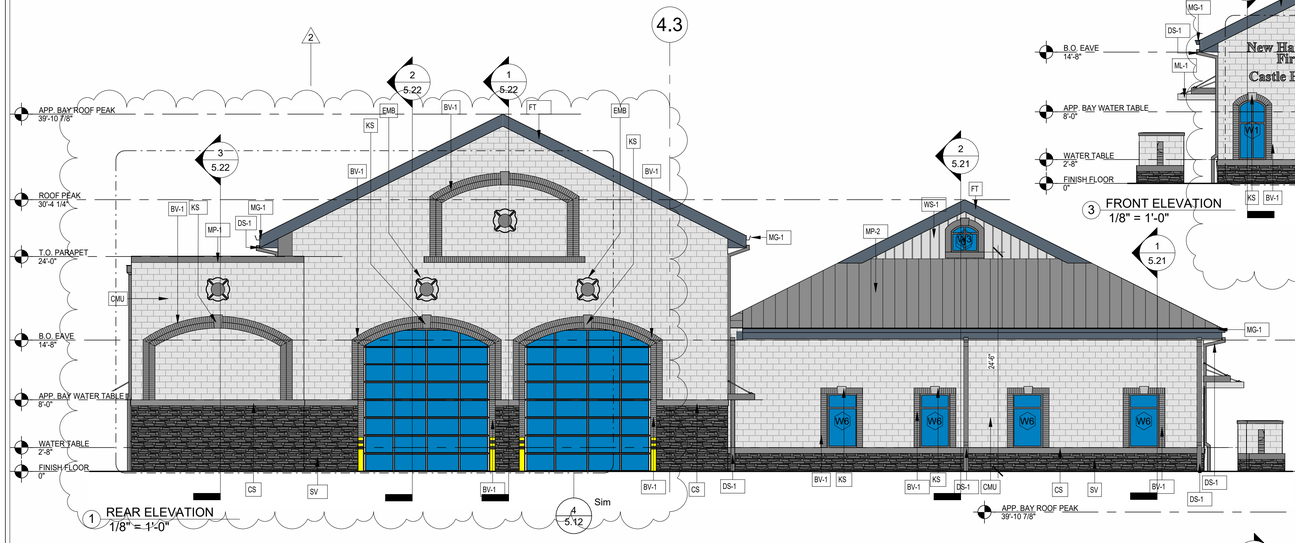
BIFOLD DOORS
SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10)

OVERHEAD DOOR FRAMES
PAINT WITH EPOXY; COLOR TO MATCH MP-2

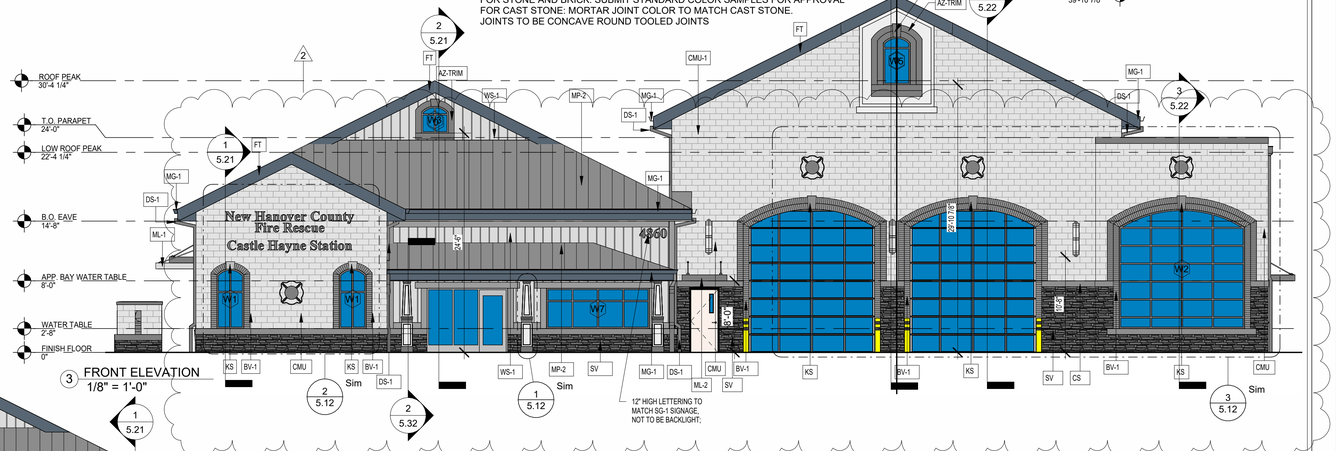
STOREFRONT DOORS & WINDOWS
ALUMINUM STOREFRONT; COLOR: ANODIZED BLACK

PVC ROOFING MEMBRANE
SARNAFIL FULLY ADHERED 80 MIL. PVC ROOFING. COLOR TO BE GRAY TO MATCH MP-2

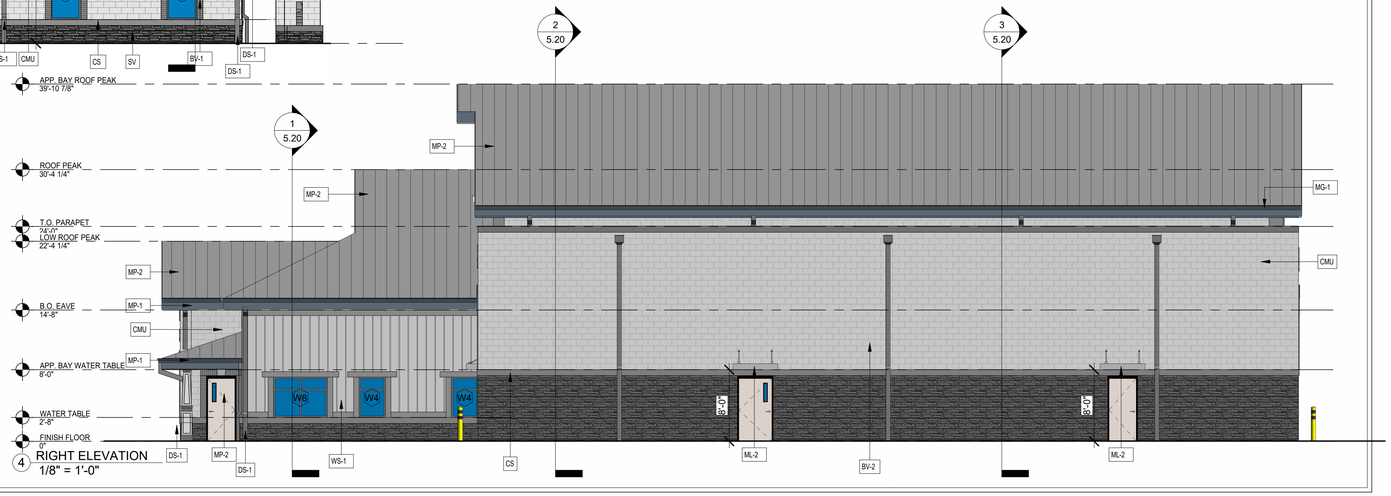
METAL CANOPY
ML-1 MAPES LUMISHADE (22' W x 4'-6" D); COLOR TO MATCH MP-1
ML-2 MAPES LUMISHADE (5' W x 3' D); COLOR TO MATCH MP-1



1 REAR ELEVATION
1/8" = 1'-0"



3 FRONT ELEVATION
1/8" = 1'-0"



4 RIGHT ELEVATION
1/8" = 1'-0"

Project No.
1738

Date:
5/10/2024 9:46:18 AM
Drawn by:
Author
Checked by:
Checker
Revisions: 2
05.10.2024
ADDENDUM 2

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KENNETH C. NEWELL REGISTERED ARCHITECT 6205 NORTH CAROLINA

03.29.2024

CASTLE HAYNES FIRE DEPARTMENT

ELEVATIONS COLORED

Sheet No.
5.10

EXTERIOR FINISH MATERIALS:

BRICK VENEER ACCENT TRIM
BV-1 INTERSTATE BRICK; COLOR: MIDNIGHT BLACK, MODULAR WIRECUT

WALL SIDING
WS-1 JAMES HARDIE PRODUCTS; PANEL VERTICAL SIDING (SMOOTH); COLOR: TBD

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MP-2 METAL ROOFING SYSTEMS, INC. .040 ALUMININUM MRS2500 PROFILE W/ CONCEALED FASTENERS;COLOR: TUNDRA (ROOF PANELS)

CLG-1 METAL ROOFING SYSTEMS, INC. .040 ALUMINUM FLUSH PANEL METAL SOFFIT W/ CONCEALED FASTENERS; COLOR: MATCH MP-2

AZ -TRIM
AZ-TRIM TRIM TO BE AZEC TRADITIONAL 2X12 TRIM OR APPROVED EQUAL; COLOR: PAINT TO MATCH MP-1. FOLLOW MANUFACTUER'S GUDELINES FOR INSTALLATION TO E NSURE PROPER JOINT PLACEMENTS FOR EXPANSION AND CONTRACTION.

