



ADDENDUM NO. 1.1

Corporate FBO Terminal Building and Parking Lot Rehabilitation

Located at 2178 Flightline Ave, Macon, GA 31216

Friday, November 22, 2024

Architect of Record: Passero Associates, LLC
4730 Casa Cola Way, Suite 200
St. Augustine, FL 32095
(904) 224-7082

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PASSERO
architecture engineering

Passero Associates Project No. 20202946.010A

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The following items are clarifications, corrections, or additions to the contract documents. **THIS ADDENDUM TAKES PRECEDENCE OVER THE ORIGINAL PARTS OF THE CONTRACT DOCUMENTS.**

All the parts of the contract documents, not specifically modified by this or other addenda, remain in full force and effect.

Bidders shall thoroughly familiarize themselves with the contents of this Addendum before submitting bid proposals. **IT SHALL BE THE BIDDER'S RESPONSIBILITY TO INFORM THE SUBCONTRACTORS, SUPPLIERS, MANUFACTURERS AND OTHER PARTIES PARTICIPATING IN THE WORK OF APPLICABLE REQUIREMENTS IN THIS ADDENDUM.**

Bidders shall acknowledge receipt of this addendum, identified by number and date, on the Addenda Receipt form included in the Proposal Section of the Contract Documents and submitted as part of their Proposal. Failure to acknowledge receipt of Addendum may be grounds for rejection of the bid proposal.

Items amended to the Contract Documents are as follows:

BID SCHEDULE REVISIONS

Questions must be directed to Christopher Nardone (cnardone@passero.com); and must be received no later than **Monday, December 2, 2024**, at 5:00pm in order to receive a response.

BID FORMS

1. **ADD** ATTACHMENT A – REQUIRED SUBMISSION DOCUMENTS (11 pgs)
2. **ADD** ATTACHMENT B – DBE FORMS (4 pgs)
3. **NOTE** revised bid form to be provided in final addendum.

DRAWINGS – CIVIL/LANDSCAPE

1. **REPLACE** sheet C100 with ADDENDUM NO. 1 – C100 for revisions to Contractor staging callouts.
2. **REPLACE** sheet C106 with ADDENDUM NO. 1 – C106 for updated electrical site component callouts.
3. **REPLACE** sheet C108 with ADDENDUM NO. 1 – C108 for added coordination callouts regarding the install of outdoor mechanical equipment in the mechanical yard.
4. **REPLACE** sheet C111 with ADDENDUM NO. 1 – C111 for added note regarding the use of blue paint on Handicap Parking Striping.
5. **REPLACE** sheet C112 with ADDENDUM NO. 1 – C112 for revised callout regarding blue striping layout for Handicap Parking stalls.
6. **REPLACE** sheet C115 with ADDENDUM NO. 1 – C115 for added callout to clarify the application of stone drainage outlet and inlet protection.

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7. **REPLACE** sheet C116 with ADDENDUM NO. 1 – C116 for updated electrical site component callouts.
8. **REPLACE** sheet C121 with ADDENDUM NO. 1 – C121 for added callout and note to clarify the adherence to the MWA Standards and to added pipe insulation to the hose bibb.
9. **REPLACE** sheet C122 with ADDENDUM NO. 1 – C122 for added callout and revised callouts to clarify the application of stone drainage outlet and inlet protection & to clarify the stone mix size.

DRAWINGS – ARCHITECTURAL

1. **NOTE** that modifications to sheet G-003 shall be provided to the awarded Contractor for permitting purposes.
2. **NOTE** that modifications to sheet G-004 shall be provided to the awarded Contractor for permitting purposes.
3. **REPLACE** sheet G-005 with ADDENDUM NO. 1 – G-005 for clarification, revision, and additional wall types.
4. **NOTE** that for sheets A-101A, A-101B, A-102A and A-102B that revised masonry and columns shall be provided for construction and shop drawing purposes for Contractor.
5. **NOTE** that sheets A-110 and A-120 are overall first and second floor plans; any changes to floor plans will be on the enlarged halved plans.
6. **REPLACE** sheets A-110A, A-110B, A-120A, and A-120B for coordinated structural drawings, revised wall types, and added general notes and legends.
7. **NOTE** that sheets A-130 and A-140 are overall first and second floor reflected ceiling plans; any changes to reflected ceiling plans will be on the enlarged halved reflected ceiling plans.
8. **REPLACE** sheets A-130A and A-130B with ADDENDUM NO. 1 – A-130A and ADDENDUM NO. 1 – A-130B for revisions to stair lighting, lobby lighting, wood ceilings underneath rotunda stairs, access panels, two exterior speakers, one (1) downspout location, and added general notes and legends.
9. **NOTE** refer to electrical for indirect lighting.
10. **REPLACE** sheets A-140A and A-140B with ADDENDUM NO. 1 – A-140A and ADDENDUM NO. 1 – A-140B for lighting coordination, revisions to one (1) downspout location, and added general notes and legends.
11. **REPLACE** sheet A-150 with ADDENDUM NO. 1 – A-150 for the coordination of roof vent stacks, one (1) revised downspout location, curb for future centrifugal roof-mounted upblast exhaust fan (omit centrifugal roof-mounted upblast exhaust fan – curb only), and color changes to roofing membranes and ribs.
12. **REPLACE** sheet A-160 with ADDENDUM NO. 1 – A-160 for clarification of dimensions, color changes to roofing membranes and ribs, added lighting at guitar head, and speakers at all porte-cochere columns, typical.

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13. **NOTE** that sheets A-200 and A-201 to have revised storefront window dimensions (2' x 7'-2"), omit the Propoint pixel diffused drum (4000k dynamic white) lighting, and cement plaster system to be a smooth stucco finish integrally-colored (Basis of Design: Stolit Milano Acrylic Finish in white, StoColor Acryl Plus high-performance finish coat, and Sto Clear Coat gloss finish coat).
14. **NOTE** that sheet A-300 in View 2 to have wood wainscot on first floor continue to the 2'-0" diameter round glulam column adjacent to room 100 Lobby/Waiting.
15. **NOTE** that sheet A-301 to have curb for future centrifugal roof-mounted upblast exhaust fan (omit centrifugal roof-mounted upblast exhaust fan – curb only).
16. **NOTE** that for sheet A-310, please find further information for notes/details on detail sheets.
17. **NOTE** that for sheets A-320 and A-322, please see structural drawings. Steel channel supports are to be by General Contractor, in lieu of the stair manufacturer.
18. **NOTE** that clarification of dimensions on sheets A-321 and A-323 shall be provided for construction and shop drawing purposes for Contractor.
19. **REPLACE** sheet A-324 with ADDENDUM NO. 1 – A-324 with an exposed 2x12 tube steel stringer (in lieu of wrapping a 2x10 in wood) to be painted black. LVT on rotunda floor to emulate piano keys, and be cut in unique radial shapes – final layout to be approved in shop drawings. Also note the following steel finishes, typical for all drawings: Exposed steel stringer in stairs to be finished per AESS 4. Exposed interior/exterior steel columns to be finished per AESS 3. All other exposed steel (rods/fasteners/spacers, and any remaining steel) to be finished per AESS 2.
20. **REPLACE** sheet A-330 with ADDENDUM NO. 1 – A-330 with revised pit location, controller location, and other updates conducive to Basis of Design: Kone Monospace 300 with 3500# capacity.
21. **REPLACE** sheets A-400, A-401, A-402, A-403, A-404, A-405, and A-406 with clarifications to keynotes and wall tags.
22. **NOTE** that sheet A-500 cast-in-place concrete foundation finish to be two coats finish paint to be white (primer not required) for cementitious dampproofing system (Basis of Design: QUIKRETE Heavy Duty Masonry Coating).
23. **NOTE** that sheet A-501 cast-in-place concrete curb finish to be two coats finish paint to be white (primer not required) for cementitious dampproofing system (Basis of Design: QUIKRETE Heavy Duty Masonry Coating). Provide 6'-0" width Indian Creek river rock gravel bed at cast-in-place concrete curb at angled curtain wall. Clarifications with dimensions shall be provided for construction and shop drawing purposes for Contractor.
24. **NOTE** that sheet A-510 to have 2 ¼" (not 2 ½") gypcrete underlayment over Basis of Design: Maxxon ¾" Acousti-Mat.
25. **NOTE** that sheet A-511 to have all corners on stucco system to have bullnose cornerbeads, aluminum (not stainless steel) gutters, 2x4 (not 2x6) framing for soffit, 5/8" GWB (not Type X), ¾" porcelain paver surface (not 2" paver surface) with hybrid pedestal system, and 2 ¼" (not 2 ½") gypcrete underlayment over Basis of Design: Maxxon ¾" Acousti-Mat.

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26. **NOTE** that sheet A-512 to have cement plaster system to be a smooth stucco finish integrally-colored (Basis of Design: Stolit Milano Acrylic Finish in white, StoColor Acryl Plus high-performance finish coat, and Sto Clear Coat gloss finish coat).
27. **REPLACE** sheet A-520 with ADDENDUM NO. 1 – A-520 with additional gutter flashing detail, additional 2by wood blocking adjacent to aluminum gutter, 5/8" (not 3/4") densdeck, and cement plaster system to be a smooth stucco finish integrally-colored (Basis of Design: Stolit Milano Acrylic Finish in white, StoColor Acryl Plus high-performance finish coat, and Sto Clear Coat gloss finish coat).
28. **NOTE** that sheet A-521 to have perimeter wide flanges and spacers painted with one coat primer and two coats finish to be black.
29. **NOTE** sheet A530 to revise colors of roofing membranes and ribs on porte-cochere, and shall be provided for construction and shop drawing purposes for Contractor. Refer to roof plan.
30. **NOTE** that for sheet A-540 all windows, penetrations, and door openings on interior face of exterior walls where gypsum board wraps to receive a 3/4" radius vinyl bullnose corner bead, typical.
31. **NOTE** that sheet A-560 to have the following reverse channel dimensional lettering heights clarified: In View 1, the Highnote logo is 2'-6" high, HIGHNOTE is 11" high, and AVIATION is 9" high. In View 2, Highnote logo is 2'-6" high, LEAVE ON A HIGH NOTE is 11" high, and MIDDLE GEORGIA REGIONAL AIRPORT is 8" high.
32. **REPLACE** sheet A-600 with ADDENDUM NO. 1 – A-600 with added wall tile types to clarify for rooms 108, 109, 206, 207, and 208 (Basis of Design: Daltile, 12" x 12").
33. **REPLACE** sheets A-601 and A-602 to have floor finish to continue to south door 100. Separate the balcony systems into the following:
 - Balcony Finish Surface Basis of Design: Tiletech 24" x 24" x 3/4" porcelain paver and wind uplift hybrid pedestal system (TP): paver to have slip-resistant finish
 - Balcony Perimeter Surface Basis of Design: MSI Travertine bullnose coping; refer to balcony details for more information
34. **NOTE** that sheet A-603 to have door schedule information on door 110B to match door 110A; hardware sets will differ between door 110A and 110B.
35. **REPLACE** sheets A-603 and A-604 with updated coordination of hardware sets.
36. **NOTE** that sheet A-605 to have cement plaster system to be a smooth stucco finish integrally-colored (Basis of Design: Stolit Milano Acrylic Finish in white, StoColor Acryl Plus high-performance finish coat, and Sto Clear Coat gloss finish coat).
37. **NOTE** that clarifications to dimensions on sheet A-606 shall be provided for construction and shop drawing purposes for Contractor.
38. **NOTE** that sheet A-607 all windows, penetrations, and door openings on interior face of exterior walls where gypsum board wraps to receive a 3/4" radius vinyl bullnose corner bead, typical. Also, sheet A-607 to have cement plaster system to be a smooth stucco finish integrally-colored (Basis of Design: Stolit Milano Acrylic Finish in white, StoColor Acryl Plus high-performance finish coat,

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and Sto Clear Coat gloss finish coat). For View 3, note that the level of the window sill is T.O. Second Floor at 15'-2" elevation (not T.O. First Floor at 0'-0" elevation); add tile trim/wall base at balcony paver system, and omit downspout in view.

DRAWINGS – STRUCTURAL

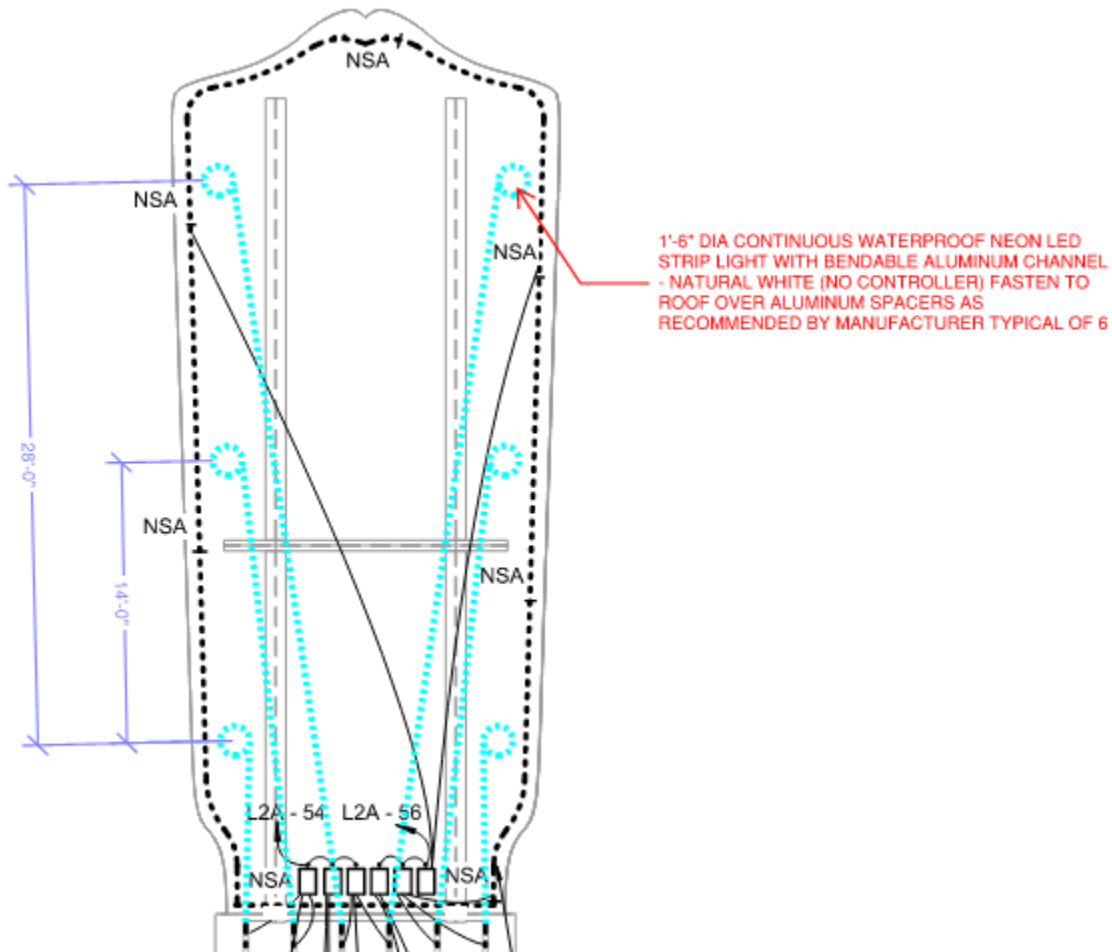
1. **REPLACE** S001 – GENERAL NOTES with ADDENDUM NO. 1 – S001 GENERAL NOTES due to added notes about temporary works and added clarifications to the deferred specialty engineering schedule.
2. **REPLACE** S003 – GENERAL NOTES with ADDENDUM NO. 1 – S003 GENERAL NOTES due to added clarifications to the architecturally exposed structural steel sections.
3. **REPLACE** S101 – FOUNDATION / MAIN FLOOR FRAMING PLAN with ADDENDUM NO. 1 – S101 FOUNDATION / MAIN FLOOR FRAMING PLAN for clarifications to foundation reinforcing layout, several updated footing tags and updated plan notes.
4. **REPLACE** S102, S102A, S102B - SECOND FLOOR FRAMING PLAN(S) for simplified framing at moment frames, reduced beam sizes and updated CLT panel lamination grades.
5. **REPLACE** S103, S103A, S103B - ROOF FRAMING PLAN(S) for simplified framing at moment frames, reduced beam sizes and updated CLT panel lamination grades.
6. **REPLACE** S110 – PORTE-COCHERE PLANS AND DETAILS with ADDENDUM NO. 1 – S110 PORTE-COCHERE PLANS AND DETAILS due to simplified clarified framing and details and updated CLT panel lamination grades.
7. **REPLACE** S201 – BUILDING SECTIONS with ADDENDUM NO. 1 – S201 BUILDING SECTIONS for clarified detail at balcony transition.
8. **REPLACE** S301 – TYPICAL CONCRETE DETAILS with ADDENDUM NO. 1 – S301 TYPICAL CONCRETE DETAILS due to clarification for anchor rod detail.
9. **REPLACE** S302 – FOUNDATION DETAILS with ADDENDUM NO. 1 – S302 FOUNDATION DETAILS for clarification for wide flange column base detail.
10. **REPLACE** S303 – TYPICAL MASONRY DETAILS with ADDENDUM NO. 1 – TYPICAL MASONRY DETAILS for clarification for glulam to CMU connection.
11. **REPLACE** S304 – TYPICAL MASS TIMBER DETAILS with ADDENDUM NO. 1 – S304 TYPICAL MASS TIMBER DETAILS for added porte-cochere to balcony connection detail and added glulam beam to steel and glulam column connection concepts.
12. **REPLACE** S305 – FRAMING DETAILS with ADDENDUM NO. 1 – S305 FRAMING DETAILS for added top of non-structural framed wall connection detail and clarifications to balcony edge details and a typical beam-column bearing detail.
13. **REPLACE** S306 – FRAMING DETAILS with ADDENDUM NO. 1 – S306 FRAMING DETAILS for added details to simplify framing at steel moment frames and clarification for typical base plate detail.
14. **REPLACE** S310 – ENLARGED STAIR FRAMING PLANS AND DETAILS with ADDENDUM NO. 1 – S310 ENLARGED STAIR FRAMING PLANS AND DETAILS for updated framing and added connection detail.
15. **REPLACE** S320 – STEEL OVERFRAMING PLANS AND DETAILS with ADDENDUM NO. 1 – S320 STEEL OVERFRAMING PLANS AND DETAILS for added clarification to concrete to CLT connection.

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DRAWINGS – MEP

1. **NOTE** on sheet M-201 2ND FLOOR MECHANICAL PLAN, Future Kitchen Hood shall have exhaust fan referenced by keynote #7 “to be future” shall be provided installed as part of this project. Provide welded steel grease duct from hood full size of unit opening to below roof structure for future extension to future hood.
2. **NOTE** sheet E-002 shall have the following revisions to lighting fixture schedule:
 - a. Fixture “NSA” shall be Linea Light Group Rubber 3D with continuous white LED.
 - b. Fixture “NSB” shall be Linea Light Group Rubber 3D RGBW Pixel with dynamic lighting effects capable of color programming with DMX controller. This fixture shall be provided where indicated on plans as identified as RGBW. These locations include below entry porte cochere, first floor horizontal window accent lights and downward facing at sky light.
 - c. Provide DMX lighting controller for all linear accent lighting with connection to computer for software driven lighting programs. Provide five (5) days of onsite programming of DMX lighting system for end user with training. DMX controller shall control all linear accent lights NSA and NSB. All NSA lighting shall be controlled as on / off. All NSB lighting shall be controlled as color changing along each strand as a program element.
 - d. All linear exterior lighting shall be provided with appropriate mounting, power supplies, cables, end connections, etc for a complete and functional system. All low voltage wiring shall be concealed below lights within continuous extruded channel.
3. **NOTE** on sheet E-201 2nd Floor Lighting Plan, there shall be a continuous LED Light in 12 equal segments around skylight per architectural sections. Total length shall be 75’. Fixture shall be white.
4. **NOTE** on sheet E-201 2nd Floor Lighting Plan, the continuous LED light indicated around entire perimeter of floor shall be installed below roof overhang as indicated in architectural sections. This light shall be NSA fixture.
5. **NOTE** on sheet E-202 Lighting Roof plan, the outer band of lighting labeled as NSA shall be revised to be connections to glass guard rail system (IG Railing Frameless Illuminated Glass System). Each mounting bracket to system shall be provided with electrical connection. Refer to architectural drawings for guard rail specifications. Provide all components for lighting operation including power supplies and cabling. Coordinate with railing manufacturer.
6. **NOTE** on sheet E-202 Lighting Porte-cochere Plan shall have additional NSA fixture accent lighting as indicated below. Provide appropriate bendable aluminum channel for attachment to fixture and roof.

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7. **NOTE** all power supplies for lighting with low voltage connection shall have power supply located above accessible ceiling or within access space as indicated on architectural drawings.

TECHNICAL SPECIFICATIONS – CIVIL/LANDSCAPE

1. **REPLACE** the CIVIL/SITE TECHNICAL SPECIFICATIONS with ADDENDUM NO. 1 – CIVIL/SITE TECHNICAL SPECIFICATIONS due to general revisions amongst the set relating to “Methods of Measurement” and payment line items. NOTE THAT THIS EFFECTS ALL CIVIL/LANDSCAPE SPECIFICATIONS.
2. **ADD** C-102 TEMPORARY AIR & WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL.
3. **ADD** P-151 CLEARING AND GRUBBING.
4. **ADD** GDOT SECTION 708 PLANT TOPSOIL.
5. **ADD** GDOT SECTION 893 MISCELLANEOUS PLANTING MATERIAL.
6. **REMOVE** GDOT SECTION 149 CONSTRUCTION LAYOUT.
7. **REMOVE** GDOT SECTION 161 CONTROL OF SOIL EROSION AND SEDIMENTATION.
8. **REMOVE** GDOT SECTION 165 MAINTENANCE OF TEMPORARY EROSION AND SEDIMENTATION CONTROL DEVICES.

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TECHNICAL SPECIFICATIONS – ARCHITECTURE

1. **REPLACE** 09 30 00 - TILING with ADDENDUM NO. 1 –09 30 00 – TILING with added tile types clarify for rooms 108, 109, 206, 207, and 208.
2. **REPLACE** 10 21 13.17 - PHENOLIC TOILET COMPARTMENTS with ADDENDUM NO. 1 – 10 21 13.17 - PHENOLIC TOILET COMPARTMENTS for revisions to panel thickness.
3. **REPLACE** 05 73 15 – FRAMELESS GLAZED METAL RAILINGS with ADDENDUM NO. 1 – 05 73 15 - FRAMELESS GLAZED METAL RAILINGS with revisions to Basis of Design accessories in order to mount railing spigots to stone bullnose coping.
4. **REPLACE** 10 28 00 – TOILET, BATH, AND LAUNDRY ACCESSORIES with ADDENDUM NO. 1 – 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES with revisions to Basis of Design products for sanitary napkin disposal unit and toilet paper dispenser with utility shelf.
5. **REPLACE** 09 91 23 – INTERIOR PAINTING with ADDENDUM NO. 1 - 09 91 23 – INTERIOR PAINTING with revisions to structural steel to be one coat primer and two coats finish (not one coat primer with one coat finish) to be black.
6. **REPLACE** 10 44 00 – FIRE PROTECTION SPECIALTIES with ADDENDUM NO. 1 – 10 44 00 – FIRE PROTECTION SPECIALTIES.
7. **NOTE** that 08 71 00 DOOR HARDWARE will be revised according to A-604 in final addendum.

BIDDERS QUESTIONS AND ANSWERS

Q1: Forms one, two, and three are what we are needing to ensure we have all the correct documents to submit with our bid. It is possible I overlooked them however could you please advise?

A1: DBE Forms have been provided in Addendum 1.1

Q2: Does the tactile signage have to be the molded or sandblasted panels? Will Impact Modified Acrylic be okay to use?

A2: 2.03 TACTILE SIGNAGE MEDIA

A. Injection Molded Panels: One-piece acrylic plastic, with raised letters and braille.

1. Total Thickness: 1/8 inch.

2.04 NON-TACTILE SIGNAGE MEDIA

A. Sand Blasted Plastic Panels: High gloss acrylic plastic; letters sand blasted to dull sheen:

1. Total Thickness: 1/8 inch

Q3: Do you know the address and where this is located?

A3: 2. C. Building Identification Signs:

1. Use individual aluminum characters with contrasting colors to building as selected by Architect.

2. Mount on outside wall in location indicated on drawings.

3. Height: 10 inches, minimum.

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4. Quantity: 8 characters (2 sets of 4 characters per building address).

Q4: Do you know the sizes of the logos and lettering here? (drawing a-560)

A4: See note 31 under “DRAWINGS – ARCHITECTURAL.”

Q5: We are interested in bids for commercial furniture for the offices and common areas, window treatments or prefab/modular walls on this project. We would like to participate if possible; I don't see this scope in the specs provided.

A5: The listed components are outside of the scope of this project.

Q6: On Plan # E-202 most of all that lighting is listed as NSA however the lighting schedule does not list a NSA only a NSB. Are both of these light styles the same? Please advise.

A6: Refer to “DRAWINGS – MEP.”

Q7: The Basis of Design says Low Iron Tempered Glass.

- a. Under IBC 2021 this glass needs to be a minimum 9/16 Laminated. We can provide the glass as the following make-up:
 - i. ¼ Low Iron Heat Strengthened with PE
 - ii. .060 SG Interlayer as approved by Architects and Engineering
 - iii. ¼ Low Iron Heat Strengthened with PE
 - iv. Include holes for standoffs.

A7: Refer to revised specification “05 73 15 – FRAMELESS GLAZED METAL RAILINGS.”

Q8: The drawing is illuminated Glass Guardrail system with Surface mounted Matte Black 316 Stainless Steel Spigots. Polished Stainless steel connectors with LED Remote.

- b. The only LED System available to OBE is the Top Cap Handrail where the LED is under the Top Cap. Also, there is a Manufacturer's Design Recco fastening. This would be completed by Engineering.
- c. Do you want Surface mount Clamps or Stand Offs on Fascia?
- d. Is this all Matte Black Finish?
- e. I need to double check on the REMOTE for LED as we would only provide the LED System under the top cap.

A8: Refer to revised specification “05 73 15 – FRAMELESS GLAZED METAL RAILINGS.”

Q9: Lastly, do you have the LF for the entire Handrail run on the 2nd Floor? If so, can you provide that?

A9: Refer to revised specification “05 73 15 – FRAMELESS GLAZED METAL RAILINGS.”

OTHER ITEMS

1. Questions must be directed to Christopher Nardone (cnardone@passero.com); and must be received no later than **Monday, December 2, 2024**, at 5:00pm in order to receive a response.

2. Bid Documents must be obtained via Macon-Bibb County's website at www.maconbibb.us/procurement, at Georgia's Department Of Administrative Services at <https://doas.ga.gov/state-purchasing/georgia-procurement-registry-local-governments/gpr->

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[overview](#) and www.passero.com/bids. It is the bidders responsibility to check the website for addenda prior to submitting their bid.

END OF ADDENDUM NO. 1

Attachment “A”
Required Submission Documents

Macon-Bibb County
Summary of Attachment “A” Required Documents

- Bidder Qualification Form
- List of Sub-Contractors
- Bidder Minority Participation Goal
- Financial & Legal Stability Statement
- Insurability Statement
- Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- Non-Collusion Affidavit

Instructions and additional information regarding the three forms below can be found on our website under the Procurement Department Documents tab if needed.

- Macon-Bibb County Vendor Application
- Form W-9
- E-Verify Affidavit

Attachment "A"
Required Submission Documents

BIDDER QUALIFICATION FORM

Company Name: _____

Address: _____

When Organized: _____ Where Incorporated: _____

How many years have you engaged in business under the present firm name? _____

Credit available for this contract? _____

Contracts now in hand? _____

Has bidder ever refused to execute a contract at the original bid amount? _____

Has bidder ever been declared in default on a contract? _____

Comments: _____

Company Name: _____

Authorized By (typed name): _____

Authorized Signature: _____

Title: _____ Date: _____

References

Following is a reference list of contracts that are similar to this project:

NAME OF PROJECT/DATE	LOCATION	CONTACT	PHONE #
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 201____

My Commission Expires: _____

Notary Public

[NOTARY SEAL]

Attachment "A"
Required Submission Documents

LIST OF SUB-CONTRACTORS

I do ____, do not ____, propose to sub-contract some of the work on this project. I propose to sub-contract work to the following contractors.

NAME/ADDRESS

TYPE OF WORK

% of Contract

Contractor Name

Attachment "A"
Required Submission Documents

BIDDER MINORITY PARTICIPATION GOAL
(Attach additional pages if required.)

I do ___, do not ___, propose to employ the minority sub-contractors as listed below on some of the work on this project.

NAME/ADDRESS	TYPE OF WORK	% of Contract
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____
_____	_____	_____
_____	_____	_____

Contractor Name

Attachment "A"
Required Submission Documents

FINANCIAL & LEGAL STABILITY STATEMENT

Please check appropriate item(s):

Firm has the financial capability to undertake the work and assume the liability required if awarded this solicitation.

Firm has the legal capability to undertake the work and assume the responsibilities required if awarded this solicitation.

Pending litigations (if any) will not affect the firm's ability to perform on this contract, if awarded.

Company Name: _____

Authorized By (typed name): _____

Authorized Signature: _____

Title: _____ Date: _____

SUBSCRIBED AND SWORN

BEFORE ME ON THIS THE

_____ DAY OF _____, 201____ My Commission Expires: _____

Notary Public

[NOTARY SEAL]

Attachment "A"
Required Submission Documents

INSURABILITY STATEMENT

Please check appropriate item(s):

___ By submission of this form, this firm confirms the ability to acquire and maintain the required levels of insurance as outlined in the bid document. It is the understanding of this firm that proof of Insurance must be provided prior to contract execution and maintained throughout the entire term of the contract.

Company Name: _____

Authorized By (typed name): _____

Authorized Signature: _____

Title: _____ Date: _____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 201____ My Commission Expires: _____

[NOTARY SEAL]

Notary Public

Attachment "A"
Required Submission Documents



Macon-Bibb County
Procurement Department
700 Poplar Street, Suite 308
Macon, Georgia 31202-0247
Tel: (478) 803-0550 • Fax: (478) 751-7252
www.maconbibb.us

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION
INELIGIBILITY AND VOLUNTARY EXCLUSION**

The Bidder/offer certifies, by submission of this Proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntary excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier, transactions, proposals, contracts, and subcontracts. Where the Bidder/offeror or any lower tier participant is unable to certify to this statement, it shall attach an explanation of this solicitation/proposal.

Dated at this _____ day of _____, 2019.

Signature of Contractor: _____

Title: _____

For Macon Bibb County Personnel Only:

Macon Bibb County Procurement Department will verify that the above bidder/offer certifies, by submission of this Proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntary excluded from participation in this transaction by any Federal department or agency.

Signature of Procurement Officer _____ Date _____

Printed Name _____

Attachment "A"
Required Submission Documents

NON COLLUSION AFFIDAVIT

Date:	
Project:	Bibb County, Georgia
Project #:	
Project Description:	
Services Provided:	General Contracting
State of:	Georgia
County of:	Bibb

I, _____ having first been duly sworn, deposes and states as follows:

I am the party making the foregoing Proposal or Bid; that such Proposal or Bid is genuine and not collusive or sham; that said Proposer or Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Proposer or Bidder or person, to put in a sham Proposal or Bid, or that such other person refrain from proposing or bidding, and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the Proposal Fee or Bid Price of affiant or any other Proposer or Bidder, or to fix any overhead, profit or cost element of said Proposal Fee or Bid Price, or that of any other Proposer or Bidder, or to secure any advantage against Bibb County, Georgia or any person interested in the proposed Contract; and that all statements in said Proposal or Bid are true; and further, that such Proposer or Bidder has not directly or indirectly submitted this Proposal or Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

Contractor:

(Signature)

(Seal)

Attachment "A"

Required Submission Documents

MACON-BIBB COUNTY

Vendor Application



Date Submitted: _____

New Application

Revised Application

RETURN THIS COMPLETED FORM TO:

Macon-Bibb County Procurement Department
700 Poplar Street, Ste. 308
Macon, GA 31201

Phone: 478-803-0550
Fax: 478-751-7252
Email: procurement@maconbibb.us

GENERAL VENDOR INFORMATION

Company Name:	
Company Address:	
Authorized By (Name):	
Title:	
Authorized Signature:	Date:
Telephone Number:	Fax Number:
Email Address:	

REMITTANCE INFORMATION (where payments should be sent)

Remit to Name:		
Remit to Address:		
Phone:	Fax:	Toll Free:
Contact:	Email:	
Business Type (choose one):	<input type="checkbox"/> Individual/Sole Proprietor	<input type="checkbox"/> Single member LLC
	<input type="checkbox"/> Business - incorporated	<input type="checkbox"/> Business - not incorporated/partnership
	<input type="checkbox"/> LLC: C S P (circle one)	<input type="checkbox"/> Other (Specify):
Social Security #:	Federal Tax ID #:	

PURCHASE ORDER INFORMATION (where purchase orders should be sent)

Purchase Order Name:		
Purchase Order Address:		
Phone:	Fax:	Toll Free:
Contact:	Email:	
Payment Terms: Discount %	# Days	Net Due
Freight Terms: Ship Via	FOB	

E-Verify Information

Private Employer Affidavit is attached :
 With E-Verify # _____ With E-Verify exemption selected _____
 Contractor Affidavit is attached: (additional affidavit, if applicable)
 With E-Verify # _____ Without E-Verify # but a copy of my driver's license is attached since
 I have no employees and no intent to hire employees _____

MBE/DBE/WBE STATUS (Select at least one)

Minority Owned (African American, Hispanic, Native American, Asian American) circle one _____
 Woman Owned _____ Disabled _____ Veteran _____ Not Applicable _____

Do you maintain a local office in Macon-Bibb County? Yes _____ No _____

Attachment "A"

Required Submission Documents

Request for Taxpayer Identification Number and Certification

Form W-9 (Rev. October 2018) Department of the Treasury Internal Revenue Service

Give Form to the requester. Do not send to the IRS.

Go to www.irs.gov/FormW9 for instructions and the latest information.

Form fields 1-7: Name, Business name, Tax classification, Exemptions, Address, City, ZIP code, List account number(s).

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding.

Social security number and Employer identification number input boxes.

Note: If the account is in more than one name, see the instructions for line 1. Also see What Name and Number To Give the Requester for guidelines on whose number to enter.

Part II Certification

Under penalties of perjury, I certify that:

- 1. The number shown on this form is my correct taxpayer identification number...
2. I am not subject to backup withholding because...
3. I am a U.S. citizen or other U.S. person...
4. The FATCA code(s) entered on this form... is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return.

Sign Here section with Signature of U.S. person and Date fields.

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
Form 1099-S (proceeds from real estate transactions)
Form 1099-K (merchant card and third party network transactions)
Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
Form 1099-C (canceled debt)
Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

Attachment "A"
Required Submission Documents

E-VERIFY AND PRIVATE EMPLOYER AFFIDAVIT

Pursuant To O.C.G.A. § 36-60-6(d)

By executing this affidavit, the undersigned private employer verifies one of the following with respect to its application for an occupational tax certificate, alcohol license, or other document required to operate a business as referenced in O.C.G.A. § 36-60-6(d):

Business Name: _____

SECTION 1 (Choose ONE of the following)

- (A) On January 1 of the below-signed year, the individual, firm, or corporation employed **ten (10) or less employees.** (Proceed to Section 3)
- (B) On January 1 of the below-signed year, the individual, firm, or corporation employed **more than ten (10) employees** and has registered with the E-Verify program. (Proceed to Section 2)

SECTION 2

The employer has registered with and utilizes the Federal Work Authorization program commonly known as E-Verify, in accordance with the applicable provisions and deadlines established in O.C.G.A. §36-60-6. The undersigned private employer also attests that its E-Verify number and date of authorization are as follows:

E-Verify Number: _____

Date of Authorization: _____ **(Proceed to Section 3)**

SECTION 3

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, _____, 20____ in _____ (city), _____ (state)

Printed Name of Authorized Officer or Agent: _____

Title of Authorized Officer or Agent: _____

Signature of Authorized Officer or Agent: _____

SUBSCRIBED AND SWORN BEFORE ME

ON THIS THE _____ DAY OF _____, 20_____

NOTARY PUBLIC

My Commission Expires: _____

OWNER'S DBE POLICY STATEMENT and
BIDDER'S CONDITION OF BID RESPONSIVENESS / RESPONSIBILITY
REQUIREMENTS

The Sponsor has established a Disadvantaged Business Enterprise (DBE) program in accordance with regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. The Sponsor has received Federal financial assistance from the Department of Transportation, and as a condition of receiving this assistance, the Sponsor, has signed an assurance that it will comply with 49 CFR Part 26.