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SG-1 BACKLIT REVESE PAN SIGNAGE; LETTER SIGNAGE ON 2" SPACES; PAINTED TO MATCH MP-2 . COLOR: TBD. LETTERS ARE TO BE INDIVIDUALLY MOUNTED WITHOUT A RAIL; FONT: TIMES NEW ROMAN

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FOR STONE AND BRICK: SUBMIT STANDARD COLOR SAMPLES FOR APPROVAL FOR CAST STONE: MORTAR JOINT COLOR TO MATCH CAST STONE. JOINTS TO BE CONCAVE ROUND TOOLED JOINTS

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CMU TO HAVE INTEGRAL WATER REPELLANT. SEE SPECS

HOLLOW METAL EXTERIOR FRAMES
PRIMED WITH SHERWIN WILLIAMS KEM BOND HS UNIVERSAL METAL PRIMER GRAY B50AZ18; PRO INDUSTRIAL URETHANE ALKYD ENAMEL FINISH COAT COLOR:TBD

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DS-1 DOWNSPOUT - SIZE 4" X 5" X .040 ALUMINUM. FOLLOW PROFILE SHOWN ON ELEVATIONS

FASCIA TRIM
FT COLOR: TO MATCH MP-1

OVERHEAD DOORS
COMMERCIAL SECTIONAL INSULATED OVERHEAD DOOR SEE SPECIFICATION WITH IMPACT GLASS. SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10).

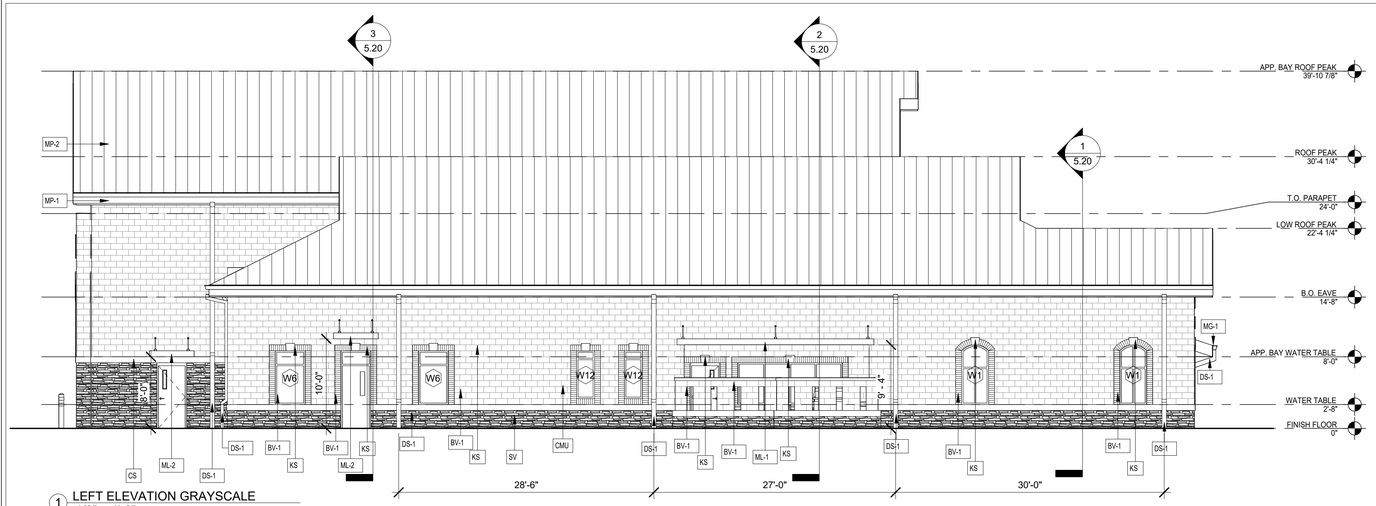
BIFOLD DOORS
SEE 4.70. FINISH COLOR TO MATCH PT-5 (SEE 7.10)

OVERHEAD DOOR FRAMES
PAINT WITH EPOXY; COLOR TO MATCH MP-2

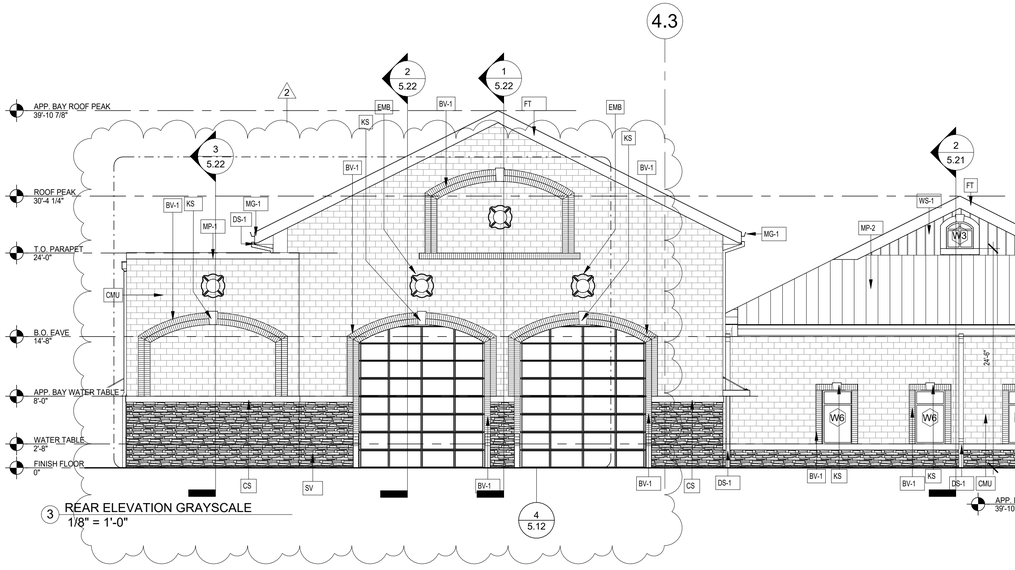
STOREFRONT DOORS & WINDOWS
ALUMINUM STOREFRONT; COLOR: ANODIZED BLACK

PVC ROOFING MEMBRANE
SARNAFIL FULLY ADHERED 80 MIL. PVC ROOFING. COLOR TO BE GRAY TO MATCH MP-2

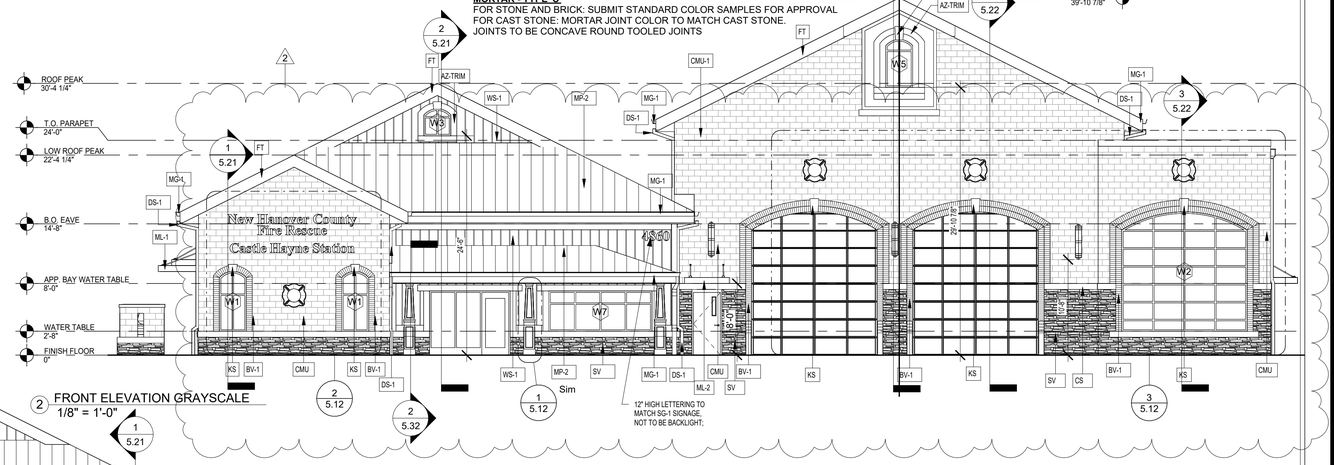
METAL CANOPY
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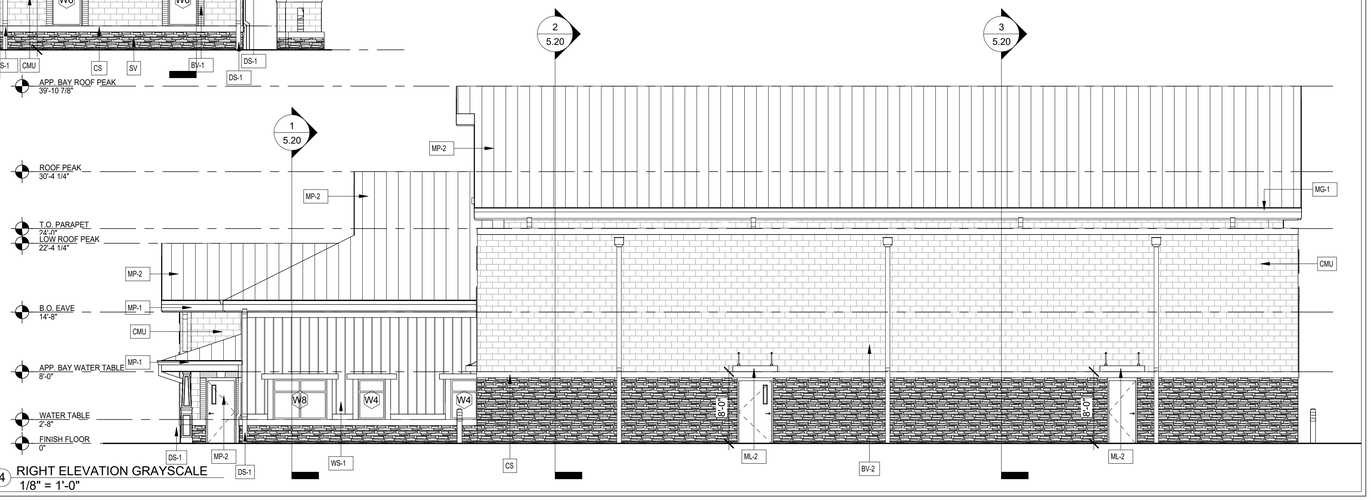
1 LEFT ELEVATION GRAYSCALE
1/8" = 1'-0"



3 REAR ELEVATION GRAYSCALE
1/8" = 1'-0"



2 FRONT ELEVATION GRAYSCALE
1/8" = 1'-0"



4 RIGHT ELEVATION GRAYSCALE
1/8" = 1'-0"

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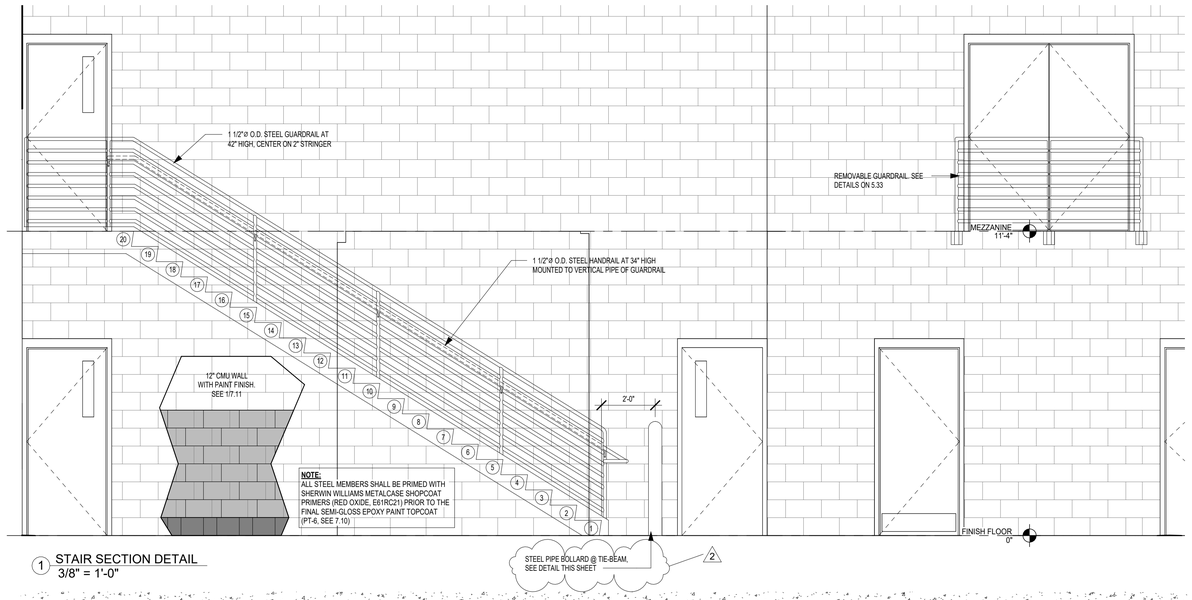
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5/10/2024 9:46:29 AM
Drawn by:
Author
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Checker
Revisions: 2
05.10.2024
ADDENDUM 2

REGISTERED ARCHITECT 6205 NORTH CAROLINA
03.29.2024

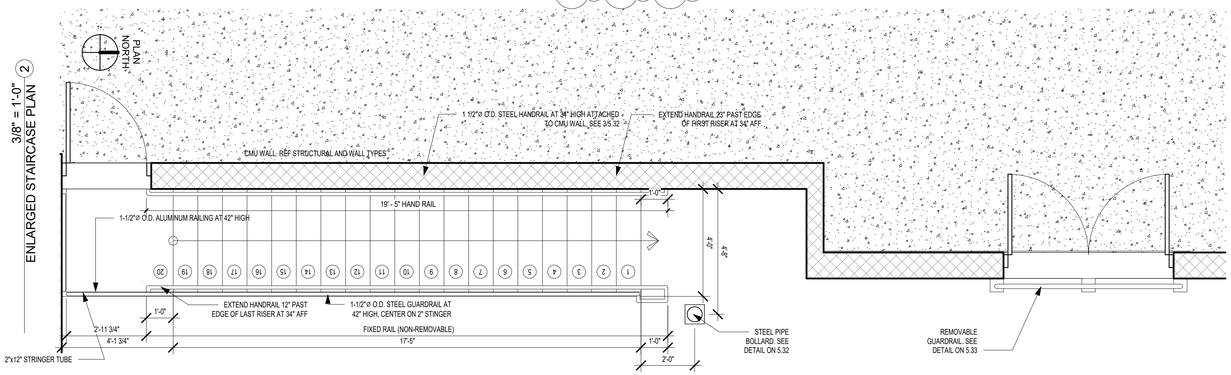
CASTLE HAYNES FIRE DEPARTMENT

ELEVATIONS GRAYSCALE

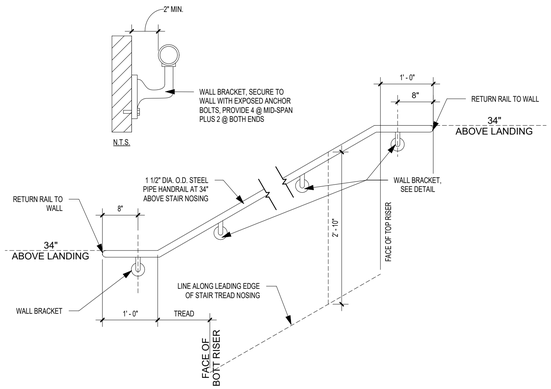
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5.11



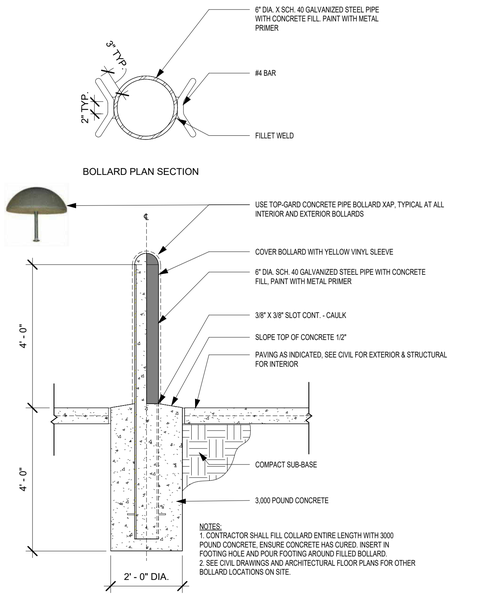
1 STAIR SECTION DETAIL
3/8" = 1'-0"



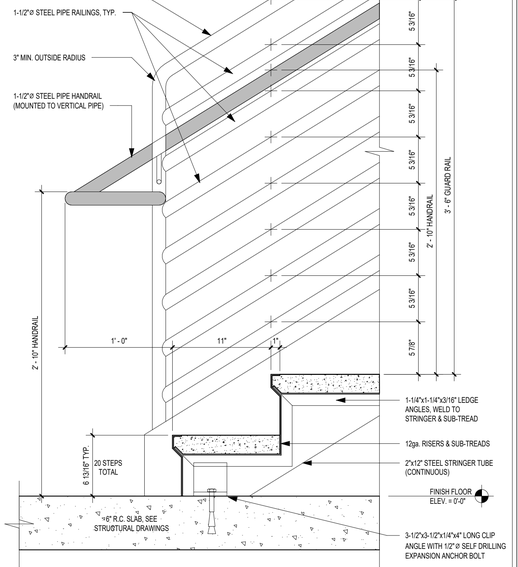
ENLARGED STAIRCASE PLAN
3/8" = 1'-0"
2



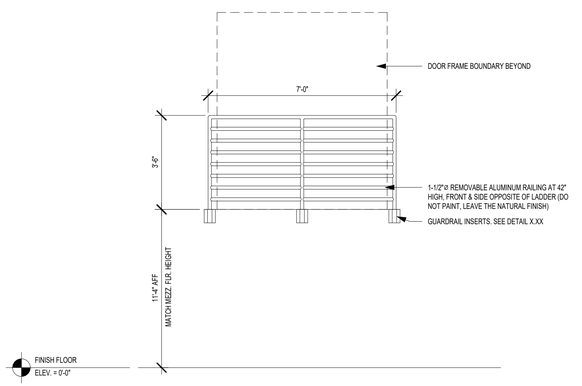
4 STAIR HANDRAIL DETAIL
3/4" = 1'-0"