It is the policy of the Sponsor to ensure that DBEs as defined in Part 26, have an equal opportunity to receive and participate in DOT-assisted contracts.

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR §26.53.

As a condition of bid responsiveness, the Bidder or Offeror must submit the following information with its proposal on the forms provided herein:

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1)
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and
- 5) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

As a condition of bid responsibility, the successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in its commitment within five days after bid opening on the forms provided herein:

1. The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2. A description of the work that each DBE firm will perform;
3. The dollar amount of the participation of each DBE firm listed under (1)
4. Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal; and
5. If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION FORMS

Form 1 – BIDDER’S DBE UTILIZATION COMMITMENT

The undersigned bidder/offeror has satisfied the requirements of the bid specification in the following manner (please check the appropriate space):

_____ The bidder/offeror is committed to a minimum of **8.59%** DBE utilization on this contract.

_____ The bidder/offeror (if unable to meet the DBE goal of **8.59%**) is committed to a minimum of _____% DBE utilization on this contract and submits documentation demonstrating good faith efforts.

The undersigned bidder/offeror shall utilize the specific DBEs listed in this bid response to perform the work and supply the materials for which each is listed, unless the undersigned obtains prior written consent of the **Ware County Board of Commissioners**, as provided in 40 CFR Part 26, §26.53(f). Unless such consent is provided, the successful bidder/prime contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE. Note: The provisions in 40 CFR Part 26 §26.53(f) apply to pre-award deletions and/or substitutions of DBE firms, and to post-award terminations of DBE firms.

Name of bidder/offeror’s firm: _____

State Registration No. _____

By: _____
(Signature) (Title)

Date: _____

DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION FORMS

FORM 2 – BIDDER’S DBE ASSURANCES

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. A Disadvantaged Business Enterprise (DBE) contract goal of **8.59%** percent has been established for this contract.

All bidders must submit an assurance stating the percentage of Disadvantaged Business Enterprises they intend to employ on this project.

The successful bidder must submit the following information within 15 business days of being notified that they are the successful bidder, but before the contract is executed:

1. The names and addresses of DBE **AND** non-DBE firms that will participate in the contract, including:
 - a. Firm’s status as a DBE or non-DBE.
 - b. Age of the firm.
 - c. Annual gross receipts of the firm (use categories below):
[] < \$500,000; [] \$500,000-\$1 million; [] \$1-2 million; [] \$2-5 million; [] > 5 million.
 - d. Description of the work the firm will perform.
 - e. Dollar amount of the work the firm will perform.
2. Written documentation of the commitment to use a DBE firm whose participation is submitted to meet the contract goal.
3. Written confirmation from the DBE firm that it is participating in the contract.
4. If the contract goal is not met, evidence of good faith efforts as defined in 49 CFR Part 26.

CERTIFICATION:

This firm, as Bidder, assures that it will utilize not less than _____% of DBE participation, and provide the required information on the firms that will participate in the contract.

Bidder’s Name: _____

Address: _____

Bidder’s Status: _____ DBE _____ Non-DBE

Age of Firm: _____

Annual gross receipts of the firm (check category):

[] < \$500,000; [] \$500,000-\$1 million; [] \$1-2 million; [] \$2-5 million; [] > 5 million.

Signature and Title

Date

DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION FORMS

FORM 3: BIDDER'S INTENT TO UTILIZE A CERTIFIED DBE

[Submit this form for each DBE subcontractor.]

Name of bidder/offeror's firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Name of DBE firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work to be performed by DBE firm:

If awarded the prime contract, the bidder/offeror is committed to utilizing the above-named DBE firm for the work described above.

The estimated dollar value of this work is \$ _____.

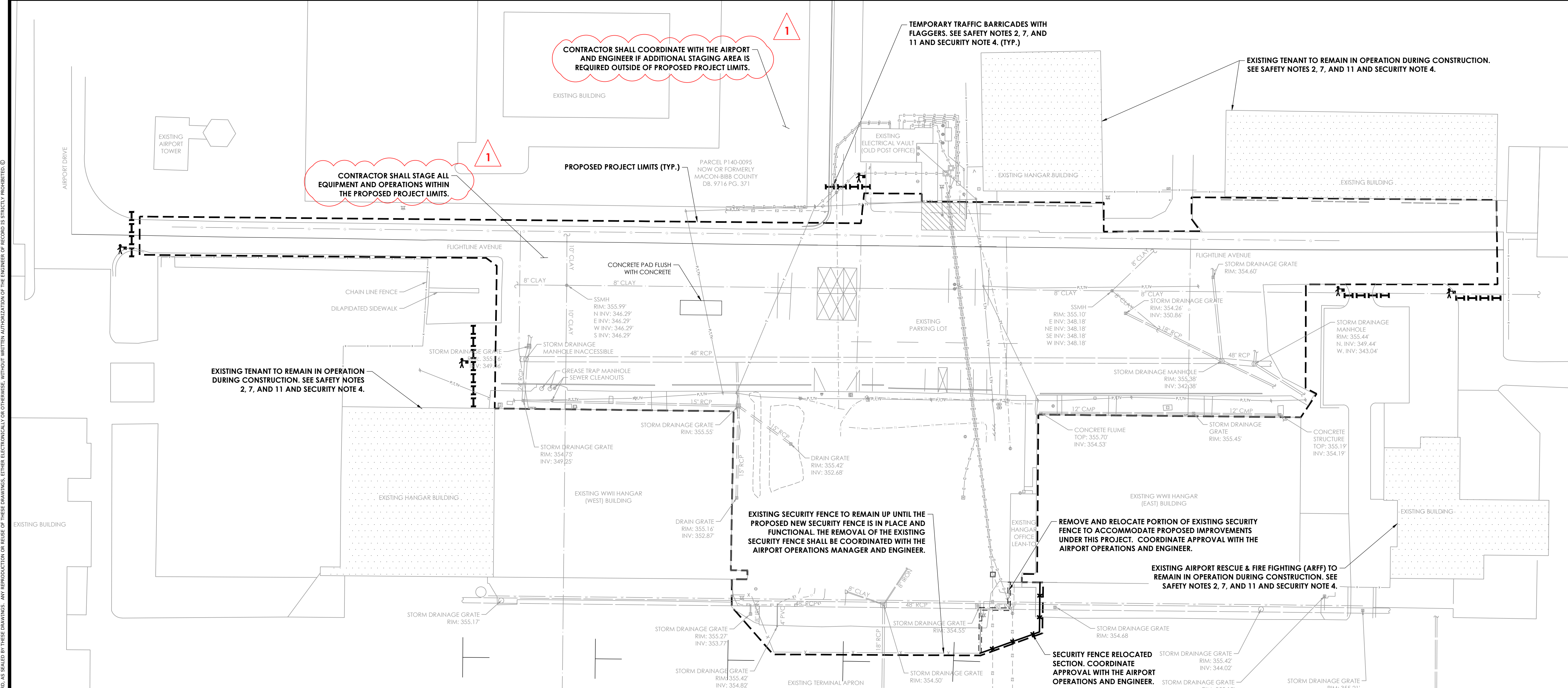
Affirmation of Intent

The above-named DBE firm affirms that if the above-named bidder is awarded the prime contract, it will perform the portion of the contract for the estimated dollar value as stated above, and that the firm is DBE certified to perform the specific trades.

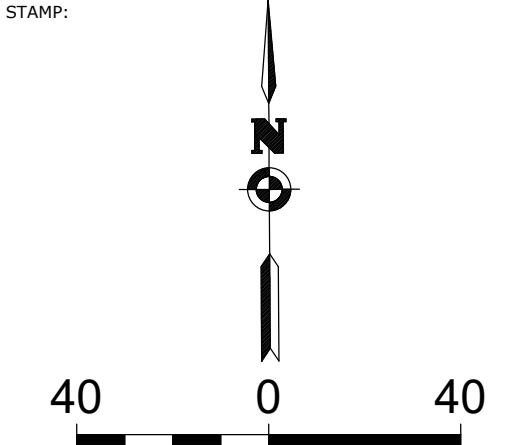
By _____
(Signature)

Type / Print Name, Title

Date: _____



BID SET - DO NOT USE FOR CONSTRUCTION



CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PRINCIPAL IN CHARGE: STAN PRICE, PE
PROJECT MANAGER: COOPER RIDGE P.E.
DESIGNER: JULIA NORRIS, ET

NO.	DATE	BY	DESCRIPTION
1	11/18/24	LMO	ADDENDUM #1

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PROJECT LAYOUT AND CONSTRUCTION SAFETY PLAN

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
C100

DATE:
NOVEMBER 2024

SAFETY NOTES

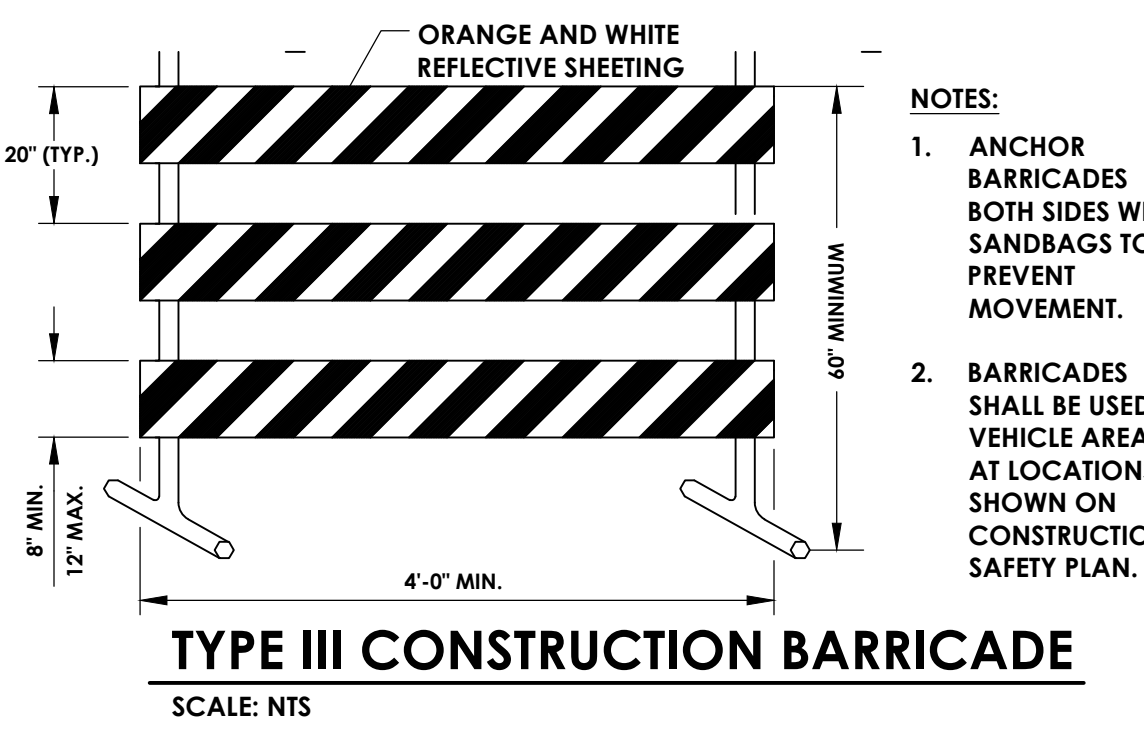
- JOB SITE SAFETY IS THE EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL ACQUAINT ALL SUPERVISORS AND EMPLOYEES WITH THE EXISTING AIRPORT TENANT ACTIVITIES AND OPERATIONS THAT WILL REMAIN OPERABLE DURING CONSTRUCTION AND SHALL CONDUCT ALL CONSTRUCTION ACTIVITIES TO CONFORM TO ALL ROUTINE AIRPORT TENANT AND AIRPORT RESCUE & FIRE FIGHTING (ARFF) REQUIREMENTS.
- ALL CONTRACTOR CONSTRUCTION EQUIPMENT AUTHORIZED TO OPERATE ON THE PROJECT SITE SHALL DISPLAY CONTACT INFORMATION & IDENTIFICATION. ALL VEHICLES OPERATING IN THE ACTIVE AIRPORT OPERATIONS AREA DURING THE HOURS OF DARKNESS SHALL BE EQUIPPED WITH A FLASHING LIGHT CONFORMING TO LOCAL CODES.
- OPEN FLAME - OPEN FLAME, WELDING OR TORCH-CUTTING OPERATIONS ARE PROHIBITED UNLESS ADEQUATE FIRE AND SAFETY PRECAUTIONS HAVE BEEN TAKEN AND THE PROCEDURE APPROVED BY FIRE INSPECTOR, AIRPORT MANAGER AND THE ENGINEER. NO DEBRIS BURNING IS ALLOWED.
- INSPECTION BY OPERATIONS - THE CONTRACTOR SHALL ARRANGE FOR INSPECTION BY THE ENGINEER AND AIRPORT MANAGER ANY AREA THAT HAS BEEN CLOSED FOR WORK OR THAT HAS BEEN USED FOR A CROSSING POINT OR HAUL ROUTE BY THE CONTRACTOR.
- AT THE END OF THE WORK DAY, CONTRACTOR SHALL REMOVE ALL EQUIPMENT FROM WORK AREA BACK TO THE CONTRACTOR STAGING AREA OR TO SUCH OTHER LOCATIONS AS APPROVED BY THE ENGINEER.
- THROUGHOUT THE DURATION OF CONSTRUCTION, THE CONTRACTOR MUST:
 - BE AWARE OF AND UNDERSTAND THE EXISTING AIRPORT TENANT & AIRPORT RESCUE & FIRE FIGHTING (ARFF) DAILY ACTIVITIES.
 - CONDUCT ACTIVITIES SO AS TO NOT IMPED E XISTING AIRPORT TENANT & AIRPORT RESCUE & FIRE FIGHTING (ARFF) DAILY ACTIVITIES.
 - INSPECT ALL CONSTRUCTION AND STORAGE AREAS AS OFTEN AS NECESSARY TO BE AWARE OF CONDITIONS.
 - PROMPTLY TAKE ALL ACTIONS NECESSARY TO PREVENT OR REMEDY ANY UNSAFE OR POTENTIALLY UNSAFE CONDITIONS AS SOON AS THEY ARE DISCOVERED.
 - THE CONTRACTOR SHALL PERFORM A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE.
- THE CONTRACTOR, SUB-CONTRACTOR, AND SUPPLIER EMPLOYEES OR UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AIRPORT OPERATION AREAS.
- IN THE EVENT OF AN EMERGENCY, THE CONTRACTOR SHALL NOTIFY AN AIRPORT

REPRESENTATIVE, AND RESIDENT PROJECT REPRESENTATIVE AFTER CALLING 911.

- ALL OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS ON AIRPORT PROPERTY SHALL BE PROMINENTLY MARKED TO IDENTIFY THESE AREAS DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.
- AN AIRPORT REPRESENTATIVE MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS, MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION, BARRICADE OPEN TRENCHES, AND STAND BY UNTIL AIRPORT RESCUE & FIRE FIGHTING (ARFF) USE IS COMPLETED.
- THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS AT ALL TIMES.
- THE OWNER RESERVES THE RIGHT TO CONTRACT AND PERFORM OTHER OR ADDITIONAL WORK ADJACENT TO AND WITHIN THE WORK AREA COVERED BY THIS CONTRACT. WHEN SEPARATE CONTRACTS ARE LET WITHIN THE LIMITS OF ANY ONE PROJECT, EACH CONTRACTOR SHALL CONDUCT HIS WORK SO AS NOT TO INTERFERE WITH OR HINDER THE PROGRESS OR THE COMPLETION OF THE WORK BEING COMPLETED BY OTHER CONTRACTORS. THE CONTRACTORS WORKING ON THE SAME PROJECT SHALL COOPERATE WITH EACH OTHER AS REQUESTED BY THE ENGINEER. ANY ADDITIONAL EFFORT OR WORK REQUIRED FOR SUCH COORDINATION WITH OTHER CONTRACTORS SHALL BE INCIDENTAL TO THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE.

SECURITY NOTES:

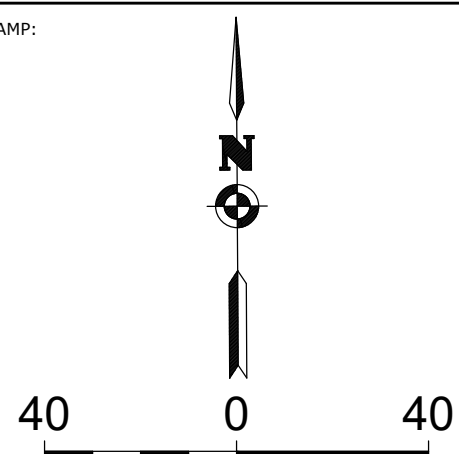
- JOB SITE SECURITY IS THE EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE AIRPORT AND WITH THE SECURITY REQUIREMENTS SPECIFIED HEREIN. THE CONTRACTOR SHALL DESIGNATE IN WRITING TO THE OWNER & RESIDENT PROJECT REPRESENTATIVE THE NAME OF HIS/HER "CONTRACTOR SECURITY OFFICER". THE CONTRACTOR SECURITY OFFICER SHALL REPRESENT THE CONTRACTOR ON THE SECURITY REQUIREMENTS OF THE CONTRACT.
- CONTRACTOR PERSONNEL SECURITY ORIENTATION - THE CONTRACTOR SECURITY OFFICER SHALL BE RESPONSIBLE FOR BRIEFING ALL CONTRACTOR PERSONNEL ON THESE REQUIREMENTS AND, FROM TIME TO TIME, OTHER SECURITY PROVISIONS ADOPTED BY THE ENGINEER OR OWNER. ALL NEW CONTRACTOR EMPLOYEES SHALL BE BRIEFED ON THESE REQUIREMENTS PRIOR TO WORKING IN THE CONSTRUCTION AREA.
- ACCESS TO THE SITE-CONTRACTOR'S ACCESS TO THE SITE SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL NOT PERMIT ANY UNAUTHORIZED CONSTRUCTION PERSONNEL OR TRAFFIC ON THE SITE. EXCEPT FOR EXISTING AIRPORT TENANTS AND AIRPORT RESCUE & FIRE FIGHTING PERSONNEL (AS NOTED IN THE SAFETY NOTES 2, 7, AND 11 ON THIS PAGE), THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL TO AND FROM THE VARIOUS CONSTRUCTION AREAS ON THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR THE IMMEDIATE CLEANUP OF ANY DEBRIS DEPOSITED ALONG THE ACCESS ROAD AS A RESULT OF HIS/HER CONSTRUCTION TRAFFIC. DIRECTIONAL SIGNING AT THE ACCESS GATE AND ALONG THE DELIVERY ROUTE TO THE STORAGE AREA OR WORK SITE SHALL BE AS DIRECTED BY THE ENGINEER.
- ALL CONTRACTOR'S MATERIAL ORDERS FOR DELIVERY TO THE SITE WILL USE THE ACCESS POINT AT THE CONTRACTOR'S STAGING AREA. THE CONTRACTOR SHALL PROVIDE ESCORT SERVICES TO DIRECT DELIVERIES.
- THE LIMITS OF CONSTRUCTION, MATERIAL STORAGE AREAS, EQUIPMENT STORAGE AREA, PARKING AREA AND OTHER AREAS DEFINED AS REQUIRED FOR THE CONTRACTOR'S EXCLUSIVE USE DURING CONSTRUCTION SHALL BE MARKED BY THE CONTRACTOR AND APPROVED BY THE OWNER. THE CONTRACTOR SHALL ERECT AND MAINTAIN AROUND THE PERIMETER OF THESE AREAS SUITABLE FENCING, SIGNAGE AND WARNING DEVICES VISIBLE FOR BOTH DAY/NIGHT USE TO DELINEATE THE PERIMETER OF ALL SUCH AREAS.



V:\projects\New\2020\20202946\Macon-Bibb County\20202946.010A\01 - CAD\BIM Models\Sheet\11 - PROJECT LAYOUT\01 - PROJECT LAYOUT.dwg - Nov 19, 2024, 3:00pm
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**BID SET - DO NOT
USE FOR
CONSTRUCTION**

STAMP:



GRAPHIC SCALE IN LINEAR FEET

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PRINCIPAL IN CHARGE: STAN PRICE, P.E.
PROJECT MANAGER: COOPER RIDGE, P.E.
DESIGNER: JULIA NORRIS, EIT

NO.	DATE	BY	DESCRIPTION
1	11/18/24	LMO	ADDENDUM #1

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SITE PLAN

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

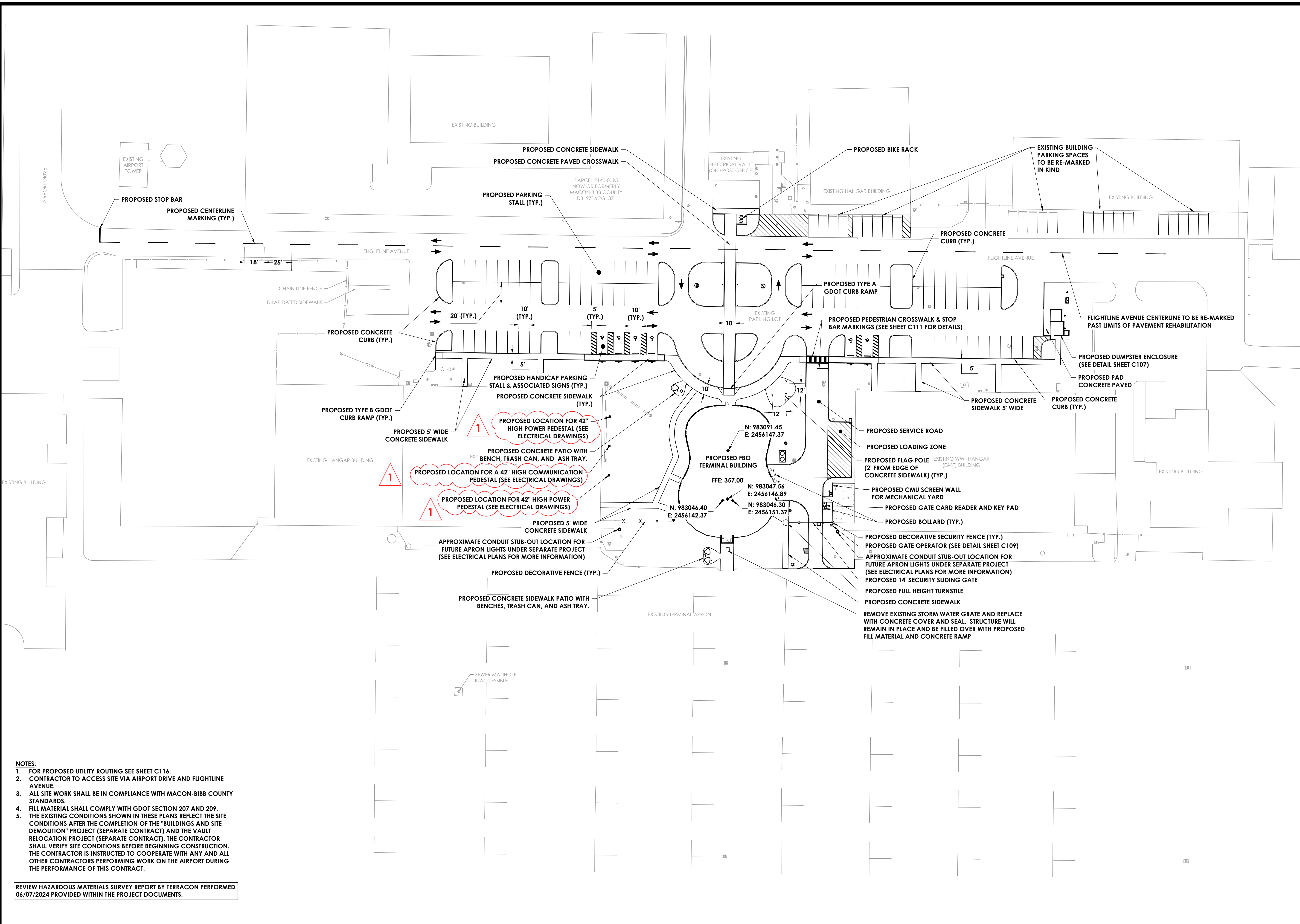
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
C106

DATE:
NOVEMBER 2024

I:\Projects\New\2020\20202946\Macon-Bibb County\20202946_0101\01_CAD\BIM\Models\Main\11_20202946_0101_L101_LAYOUT.dwg Nov 18, 2024 - 5:59pm
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- NOTES:**
- FOR PROPOSED UTILITY ROUTING SEE SHEET C116.
 - CONTRACTOR TO ACCESS SITE VIA AIRPORT DRIVE AND FLIGHTLINE AVENUE.
 - ALL SITE WORK SHALL BE IN COMPLIANCE WITH MACON-BIBB COUNTY STANDARDS.
 - FILL MATERIAL SHALL COMPLY WITH GDOT SECTION 207 AND 209.
 - THE EXISTING CONDITIONS SHOWN IN THESE PLANS REFLECT THE SITE CONDITIONS AFTER THE COMPLETION OF THE "BUILDINGS AND SITE DEMOLITION" PROJECT (SEPARATE CONTRACT) AND THE VAULT RELOCATION PROJECT (SEPARATE CONTRACT). THE CONTRACTOR SHALL VERIFY SITE CONDITIONS BEFORE BEGINNING CONSTRUCTION. THE CONTRACTOR IS INSTRUCTED TO COOPERATE WITH ANY AND ALL OTHER CONTRACTORS PERFORMING WORK ON THE AIRPORT DURING THE PERFORMANCE OF THIS CONTRACT.

REVIEW HAZARDOUS MATERIALS SURVEY REPORT BY TERRACON PERFORMED 06/07/2024 PROVIDED WITHIN THE PROJECT DOCUMENTS.

**BID SET - DO NOT
USE FOR
CONSTRUCTION**

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PRINCIPAL IN CHARGE: STAN PRICE, P.E.
PROJECT MANAGER: COOPER RIDGE P.E.
DESIGNER: JULIA NORRIS, EIT

NO.	DATE	BY	DESCRIPTION
1	11/18/24	LMO	ADDENDUM #1

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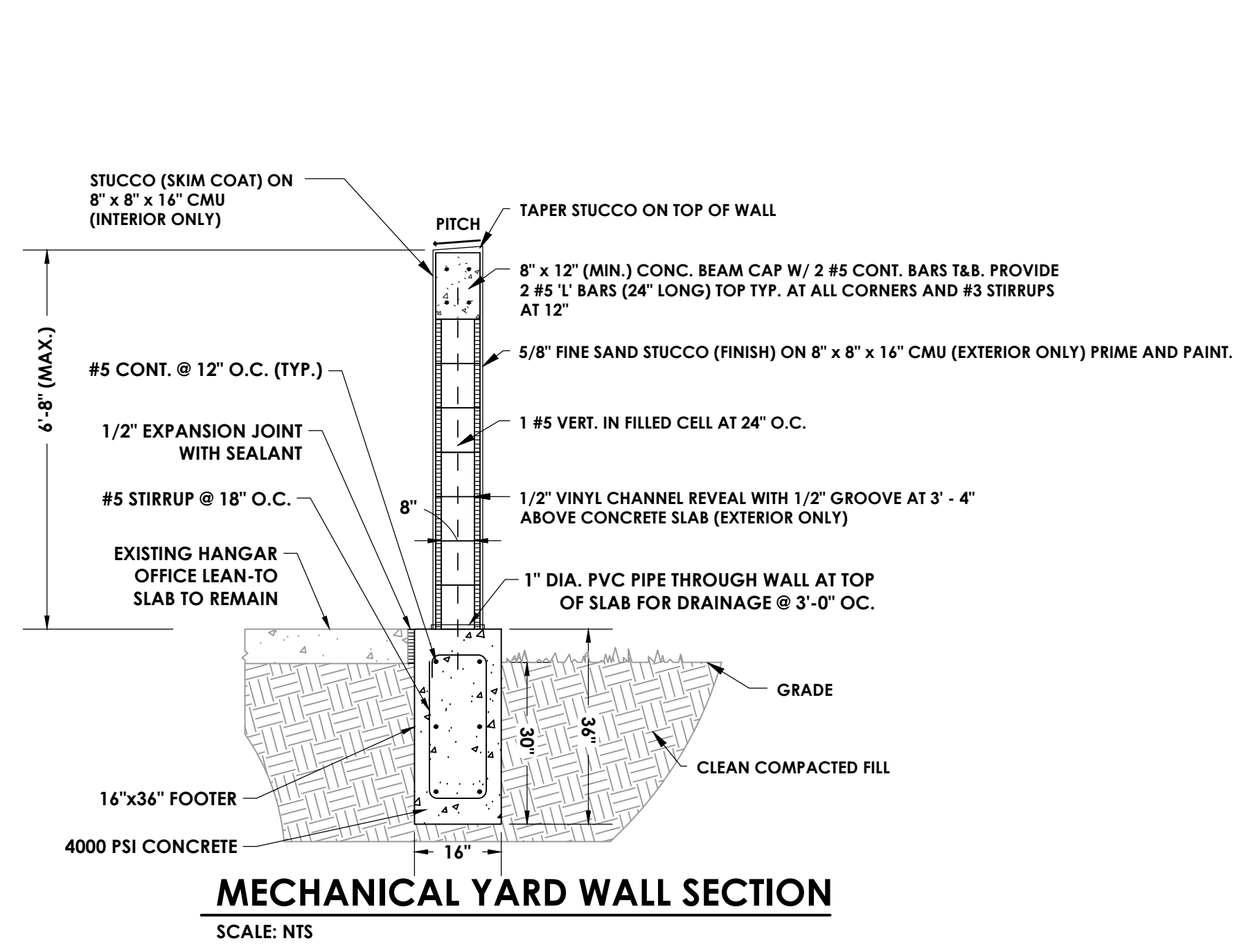
**SITE DETAILS -
SHEET 2**

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

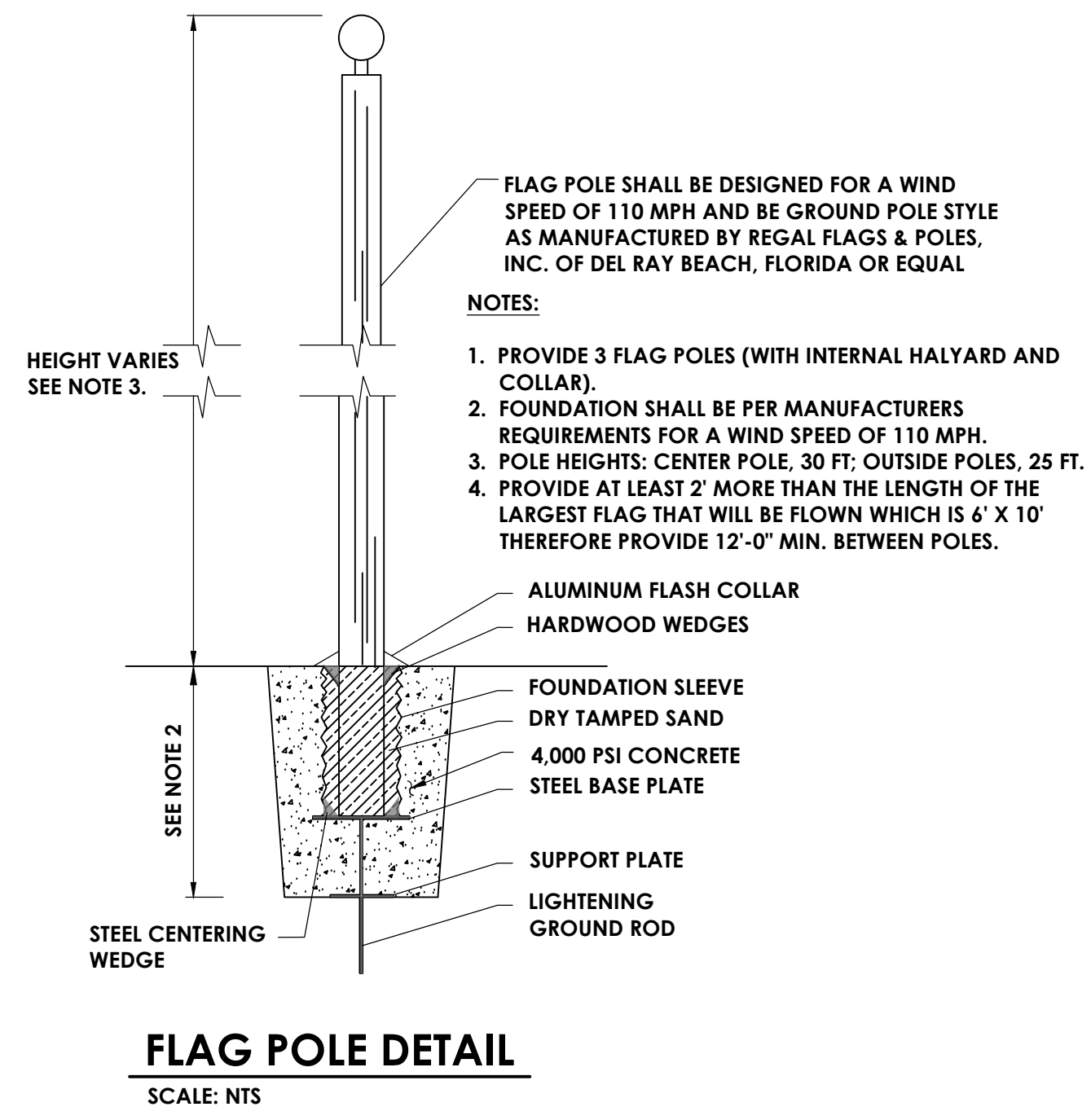
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:
20202946.010A