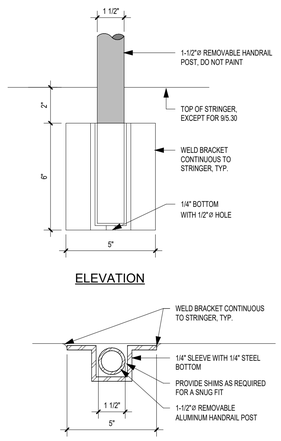
3 STEEL BOLLARD
1/2" = 1'-0"



5 STAIR RAIL DETAIL
1 1/2" = 1'-0"



6 GUARDRAIL @ MEZZANINE
3/8" = 1'-0"



7 REMOVABLE GUARDRAIL DETAIL
3" = 1'-0"

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KCN
Revisions:
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ADDENDUM 2

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REGISTERED ARCHITECT KEVIN C. NEWELL 6205 NORTH CAROLINA
03.29.2024

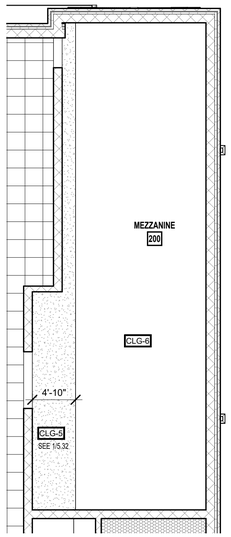
CASTLE HAYNES FIRE DEPARTMENT

STAIRCASE, BOLLARD, AND SITE DETAILS

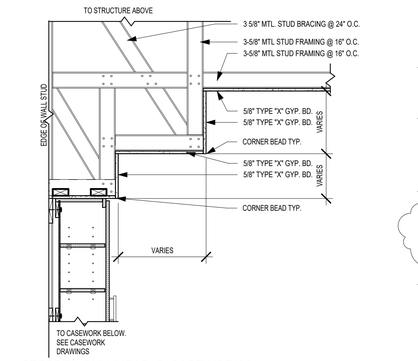
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5.33



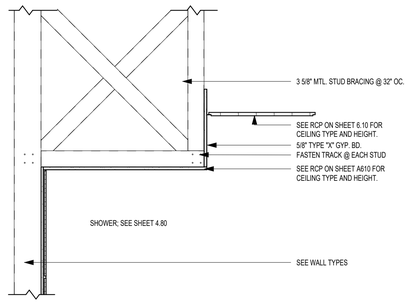
1 First Floor
1/8" = 1'-0"



2 Mezzanine
1/8" = 1'-0"

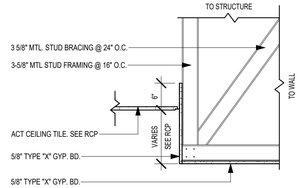


3 STEPPED BULKHEAD @ CASEWORK & HARD CEILING
3/4" = 1'-0"

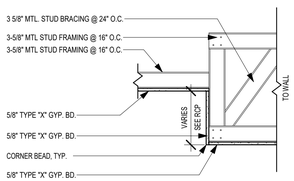


4 SHOWER BULKHEAD, TYP.
3/4" = 1'-0"

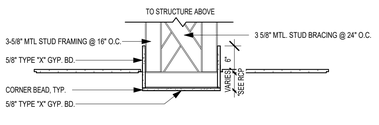
5 BULKHEAD @ LOCKERS
3/4" = 1'-0"



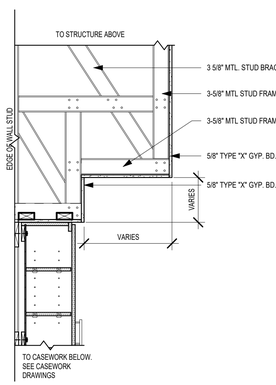
6 BULKHEAD @ DROP CEILING, TYP.
3/4" = 1'-0"



7 BULKHEAD @ HARD CEILING, TYP.
3/4" = 1'-0"



8 INTERMEDIATE BULKHEAD, TYP.
3/4" = 1'-0"



9 STEPPED BULKHEAD @ EXPOSED CEILING
3/4" = 1'-0"

REFLECTED CEILING PLAN NOTES

1. GENERAL CONTRACTOR SHALL COORDINATE THE INSTALLATION AND PROPER LOCATION OF ALL CEILING MOUNTED AND INSTALLED ELEMENTS. REFERENCE MECHANICAL, FIRE PROTECTION AND ELECTRICAL DRAWINGS FOR CEILING MOUNTED AND INSTALLED ELEMENTS. CEILING GRID MAY BE SUBJECT TO CHANGE TO ASSURE PROPER CENTERING AND PLACEMENT OF LIGHTS IN ROOMS.
2. NO LAY-IN TYPE CEILING PANELS ARE TO MEASURE LESS THAN 6" IN EITHER DIRECTION UNLESS DIRECTED BY THE ARCHITECT.
3. PROVIDE VINYL COATED LAY-IN CEILING PANELS IN DAMP AREAS SCHEDULED TO RECEIVE LAY-IN CEILING PANELS: INCLUDING BUT NOT LIMITED TO SHOWERS AND KITCHENS. REFERENCE FINISH PLANS FOR SCHEDULE AND LOCATIONS OF CEILING TYPES.
4. PRIOR TO INSTALLATION OF SPRINKLER HEADS, CONTRACTOR TO VERIFY ALL CEILING HEIGHTS WITH DOORS, WINDOWS AND MECHANICAL DUCTWORK. ALL HEADS TO BE CENTERED IN CEILING GRIDS.
5. SOFFIT WIDTH TO BE 2'-0" FROM FACE OF GWB TO FACE OF GWB UNLESS DIMENSIONED OTHERWISE ON THE REFLECTED CEILING PLAN OR CEILING DETAILS.
6. CEILING FRAMING PER DELEGATED DESIGN.
7. REFER TO NOTE 9 ON SHEET 4.72 **WALL TYPE AND INSULATION NOTES**: WALL TYPE NOTES

FINISH NOTES

1. INTERIOR DOOR FRAMES SHALL BE PAINTED TO MATCH ADJACENT WALL.
2. PROVIDE CORIAN QUARTZ DOVE GRAY LEATHERED THRESHOLDS AT ENTRANCES TO ALL ROOMS WITH HARD TILE FLOORS.
3. PRIME ALL SURFACES PRIOR TO APPLYING FINAL PAINT FINISHES (SEE PAINT SPECS).
4. ALL SURFACES SHALL RECEIVE A FINISH WHETHER NOTED OR NOT. ITEMS NOT NOTED WILL BE SELECTED BY THE ARCHITECT DURING CONSTRUCTION.
5. COLOR OF ALL TRANSITION STRIPS SHALL BE AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE OF AVAILABLE COLORS. PROVIDE TRANSITION STRIP OF APPROPRIATE DESIGN AT ALL CONDITIONS.
6. AT ALL INTERIOR EXPOSED CMU, PROVIDE 2 COATS OF BLOCK FILLER & 2 COATS OF ACRYLIC PAINT.
7. PROVIDE 2 COATS OF CONCRETE SEALER AT ALL EXPOSED CONCRETE FLOORS.
8. FACTORY PAINT ALL VENTS, GRILLES, PIPING, ETC. TO MATCH ADJACENT PAINT COLOR.
9. ALL STRUCTURE, MECHANICAL EQUIPMENT, AND DECKING SCHEDULED FOR OR OTHERWISE INDICATED AS BEING PAINTED AND THAT HAS NOT BEEN PREFINISHED, SHALL BE PRIMED WITH SHERWIN WILLIAMS ALL PURPOSE METAL PRIMER (GRAY). APPLY P-6 AFTER PRIMER IN ROOMS WITH EXPOSED CEILINGS.
10. PROVIDE SAMPLES FOR APPROVAL PRIOR TO PROCUREMENT AND INSTALLATION OF ALL FINISHES.
11. COLOR, MATERIAL, AND PATTERN ORIENTATION CHANGES (CARPET TO CARPET, VCT TO CARPET ETC.) THAT OCCUR AT DOORS SHALL BE CENTERED DIRECTLY BENEATH THE DOOR PANEL.
12. COORDINATE TILE JOINTS WITH CONCRETE SLAB CONTROL JOINT LOCATIONS.
13. ALL COVER PLATES (COMPUTER, LIGHTS, TELEPHONE, ETC.) SHALL BE STAINLESS STEEL.
14. ALL ELECTRICAL COMPONENTS TO BE GRAY TO COORDINATE WITH STAINLESS STEEL COVER PLATES.
15. PAINT ALL BULKHEADS WHITE IF NOT OTHERWISE NOTED.
16. THE GROUT MANUFACTURER SHALL BE LATICRETE SPECTRALOCK PRO. COLOR: LATICRETE SPECTRALOCK PRO; 1/8" UN-SANDED JOINTS; 45 RAVEN
17. PROTECT EXPOSED CONCRETE SLABS FROM SCRATCHES, MUD AND OIL STAINS. ALL MUD STAINS MUST BE COMPLETELY REMOVED FROM CONCRETE.
18. ALL EXPOSED CONCRETE SLABS MUST RECEIVE A SECOND FINAL CLEAR COAT OF SEALER PRIOR TO TURNING PROJECT OVER TO THE OWNER.
19. NO EXPOSED CONDUIT WILL BE ACCEPTED. GC SHALL COORDINATE ALL TRADES PRIOR TO ERECTION OF CMU WALLS.
20. GC TO COORDINATE ALL WALL AND CEILING FINISHES AND FINISH DETAILS FOUND ON SHEETS 7.10 AND 7.11 WITH SHEETS 6.10 AND 6.11.
21. FEATHER FLOOR AS REQUIRED AT TRANSITIONS BETWEEN DIFFERENT FLOORS SO FLOOR IS LEVEL.
22. THERE WILL BE NO CARPET OR LVT UNDER FIXED MILLWORK. PROVIDE SCHEDULED FLOOR FINISHES AT ACCESSIBLE ADA COMPLIANT MILLWORK WHERE OCCURS.
23. ALL MUDSET PORCELAIN TILE SHALL BE ON 2" SETTING BED.
24. ALL CEILING TILE TO BE CLG-1 UNLESS NOTED OTHERWISE. ANY GYPSUM CEILING REQUIRING PAINT SHALL BE PT-10.
25. SHOWER FLOORS TO BE PFT-2 UNLESS NOTED OTHERWISE.
26. SEE SHEET 4.80 & 6.10 FOR ADDITIONAL FINISH DESIGNATIONS AT SHOWERS.
27. ANY TOILET ACCESSORY THAT BRIDGES THE WAINSCOT TILE MUST BE SHIMMED.
28. ALL LOBBIES AND CORRIDORS, TRAINING ROOM 109 TO HAVE ABUSE RESISTANT 'TYPE X' GYPSUM BOARD TO 8'-0" A.F.F.
29. BRACE CLG-1, CLG-2, CLG-3, & CLG-4 PER SEISMIC CODE REQUIREMENTS & COORDINATE WITH ARCHITECT PRIOR TO CONSTRUCTION. PAINT ALL SEISMIC BRACING P-6 (REFER TO NOTE #11 THIS SHEET).
30. WALLS IN CORRIDORS, DAYROOM, TRAINING ROOM TO RECEIVE LEVEL-5 FINISH.
31. SEE **WALL TYPE AND INSULATION NOTES:** INSULATION NOTE #5 ON SHEET 4.72

FINISH LEGEND:

CARPET TILE (NOTED AS CPT - #)

CPT-1 J+J FLOORING: KINETEX: SOUNDTRACK MODULAR 1847, COLOR: ALBUM 3017
18"x36" TILE (OR PRIOR APPROVED EQUAL.) HERRINGBONE PATTERN.
FULLY ADHERE PER MANUFACTURER'S SPECS

PORCELAIN FLOOR TILE (NOTED AS PFT - #)

PFT-1 BEST TILE: CAESAR CERAMICS: WHISPER COLLECTION; COLOR: ASH, HONED; SIZE: 8"x40", 1/8" JOINT WIDTH UN-SANDED
PFT-2 BEST TILE: STONE PEAK CERAMICS: WAVE COLLECTION; COLOR: ASH USG12M9278, HONED; SIZE: 4"x4"; MOSAIC, 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)
GROUT LATICRETE: SPECTRALOCK PRO EPOXY GROUT; COLOR: #45 RAVEN

PORCELAIN WALL TILE (NOTED AS PWT - #) ALIGN JOINTS TO PFT

PWT-1 CAESAR CERAMICS: WHISPER COLLECTION; COLOR: BREEZE 309549, HONED; SIZE: 8"x40", 1/8" JOINT WIDTH UN-SANDED
PWT-2 BEST TILE: BAMBUSA COLLECTION; COLOR: GRIGIO, HONED; SIZE: 2.5"x24", 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)
PWT-3 BEST TILE: BAMBUSA COLLECTION; COLOR: BIANCO, HONED; SIZE: 2.5"x24", 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)
GROUT LATICRETE: SPECTRALOCK PRO EPOXY GROUT; COLOR: #45 RAVEN

PAINT (NOTED AS PT - #)

PT-1 SHERWIN WILLIAMS PAINTS; COLOR 6258 TRICORN BLACK; EPOXY EGGSHELL FINISH
PT-2 SHERWIN WILLIAMS PAINTS; COLOR 7026 GRIFFIN; EPOXY EGGSHELL FINISH
PT-3 SHERWIN WILLIAMS PAINTS; COLOR 7031 MEGA GREIGE; EPOXY EGGSHELL FINISH
PT-4 SHERWIN WILLIAMS PAINTS; COLOR 7029 AGREEABLE GRAY; EPOXY EGGSHELL FINISH
PT-5 SHERWIN WILLIAMS PAINTS; COLOR 6335 FIRED BRICK; EPOXY EGGSHELL FINISH (APPARATUS BAY ONLY. SEE SHEET 7.10 FOR LOCATION AND 7.11 FOR DETAIL
PT-6 SHERWIN WILLIAMS PAINTS; COLOR 6335 FIRED BRICK; EPOXY SEMI-GLOSS FINISH (STAIRCASE, RAILING, & TRAINING PLATFORM IN APPARATUS BAY; SEE NOTE ON 5.32/5.33 (STAIR DTLS)
PT-7 SHERWIN WILLIAMS PAINTS; COLOR 7031 MEGA GREIGE; EGGSHELL FINISH
PT-8 SHERWIN WILLIAMS PAINTS; COLOR 7029 AGREEABLE GRAY; EGGSHELL FINISH
PT-9 SHERWIN WILLIAMS PAINTS DRYFALL; COLOR 6258 TRICORN BLACK; FLAT FINISH @ EXPOSED CEILINGS ONLY (CLG-5, CLG-7)
PT-10 SHERWIN WILLIAMS PAINTS; COLOR 7006 EXTRA WHITE; SATIN FINISH @ GYP. BD. CEILINGS ONLY (CLG-3, CLG-4)
PT-11 SEE SHEET 5.10 FOR THE EPOXY PAINT COLORS OF HOLLOW METAL DOORS & FRAMES, METAL BRACKETS AND EXPOSED LOOSE LINTELS

CEILING / CEILING TILE (NOTED AS CLG - #)

CLG-1 ARMSTRONG CALLA 2820 (WHITE); LAY IN; TILE SIZE: 24"X24" W/ SUPRAFINE XL 9/16" EXPOSED TEE; SEE SHEET 6.10
CLG-2 ARMSTRONG ULTIMA HEALTH ZONE 1936 (WHITE); LAY IN; TILE SIZE: 24"X24"; SEE SHEET 6.10 W/ SUPRAFINE XL 9/16" EXPOSED TEE
CLG-3 ARMSTRONG METAL WORKS TEGULAR EFFECTS (MICROPERFORATED AT KITCHEN AND DAY ROOM CEILING ONLY) CUSTOM COLOR TO MATCH DOOR WD-1; IN ARMSTRONG 9/16" CLOUD SYSTEM (NO CLOUD AT TRAINING ROOM ENTRANCE, KEEP WOOD LOOK TILES); TILE SIZE: 24"X24". CLG-7 BEYOND. SEE SHEET 6.10 BLACK CEILING GRID AT ALL CLOUD LOCATIONS AXIOM KNIFE EDGE TRIM AT ALL CLOUD LOCATIONS
CLG-4 PAINTED GYPSUM BOARD, P-10; SEE SHEET 6.10
CLG-5 PAINTED MOISTURE RESISTANT GYPSUM BOARD, PT-10; SEE SHEET 6.10
CLG-6 EXPOSED TO STRUCTURE - SEE GENERAL PAINTING & FINISH NOTE #9; PT-9
CLG-7 EXPOSED TO STRUCTURE - SEE GENERAL PAINTING AND FINISH NOTE #9. CEILING TO RECEIVE OWENS CORNING 2" FIBERGLAS SELECTSOUND BLACK ACOUSTIC BOARD INSULATION OR APPROVED EQUAL, ATTACHED TO THE UNDERSIDE OF ROOF ASSEMBLY & INSTALLED PER MFR'S SPECS. SEE SHEET 4.30 FOR ROOF ASSEMBLY. FASTENERS TO BE BLACK; FASTENERS NOT TO PENETRATE LAYER OF INSULATION CLOSEST TO METAL ROOF PANEL.
CLG-8 ARMSTRONG METAL WORKS FOR DESIGN FLEX TEGULAR -SQUARES & RECTANGLES 24"X24" WHITE M15 PERFORATED W/ SUPRAFINE XL 9/16" EXPOSED TEE
CLG-9 EXTERIOR SOFFIT. SEE SHEET 5.10
CLG-10 ARMSTRONG KITCHENZONE (BLACK); LAY IN; TILE SIZE: 24"X24" W/ SUPRAFINE XL 9/16" EXPOSED TEE (BLACK); PROVIDE PANEL CLIPS; SEE SHEET 6.10