DRAWING NO.:
C108

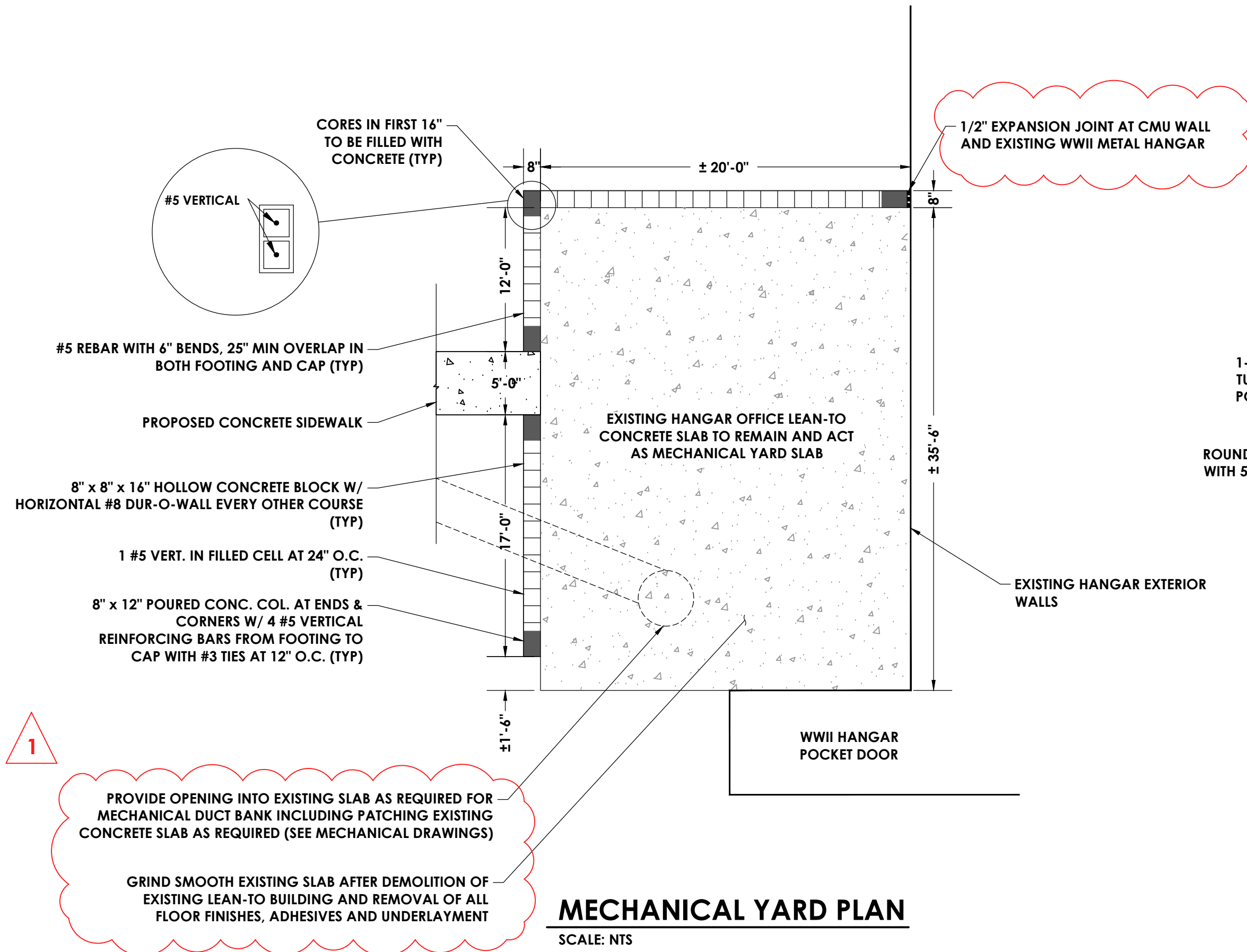
DATE:
NOVEMBER 2024



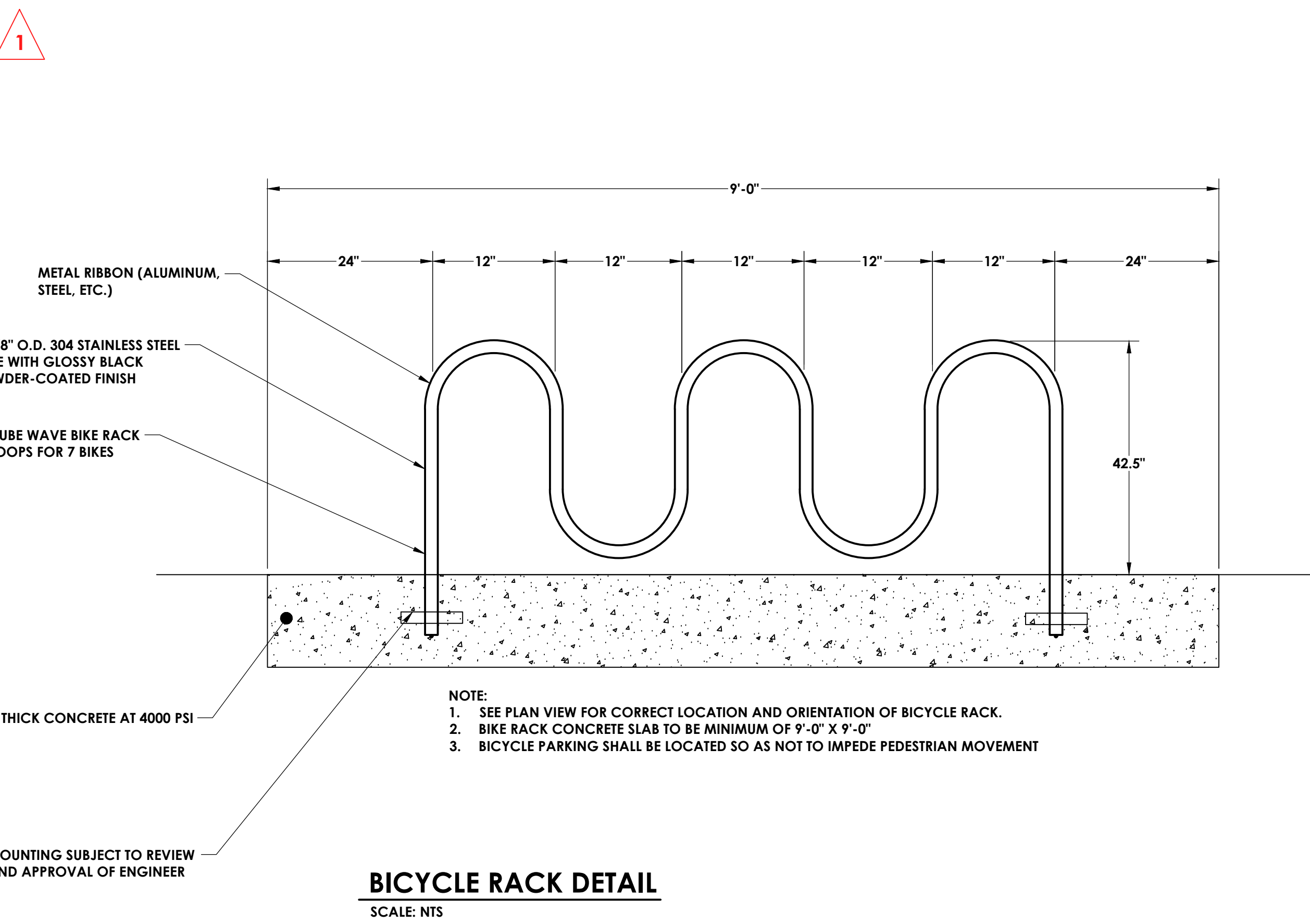
MECHANICAL YARD WALL SECTION
SCALE: NTS



FLAG POLE DETAIL
SCALE: NTS



MECHANICAL YARD PLAN
SCALE: NTS



BICYCLE RACK DETAIL
SCALE: NTS

1:\Projects\New\2020\20202946-Macon-Bibb County\20202946.0101\01_CAD\Bibb-Mechanics\Mechanics\11_C108-Mechanics\Mechanics\11_C108-Mechanics.dwg - Rev. 18 - 2024 - 5:59pm
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PRINCIPAL IN CHARGE: STAN PRICE, PE
PROJECT MANAGER: COOPER RIDGE, P.E.
DESIGNER: JULIA NORRIS, ETI

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**PAVEMENT MARKING
DETAILS**

2178 FLIGHTLINE AVE

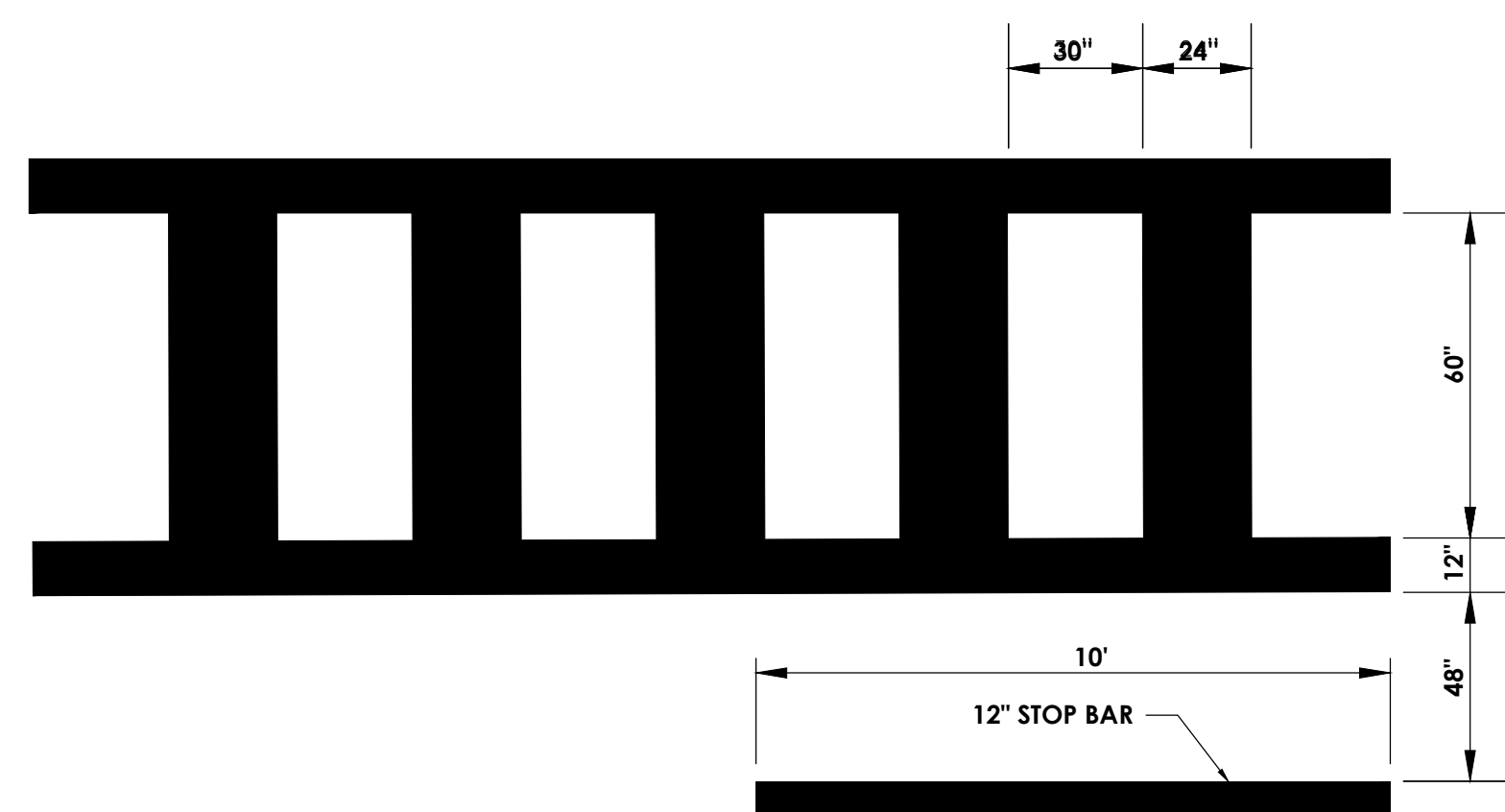
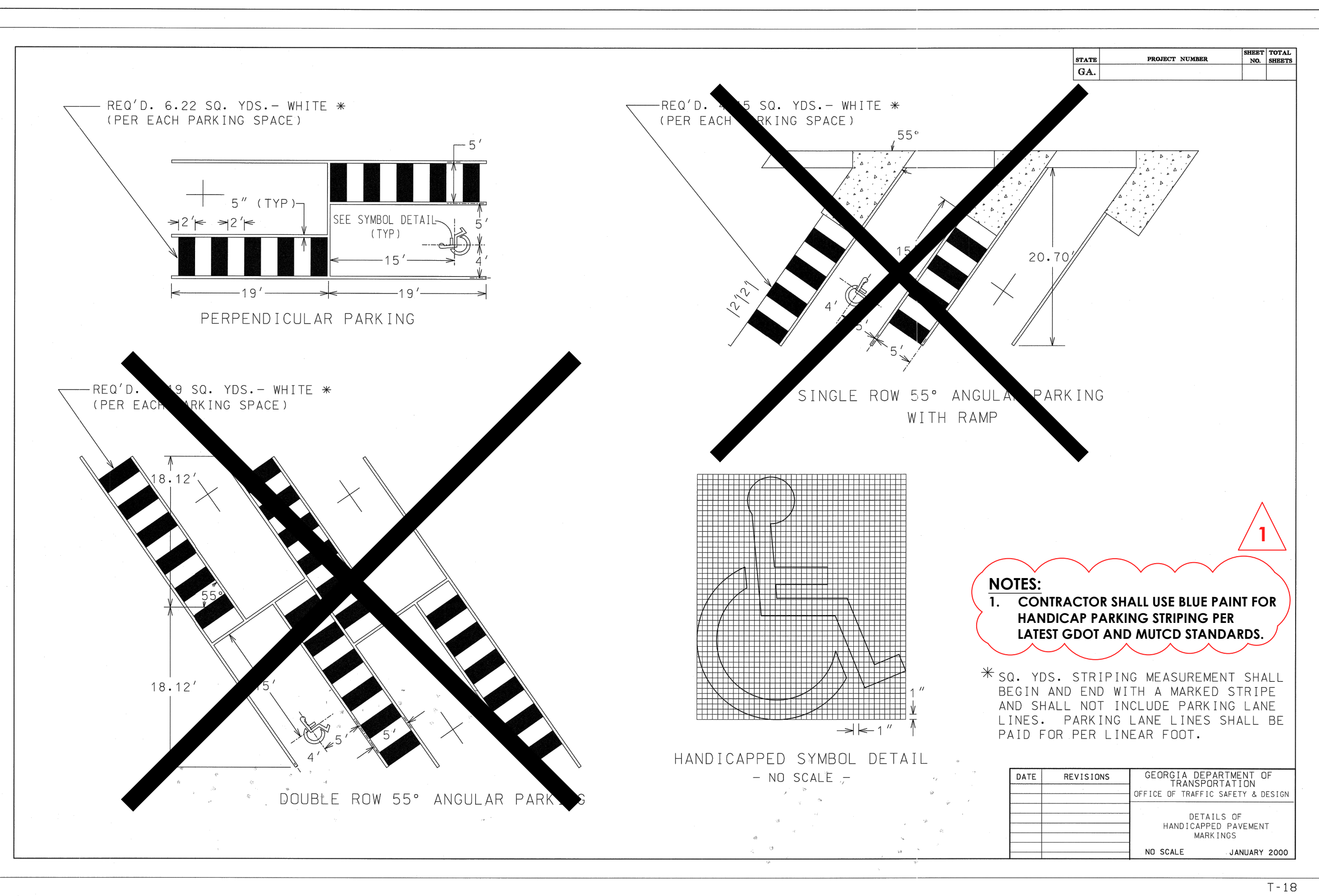
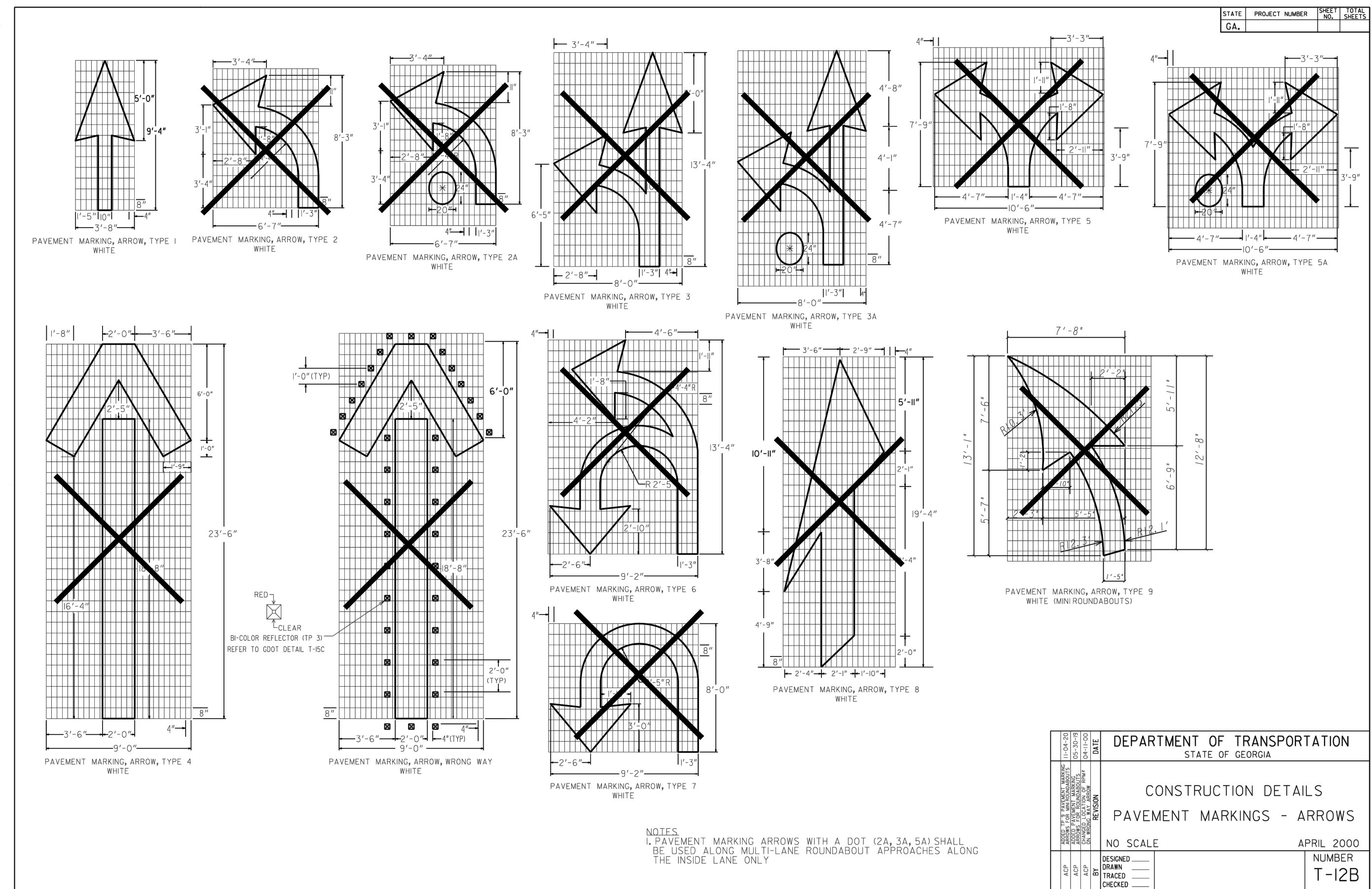
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
C111

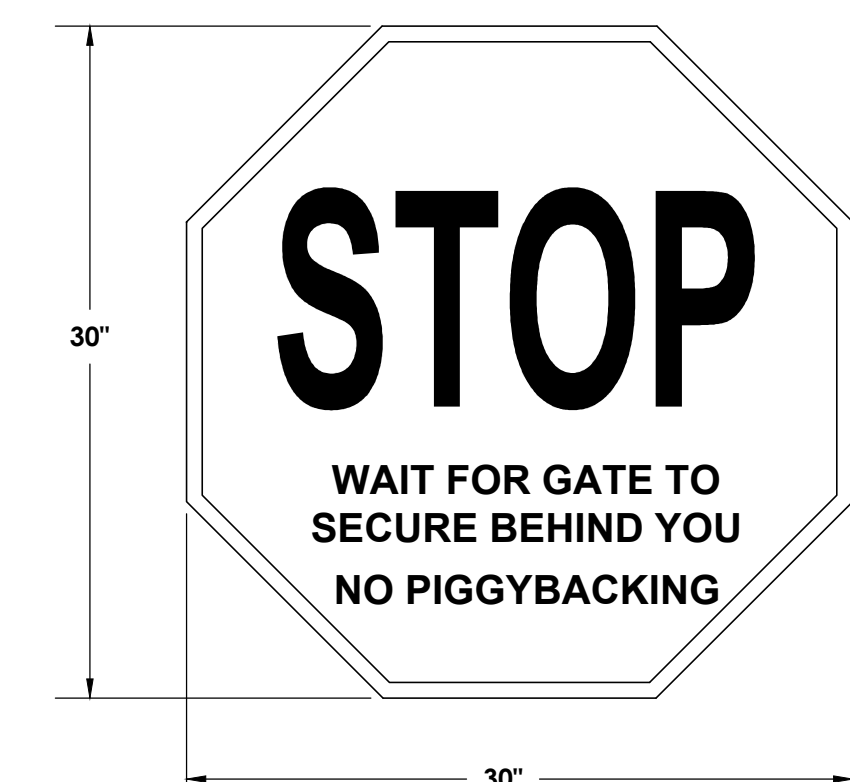
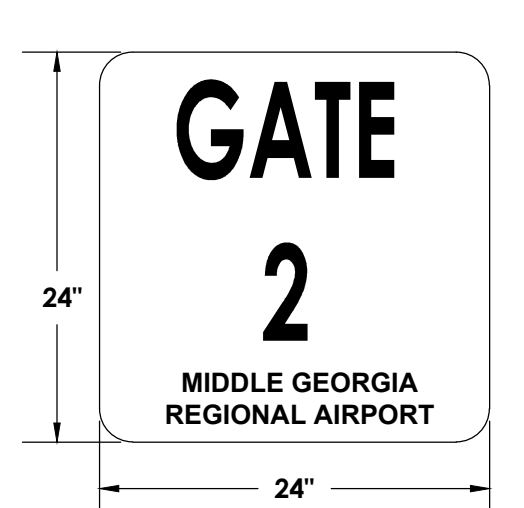
DATE:
NOVEMBER 2024



NOTES:
1. CROSSWALK MINIMUM WIDTHS: INTERSECTION CROSSWALK 6'. MIDBLOCK CROSSWALK 10'
2. ALL CROSSWALK MARKINGS SHALL BE WHITE
3. WHERE CROSSWALK IS SKEWED TO THE LANE LINES, THE SPECIAL EMPHASIS LONGITUDINAL LINES SHOULD BE PARALLEL TO THE LANE LINE.



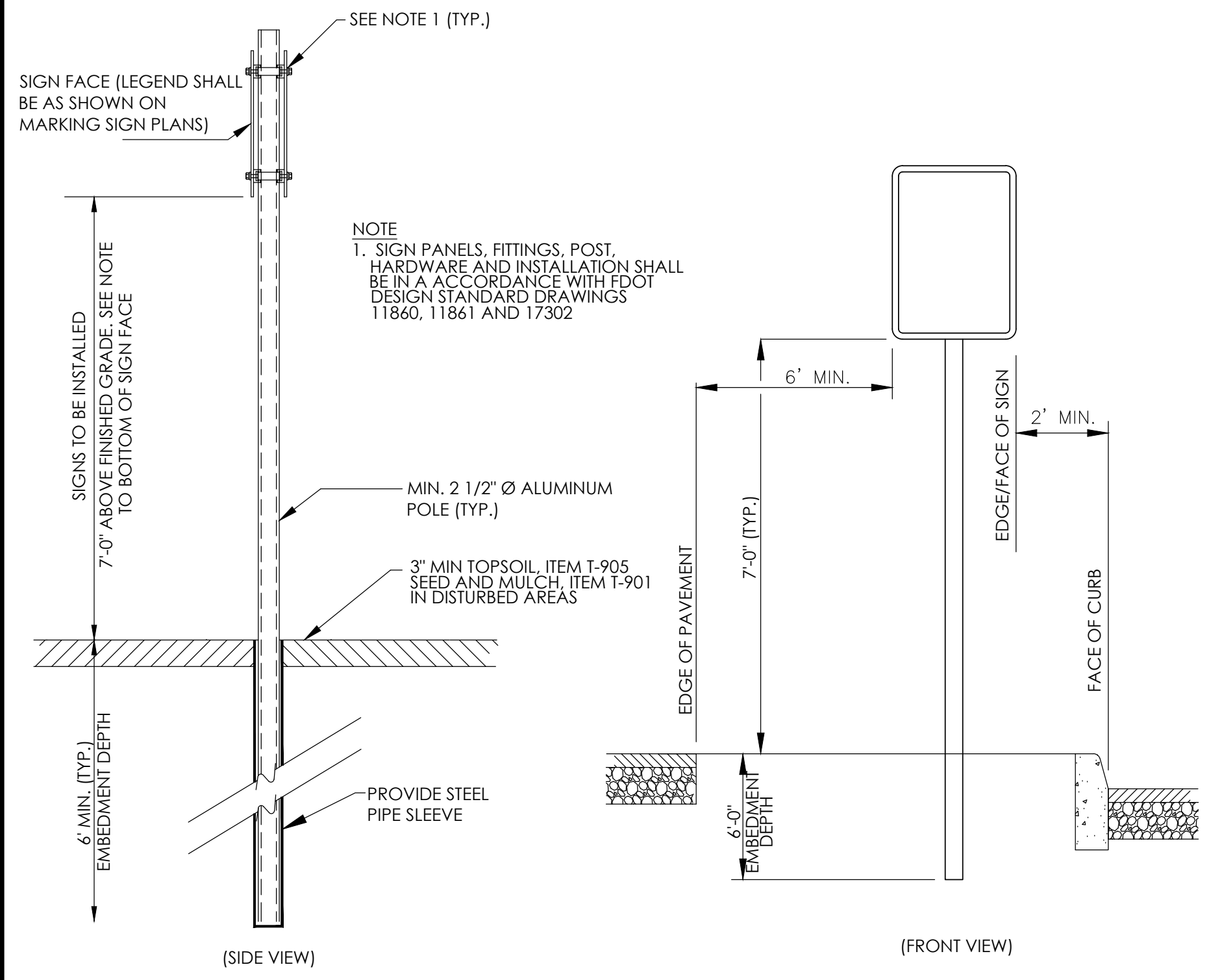
GENERAL NOTES:
1. REFERENCE MUTCD R5-11.



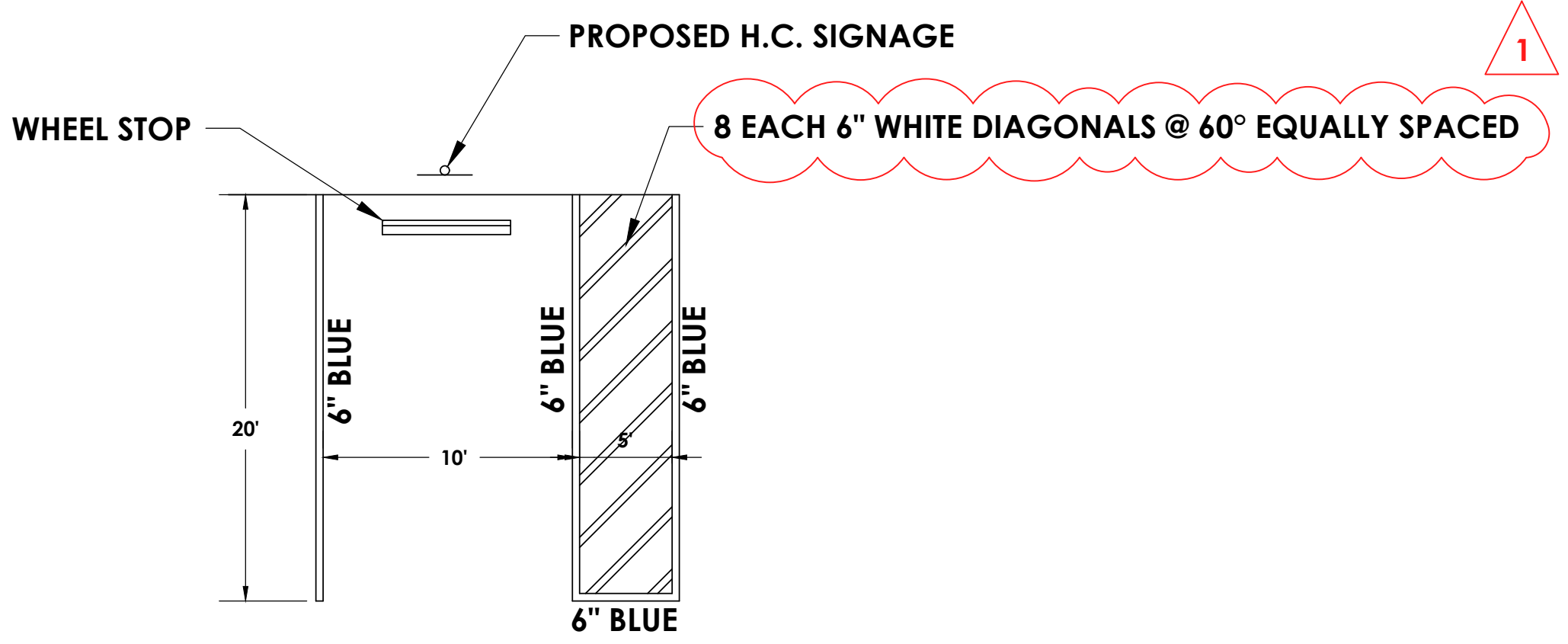
TYPICAL GUIDE SIGNS
N.T.S.



11/19/2024 10:20:00 AM Macomb County 20202946.0101.DWG 11/19/2024 3:10pm
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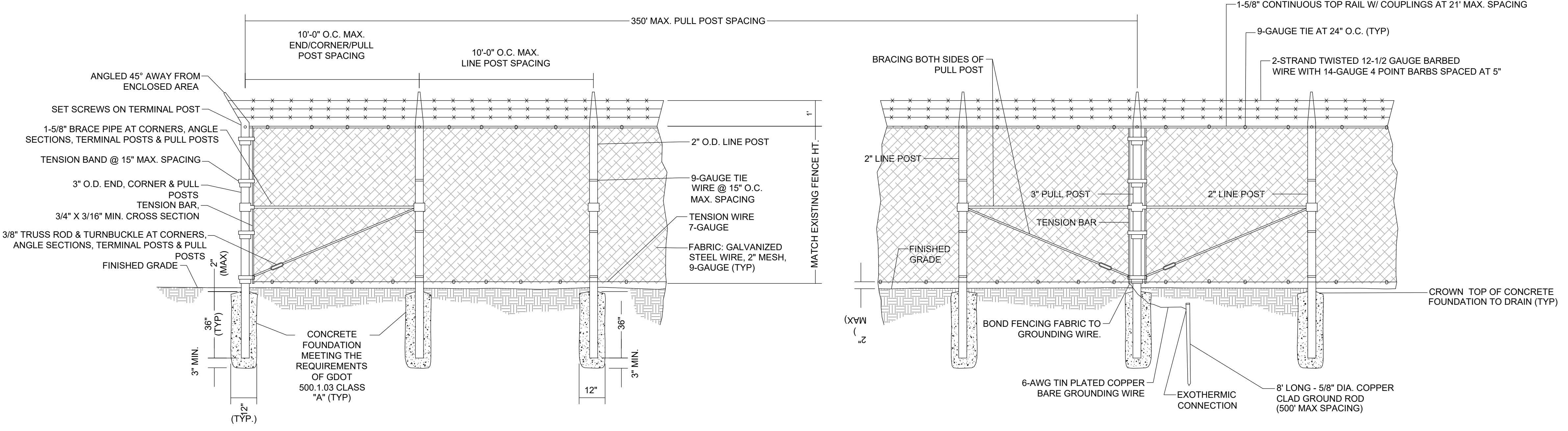


TYPICAL POST MOUNTED SIGN DETAIL
N.T.S.



- GENERAL NOTES:**
1. PROPOSED HANDICAPPED MARKINGS SHALL BE IN ACCORDANCE WITH GDOT DESIGN STANDARDS.
 2. HANDICAP SIGN SHALL HAVE A REFLECTIVE BLUE BACK GROUND WITH WHITE REFLECTIVE SYMBOL AND BORDER.

DISABLED PARKING SPACE AND SIGN DETAIL
N.T.S.



RELOCATED EXISTING SECURITY FENCE DETAIL
N.T.S.

- FENCE NOTES:**
1. ALL FRAME MEMBERS SHALL BE HOT-DIPPED GALVANIZED STEEL MEETING THE REQUIREMENTS OF ASTM F-1083 WITH A 2 OZ/SF ZINC COATING.
 2. ALL FABRIC SHALL BE WOVEN WITH A 9-GAUGE GALVANIZED STEEL WIRE IN A 2" MESH WITH 2 OZ/SF ZINC COATING IN ACCORDANCE WITH ASTM A 392, CLASS 2.
 3. PULL POSTS SHALL BE USED AT BREAKS IN VERTICAL GRADES OF 15" OR MORE, OR AT APPROXIMATELY 350' CENTER. CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL BREAKS IN FENCE AT 15" OR MORE AND AS REQUIRED AT VERTICAL BREAKS OVER 15" AS DETERMINED BY THE ENGINEER.
 4. INSTALLING FABRIC: THE WIRE FABRIC SHALL BE FIRMLY ATTACHED TO THE POSTS AND BRACED IN THE MANNER SHOWN ON THE PLANS. ALL WIRE SHALL BE STRETCHED TAUT AND SHALL BE INSTALLED TO THE REQUIRED ELEVATIONS. THE FENCE SHALL GENERALLY FOLLOW THE CONTOUR OF THE GROUND, WITH THE BOTTOM OF THE FENCE FABRIC NO LESS THAN 1" OR MORE THAN 4" FROM THE GROUND SURFACE. GRADING SHALL BE PERFORMED WHERE NECESSARY. AT LOCATIONS OF SMALL NATURAL SWALES OR DRAINAGE DITCHES AND WHERE IT IS NOT PRACTICAL TO HAVE THE FENCE CONFORM TO THE GENERAL CONTOUR OF THE GROUND SURFACE, LONGER POSTS MAY BE USED AND MULTIPLE STRANDS OF BARBED WIRE STRETCHED THERON TO SPAN THE OPENING BELOW THE FENCE (SEE FENCE DITCH CROSSING DETAIL). THE VERTICAL CLEARANCE BETWEEN STRANDS OF BARBED WIRE SHALL BE 6 INCHES OR LESS.
 5. AT THE CONTRACTOR'S OPTION, CONCRETE POST FOUNDATIONS MAY BE SET WITH OUTSIDE EDGE FLUSH WITH FINISHED GROUND; & CROWNED TO DRAIN.
 6. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS HARDWARE AND FITTINGS REQUIRED TO PROVIDE A COMPLETE FENCE, EVEN IF NOT SPECIFICALLY IDENTIFIED IN THE PLANS OR SPECIFICATIONS.
 7. THE PROPOSED FENCE ASSEMBLIES SHALL BE APPROVED THROUGH THE SHOP DRAWING REVIEW PROCESS PRIOR TO FABRICATION.