AX-1 ARMSTRONG AXIOM KNIFE EDGE TRIM 5" ALL VISIBLE EDGES AND FACES FACTORY FINISH TO MATCH CLOUD CEILING GRID

RESILIENT BASE (NOTED AS RB - #)

RB-1 ROPPE VINYL WALL BASE W/ TOE; COLOR: 147 LIGHT BROWN; 4" HEIGHT
RB-2 ROPPE VINYL WALL BASE W/ TOE; COLOR: 100 BLACK; 4" HEIGHT

LUXURY VINYL TILE FLOORING (NOTED AS LVT - #)

LVT-1 J+J FLOORING; STYLE: CLASSICS V5000; COLOR: 1009 HERITAGE; SIZE: 9"x48", 20 MIL; STAGGER PLANKS 1/3 OF LENGTH (TYP.); SEE SHEET 7.10.
FULLY ADHERE PER MANUFACTURER'S SPECS

LVT-2 J+J FLOORING; STYLE: CLASSICS V5000; COLOR: 1000 NOTABLE; SIZE: 9"x48", 20 MIL; STAGGER PLANKS 1/3 OF LENGTH (TYP.); SEE SHEET 7.10.
FULLY ADHERE PER MANUFACTURER'S SPECS

FIBERGLASS REINFORCED PLASTIC (NOTED AS FRP - #)

FIBERGLASS REINFORCED PLASTIC
FRP-1 CRANE COMPOSITES; VARIETEX COLLECTION; COLOR: PEPPERDUST 8044; STYLE: LINEN

WINDOW BLINDS (NOTED AS WB - #)

WB-1 BLACKOUT ROLLER SHADES (MANUAL) APERTURE CONTRACT, INC.; VERONA 1%, COLOR: IRONITE; @ SLEEP ROOMS ONLY. DIRECT MOUNT WITH SEALED HEM BAR AND SIDE CHANNELS

WB-2 SWFCONTRACT; BRUSHED ALUMINUM 121; 2" HERITAGE

CORNER AND WALL GUARDS (NOTED AS CG- & WG- #)

CG-1 FLUSH MOUNTED CORNER GUARD, NON-RATED, INPRO 150F OR PAWLING CGT-7, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

CG-2 FLUSH MOUNTED CORNER GUARD, 1-HR. FIRE-RATED, INPRO 150FR1 OR PAWLING CGFT-7, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

CG-3 FLUSH MOUNTED END WALL GUARD, NON-RATED, INPRO 140D OR PAWLING CGT-888, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

WG-1 SURFACE MOUNTED WALL GUARD, INPRO 1600 OR PAWLING WG-6, PROVIDE ALL NECESSARY COMPONENTS (END CAP, INSIDE & OUTSIDE CORNERS, ETC.) COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

MISCELLANEOUS

SC-1 SEALED CONCRETE
SC-2 LIGHT-BROOMED FINISHED CONCRETE
ESC-1 SIKA MMA (METHYL METHACRYLATE) TRAFFIC 2900 COATIND SYSTEM; PIGMENTED; FLOORING AND STRIPING COLORS BY OWNER

DOORS
WD-1 VT INDUSTRIES; WALNUT; COLOR: SERENGETI SE18

CASEWORK -
WOOD: KEWAUNEE SCIENTIFIC WOOD CASEWORK. CUSTOM COLOR TO MATCH WD-1
STEEL: KEWAUNEE SCIENTIFIC STEEL CASEWORK. MATERIAL CONSTRUCTION AND COLOR TO BE STAINLESS STEEL

FULLY WELDED LOCKERS
CONTACT ERNIE TAYLOR @ PENCO PRODUCTS. 703-819-6061 ERNIE.TAYLOR@PENCOPRODUCTS.COM
LK-1 BASIS OF DESIGN:
PENCO PATRIOT FULLY FRAMED GEAR LOCKER OR PRIOR APPROVED EQUAL;
LOCKER TO RECEIVE FACTORY FINISH CUSTOM COLOR TO MATCH PT-7. REFER TO 25/7.11

COUNTERTOPS & SILLS
CTR-1 CORIAN QUARTZ; COLOR: BIANCO MARMOR
CTR-2 STAINLESS STEEL COUNTERTOP @ EXTERIOR CASEWORK, #4 SATIN FINISH
CTR-3 SOLID WOOD BUTCHER BLOCK WITH 2 COATS OF WOOD SEALER (TOOL SHOP COUNTERTOP ONLY)
SILL CORIAN QUARTZ; COLOR: BIANCO MARMOR

ATHLETIC RUBBER FLOORING (ARF-1) - NORAMENT 992 GRANO 5304 BLACK PEPPER;
9mm THICK FOR FLOORING; 3.5mm THICK FOR WALL RETURN

BACKSPLASH
BS-1 SEE PWT-3
BS-2 STAINLESS STEEL BACKSPLASH, FINISH TO MATCH CTR-2
BS-3 CORIAN QUARTZ BACKSPLASH; COLOR: BIANCO MARMOR

TRANSITIONS ARE NOT TO BE USED BETWEEN LIKE MATERIALS AT THE SAME LEVEL UNLESS NOTED OTHERWISE. SEE SHEET 7.11 FOR TRANSITION AND THRESHHOLD DETAILS

ALL EXTERIOR OR UNFINISHED PAINTED METAL TO RECEIVE PRO INDUSTRIAL URETHANE ALKYD ENAMEL B54, ARCHITECT TO CONFIRM COLOR.

Project No.
1738

Date:
5/10/2024 9:47:42 AM
Drawn by:
Author
Checked by:
Checker
Revisions: 2
05.10.2024
ADDENDUM 2

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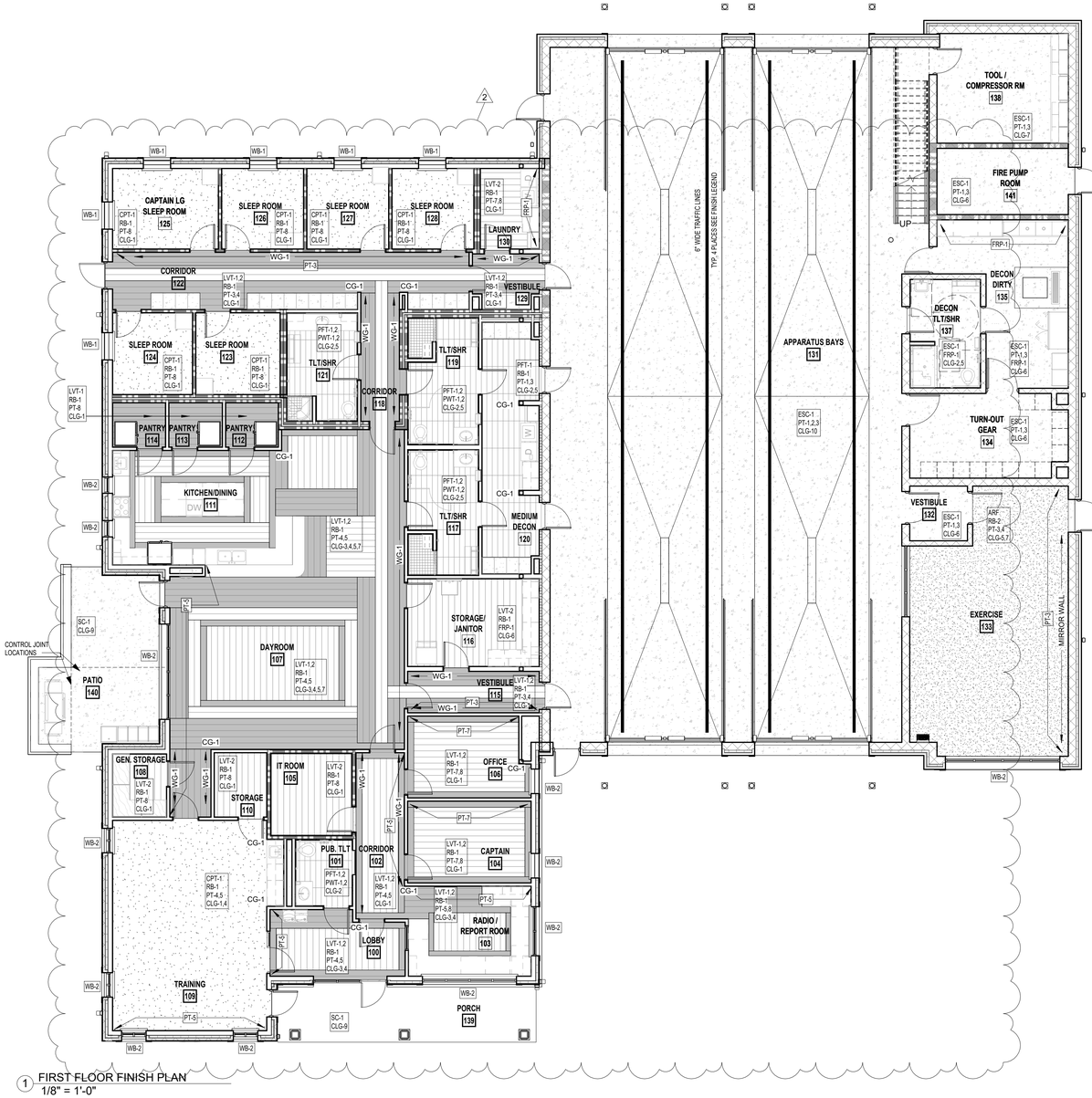
KENNETH M. NEWELL REGISTERED ARCHITECT 6205 GASTONIA

03.29.2024

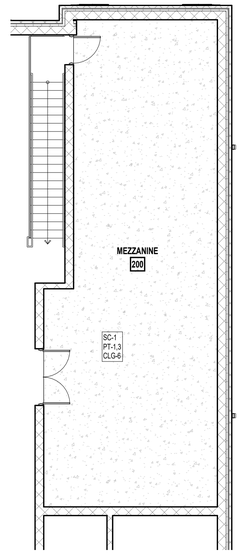
CASTLE HAYNES FIRE DEPARTMENT

REFLECTED CEILING PLAN

Sheet No.
6.10



1 FIRST FLOOR FINISH PLAN
1/8" = 1'-0"



2 MEZZANINE FINISH PLAN
1/8" = 1'-0"

FINISH LEGEND:

CARPET TILE (NOTED AS CPT - #)

CPT-1 J+J FLOORING: KINETEX: SOUNDTRACK MODULAR 1847, COLOR: ALBUM 3017 18"x36" TILE (OR PRIOR APPROVED EQUAL); HERRINGBONE PATTERN. FULLY ADHERE PER MANUFACTURER'S SPECS

PORCELAIN FLOOR TILE (NOTED AS PFT - #)

PFT-1 BEST TILE: CAESAR CERAMICS: WHISPER COLLECTION; COLOR: ASH, HONED; SIZE: 8"x40"; 1/8" JOINT WIDTH UN-SANDED

PFT-2 BEST TILE: STONE PEAK CERAMICS: WAVE COLLECTION; COLOR: ASH USG12M9278, HONED; SIZE: 4"x4"; MOSAIC; 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)

GROUT LATICRETE: SPECTRALOCK PRO EPOXY GROUT; COLOR: #45 RAVEN

PORCELAIN WALL TILE (NOTED AS PWT - #) ALIGN JOINTS TO PFT

PWT-1 CAESAR CERAMICS: WHISPER COLLECTION; COLOR: BREEZE 300649, HONED; SIZE: 8"x40"; 1/8" JOINT WIDTH UN-SANDED

PWT-2 BEST TILE: BAMBUSA COLLECTION; COLOR: GRIGIO, HONED; SIZE: 2.5"x24", 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)

PWT-3 BEST TILE: BAMBUSA COLLECTION; COLOR: BIANCO, HONED; SIZE: 2.5"x24", 1/8" JOINT WIDTH UN-SANDED (@DESIGNATED ROOMS & ALL SHOWERS)

GROUT LATICRETE: SPECTRALOCK PRO EPOXY GROUT; COLOR: #45 RAVEN

PAINT (NOTED AS PT - #)

PT-1 SHERWIN WILLIAMS PAINTS; COLOR 6258 TRICORN BLACK; EPOXY EGGSHELL FINISH
PT-2 SHERWIN WILLIAMS PAINTS; COLOR 7026 GRIFFIN; EPOXY EGGSHELL FINISH
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PT-10 SHERWIN WILLIAMS PAINTS; COLOR 7006 EXTRA WHITE; SATIN FINISH @ GYP. BD. CEILINGS ONLY (CLG-3, CLG-4)
PT-11 SEE SHEET 5.10 FOR THE EPOXY PAINT COLORS OF HOLLOW METAL DOORS & FRAMES, METAL BRACKETS AND EXPOSED LOOSE LINTELS

CEILING / CEILING TILE (NOTED AS CLG - #)

CLG-1 ARMSTRONG CALLA 2820 (WHITE); LAY IN; TILE SIZE: 24"X24" W/ SUPRAFINE XL 9/16" EXPOSED TEE; SEE SHEET 6.10
CLG-2 ARMSTRONG ULTIMA HEALTH ZONE 1936 (WHITE); LAY IN; TILE SIZE: 24"X24"; SEE SHEET 6.10 W/ SUPRAFINE XL 9/16" EXPOSED TEE
CLG-3 ARMSTRONG METAL WORKS TEGULAR EFFECTS (MICROPERFORATED AT KITCHEN AND DAY ROOM CEILING ONLY) CUSTOM COLOR TO MATCH DOOR WD-1; IN ARMSTRONG 9/16" CLOUD SYSTEM (NO CLOUD AT TRAINING ROOM ENTRANCE. KEEP WOOD LOOK TILES); TILE SIZE: 24"X24". CLG-7 BEYOND. SEE SHEET 6.10 BLACK CEILING GRID AT ALL CLOUD LOCATIONS AXIOM KNIFE EDGE TRIM AT ALL CLOUD LOCATIONS
CLG-4 PAINTED GYPSUM BOARD, P-10; SEE SHEET 6.10
CLG-5 PAINTED MOISTURE RESISTANT GYPSUM BOARD, PT-10; SEE SHEET 6.10
CLG-6 EXPOSED TO STRUCTURE - SEE GENERAL PAINTING & FINISH NOTE #9; PT-9
CLG-7 EXPOSED TO STRUCTURE - SEE GENERAL PAINTING AND FINISH NOTE #9. CEILING TO RECEIVE OWENS CORNING 2" FIBERGLAS SELECTSOUND BLACK ACOUSTIC BOARD INSULATION OR APPROVED EQUAL, ATTACHED TO THE UNDERSIDE OF ROOF ASSEMBLY & INSTALLED PER MFR'S SPECS. SEE SHEET 4.30 FOR ROOF ASSEMBLY. FASTENERS TO BE BLACK; FASTENERS NOT TO PENETRATE LAYER OF INSULATION CLOSEST TO METAL ROOF PANEL.
CLG-8 ARMSTRONG METAL WORKS FOR DESIGN FLEX TEGULAR -SQUARES & RECTANGLES 24"X24" WHITE M15 PERFORATED W/ SUPRAFINE XL 9/16" EXPOSED TEE
CLG-9 EXTERIOR SOFFIT. SEE SHEET 5.10
CLG-10 ARMSTRONG KITCHENZONE (BLACK); LAY IN; TILE SIZE: 24"X24" W/ SUPRAFINE XL 9/16" EXPOSED TEE (BLACK); PROVIDE PANEL CLIPS; SEE SHEET 6.10

AX-1 ARMSTRONG AXIOM KNIFE EDGE TRIM 5" ALL VISIBLE EDGES AND FACES FACTORY FINISH TO MATCH CLOUD CEILING GRID

RESILIENT BASE (NOTED AS RB - #)

RB-1 ROPPE VINYL WALL BASE W/ TOE; COLOR: 147 LIGHT BROWN; 4" HEIGHT
RB-2 ROPPE VINYL WALL BASE W/ TOE; COLOR: 100 BLACK; 4" HEIGHT

LUXURY VINYL TILE FLOORING (NOTED AS LVT - #)

LVT-1 J+J FLOORING; STYLE: CLASSICS V5000; COLOR: 1009 HERITAGE; SIZE: 9"x48", 20 MIL; STAGGER PLANKS 1/3 OF LENGTH (TYP.), SEE SHEET 7.10. FULLY ADHERE PER MANUFACTURER'S SPECS

LVT-2 J+J FLOORING; STYLE: CLASSICS V5000; COLOR: 1000 NOTABLE; SIZE: 9"x48", 20 MIL; STAGGER PLANKS 1/3 OF LENGTH (TYP.), SEE SHEET 7.10. FULLY ADHERE PER MANUFACTURER'S SPECS

FIBERGLASS REINFORCED PLASTIC (NOTED AS FRP - #)

FIBERGLASS REINFORCED PLASTIC
FRP-1 CRANE COMPOSITES; VARIETEX COLLECTION; COLOR: PEPPERDUST 8044; STYLE: LINEN

WINDOW BLINDS (NOTED AS WB - #)

WB-1 BLACKOUT ROLLER SHADES (MANUAL) APERTURE CONTRACT, INC.; VERONA 1%, COLOR: IRONITE; @ SLEEP ROOMS ONLY. DIRECT MOUNT WITH SEALED HEM BAR AND SIDE CHANNELS

WB-2 SWFCONTRACT; BRUSHED ALUMINUM 121; 2" HERITAGE

CORNER AND WALL GUARDS (NOTED AS CG- & WG- #)

CG-1 FLUSH MOUNTED CORNER GUARD, NON-RATED, INPRO 150F OR PAWLING CGT-7, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