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PROJECT MANAGER: COOPER RIDGE P.E.
DESIGNER: JULIA NORRIS, EIT

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1	11/18/24	LMO	ADDENDUM #1

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PVMT MRKG DETAILS - SHEET 2

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

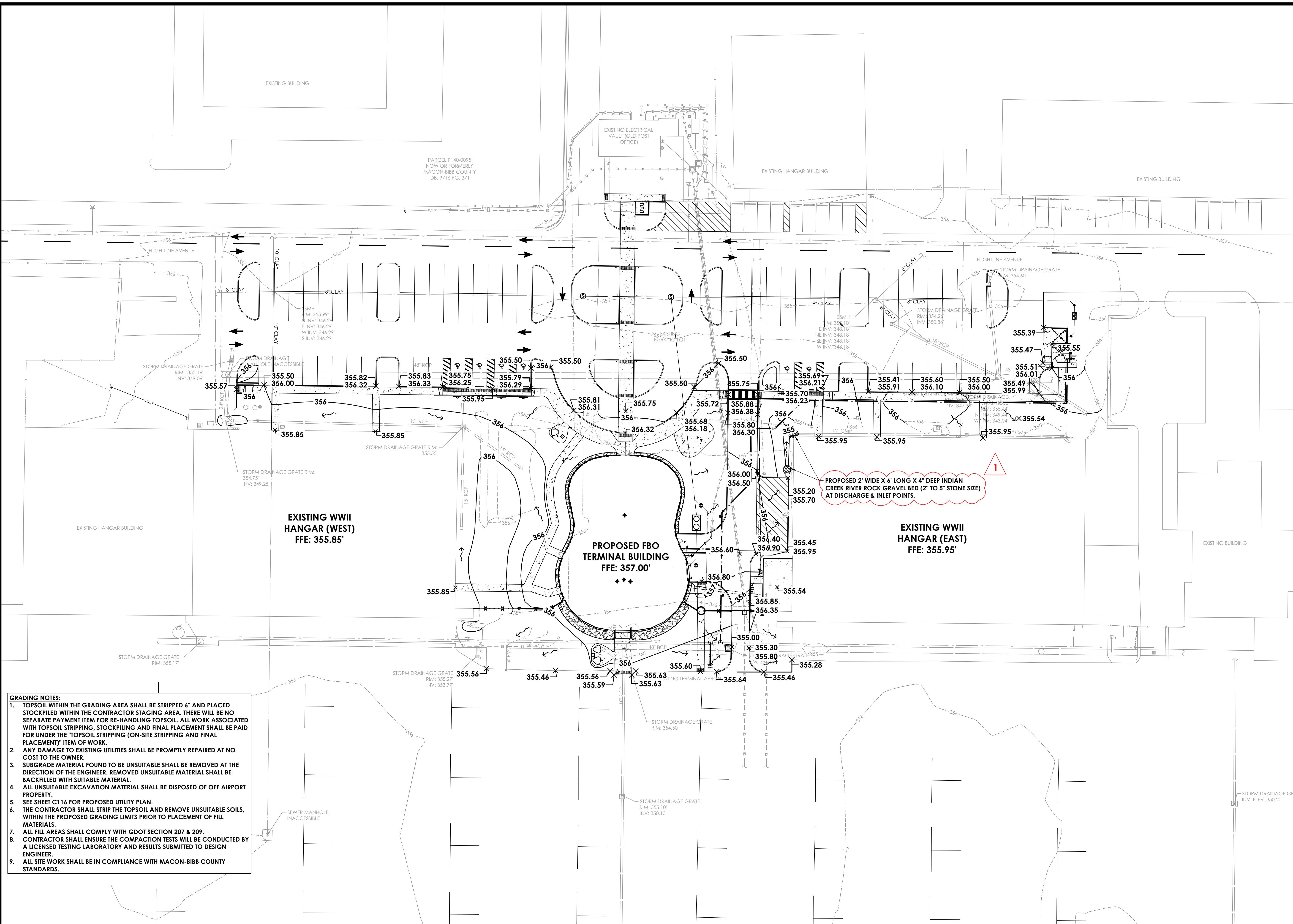
PROJECT NO.:
20202946.010A

DRAWING NO.:
C112

DATE:
NOVEMBER 2024

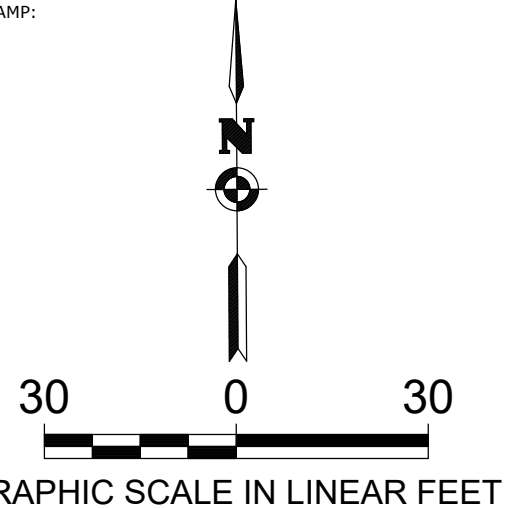
11/18/24 - New 2024/01/01 - Macon-Bibb County 20202946.01010A - 01/01 - C:\Users\mwoodr\OneDrive\Documents\20202946.01010A.DWG - Rev. 18 - 2024 - 6:00pm
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- GRADING NOTES:**
1. TOPSOIL WITHIN THE GRADING AREA SHALL BE STRIPPED 6" AND PLACED STOCKPILED WITHIN THE CONTRACTOR STAGING AREA. THERE WILL BE NO SEPARATE PAYMENT ITEM FOR RE-HANDLING TOPSOIL. ALL WORK ASSOCIATED WITH TOPSOIL STRIPPING, STOCKPILING AND FINAL PLACEMENT SHALL BE PAID FOR UNDER THE "TOPSOIL STRIPPING (ON-SITE STRIPPING AND FINAL PLACEMENT)" ITEM OF WORK.
 2. ANY DAMAGE TO EXISTING UTILITIES SHALL BE PROMPTLY REPAIRED AT NO COST TO THE OWNER.
 3. SUBGRADE MATERIAL FOUND TO BE UNSUITABLE SHALL BE REMOVED AT THE DIRECTION OF THE ENGINEER. REMOVED UNSUITABLE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL.
 4. ALL UNSUITABLE EXCAVATION MATERIAL SHALL BE DISPOSED OF OFF AIRPORT PROPERTY.
 5. SEE SHEET C114 FOR PROPOSED UTILITY PLAN.
 6. THE CONTRACTOR SHALL STRIP THE TOPSOIL AND REMOVE UNSUITABLE SOILS, WITHIN THE PROPOSED GRADING LIMITS PRIOR TO PLACEMENT OF FILL MATERIALS.
 7. ALL FILL AREAS SHALL COMPLY WITH GDOT SECTION 207 & 209.
 8. CONTRACTOR SHALL ENSURE THE COMPACTION TESTS WILL BE CONDUCTED BY A LICENSED TESTING LABORATORY AND RESULTS SUBMITTED TO DESIGN ENGINEER.
 9. ALL SITE WORK SHALL BE IN COMPLIANCE WITH MACON-BIBB COUNTY STANDARDS.

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PRINCIPAL IN CHARGE: STAN PRICE, PE
PROJECT MANAGER: COOPER RIDGE, P.E.
DESIGNER: JULIA NORRIS, ET

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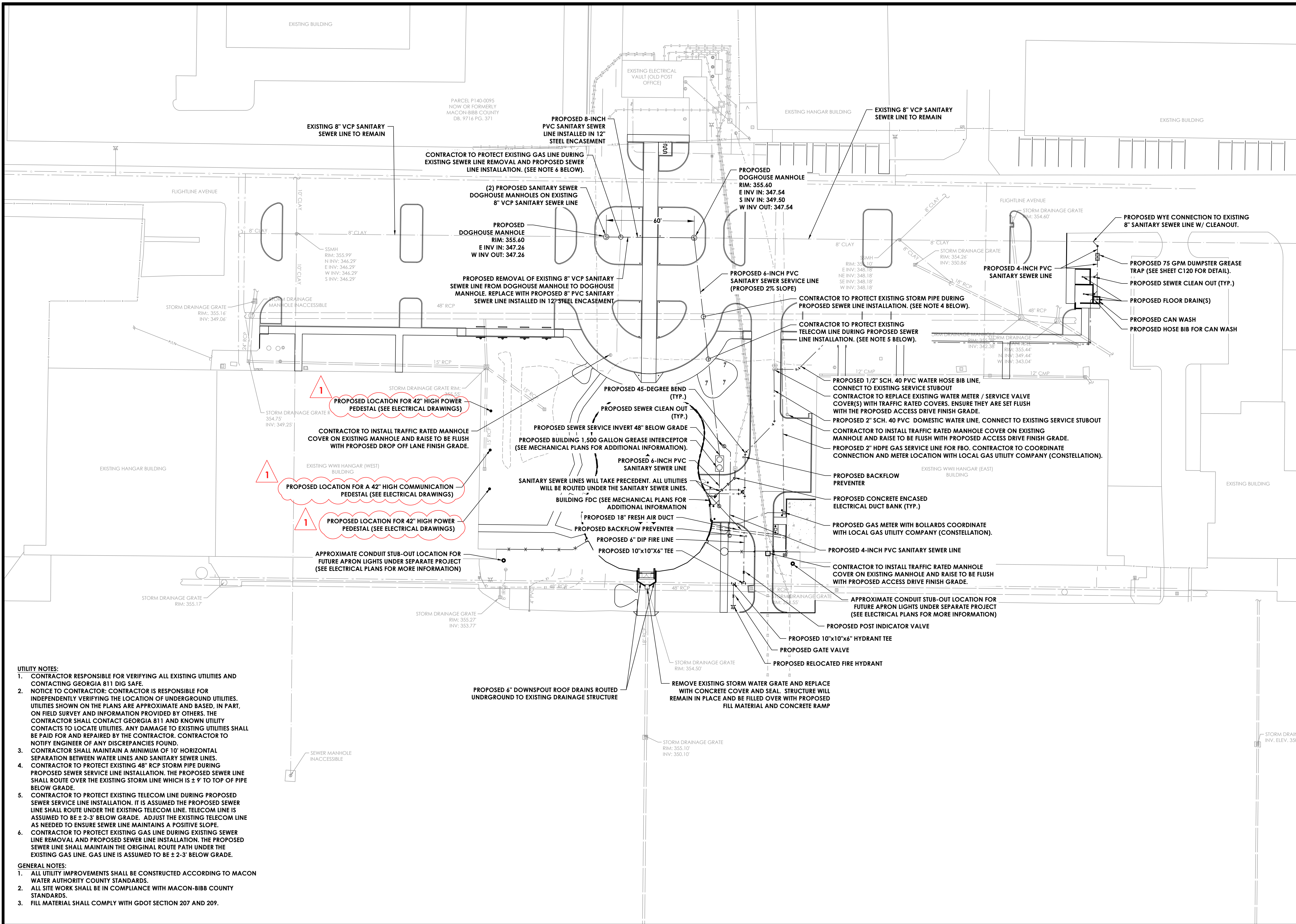
GRADING PLAN
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.: 20202946.010A

DRAWING NO.: C115

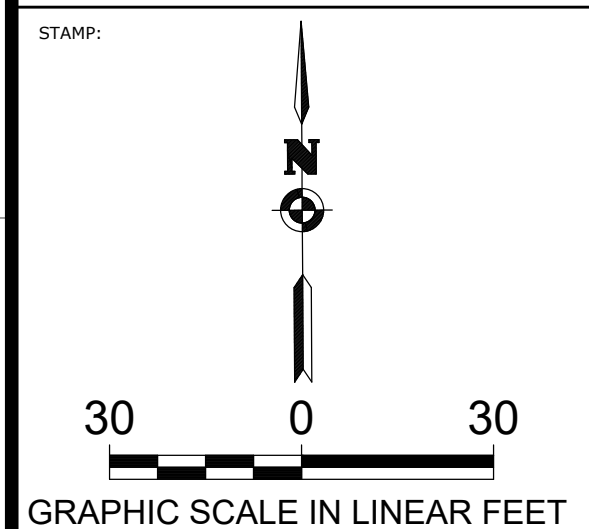
DATE: NOVEMBER 2024

V:\Projects\New\2020\2020946\2020946_010101_01_CAD\BIBB\Modals\Modals\11_2020\2020946_010101_01_UTILITY.dwg - Nov 18, 2024 - 4:01pm
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- UTILITY NOTES:**
- CONTRACTOR RESPONSIBLE FOR VERIFYING ALL EXISTING UTILITIES AND CONTACTING GEORGIA 811 DIG SAFE.
 - NOTICE TO CONTRACTOR: CONTRACTOR IS RESPONSIBLE FOR INDEPENDENTLY VERIFYING THE LOCATION OF UNDERGROUND UTILITIES. UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE AND BASED, IN PART, ON FIELD SURVEY AND INFORMATION PROVIDED BY OTHERS. THE CONTRACTOR SHALL CONTACT GEORGIA 811 AND KNOWN UTILITY CONTACTS TO LOCATE UTILITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE PAID FOR AND REPAIRED BY THE CONTRACTOR. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES FOUND.
 - CONTRACTOR SHALL MAINTAIN A MINIMUM OF 10' HORIZONTAL SEPARATION BETWEEN WATER LINES AND SANITARY SEWER LINES.
 - CONTRACTOR TO PROTECT EXISTING 48" RCP STORM PIPE DURING PROPOSED SEWER SERVICE LINE INSTALLATION. THE PROPOSED SEWER LINE SHALL ROUTE OVER THE EXISTING STORM LINE WHICH IS ± 9" TO TOP OF PIPE BELOW GRADE.
 - CONTRACTOR TO PROTECT EXISTING TELECOM LINE DURING PROPOSED SEWER SERVICE LINE INSTALLATION. IT IS ASSUMED THE PROPOSED SEWER LINE SHALL ROUTE UNDER THE EXISTING TELECOM LINE. TELECOM LINE IS ASSUMED TO BE ± 2'-3" BELOW GRADE. ADJUST THE EXISTING TELECOM LINE AS NEEDED TO ENSURE SEWER LINE MAINTAINS A POSITIVE SLOPE.
 - CONTRACTOR TO PROTECT EXISTING GAS LINE DURING EXISTING SEWER LINE REMOVAL AND PROPOSED SEWER LINE INSTALLATION. THE PROPOSED SEWER LINE SHALL MAINTAIN THE ORIGINAL ROUTE PATH UNDER THE EXISTING GAS LINE. GAS LINE IS ASSUMED TO BE ± 2'-3" BELOW GRADE.
- GENERAL NOTES:**
- ALL UTILITY IMPROVEMENTS SHALL BE CONSTRUCTED ACCORDING TO MACON WATER AUTHORITY COUNTY STANDARDS.
 - ALL SITE WORK SHALL BE IN COMPLIANCE WITH MACON-BIBB COUNTY STANDARDS.
 - FILL MATERIAL SHALL COMPLY WITH GDOT SECTION 207 AND 209.

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DESIGNER: JULIA NORRIS, ET

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UTILITY PLAN

2178 FLIGHTLINE AVE

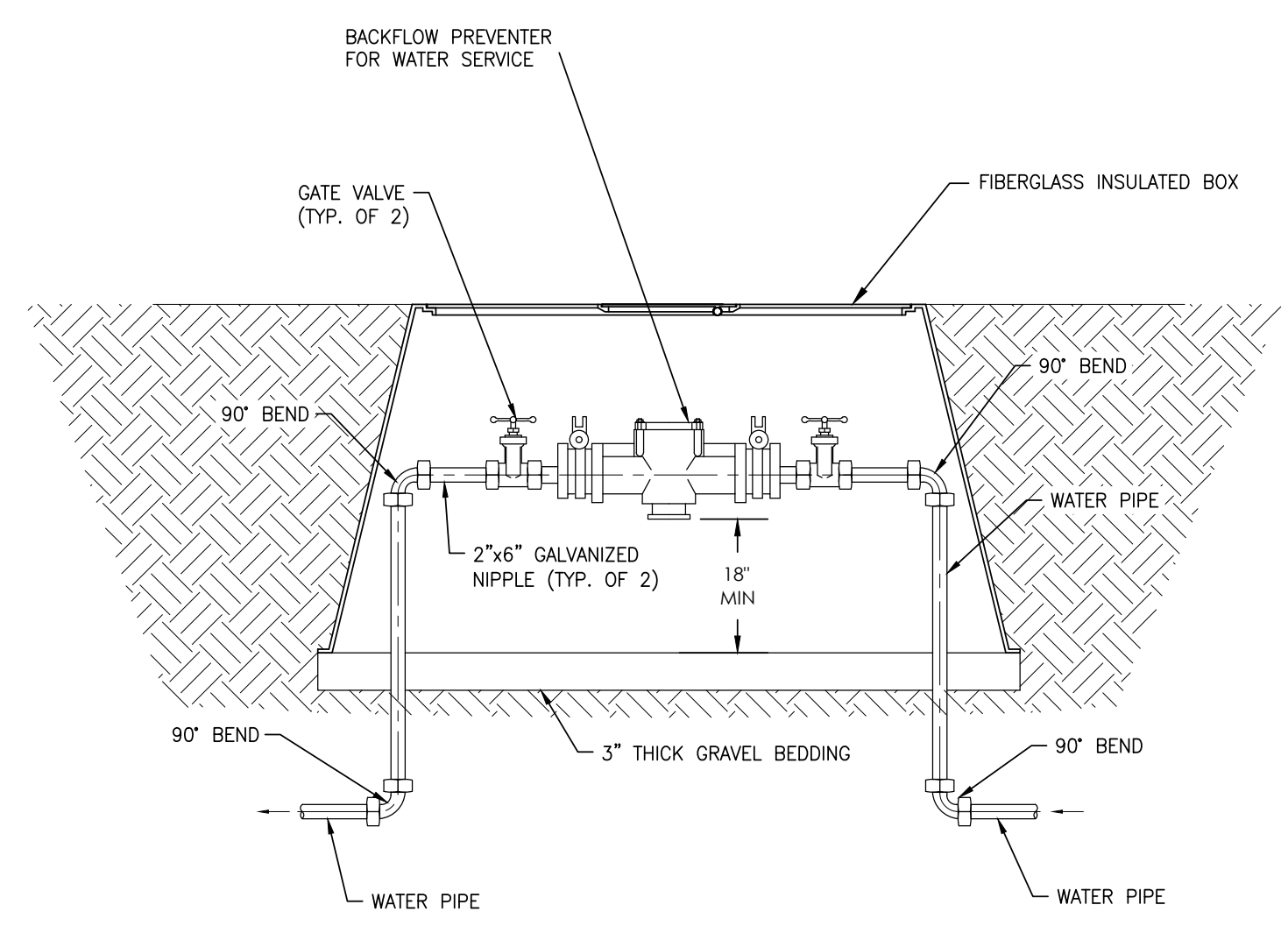
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: **20202946.010A**

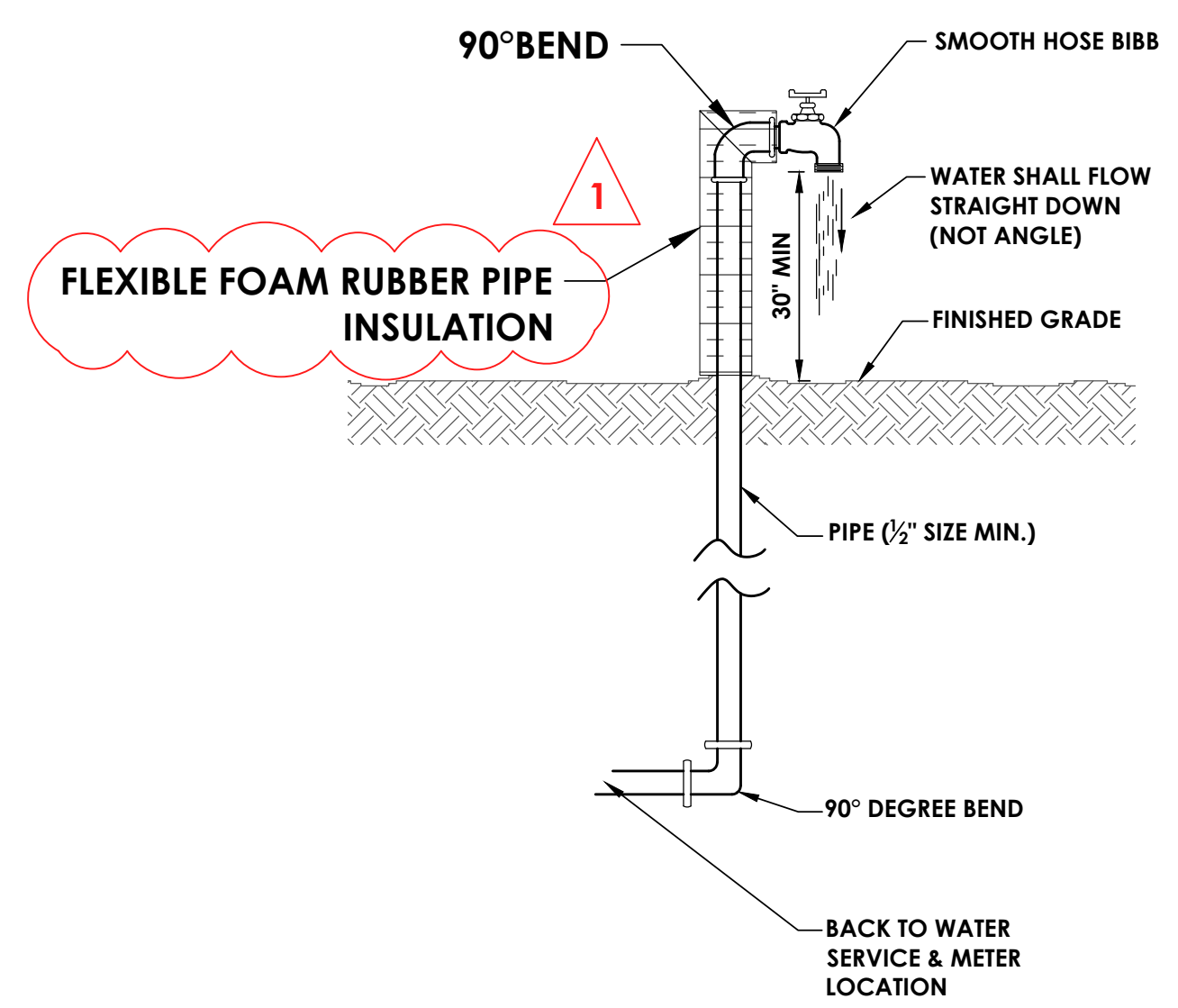
DRAWING NO.: **C116**

DATE: **NOVEMBER 2024**



BACKFLOW PREVENTER DETAIL

- NOTES:**
1. BACK FLOW PREVENTER SHALL BE CONSTRUCTED ACCORDING TO MACON WATER AUTHORITY COUNTY STANDARDS.



HOSE BIBB DETAIL

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DESIGNER: JULIA NORRIS, EIT

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UTILITY DETAILS - SHEET 4

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

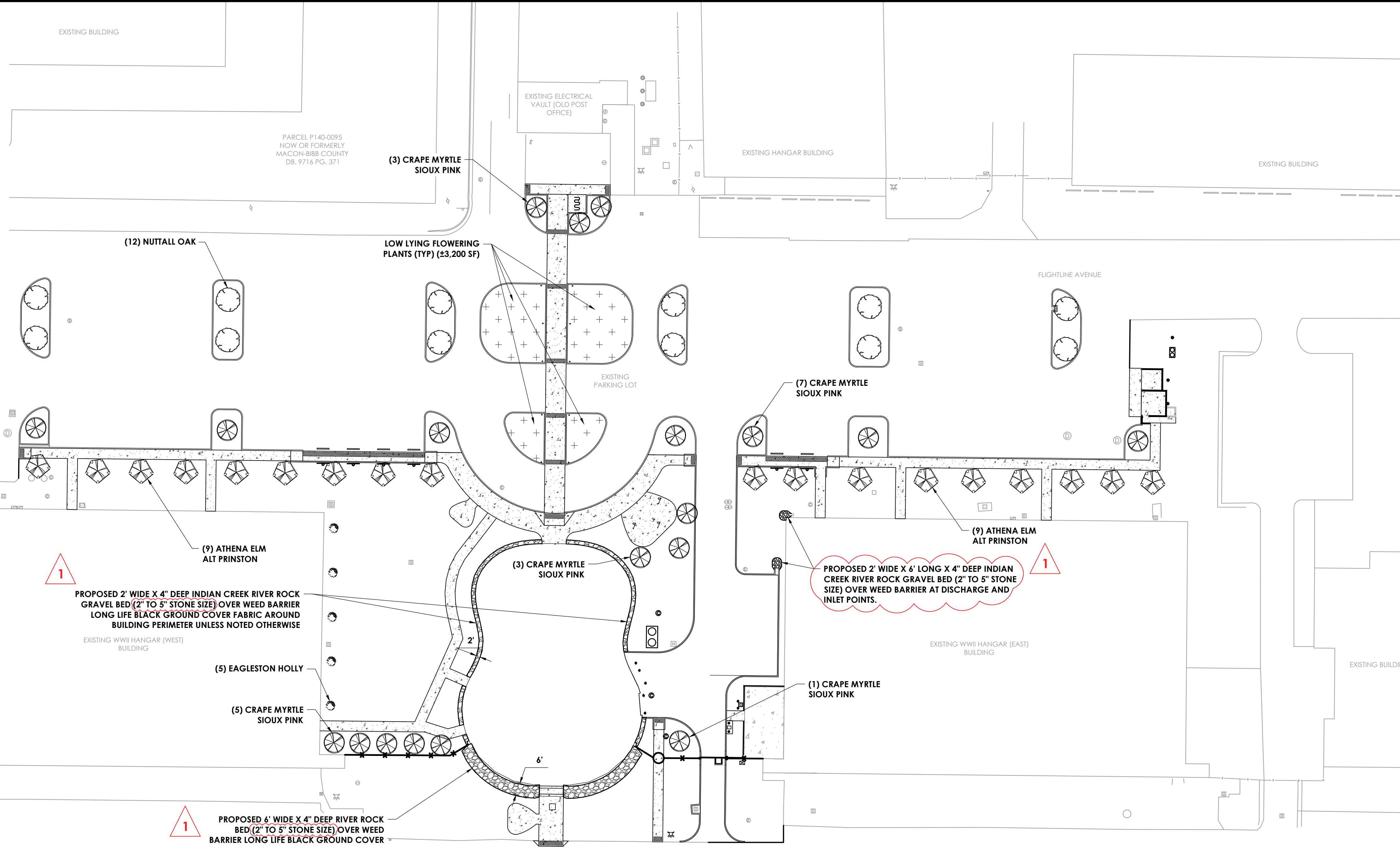
DRAWING NO.:
C121

DATE:
NOVEMBER 2024

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LEGEND:	QUANTITY:
LOW LYING FLOWERING PLANTS	± 3,200 SF
EAGLESTON HOLLY	5 EA
NUTTALL OAK	12 EA
CRAPE MYRTLE, SIOUX PINK	19 EA
ATHENA ELM, ALT PRINSTON	18 EA

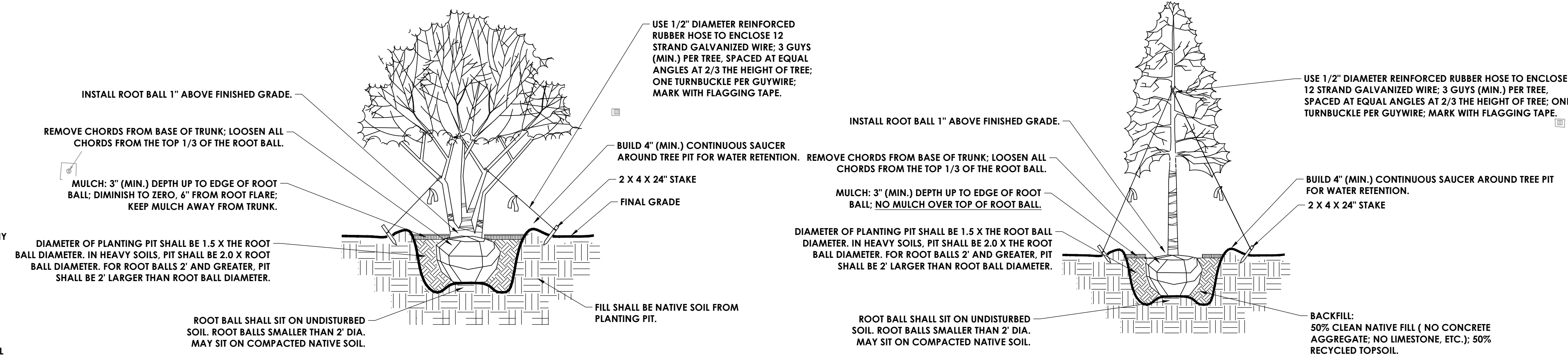
V:\Projects\New\2020\20202946\20202946-01010101 - CAD\BIM\Models\Vendor\11-2020\2946-01010101 LANDSCAPE RFP\PLANTING Nov 18, 2024 - 4:01pm
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- NOTES:**
1. ALL PERMANENT STABILIZATION SHALL BE IN ACCORDANCE WITH THE LATEST STATE AND LOCAL LANDSCAPING STANDARDS, AND GDOT SECTIONS 700 AND 702. SEE SHEET C103 FOR PERMANENT STABILIZATION LOCATIONS.

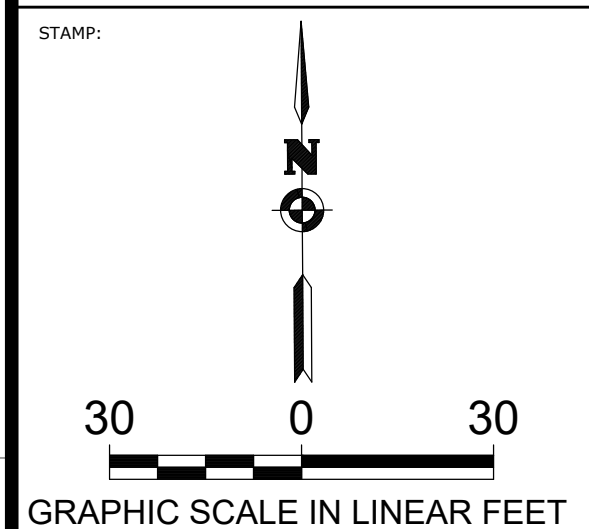
- LANDSCAPING NOTES:**
1. UNDERGROUND UTILITIES SHALL NOT BE CLOSER THAN SIX (6) FEET TO TREE.
 2. ALL LANDSCAPED AREAS SHALL BE GRASS OR COVERED WITH GROUND COVER. SOLID SOD SHALL BE USED IN SWALES AND AREAS SUBJECT TO EROSION.
 3. GRASS SOD SHALL BE CLEAN & REASONABLY FREE OF WEEDS, PESTS, & DISEASE.
 4. EUCALYPTUS MULCH (OR APPROVED EQUAL) SHALL BE INSTALLED IN ALL PLANTING AREAS TO A MINIMUM DEPTH OF THREE (3) INCHES.
 5. PLANT MATERIAL SHALL BE GUARANTEED FOR ONE YEAR. LANDSCAPE MATERIALS STANDARD - MAINTENANCE REQUIREMENTS, COMMENCING ON DATE OF CERTIFICATION BY ARCHITECT. ALL WARRANTIES ARE VOIDED BY DAMAGE FROM FROST CONDITIONS, HIGH WINDS, IMPROPER MAINTENANCE (NEGLECT OR VANDALISM).
 6. MULCH: RECYCLED OR ALTERNATIVE MULCH (MELALEUCA OR EUCALYPTUS) CYPRESS MULCH IS NOT PERMITTED. ALL GROUND COVER AREAS SHALL RECEIVE (UP TO) 2" OF ORGANIC MULCH. KEEP AWAY FROM PLANT STEMS. ALL TREES IN SOD AREAS SHALL RECEIVE AN OPEN, 3' RADIUS, NON-MULCHED RING AROUND TRUNK. NOTE: NO MULCH SHALL BE PLACED OVER ANY TREE ROOT BALL.

- MAINTENANCE NOTES**
1. ALL PLANTINGS SHALL BE CONTINUALLY MAINTAINED IN AN ATTRACTIVE AND HEALTHY CONDITION. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO, WATERING, TILLING, FERTILIZING AND SPRAYING, MOWING, WEEDING, REMOVAL OF LITTER AND DEAD PLANT MATERIAL, AND NECESSARY PRUNING AND TRIMMING.
 2. REQUIRED PLANTS THAT BECOME DISEASED OR DIE SHALL BE REPLACED NOT LATER THAN THREE (3) MONTHS FOLLOWING THE LOSS OF THE PLANT.
 3. TREE PROPERTY OWNER IS RESPONSIBLE FOR THE MAINTENANCE OF ALL REQUIRED LANDSCAPING IN A HEALTHY, THRIVING CONDITION.
 4. TREES SHALL BE PRUNED ONLY AS NECESSARY TO PROMOTE HEALTHY GROWTH OR TO AVOID POWER LINES. TREES SHALL NOT BE SEVERELY PRUNED OR "HATRAKED" IN ORDER TO PERMANENTLY MAINTAIN GROWTH AT A REDUCED HEIGHT. PRUNING SHALL COMPLY WITH CURRENT NATIONAL ARBORISTS SOCIETY STANDARDS.



PERMANENT STABILIZATION MATERIAL	SODDING	COMMON BERMUDA GRASS (CYNODON DACTYLON)	4,440 SY
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PRINCIPAL IN CHARGE PROJECT MANAGER DESIGNER
STAN PRICE, P.E. COOPER RIDGE, P.E. JULIA NORRIS, EIT

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LANDSCAPE PLAN
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:
20202946.010A

DRAWING NO.:
C122

DATE:
NOVEMBER 2024

NO NAILS SHALL BE DRIVEN INTO TREE TRUNK SHALL BE FREE OF ANY MAJOR SCARS.

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PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
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WALL TYPES

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

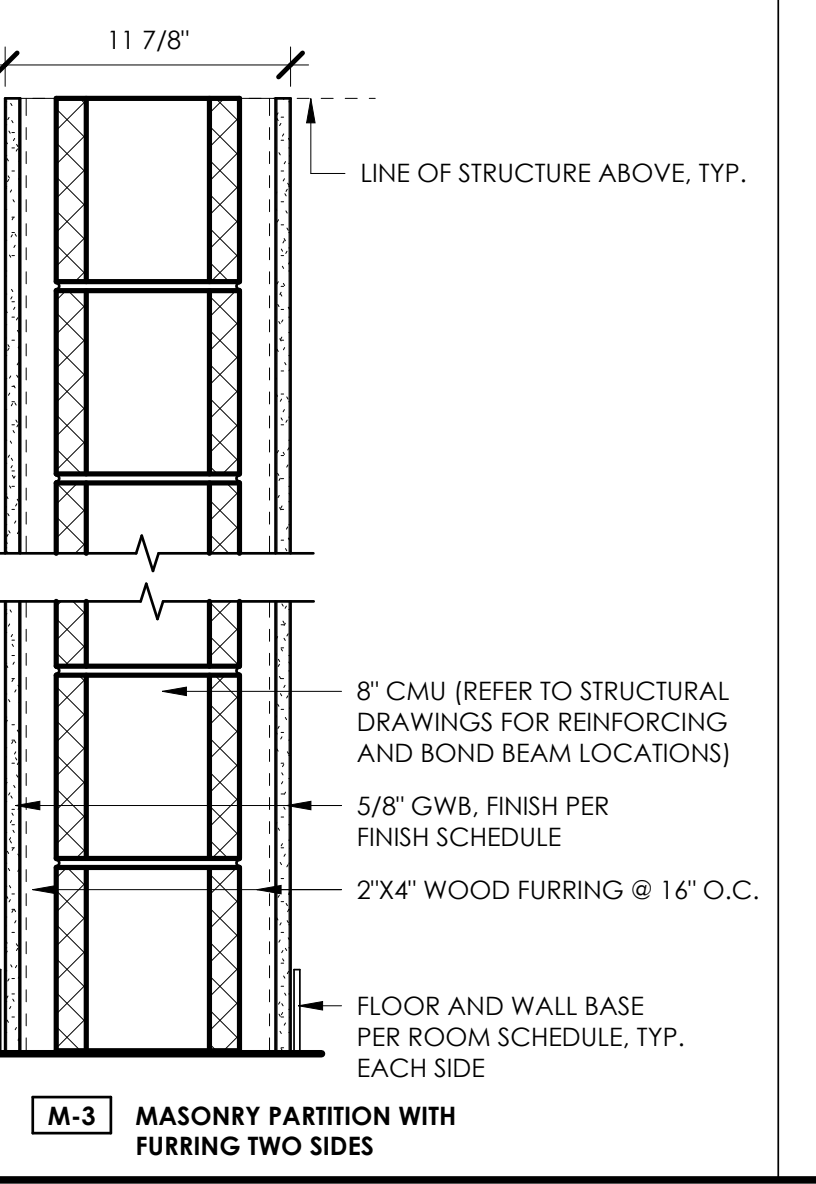
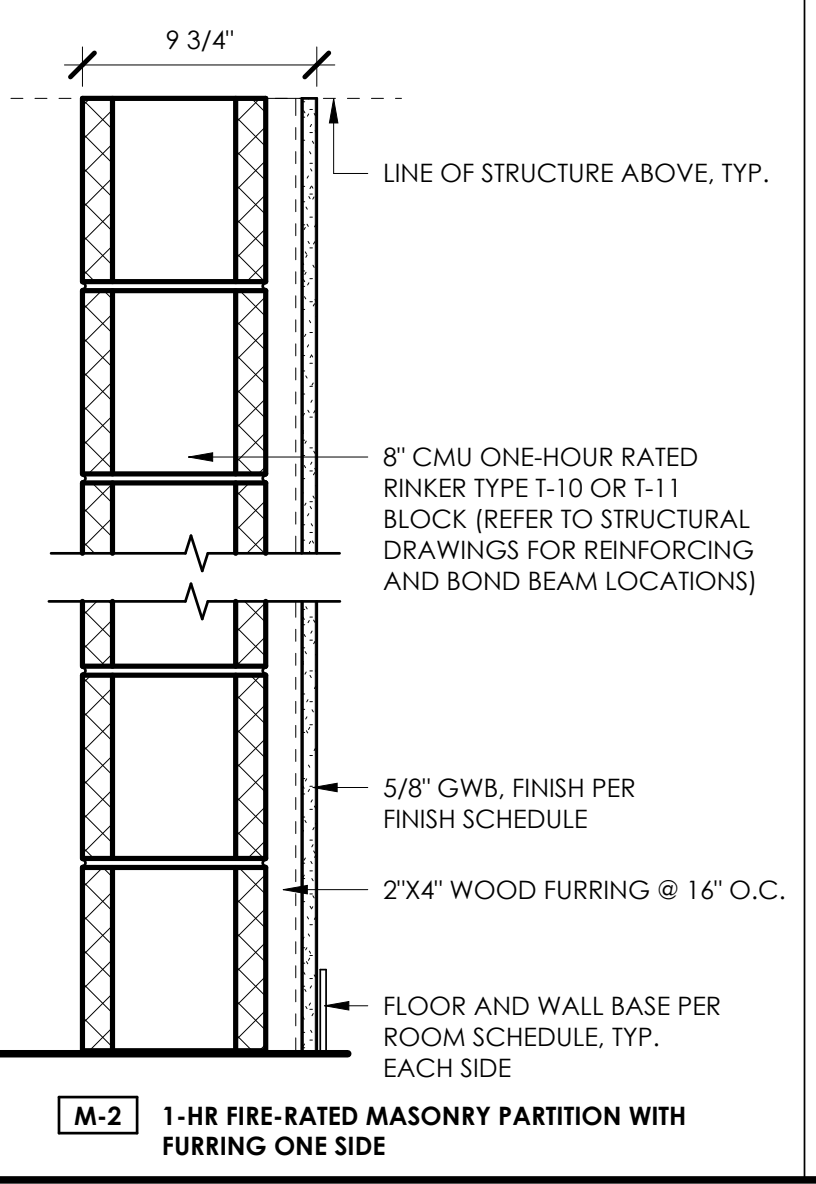
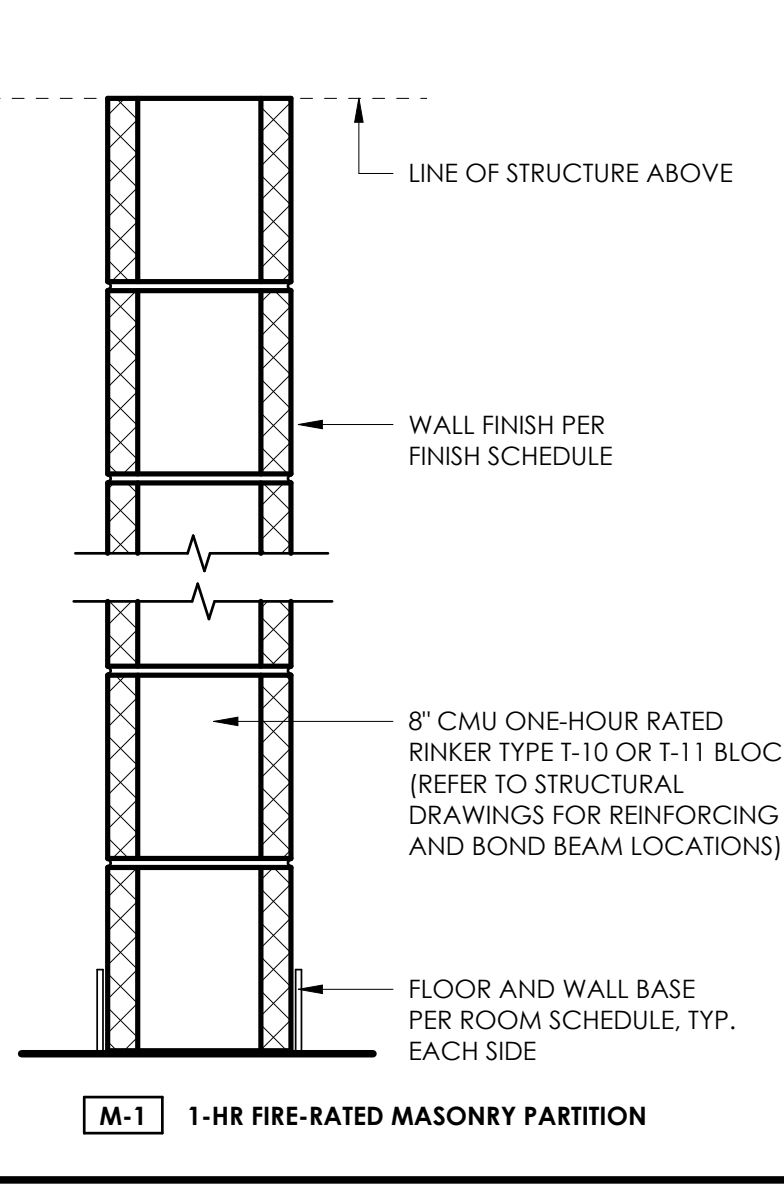
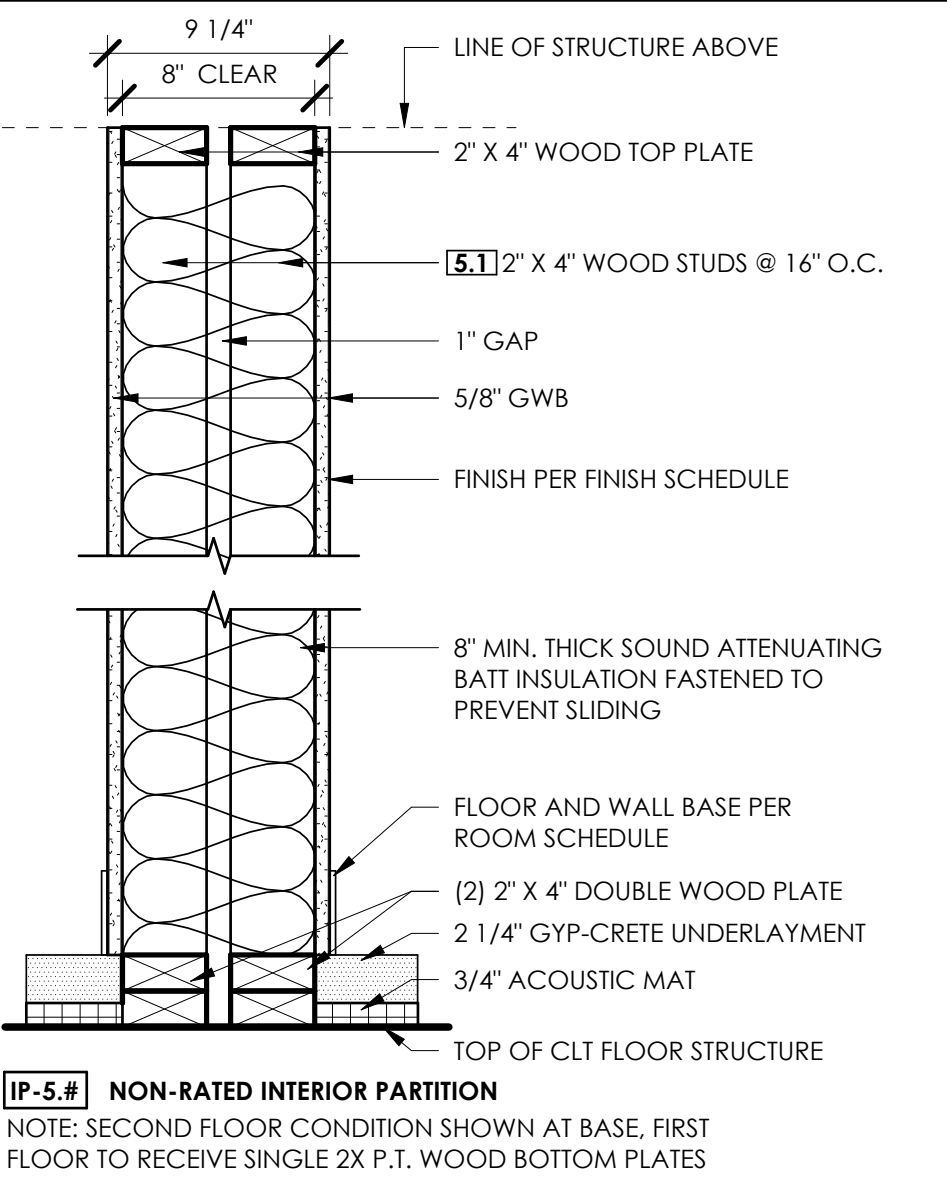
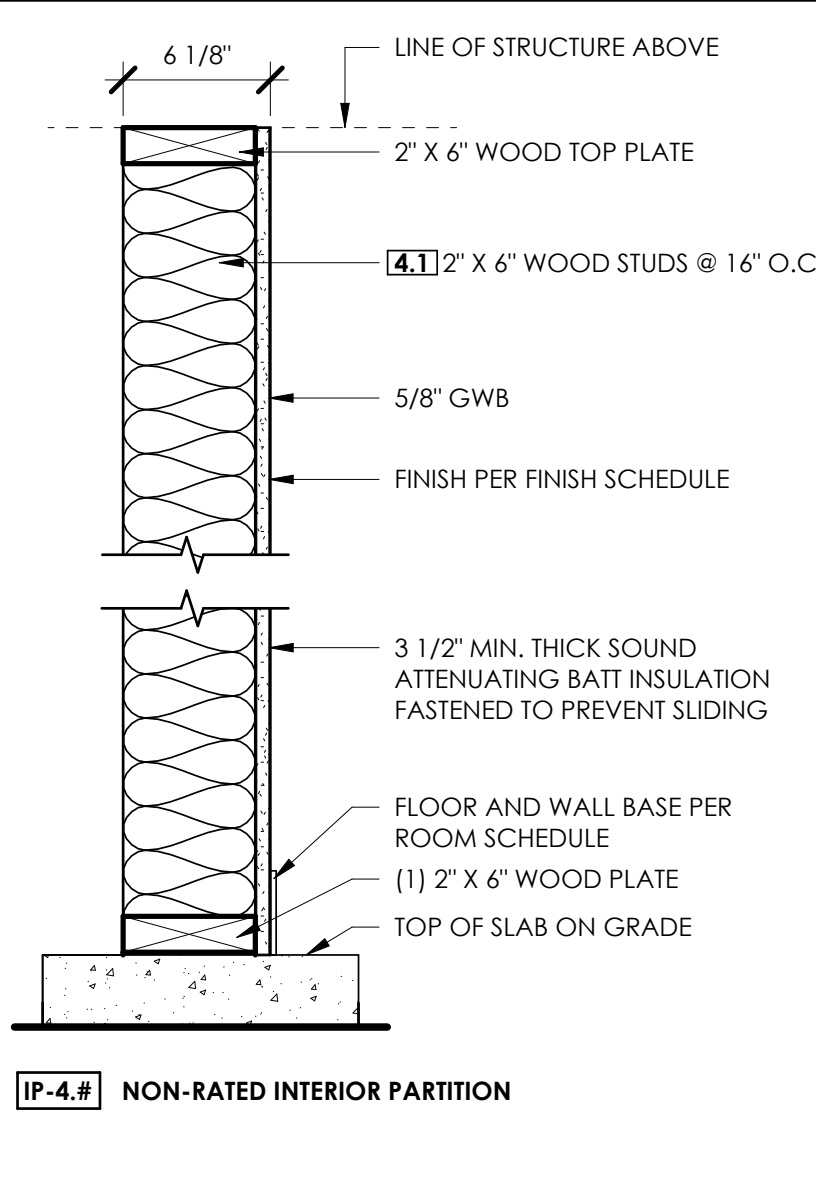
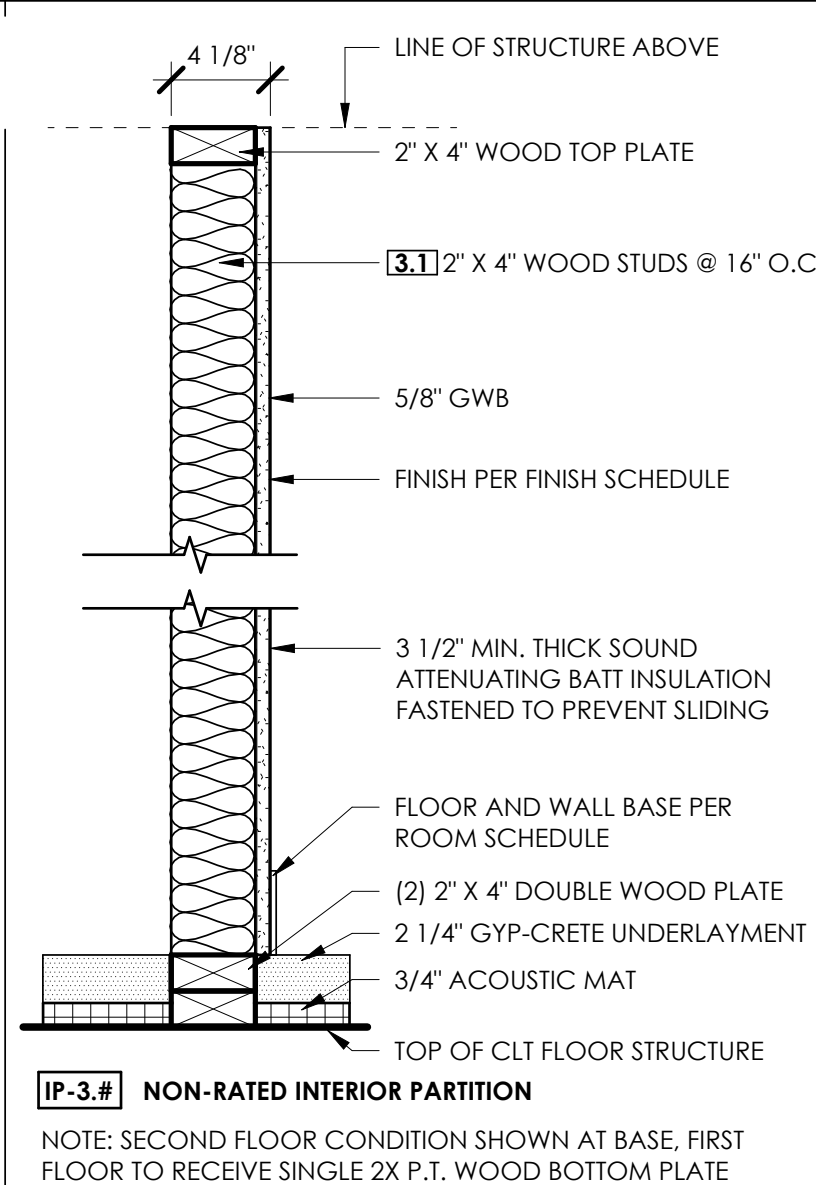
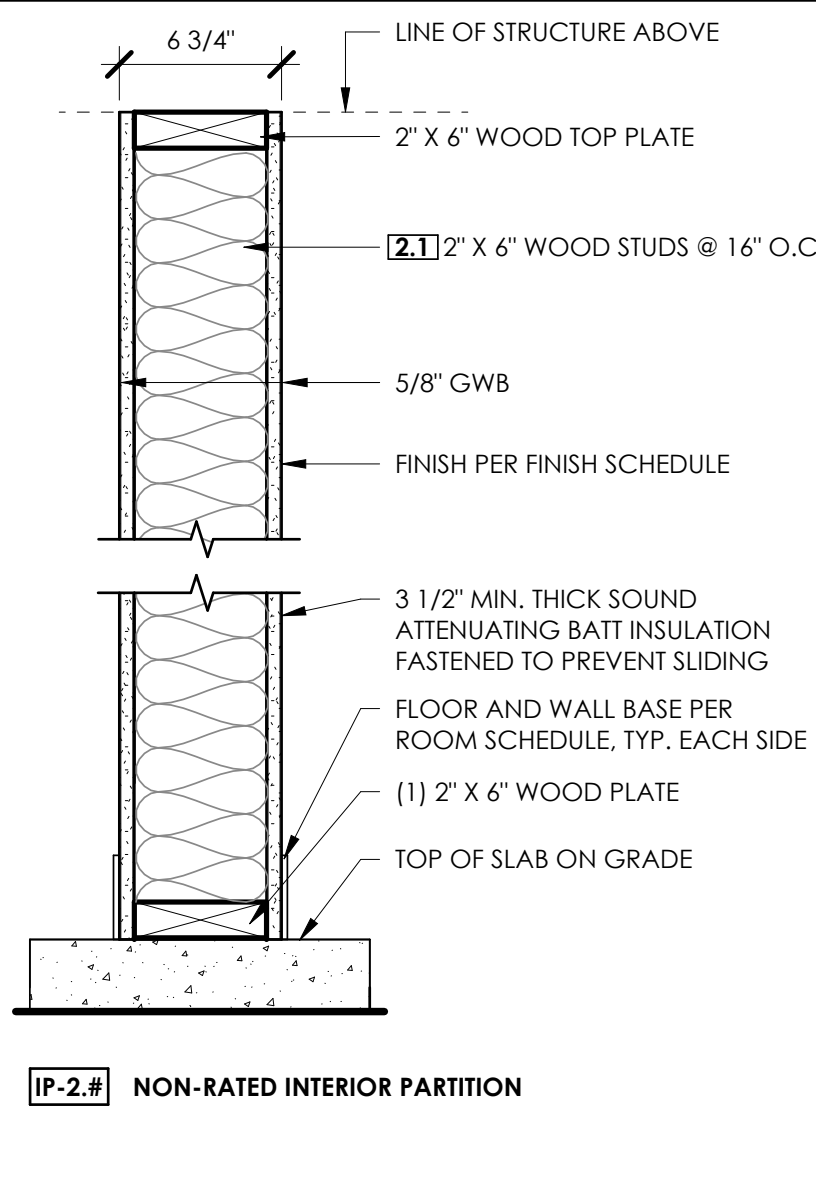
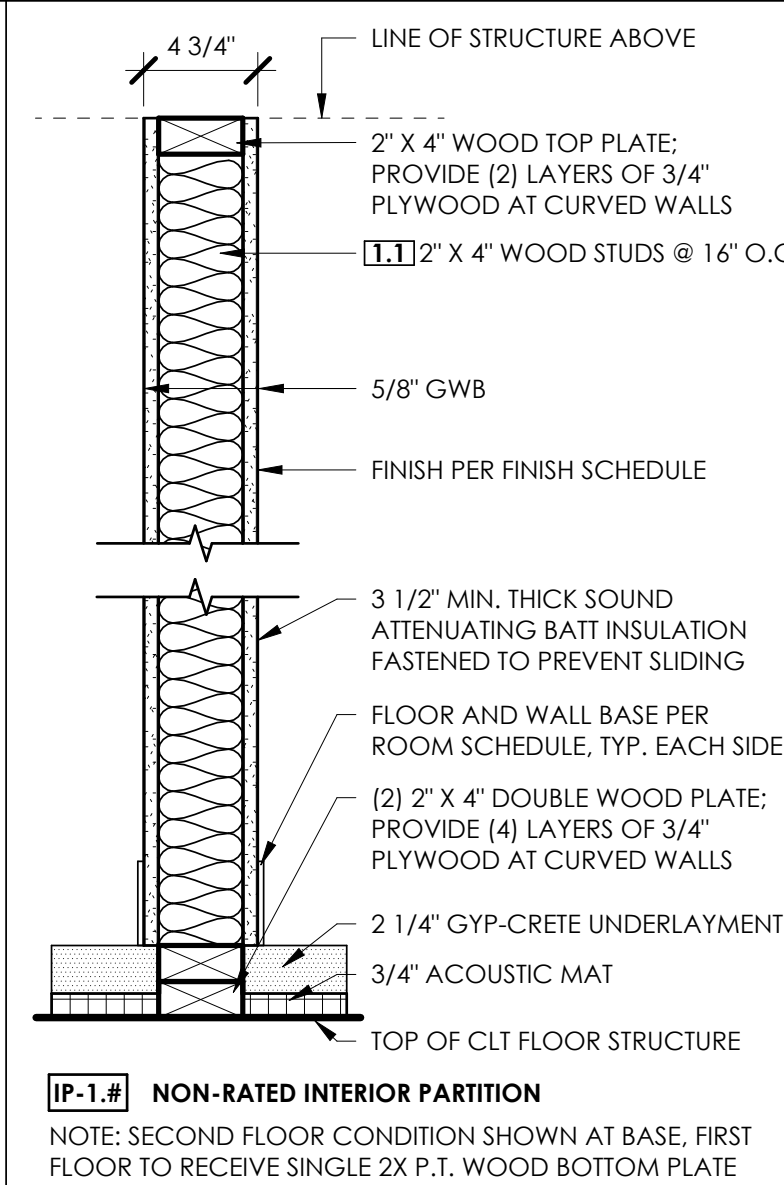
PROJECT NO.:
20202946.010A

DRAWING NO.:
G-005

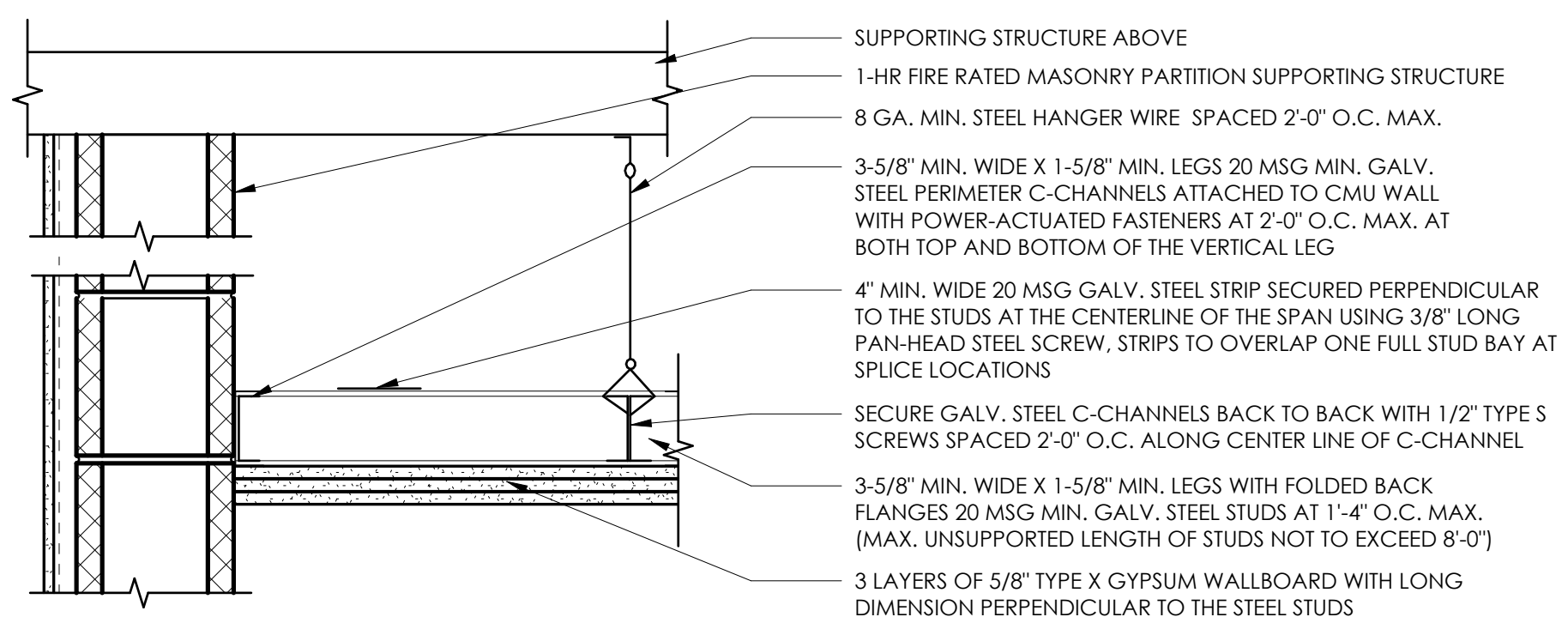
DATE:
NOVEMBER 4, 2024

INTERIOR PARTITIONS

MASONRY/FIRE-RATED ASSEMBLIES



WALL TYPE NOTES:
1. PROVIDE MOISTURE RESISTANT GYPSUM WALL BOARD AT ALL WET AREAS AS REQUIRED BY CODE.
2. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR CERAMIC TILE AND WOOD PANEL WAINSCOT LOCATIONS.
3. PROVIDE CONCRETE MASONRY UNIT AGGREGATE TYPE AND MINIMUM REQUIRED EQUIVALENT THICKNESS TO MEET ONE HOUR FIRE RESISTANCE RATING FOR ELEVATOR AND STAIRS ENCLOSURE.



- FLOOR PLAN GENERAL NOTES:**
- REFER TO SHEET **G-005** FOR WALL TYPES.
 - DIMENSION STYLES
 - WOOD STUD WALLS ARE DIMENSIONED TO CENTERLINE OF STUD.
 - MASONRY WALLS ARE DIMENSIONED TO FACE OF MASONRY.
 - ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFOI OWNER FURNISHED, OWNER INSTALL
 - ALL EXTERIOR WALL ASSEMBLIES TO BE WALL TYPE E1, PER SHEET **G-005**, UNLESS NOTED OTHERWISE.

LEGEND	
	SEMI-RECESSED FIRE EXTINGUISHER CABINET
	SURFACE MOUNTED FIRE EXTINGUISHER CABINET
	SURFACE MOUNTED ELECTRIC PANEL (SEE ELECTRICAL DRAWINGS)

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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FIRST FLOOR ENLARGED PLAN - NORTH

2178 FLIGHTLINE AVE

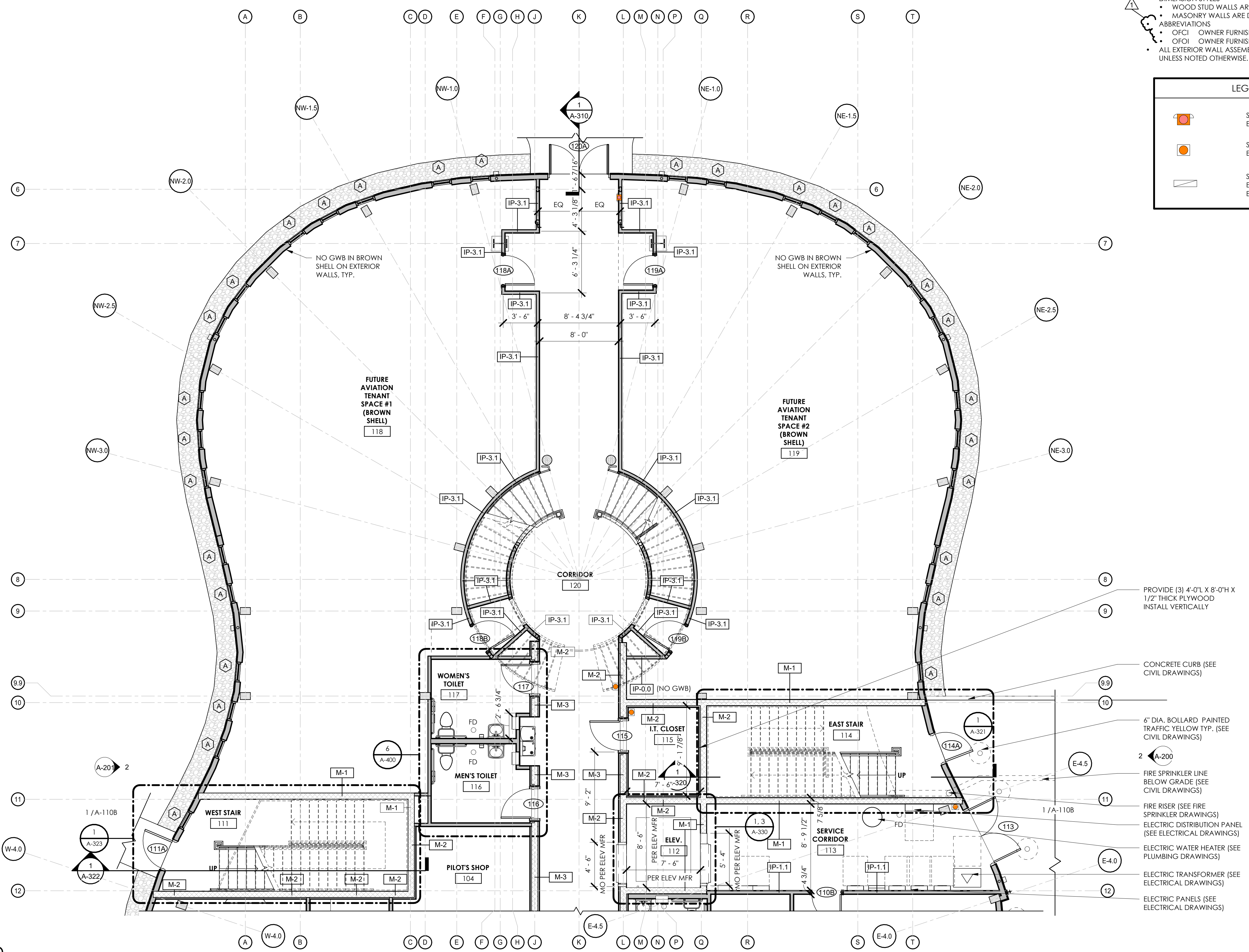
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

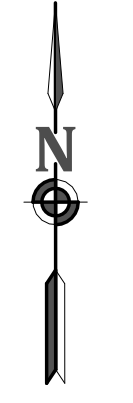
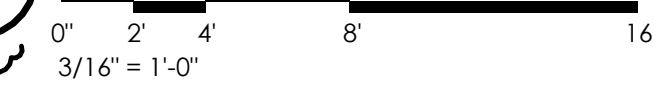
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-110A

DATE:
NOVEMBER 4, 2024



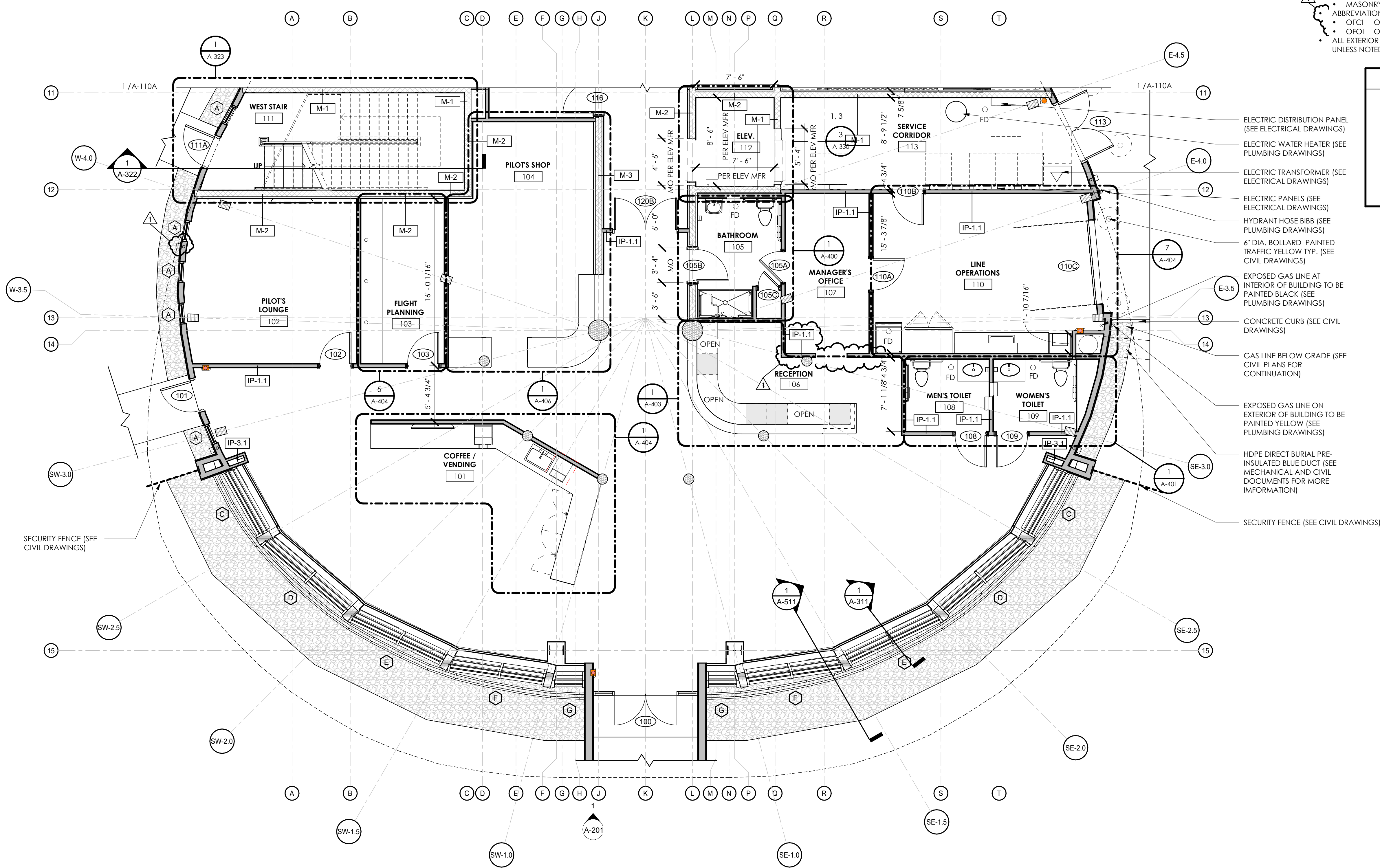
1 FIRST FLOOR ENLARGED FLOOR PLAN - NORTH



- FLOOR PLAN GENERAL NOTES:**
- REFER TO SHEET **G-005** FOR WALL TYPES.
 - DIMENSION STYLES
 - WOOD STUD WALLS ARE DIMENSIONED TO CENTERLINE OF STUD.
 - MASONRY WALLS ARE DIMENSIONED TO FACE OF MASONRY.
 - ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFOI OWNER FURNISHED, OWNER INSTALL
 - ALL EXTERIOR WALL ASSEMBLIES TO BE WALL TYPE E1, PER SHEET **G-005**, UNLESS NOTED OTHERWISE.