CG-2 FLUSH MOUNTED CORNER GUARD, 1-HR. FIRE-RATED, INPRO 150FR1 OR PAWLING CGFT-7, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

CG-3 FLUSH MOUNTED END WALL GUARD, NON-RATED, INPRO 140D OR PAWLING CGT-888, COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

WG-1 SURFACE MOUNTED WALL GUARD, INPRO 1600 OR PAWLING WG-6, PROVIDE ALL NECESSARY COMPONENTS (END CAP, INSIDE & OUTSIDE CORNERS, ETC.) COLOR TO BE SELECTED DURING CONSTRUCTION FROM THE FULL RANGE OF MANUFACTURER'S COLORS, SEE 7.11

MISCELLANEOUS

SC-1 SEALED CONCRETE
SC-2 LIGHT-BROOMED FINISHED CONCRETE
ESC-1 SIKA MMA (METHYL METHACRYLATE) TRAFFIC 2900 COATIND SYSTEM; PIGMENTED; FLOORING AND STRIPING COLORS BY OWNER

DOORS
WD-1 VT INDUSTRIES; WALNUT; COLOR: SERENGETI SE18

CASEWORK -
WOOD: KEWAUNEE SCIENTIFIC WOOD CASEWORK. CUSTOM COLOR TO MATCH WD-1
STEEL: KEWAUNEE SCIENTIFIC STEEL CASEWORK. MATERIAL CONSTRUCTION AND COLOR TO BE STAINLESS STEEL

FULLY WELDED LOCKERS
CONTACT ERNIE TAYLOR @ PENCO PRODUCTS. 703-819-6061 ERNIE.TAYLOR@PENCOPRODUCTS.COM
LK-1 BASIS OF DESIGN:
PENCO PATRIOT FULLY FRAMED GEAR LOCKER OR PRIOR APPROVED EQUAL;
LOCKER TO RECEIVE FACTORY FINISH CUSTOM COLOR TO MATCH PT-7. REFER TO 25/7.11

COUNTERTOPS & SILLS
CTR-1 CORIAN QUARTZ; COLOR: BIANCO MARMOR
CTR-2 STAINLESS STEEL COUNTERTOP @ EXTERIOR CASEWORK, #4 SATIN FINISH
CTR-3 SOLID WOOD BUTCHER BLOCK WITH 2 COATS OF WOOD SEALER (TOOL SHOP COUNTERTOP ONLY)
SILL CORIAN QUARTZ; COLOR: BIANCO MARMOR

ATHLETIC RUBBER FLOORING (ARF-1) - NORAMENT 992 GRANO 5304 BLACK PEPPER;
9mm THICK FOR FLOORING; 3.5mm THICK FOR WALL RETURN

BACKSPLASH
BS-1 SEE PWT-3
BS-2 STAINLESS STEEL BACKSPLASH, FINISH TO MATCH CTR-2
BS-3 CORIAN QUARTZ BACKSPLASH; COLOR: BIANCO MARMOR

TRANSITIONS ARE NOT TO BE USED BETWEEN LIKE MATERIALS AT THE SAME LEVEL UNLESS NOTED OTHERWISE. SEE SHEET 7.11 FOR TRANSITION AND THRESHHOLD DETAILS

ALL EXTERIOR OR UNFINISHED PAINTED METAL TO RECEIVE PRO INDUSTRIAL URETHANE ALKYD ENAMEL B54, ARCHITECT TO CONFIRM COLOR.

FINISH NOTES

1. INTERIOR DOOR FRAMES SHALL BE PAINTED TO MATCH ADJACENT WALL.
2. PROVIDE CORIAN QUARTZ DOVE GRAY LEATHERED THRESHOLDS AT ENTRANCES TO ALL ROOMS WITH HARD TILE FLOORS.
3. PRIME ALL SURFACES PRIOR TO APPLYING FINAL PAINT FINISHES (SEE PAINT SPECS).
4. ALL SURFACES SHALL RECEIVE A FINISH WHETHER NOTED OR NOT. ITEMS NOT NOTED WILL BE SELECTED BY THE ARCHITECT DURING CONSTRUCTION.
5. COLOR OF ALL TRANSITION STRIPS SHALL BE AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE OF AVAILABLE COLORS. PROVIDE TRANSITION STRIP OF APPROPRIATE DESIGN AT ALL CONDITIONS.
6. AT ALL INTERIOR EXPOSED CMU, PROVIDE 2 COATS OF BLOCK FILLER & 2 COATS OF ACRYLIC PAINT.
7. PROVIDE 2 COATS OF CONCRETE SEALER AT ALL EXPOSED CONCRETE FLOORS.
8. FACTORY PAINT ALL VENTS, GRILLES, PIPING, ETC. TO MATCH ADJACENT PAINT COLOR.
9. ALL STRUCTURE, MECHANICAL EQUIPMENT, AND DECKING SCHEDULED FOR OR OTHERWISE INDICATED AS BEING PAINTED AND THAT HAS NOT BEEN PREFINISHED, SHALL BE PRIMED WITH SHERWIN WILLIAMS ALL PURPOSE METAL PRIMER (GRAY). APPLY P-6 AFTER PRIMER IN ROOMS WITH EXPOSED CEILINGS.
10. PROVIDE SAMPLES FOR APPROVAL PRIOR TO PROCUREMENT AND INSTALLATION OF ALL FINISHES.
11. COLOR, MATERIAL, AND PATTERN ORIENTATION CHANGES (CARPET TO CARPET, VCT TO CARPET ETC.) THAT OCCUR AT DOORS SHALL BE CENTERED DIRECTLY BENEATH THE DOOR PANEL.
12. COORDINATE TILE JOINTS WITH CONCRETE SLAB CONTROL JOINT LOCATIONS.
13. ALL COVER PLATES (COMPUTER, LIGHTS, TELEPHONE, ETC.) SHALL BE STAINLESS STEEL.
14. ALL ELECTRICAL COMPONENTS TO BE GRAY TO COORDINATE WITH STAINLESS STEEL COVER PLATES.
15. PAINT ALL BULKHEADS WHITE IF NOT OTHERWISE NOTED.
16. THE GROUT MANUFACTURER SHALL BE LATICRETE SPECTRALOCK PRO. COLOR: LATICRETE SPECTRALOCK PRO; 1/8" UN-SANDED JOINTS; 45 RAVEN
17. PROTECT EXPOSED CONCRETE SLABS FROM SCRATCHES, MUD AND OIL STAINS. ALL MUD STAINS MUST BE COMPLETELY REMOVED FROM CONCRETE.
18. ALL EXPOSED CONCRETE SLABS MUST RECEIVE A SECOND FINAL CLEAR COAT OF SEALER PRIOR TO TURNING PROJECT OVER TO THE OWNER.
19. NO EXPOSED CONDUIT WILL BE ACCEPTED. GC SHALL COORDINATE ALL TRADES PRIOR TO ERECTION OF CMU WALLS.
20. GC TO COORDINATE ALL WALL AND CEILING FINISHES AND FINISH DETAILS FOUND ON SHEETS 7.10 AND 7.11 WITH SHEETS 6.10 AND 6.11.
21. FEATHER FLOOR AS REQUIRED AT TRANSITIONS BETWEEN DIFFERENT FLOORS SO FLOOR IS LEVEL.
22. THERE WILL BE NO CARPET OR LVT UNDER FIXED MILLWORK. PROVIDE SCHEDULED FLOOR FINISHES AT ACCESSIBLE ADA COMPLIANT MILLWORK WHERE OCCURS.
23. ALL MUDSET PORCELAIN TILE SHALL BE ON 2" SETTING BED.
24. ALL CEILING TILE TO BE CLG-1 UNLESS NOTED OTHERWISE. ANY GYPSUM CEILING REQUIRING PAINT SHALL BE PT-10.
25. SHOWER FLOORS TO BE PFT-2 UNLESS NOTED OTHERWISE.
26. SEE SHEET 4.80 & 6.10 FOR ADDITIONAL FINISH DESIGNATIONS AT SHOWERS.
27. ANY TOILET ACCESSORY THAT BRIDGES THE WAINSCOT TILE MUST BE SHIMMED.
28. ALL LOBBIES AND CORRIDORS, TRAINING ROOM 109 TO HAVE ABUSE RESISTANT 'TYPE X' GYPSUM BOARD TO 8'-0" A.F.F.
29. BRACE CLG-1, CLG-2, CLG-3, & CLG-4 PER SEISMIC CODE REQUIREMENTS & COORDINATE WITH ARCHITECT PRIOR TO CONSTRUCTION. PAINT ALL SEISMIC BRACING P-6 (REFER TO NOTE #11 THIS SHEET).
30. WALLS IN CORRIDORS, DAYROOM, TRAINING ROOM TO RECEIVE LEVEL-5 FINISH.
31. SEE **WALL TYPE AND INSULATION NOTES:** INSULATION NOTE #5 ON SHEET 4.72

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1738

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ADDENDUM 2

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CASTLE HAYNES FIRE DEPARTMENT

FINISH PLANS

Sheet No.
7.10