LEGEND

- SEMI-RECESSED FIRE EXTINGUISHER CABINET
- SURFACE MOUNTED FIRE EXTINGUISHER CABINET
- SURFACE MOUNTED ELECTRIC PANEL (SEE ELECTRICAL DRAWINGS)



- ELECTRIC DISTRIBUTION PANEL (SEE ELECTRICAL DRAWINGS)
- ELECTRIC WATER HEATER (SEE PLUMBING DRAWINGS)
- ELECTRIC TRANSFORMER (SEE ELECTRICAL DRAWINGS)
- ELECTRIC PANELS (SEE ELECTRICAL DRAWINGS)
- HYDRANT HOSE BIBB (SEE PLUMBING DRAWINGS)
- 6" DIA. BOLLARD PAINTED TRAFFIC YELLOW TYP. (SEE CIVIL DRAWINGS)
- EXPOSED GAS LINE AT INTERIOR OF BUILDING TO BE PAINTED BLACK (SEE PLUMBING DRAWINGS)
- CONCRETE CURB (SEE CIVIL DRAWINGS)
- GAS LINE BELOW GRADE (SEE CIVIL PLANS FOR CONTINUATION)
- EXPOSED GAS LINE ON EXTERIOR OF BUILDING TO BE PAINTED YELLOW (SEE PLUMBING DRAWINGS)
- HDPE DIRECT BURIAL PRE-INSULATED BLUE DUCT (SEE MECHANICAL AND CIVIL DOCUMENTS FOR MORE INFORMATION)
- SECURITY FENCE (SEE CIVIL DRAWINGS)

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER STAN PRICE, PE
PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
DESIGNER KATIE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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FIRST FLOOR ENLARGED PLAN - SOUTH

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

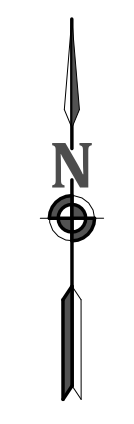
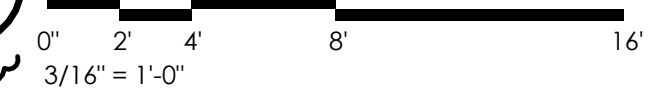
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

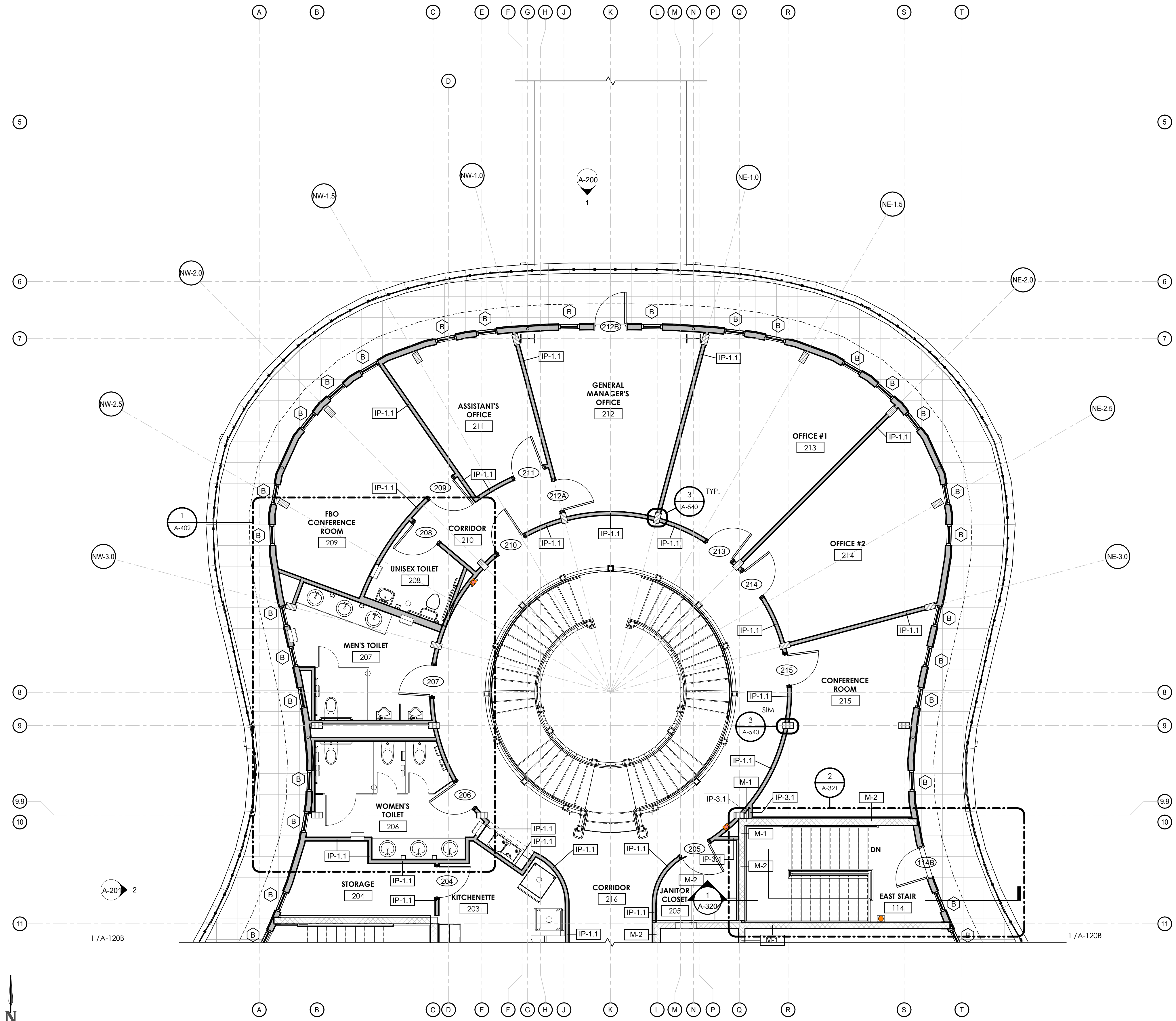
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-110B

DATE:
NOVEMBER 4, 2024

1 FIRST FLOOR ENLARGED FLOOR PLAN - SOUTH

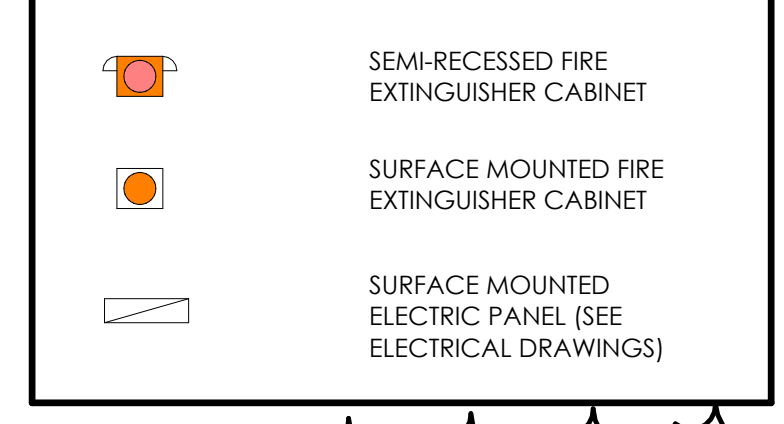




FLOOR PLAN GENERAL NOTES:

- REFER TO SHEET G-005 FOR WALL TYPES.
- DIMENSION STYLES
- WOOD STUD WALLS ARE DIMENSIONED TO CENTERLINE OF STUD.
- MASONRY WALLS ARE DIMENSIONED TO FACE OF MASONRY.
- ABBREVIATIONS
- OFCI OWNER FURNISHED, CONTRACTOR INSTALL
- OFOI OWNER FURNISHED, OWNER INSTALL
- ALL EXTERIOR WALL ASSEMBLIES TO BE WALL TYPE E1, PER SHEET G-005, UNLESS NOTED OTHERWISE.

LEGEND



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER: STAN PRICE, PE
 PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
 DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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SECOND FLOOR ENLARGED PLAN - NORTH

2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

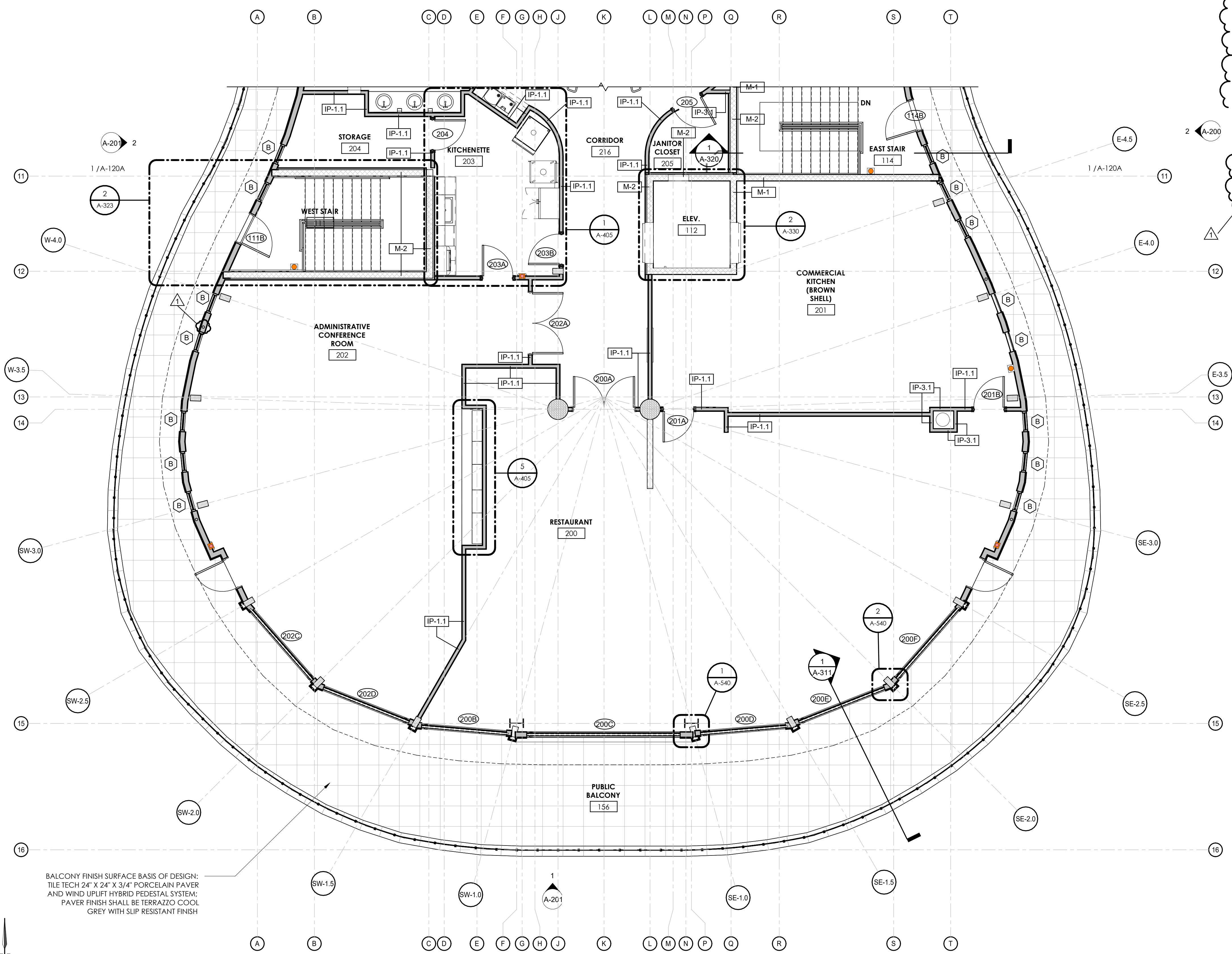
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-120A

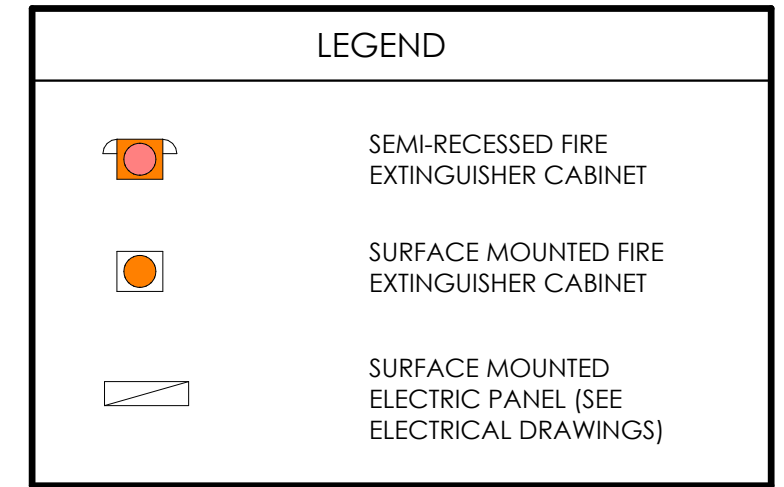
DATE:
NOVEMBER 4, 2024

1 SECOND FLOOR ENLARGED PLAN - NORTH

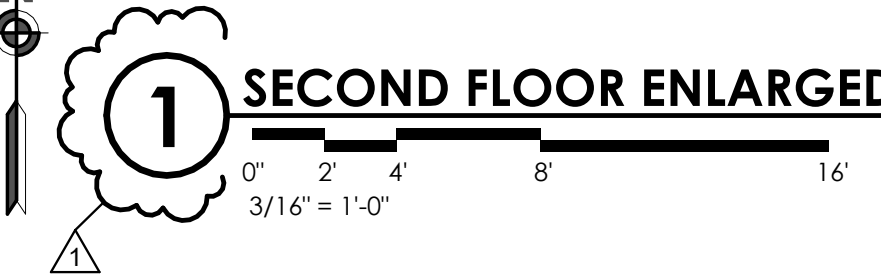




- FLOOR PLAN GENERAL NOTES:**
- REFER TO SHEET G-005 FOR WALL TYPES.
 - DIMENSION STYLES
 - WOOD STUD WALLS ARE DIMENSIONED TO CENTERLINE OF STUD.
 - MASONRY WALLS ARE DIMENSIONED TO FACE OF MASONRY.
 - ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFCI OWNER FURNISHED, OWNER INSTALL
 - ALL EXTERIOR WALL ASSEMBLIES TO BE WALL TYPE E1, PER SHEET G-005, UNLESS NOTED OTHERWISE.



BALCONY FINISH SURFACE BASIS OF DESIGN:
 TILE TECH 24" X 24" X 3/4" PORCELAIN PAVER
 AND WIND UPLIFT HYBRID PEDESTAL SYSTEM;
 PAVER FINISH SHALL BE TERRAZZO COOL
 GREY WITH SLIP RESISTANT FINISH



1 SECOND FLOOR ENLARGED PLAN - SOUTH

BID SET

STAMP:

CLIENT:
 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER STAN PRICE, PE
 PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
 DESIGNER KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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**SECOND FLOOR
 ENLARGED PLAN - SOUTH**

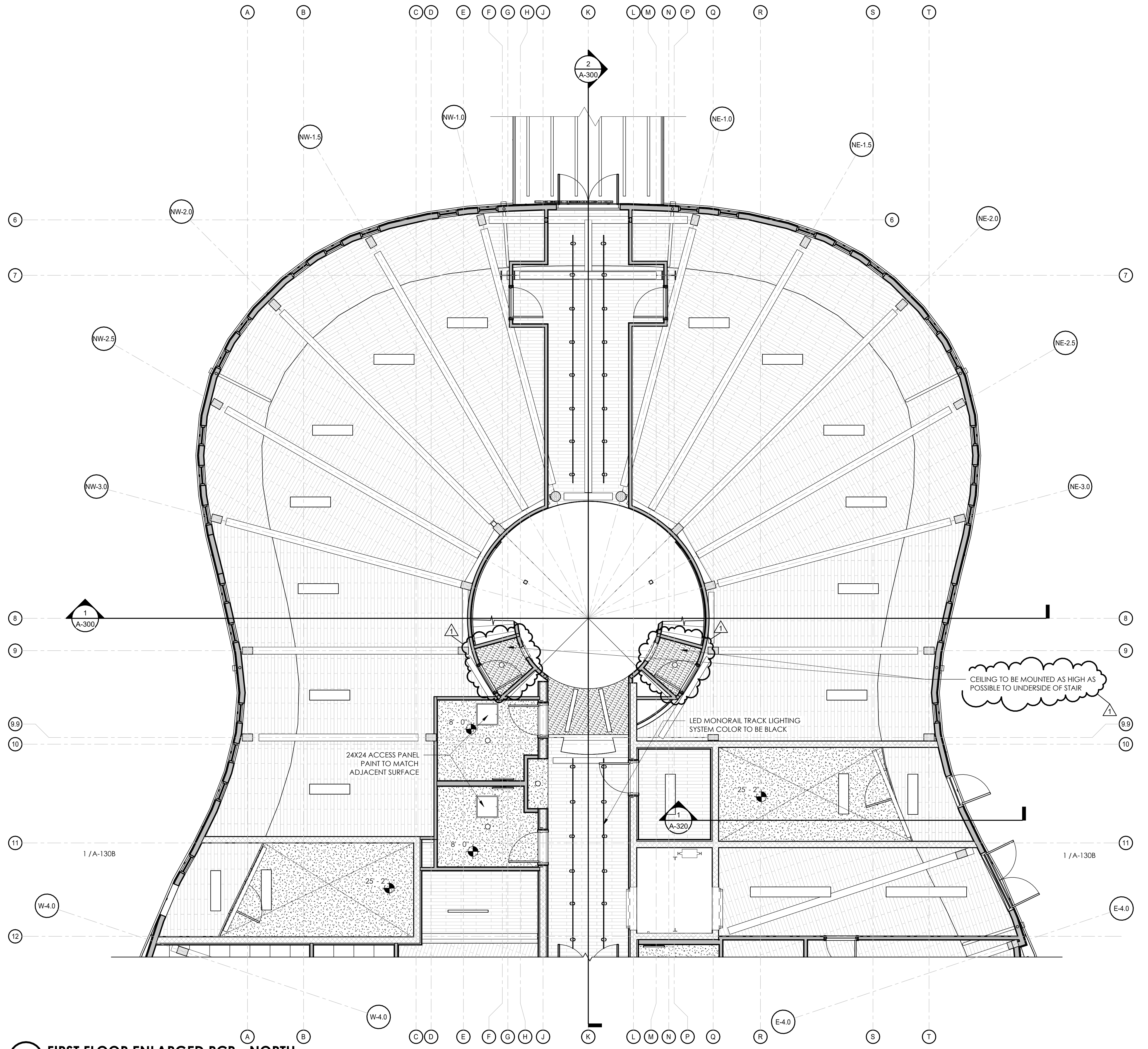
2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
 20202946.010A

DRAWING NO.:
 A-120B

DATE:
 NOVEMBER 4, 2024



REFLECTED CEILING PLAN GENERAL NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE SCHEDULE.

REFLECTED CEILING PLAN LEGEND

- EXPOSED CLT ON GLULAM BEAMS (NO CEILING)
- WOOD PANEL CEILING
- GWB CEILING
- TIN CEILING TILE PER FINISH SCHEDULE

LIGHTING LEGEND

- RGBW EXTERIOR STRIP LIGHTING WITH DMX CONTROLLER ADDITIVE
- INTERIOR WHITE STRIP LIGHTS
- ALUMINUM LED CHANNEL FOR LED STRIP LIGHTS
- CONTINUOUS LED STRIP LIGHT (WHITE) WITH WATERPROOF CORNER LED STRIP CHANNEL AND ALUMINUM MOUNTING BRACKETS FASTENED TO SOFFIT AS REQUIRED
- UNDER CABINET STRIP LIGHTS
- MONORAIL TRACK LIGHT FIXTURES
- LINEAR LIGHT FIXTURE
- LINEAR PENDANT LIGHT FIXTURE
- ROUND CHANDELIER LIGHT FIXTURE
- RECESSED CAN LIGHT FIXTURE
- PENDANT LIGHT FIXTURES
- ELLIPTICAL LINEAR PENDANT LIGHT FIXTURE
- VANITY LIGHT FIXTURES

1 FIRST FLOOR ENLARGED RCP - NORTH

0" 2" 4" 8" 16"
3/16" = 1'-0"

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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FIRST FLOOR ENLARGED RCP - NORTH

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-130A

DATE:
NOVEMBER 4, 2024

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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FIRST FLOOR ENLARGED
RCP - SOUTH

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-130B

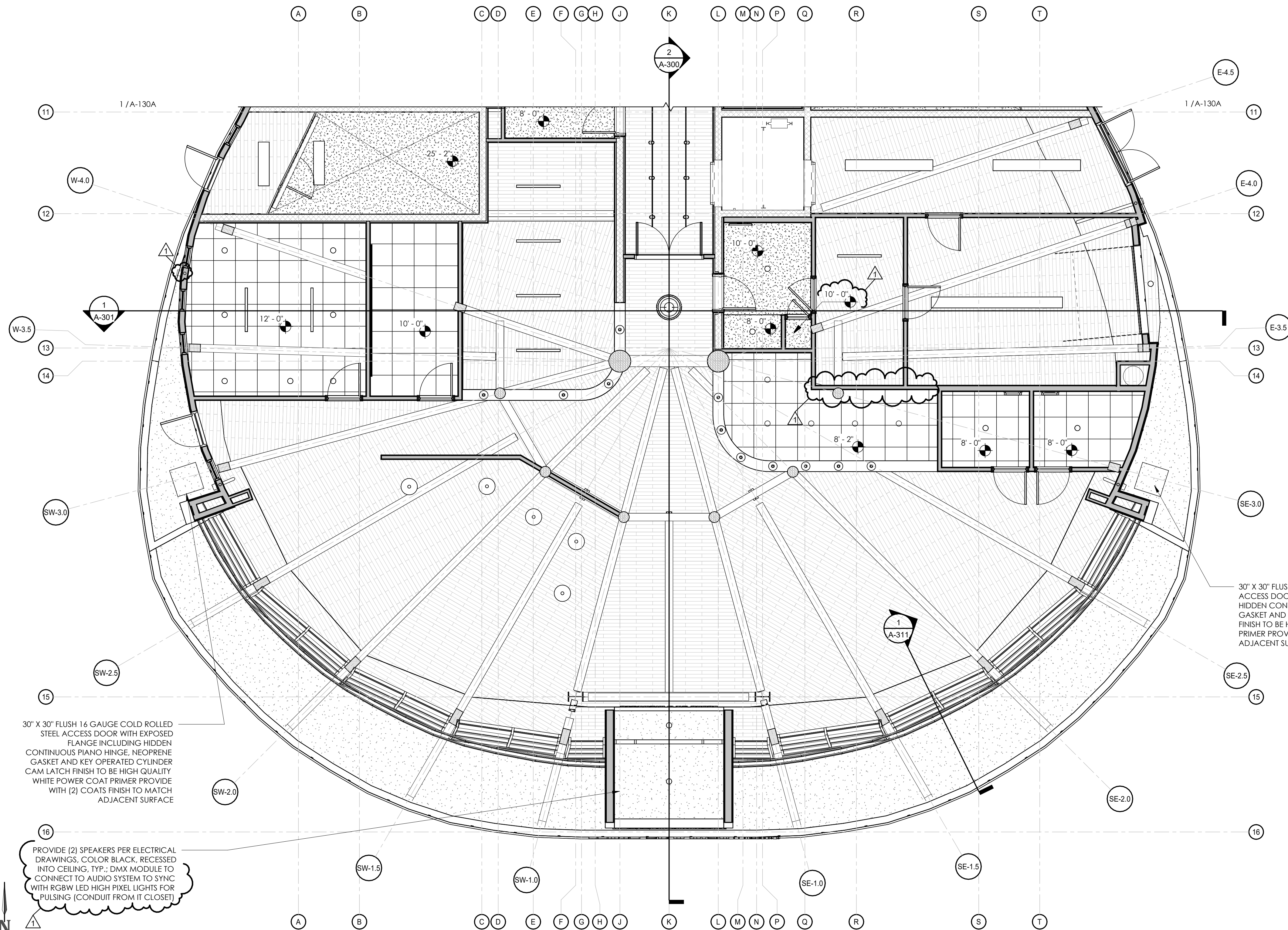
DATE:
NOVEMBER 4, 2024

REFLECTED CEILING PLAN GENERAL NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE SCHEDULE.

REFLECTED CEILING PLAN LEGEND	
	EXPOSED CLT ON GLULAM BEAMS (NO CEILING)
	WOOD PANEL CEILING
	GWB CEILING
	TIN CEILING TILE PER FINISH SCHEDULE

LIGHTING LEGEND	
	RGBW EXTERIOR STRIP LIGHTING WITH DMX CONTROLLER ADDITIVE
	INTERIOR WHITE STRIP LIGHTS
	ALUMINUM LED CHANNEL FOR LED STRIP LIGHTS
	CONTINUOUS LED STRIP LIGHT (WHITE) WITH WATERPROOF CORNER LED STRIP CHANNEL AND ALUMINUM MOUNTING BRACKETS FASTENED TO SOFFIT AS REQUIRED
	UNDER CABINET STRIP LIGHTS
	MONORAIL TRACK LIGHT FIXTURES
	LINEAR LIGHT FIXTURE
	LINEAR PENDANT LIGHT FIXTURE
	ROUND CHANDELIER LIGHT FIXTURE
	RECESSED CAN LIGHT FIXTURE
	PENDANT LIGHT FIXTURES
	ELLIPTICAL LINEAR PENDANT LIGHT FIXTURE
	VANITY LIGHT FIXTURES



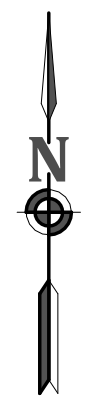
30" X 30" FLUSH 16 GAUGE COLD ROLLED STEEL ACCESS DOOR WITH EXPOSED FLANGE INCLUDING HIDDEN CONTINUOUS PIANO HINGE, NEOPRENE GASKET AND KEY OPERATED CYLINDER CAM LATCH FINISH TO BE HIGH QUALITY WHITE POWER COAT PRIMER PROVIDE WITH (2) COATS FINISH TO MATCH ADJACENT SURFACE

30" X 30" FLUSH 16 GAUGE COLD ROLLED STEEL ACCESS DOOR WITH EXPOSED FLANGE INCLUDING HIDDEN CONTINUOUS PIANO HINGE, NEOPRENE GASKET AND KEY OPERATED CYLINDER CAM LATCH FINISH TO BE HIGH QUALITY WHITE POWER COAT PRIMER PROVIDE WITH (2) COATS FINISH TO MATCH ADJACENT SURFACE

PROVIDE (2) SPEAKERS PER ELECTRICAL DRAWINGS, COLOR BLACK, RECESSED INTO CEILING, TYP.: DMX MODULE TO CONNECT TO AUDIO SYSTEM TO SYNC WITH RGBW LED HIGH PIXEL LIGHTS FOR PULSING (CONDUIT FROM IT CLOSET)

1 FIRST FLOOR ENLARGED RCP - SOUTH

0' 2' 4' 8' 16'
3/16" = 1'-0"



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE EMERICK, ASSOC., AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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**SECOND FLOOR
ENLARGED RCP - NORTH**

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-140A

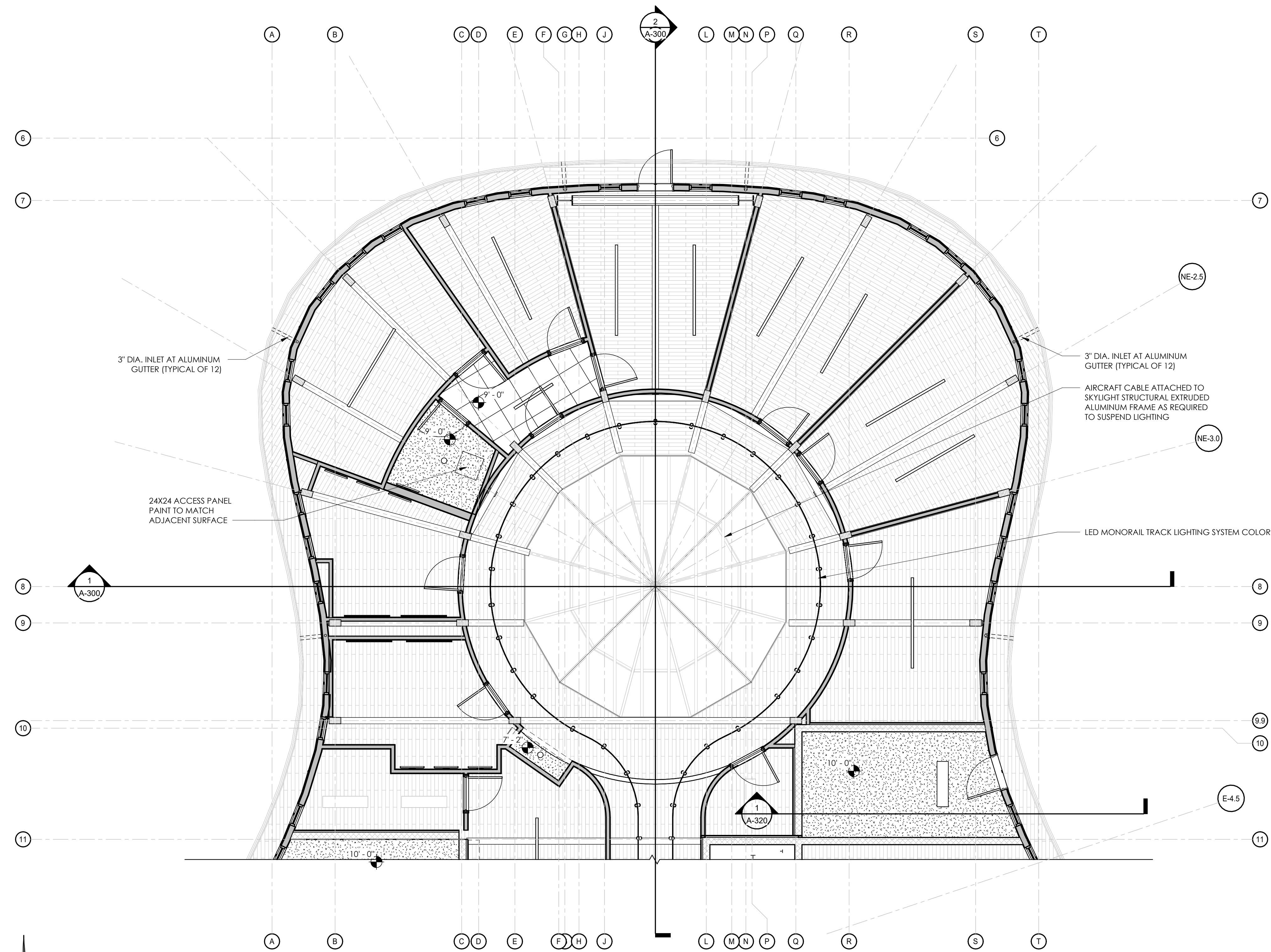
DATE:
NOVEMBER 4, 2024

REFLECTED CEILING PLAN GENERAL NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE SCHEDULE.

REFLECTED CEILING PLAN LEGEND	
	EXPOSED CLT ON GLULAM BEAMS (NO CEILING)
	WOOD PANEL CEILING
	GWB CEILING
	TIN CEILING TILE PER FINISH SCHEDULE

LIGHTING LEGEND	
	RGBW EXTERIOR STRIP LIGHTING WITH DMX CONTROLLER ADDITIVE
	INTERIOR WHITE STRIP LIGHTS
	ALUMINUM LED CHANNEL FOR LED STRIP LIGHTS
	CONTINUOUS LED STRIP LIGHT (WHITE) WITH WATERPROOF CORNER LED STRIP CHANNEL AND ALUMINUM MOUNTING BRACKETS FASTENED TO SOFFIT AS REQUIRED
	UNDER CABINET STRIP LIGHTS
	MONORAIL TRACK LIGHT FIXTURES
	LINEAR LIGHT FIXTURE
	LINEAR PENDANT LIGHT FIXTURE
	ROUND CHANDELIER LIGHT FIXTURE
	RECESSED CAN LIGHT FIXTURE
	PENDANT LIGHT FIXTURES
	ELLIPTICAL LINEAR PENDANT LIGHT FIXTURE
	VANITY LIGHT FIXTURES



1 SECOND FLOOR ENLARGED REFLECTED CEILING PLAN - NORTH

0' 2' 4' 8' 16'
3/16" = 1'-0"



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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SECOND FLOOR ENLARGED RCP - SOUTH

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-140B

DATE:
NOVEMBER 4, 2024

REFLECTED CEILING PLAN GENERAL NOTES:

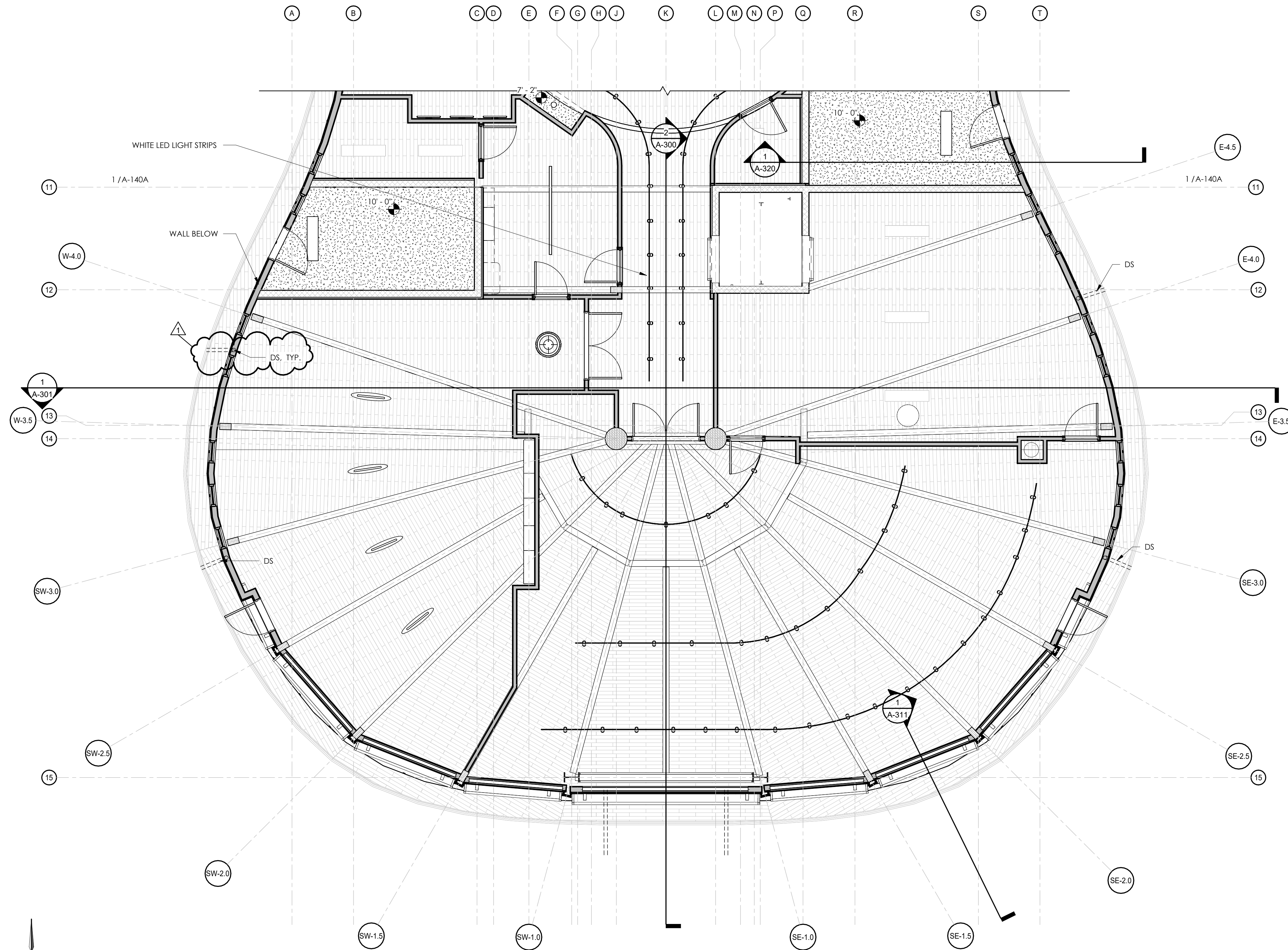
- REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE SCHEDULE.

REFLECTED CEILING PLAN LEGEND

- EXPOSED CLT ON GLULAM BEAMS (NO CEILING)
- WOOD PANEL CEILING
- GWB CEILING
- TIN CEILING TILE PER FINISH SCHEDULE

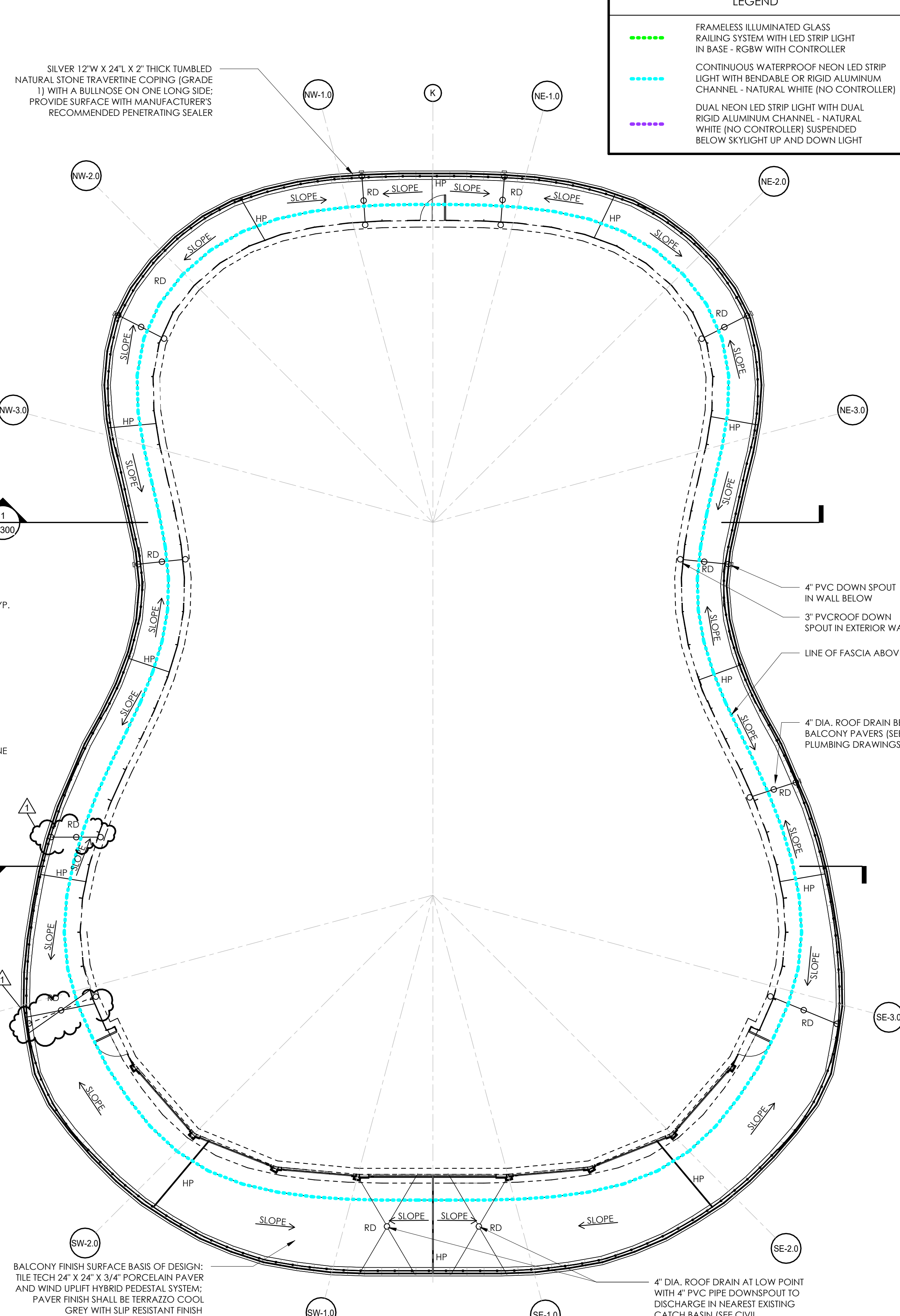
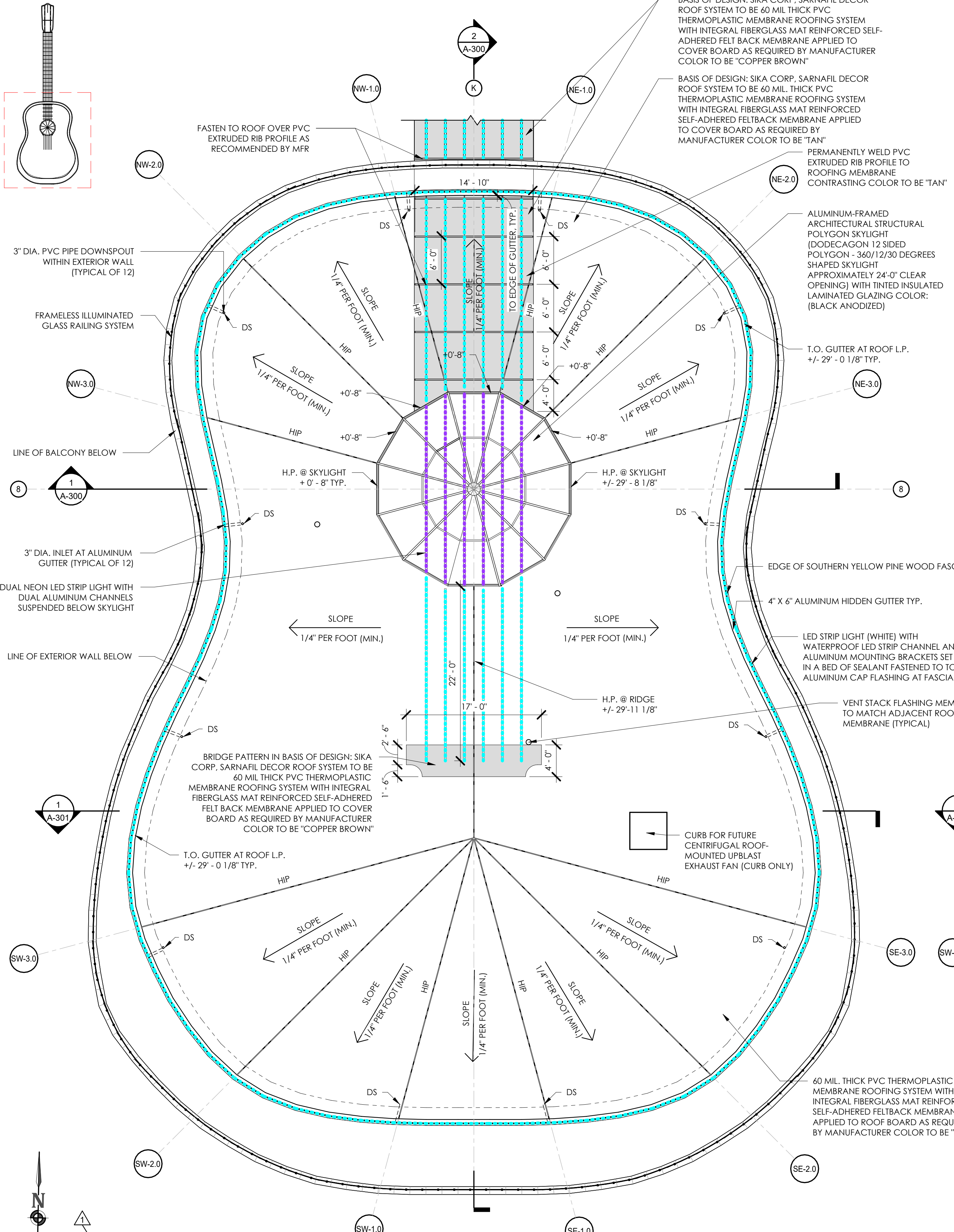
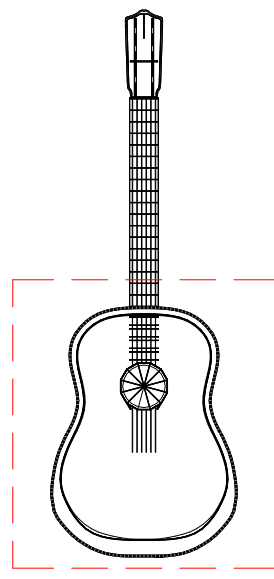
LIGHTING LEGEND

- RGBW EXTERIOR STRIP LIGHTING WITH DMX CONTROLLER ADDITIVE
- INTERIOR WHITE STRIP LIGHTS
- ALUMINUM LED CHANNEL FOR LED STRIP LIGHTS
- CONTINUOUS LED STRIP LIGHT (WHITE) WITH WATERPROOF CORNER LED STRIP CHANNEL AND ALUMINUM MOUNTING BRACKETS FASTENED TO SOFFIT AS REQUIRED
- UNDER CABINET STRIP LIGHTS
- MONORAIL TRACK LIGHT FIXTURES
- LINEAR LIGHT FIXTURE
- LINEAR PENDANT LIGHT FIXTURE
- ROUND CHANDELIER LIGHT FIXTURE
- RECESSED CAN LIGHT FIXTURE
- PENDANT LIGHT FIXTURES
- ELLIPTICAL LINEAR PENDANT LIGHT FIXTURE
- VANITY LIGHT FIXTURES



1 SECOND FLOOR ENLARGED RCP - SOUTH

0' 2' 4' 8' 16'
3/16" = 1'-0"



LEGEND	
	FRAMELESS ILLUMINATED GLASS RAILING SYSTEM WITH LED STRIP LIGHT IN BASE - RGBW WITH CONTROLLER
	CONTINUOUS WATERPROOF NEON LED STRIP LIGHT WITH BENDABLE OR RIGID ALUMINUM CHANNEL - NATURAL WHITE (NO CONTROLLER)
	DUAL NEON LED STRIP LIGHT WITH DUAL RIGID ALUMINUM CHANNEL - NATURAL WHITE (NO CONTROLLER) SUSPENDED BELOW SKYLIGHT UP AND DOWN LIGHT

PASSERO
architecture engineering

EQUILIBRIUM

PROMUS

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COCA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMEKIC, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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ROOF PLAN AND BALCONY ROOF PLAN

2178 FLIGHTLINE AVE

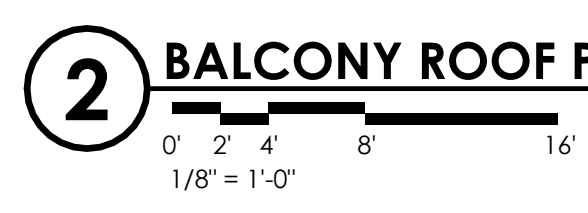
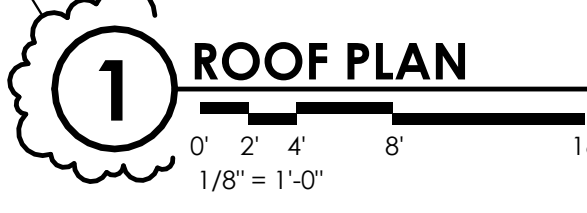
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

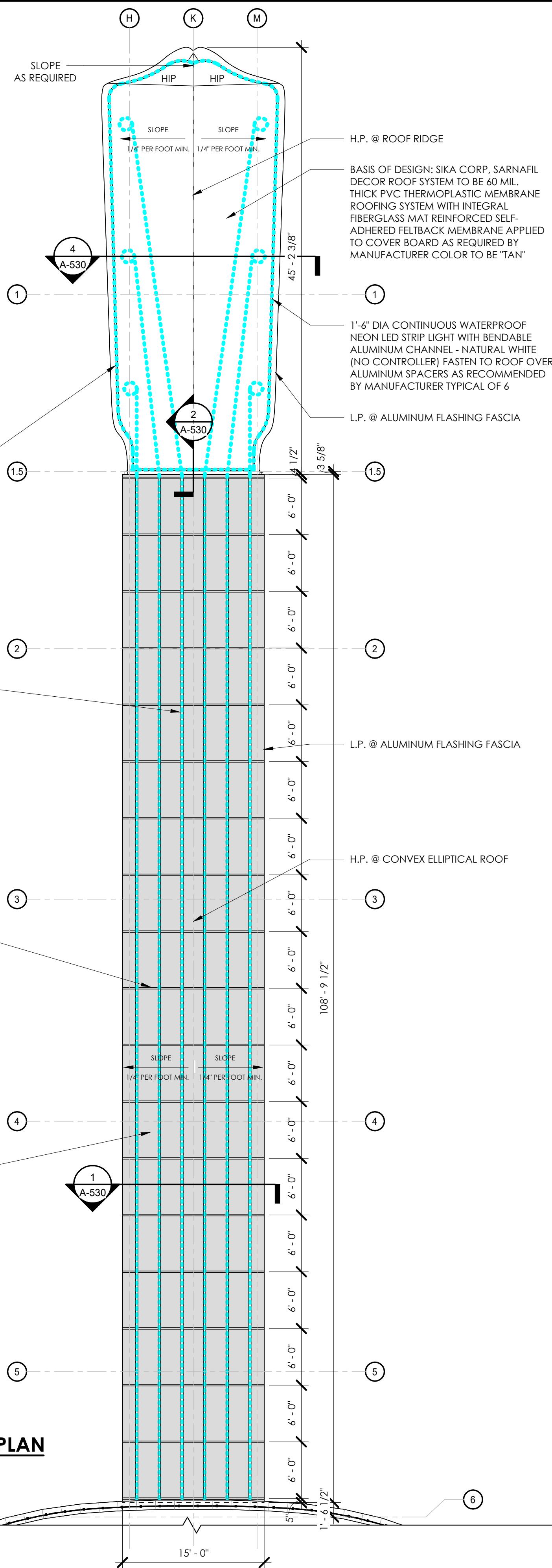
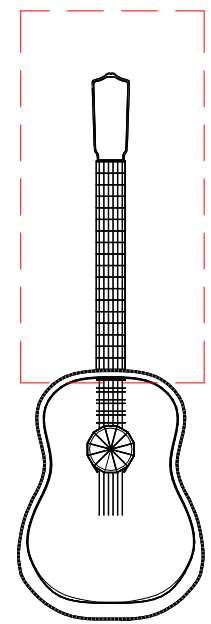
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-150

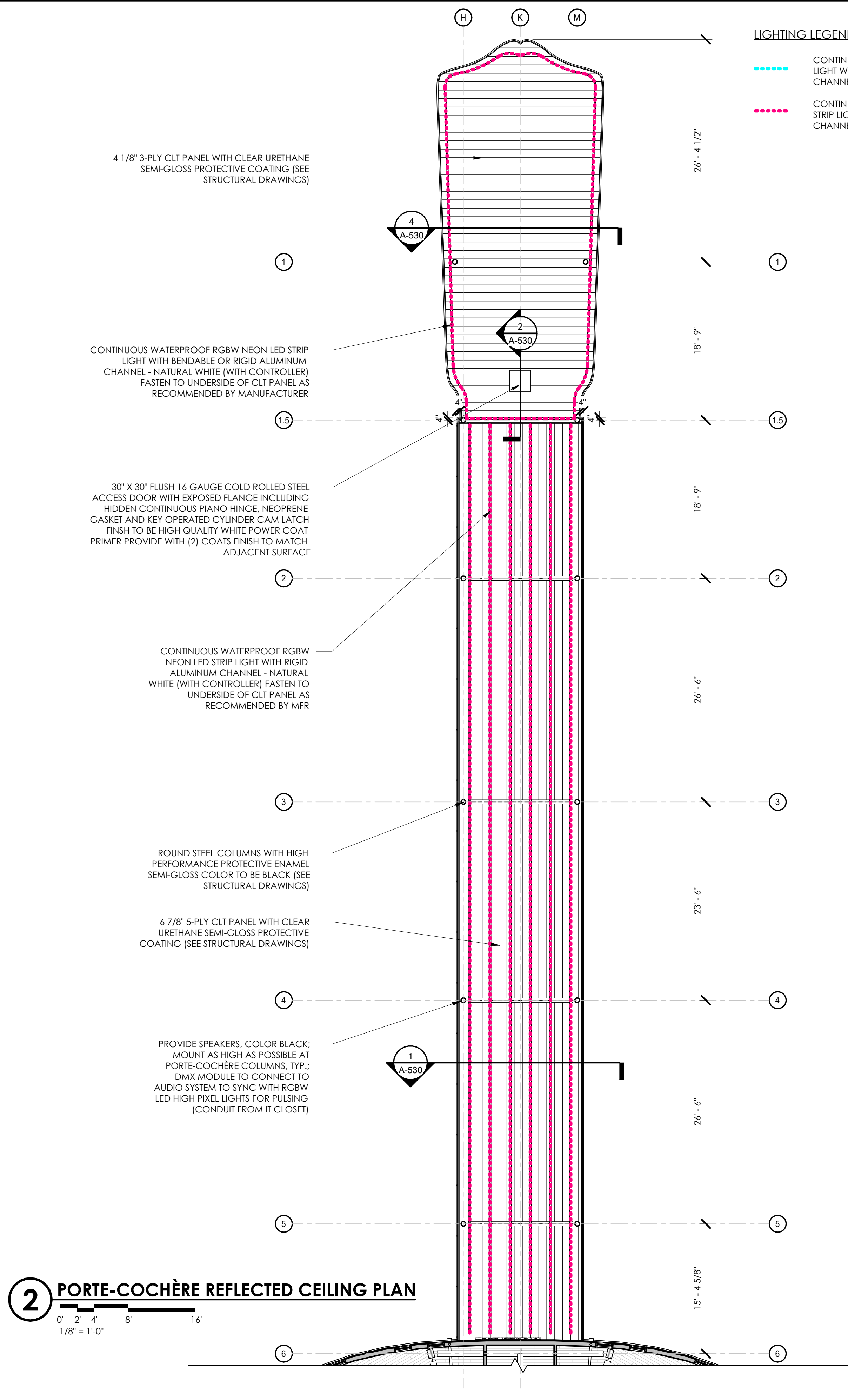
DATE:
NOVEMBER 4, 2024





1 PORTE-COCHÈRE ROOF PLAN

0' 2' 4' 8' 16'
1/8" = 1'-0"



2 PORTE-COCHÈRE REFLECTED CEILING PLAN

0' 2' 4' 8' 16'
1/8" = 1'-0"

LIGHTING LEGEND:

- CONTINUOUS WATERPROOF NEON LED STRIP LIGHT WITH BENDABLE OR RIGID ALUMINUM CHANNEL - NATURAL WHITE (NO CONTROLLER)
- CONTINUOUS WATERPROOF RGBW NEON LED STRIP LIGHT WITH BENDABLE OR RIGID ALUMINUM CHANNEL - NATURAL WHITE (WITH CONTROLLER)

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700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER STAN PRICE, PE
PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
DESIGNER KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
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**PORTE-COCHÈRE
ROOF/REFLECTED
CEILING PLAN**

2178 FLIGHTLINE AVE

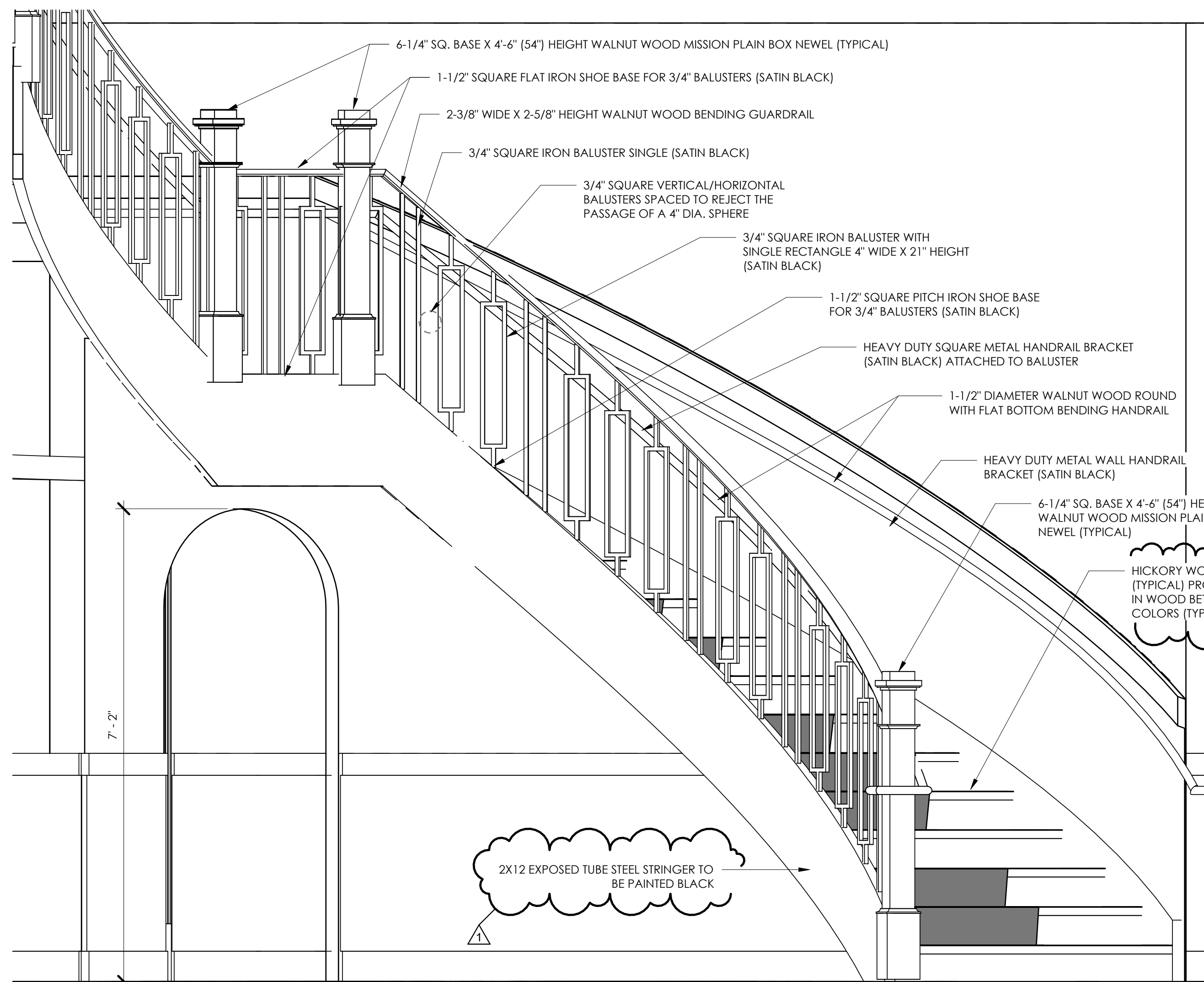
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

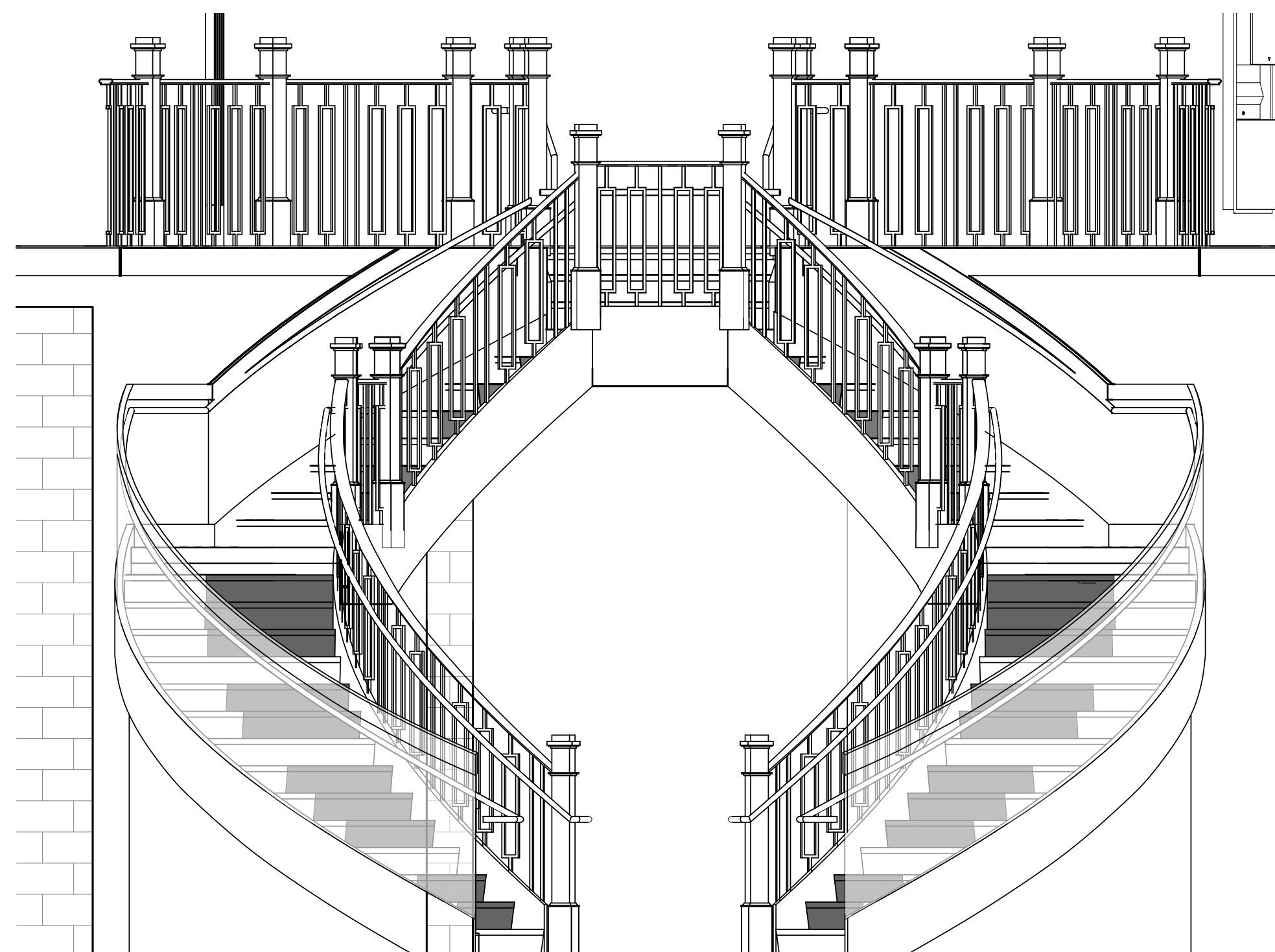
DRAWING NO.:
A-160

DATE:
NOVEMBER 4, 2024



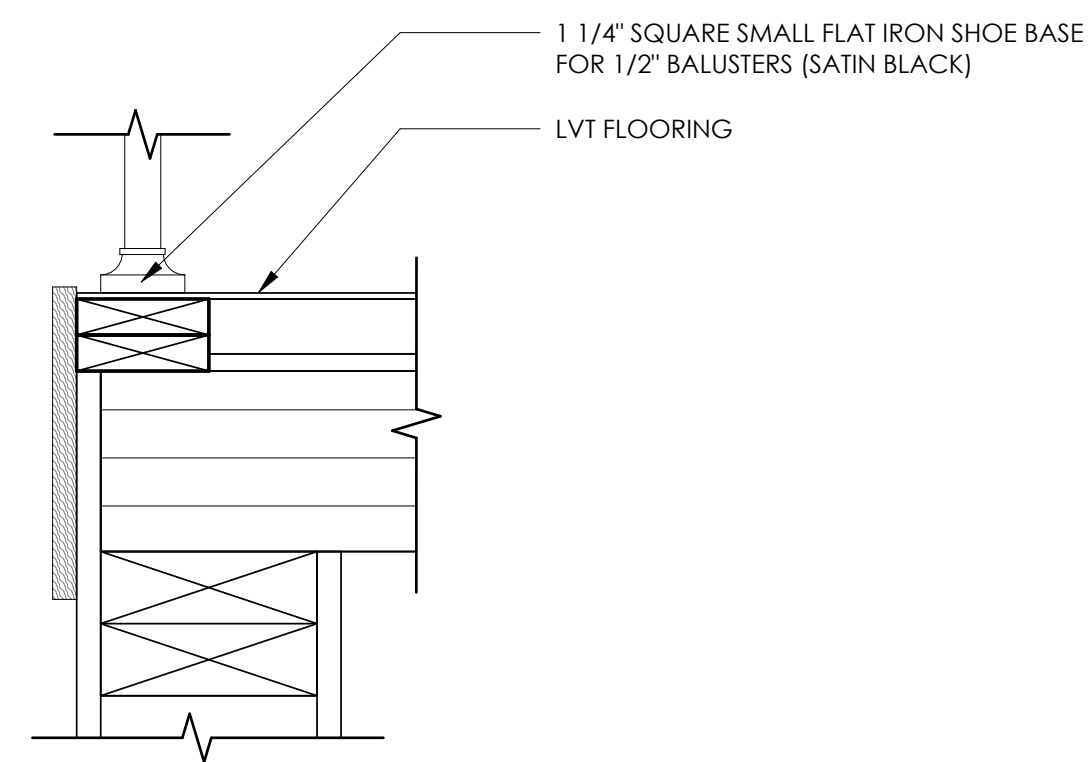
1 ROTUNDA STAIR HALF ELEVATION

0' 6" 1' 2' 4'
3/4" = 1'-0"



3 ROTUNDA STAIR FULL ELEVATION

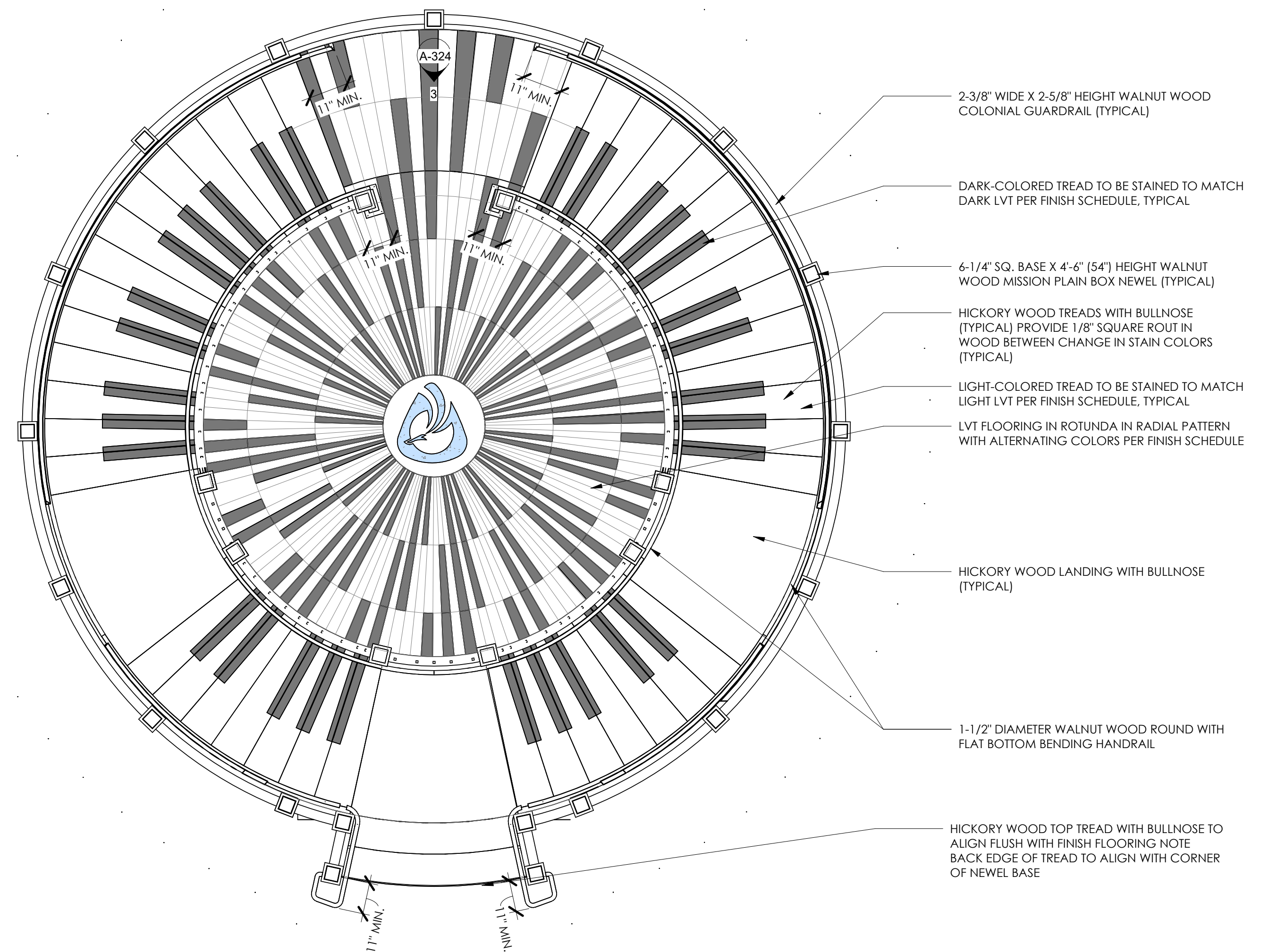
0' 1' 2' 4' 8'
3/8" = 1'-0"



4 TYP. ROTUNDA STAIR DETAIL

0' 3" 6" 1' 2'
1 1/2" = 1'-0"

- STAIR GENERAL NOTES:**
- THE TREAD AND LANDING SLOPE SHALL NOT EXCEED 1/4 IN./FT PER NFPA 101 7.2.2.3.4.
 - VARIATION IN EXCESS OF 3/16 IN. IN THE SIZES OF ADJACENT TREAD DEPTHS OR IN THE HEIGHT OF ADJACENT RISERS SHALL BE PROHIBITED, UNLESS OTHERWISE PERMITTED IN 7.2.2.3.6.3. PER NFPA 101 7.2.2.3.6.1.
 - THE VARIATION BETWEEN THE SIZES OF THE LARGEST AND SMALLEST RISER OR BETWEEN THE LARGEST AND SMALLEST TREAD DEPTHS SHALL NOT EXCEED 3/8 IN. IN ANY FLIGHT PER NFPA 101 7.2.2.3.6.2.
 - BASIS OF DESIGN FOR MONUMENTAL STAIR COMPONENTS: WWW.STAIRWAREHOUSE.COM
 - HICKORY WOOD TREADS AND RISERS TO BE STAINED COLORS TO MATCH LVT COLOR SELECTION PROVIDE WITH CLEAR OIL-BASED POLYURETHANE VARNISH TO ACHIEVE A NON-SLIP COATING (TYPICAL); NON-SLIP COATING MUST BE ADA-COMPLIANT SLIP COEFFICIENT PER CODE.
 - EXPOSED STEEL STRINGER IN STAIRS TO BE FINISHED PER AESS 4.
 - EXPOSED INTERIOR/EXTERIOR STEEL COLUMNS TO BE FINISHED PER AESS 3.
 - ALL OTHER EXPOSED STEEL (RODS/FASTENERS/SPACERS, AND ANY REMAINING STEEL) TO BE FINISHED PER AESS 2.
 - PAINTING OF EXPOSED STEEL PER SPECIFICATIONS.



2 ROTUNDA STAIR PLAN

0' 1' 2' 4' 8'
3/8" = 1'-0"

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MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE EMEKIC, ASSOC., AIA

NO.	DATE	BY	DESCRIPTION
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ROTUNDA MONUMENTAL STAIR ENLARGED PLANS AND ELEVATIONS

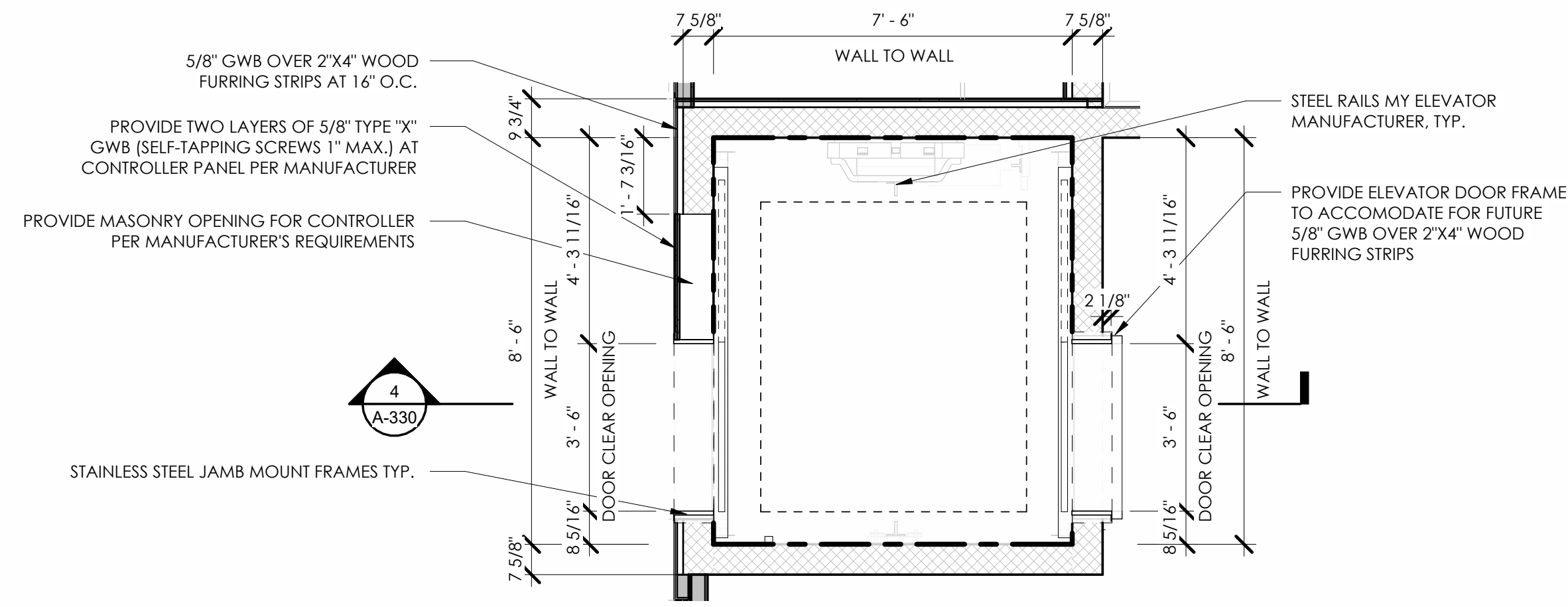
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

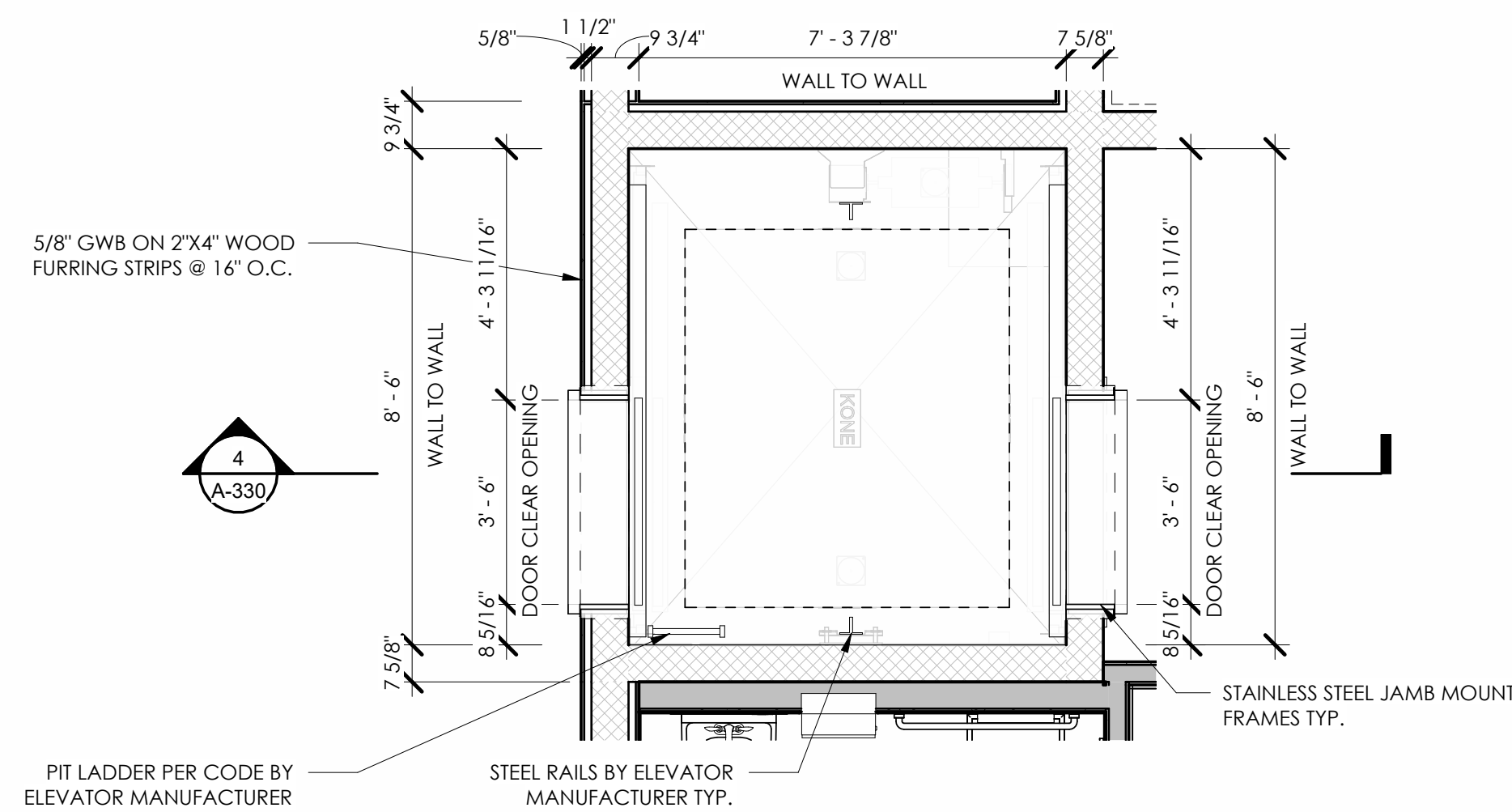
PROJECT NO.: 20202946.010A

DRAWING NO.: A-324

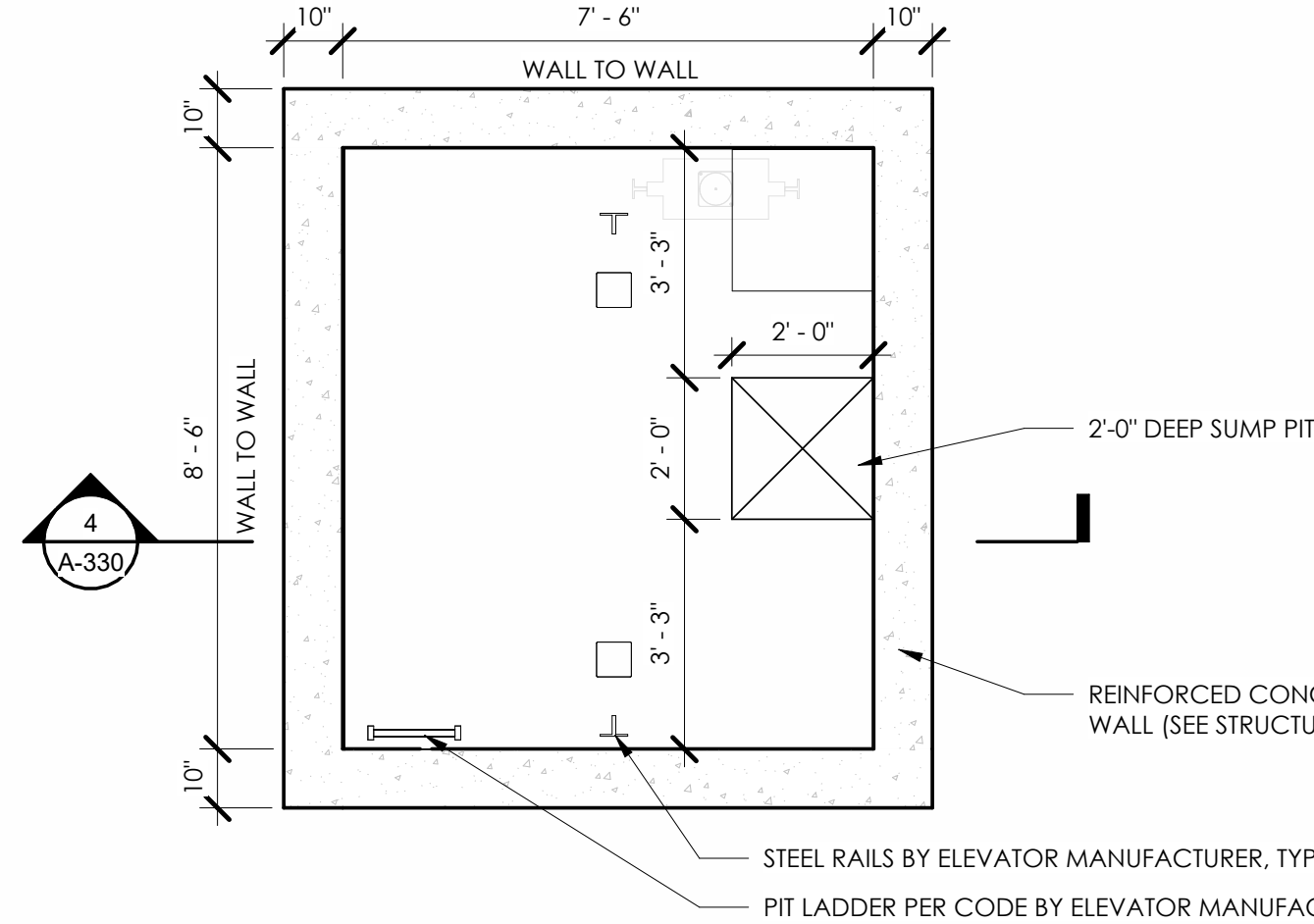
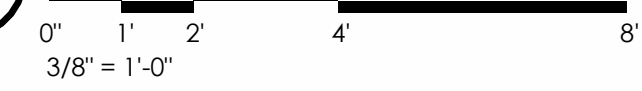
DATE: NOVEMBER 4, 2024



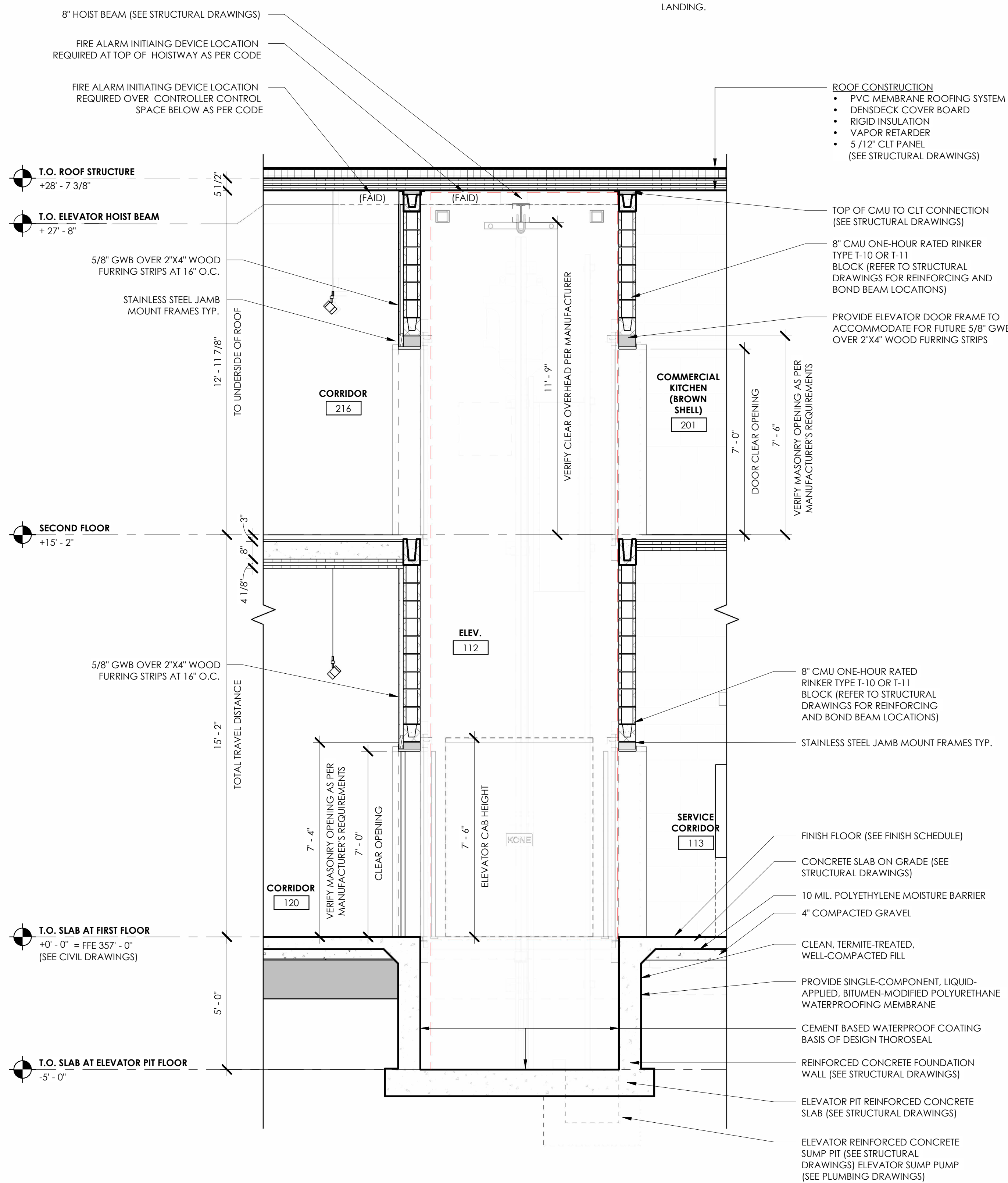
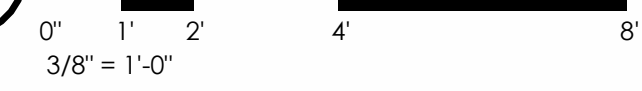
2 ELEVATOR - SECOND FLOOR [ELEVATION +15'-2"]



1 ELEVATOR - FIRST FLOOR [ELEVATION +0'-0"]



3 ELEVATOR - PIT [ELEVATION -5'-0"]



4 ELEVATOR SECTION



ELEVATOR GENERAL NOTES:

1. VERIFY WITH MANUFACTURER MINIMUM REQUIRED CLEARANCES FOR ELEVATOR SHAFT PRIOR TO CONSTRUCTING CONCRETE BLOCK WALLS AND RECESSED PIT.
2. VERIFY ALL MASONRY OPENINGS SIZES AS REQUIRED BY MANUFACTURER.
3. PROVIDE ADA ACCESSIBILITY PER CODE.
4. REFER TO SPECIFICATIONS FOR ALL INTERIOR ELEVATOR FINISHES.
5. BASIS OF DESIGN: KONE PASSENGER ELEVATOR MODEL: MONOSPACE 300 WITH 3500# CAPACITY, 150 FPM SPEED AND TOTAL TRAVEL 15'-2".
6. NO MACHINE ROOM - MACHINE ROOMLESS TECHNOLOGY WITH CONTROLLER AT TOP LANDING.

- ROOF CONSTRUCTION**
- PVC MEMBRANE ROOFING SYSTEM
 - DENSDECK COVER BOARD
 - RIGID INSULATION
 - VAPOR RETARDER
 - 5 1/2" CLT PANEL (SEE STRUCTURAL DRAWINGS)

TOP OF CMU TO CLT CONNECTION (SEE STRUCTURAL DRAWINGS)

8" CMU ONE-HOUR RATED RINKER TYPE T-10 OR T-11 BLOCK (REFER TO STRUCTURAL DRAWINGS FOR REINFORCING AND BOND BEAM LOCATIONS)

PROVIDE ELEVATOR DOOR FRAME TO ACCOMMODATE FOR FUTURE 5/8" GWB OVER 2"X4" WOOD FURRING STRIPS

VERIFY MASONRY OPENING AS PER MANUFACTURER'S REQUIREMENTS

8" CMU ONE-HOUR RATED RINKER TYPE T-10 OR T-11 BLOCK (REFER TO STRUCTURAL DRAWINGS FOR REINFORCING AND BOND BEAM LOCATIONS)

STAINLESS STEEL JAMB MOUNT FRAMES TYP.

FINISH FLOOR (SEE FINISH SCHEDULE)

CONCRETE SLAB ON GRADE (SEE STRUCTURAL DRAWINGS)

10 MIL. POLYETHYLENE MOISTURE BARRIER

4" COMPACTED GRAVEL

CLEAN, TERMITED-TREATED, WELL-COMPACTED FILL

PROVIDE SINGLE-COMPONENT, LIQUID-APPLIED, BITUMEN-MODIFIED POLYURETHANE WATERPROOFING MEMBRANE

CEMENT BASED WATERPROOF COATING BASIS OF DESIGN THOROSEAL

REINFORCED CONCRETE FOUNDATION WALL (SEE STRUCTURAL DRAWINGS)

ELEVATOR PIT REINFORCED CONCRETE SLAB (SEE STRUCTURAL DRAWINGS)

ELEVATOR REINFORCED CONCRETE SUMP PIT (SEE STRUCTURAL DRAWINGS) ELEVATOR SUMP PUMP (SEE PLUMBING DRAWINGS)

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700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
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PROJECT MANAGER: STAN PRICE, PE
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ELEVATOR ENLARGED PLANS AND SECTIONS

2178 FLIGHTLINE AVE

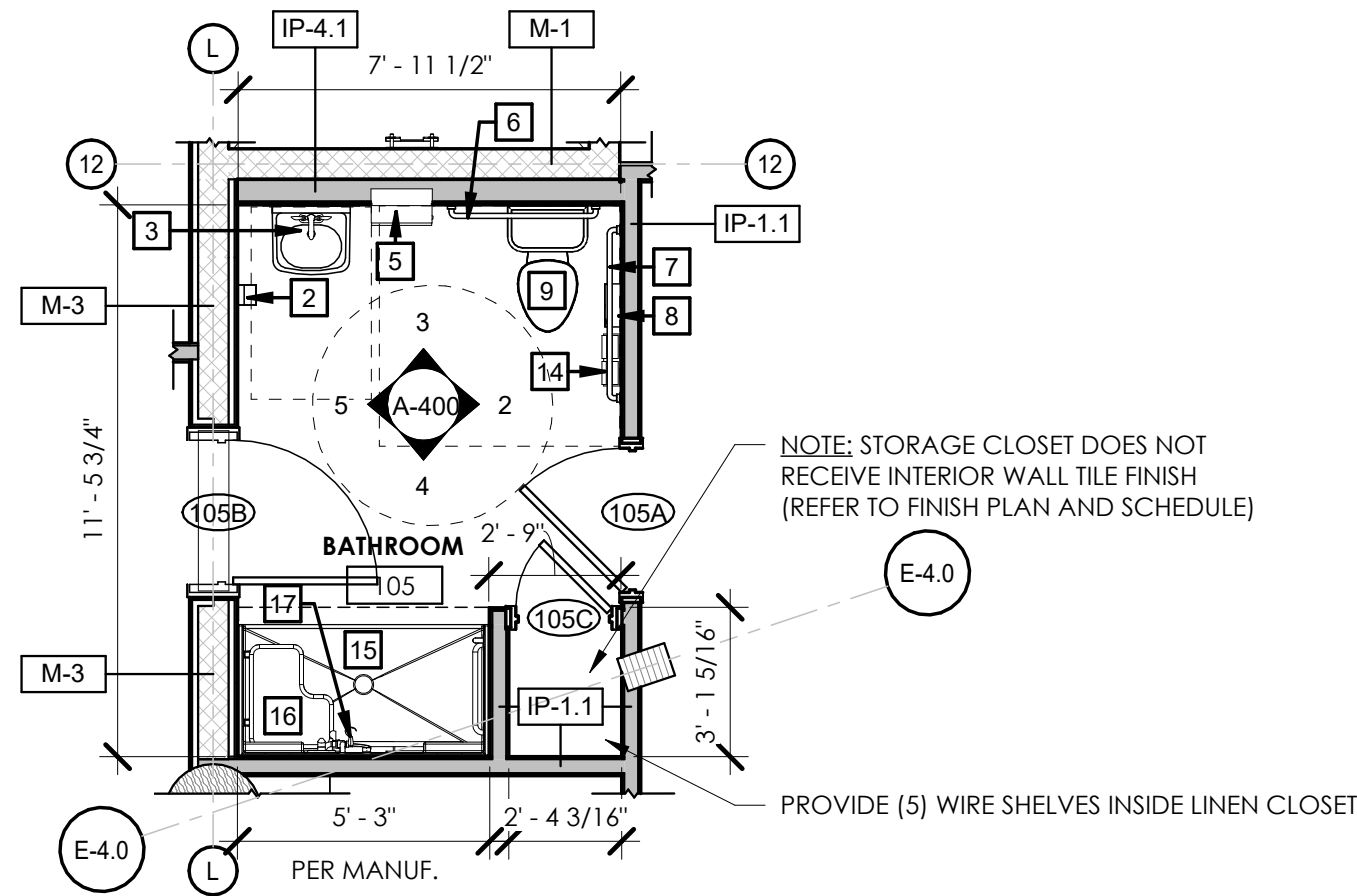
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

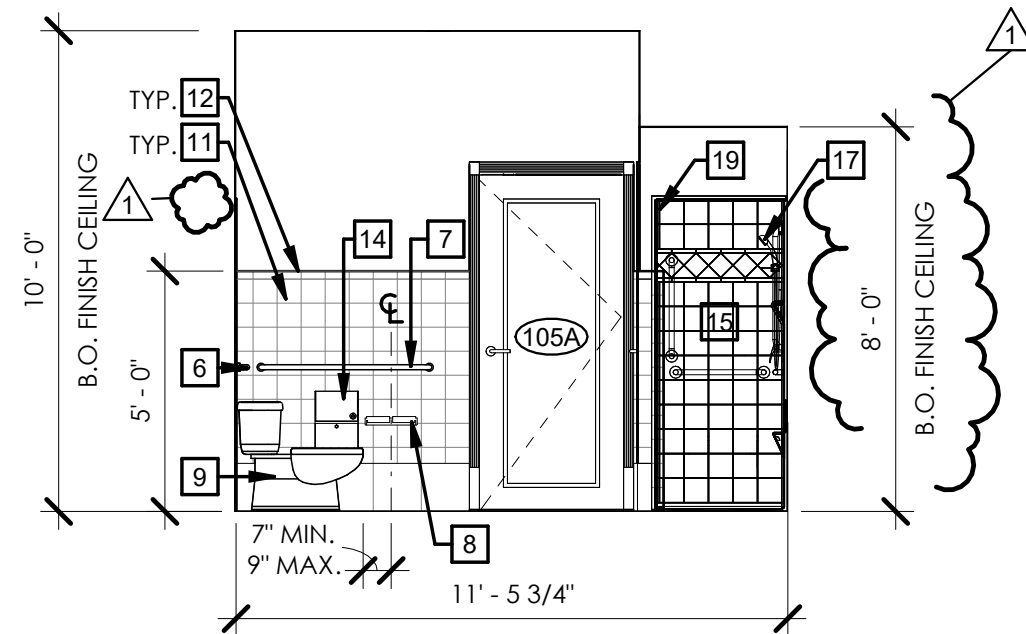
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-330

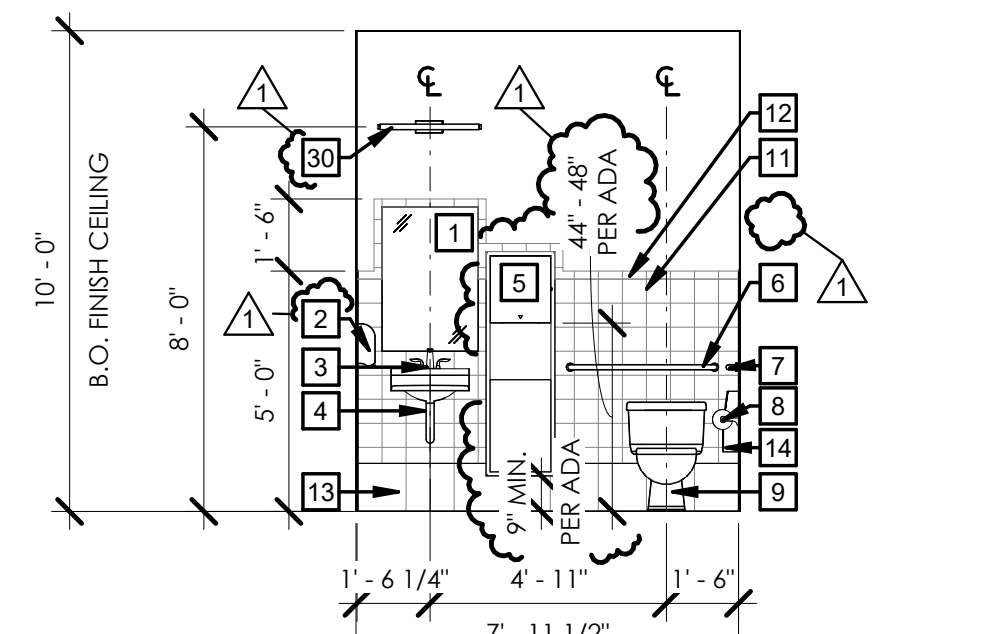
DATE:
NOVEMBER 4, 2024



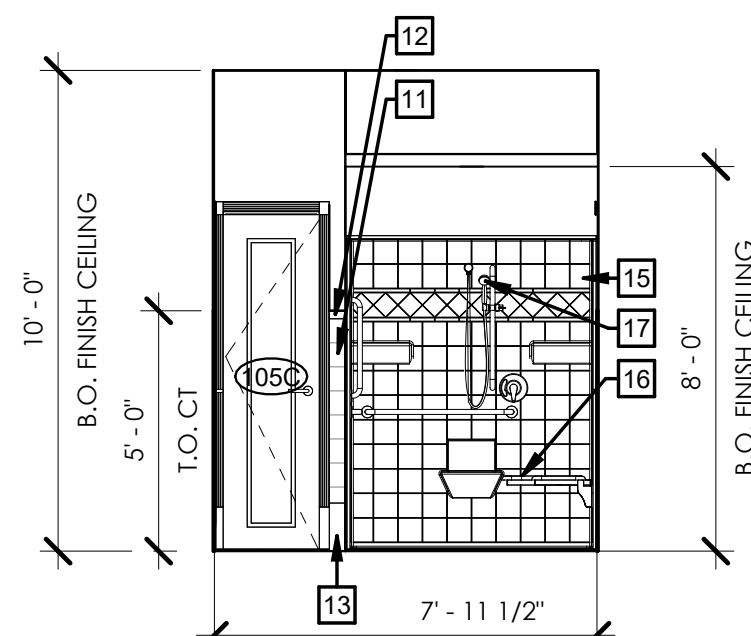
1 BATHROOM - FLOOR PLAN



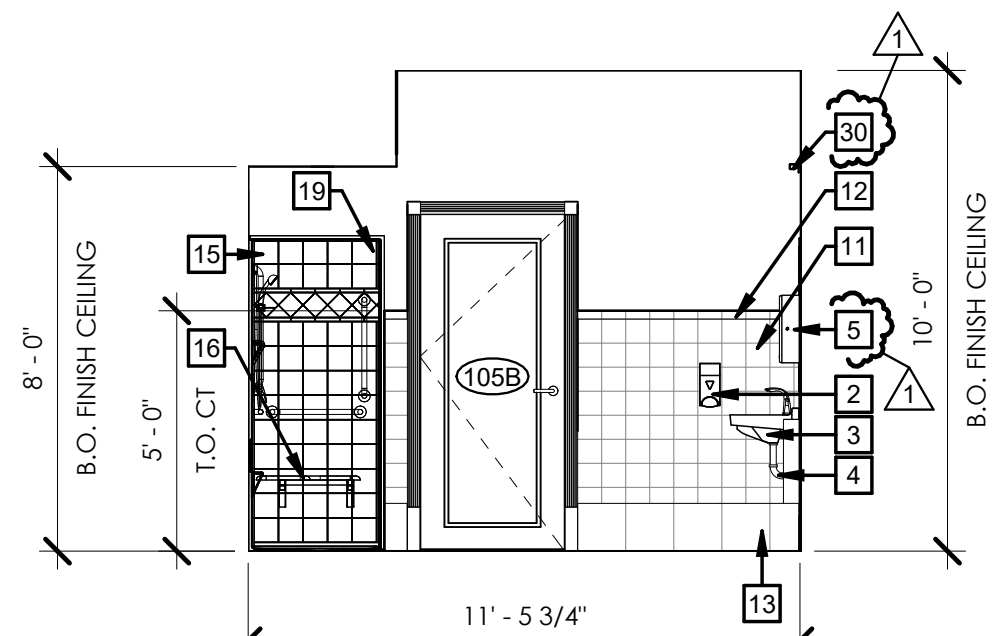
2 BATHROOM - EAST ELEVATION



3 BATHROOM - NORTH ELEVATION



4 BATHROOM - SOUTH ELEVATION



5 BATHROOM - WEST ELEVATION

TOILET ROOM GENERAL NOTES:

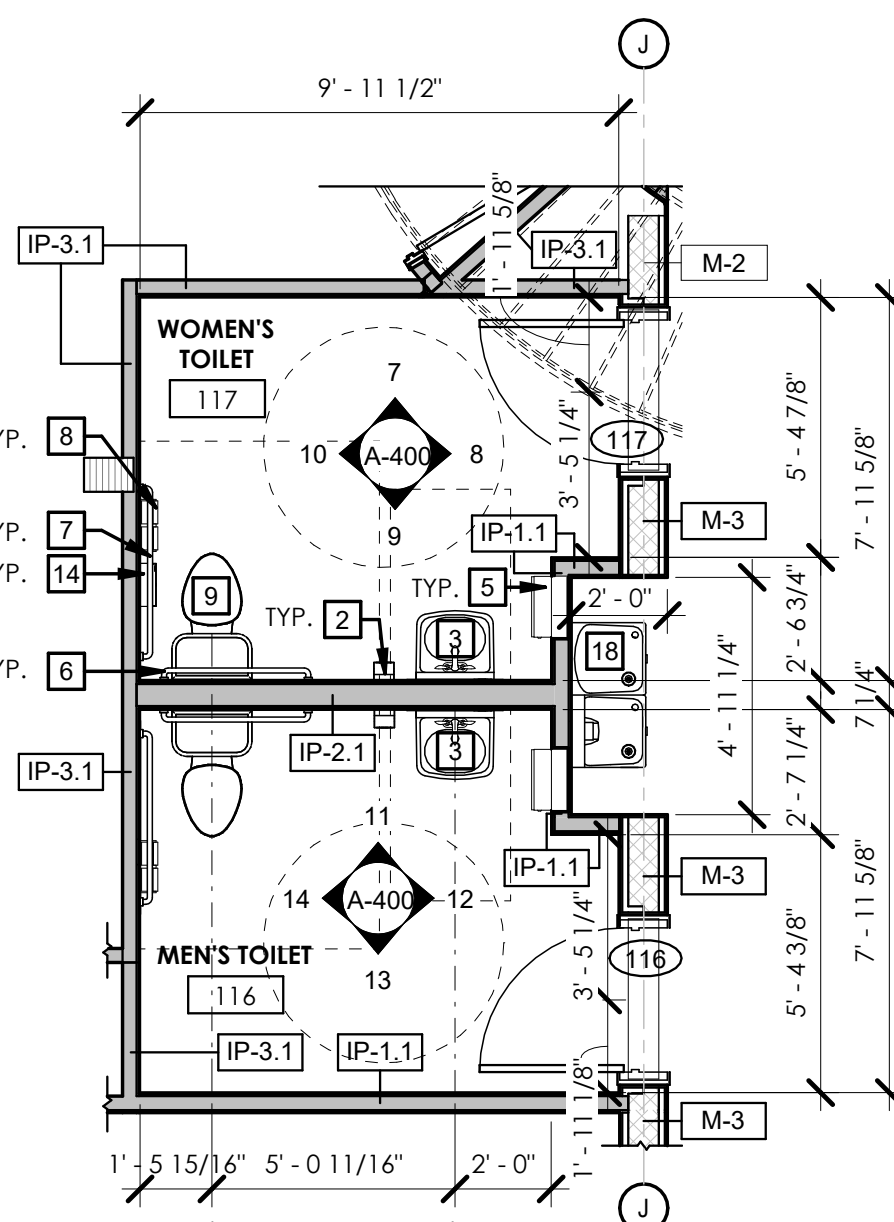
- PROVIDE BLOCKING FOR ALL CABINETS AND ACCESSORIES AS REQUIRED.
- REFER TO TYPICAL TOILET ROOM DIMENSIONS AND CLEARANCES ON SHEET **G-002** FOR ADDITIONAL INFORMATION, MOUNTING HEIGHTS, LOCATIONS, ETC.
- TOILET PAPER DISPENSERS SHALL BE 7 INCHES MINIMUM AND 9 INCHES MAXIMUM IN FRONT OF THE WATER CLOSET MEASURED TO THE CENTERLINE OF THE DISPENSER (2010 ADA STANDARDS FOR ACCESSIBLE DESIGN).
- REFER TO WALL TYPES ON SHEET **G-005**; DIMENSIONS ARE TO FINISH FACE AND INCLUDE 1/4" TILE AT RESTROOMS AND BATHROOM.
- REFER TO FINISH FLOOR PLANS AND SCHEDULES ON SHEETS **A-600, A-601, AND A-602** FOR ADDITIONAL FINISH INFORMATION.
- KEYNOTES ARE TYPICAL. NOT ALL INSTANCES ARE NOTED.

KEYNOTES - TOILET ROOMS

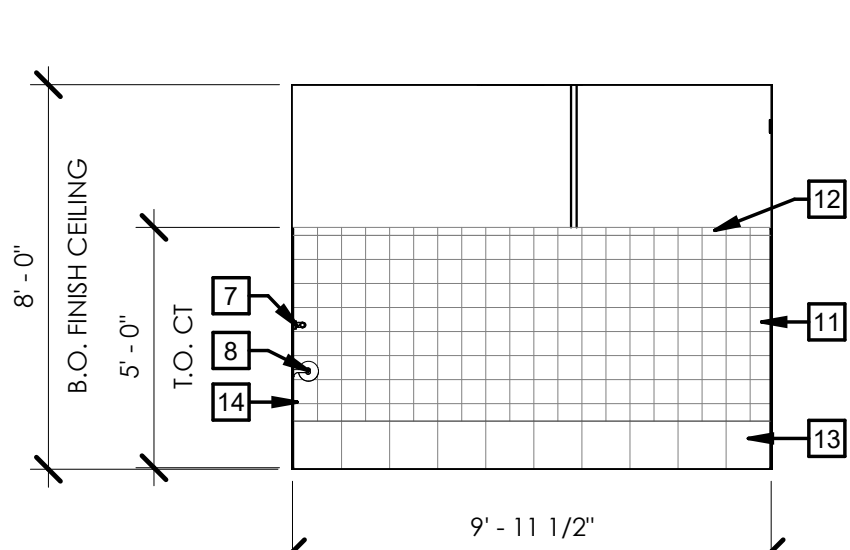
1	24" W X 36" H MIRROR WITH FRAME, SURFACE-MOUNTED, BOBRICK B-165 2436
2	AUTOMATED FOAM SOAP DISPENSER, SURFACE-MOUNTED, BRADLEY 6A01-11
3	WALL-MOUNTED COMMERCIAL GRADE VITREOUS CHINA LAVATORY AND POLISHED CHROME FAUCET WITH LEVER HANDLES
4	ALL EXPOSED WATER AND DRAIN PIPES UNDER LAVATORY SHALL BE INSULATED OR OTHERWISE COVERED; THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER THE LAVATORY PER ADA
5	RECESSED-MOUNTED AUTOMATIC PAPER TOWEL DISPENSER WITH TRASH RECEPTACLE, BOBRICK B-3974, OFCI
6	1-1/2" DIA. X 36" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X36
7	1-1/2" DIA. X 42" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X42
8	TOILET TISSUE DISPENSER WITH UTILITY SHELF, SURFACE-MOUNTED, BOBRICK B-2840
9	VITREOUS CHINA ADA COMPLIANT FLOOR-MOUNTED WATER CLOSET
10	NOT USED
11	6" X 6" WALL TILE PER FINISH SCHEDULE (WT-1 OR WT-2)
12	3" X 6" BULLNOSE TILE PER FINISH SCHEDULE (BN-1)
13	12" X 12" WALL TILE PER FINISH SCHEDULE WITH COVE BASE (WT-5 OR WT-6)
14	SANITARY NAPKIN DISPOSAL, SURFACE-MOUNTED, BOBRICK B-270
15	ADA-COMPLIANT ROLL-IN SHOWER 63" X 34"; BOD: FREEDOM SHOWERS 63" X 34" ADA ROLL IN SHOWER, RIGHT
16	ADA COMPLIANT 5/16" THICK SOLID PHENOLIC FOLDING SHOWER SEAT
17	ADA COMPLIANT SHOWER COMPARTMENT CONTROLS AS PER ADA REQUIREMENTS
18	ADA ACCESSIBLE H/L/O STAINLESS STEEL DRINKING FOUNTAIN (COOLER) WITH WATER BOTTLE REFILLING STATION WITH FILTER
19	HEAVY DUTY SHOWER CURTAIN ROD AND CURTAIN WITH CONCEALED MOUNTING
20	FLOOR-SUPPORTED SOLID PHENOLIC TOILET PARTITION; STALLS TO BE 3'-0" X 5'-0" DEEP MINIMUM
21	315X50 STEEL CLT SPACERS; REFER TO STRUCTURAL DRAWINGS FOR SPACING
22	PROVIDE OIL-BASED POLYURETHANE SEMI-GLOSS FINISH COATING FOR EXPOSED GLULAM BEAMS, TYP.
23	PROVIDE OIL-BASED POLYURETHANE SEMI-GLOSS FINISH COATING FOR EXPOSED GLULAM COLUMN, TYP.
24	CAMBRIA GRANITE SLAB COUNTERTOP AND BACKSPASH PER FINISH SCHEDULE (G-2 OR G-3)
25	COUNTER-SET COMMERCIAL GRADE VITREOUS CHINA VESSEL LAVATORY WITH SINGLE FAUCET HOLE; BOD: KOHLER K-21059-1
26	SINGLE-HANDLE LAVATORY FAUCET; BOD: MOEN GIBSON MODEL 6145
27	WALL-MOUNTED VITREOUS CHINA URINAL WITH FLUSH VALVE
28	WALL-MOUNTED VITREOUS CHINA WATER CLOSET WITH FLUSH VALVE
29	18" DEEP X 55" HIGH X 3/4" THICK SOLID PHENOLIC WALL-MOUNTED URINAL PARTITION
30	LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)

INTERIOR ELEVATION GENERAL NOTES:

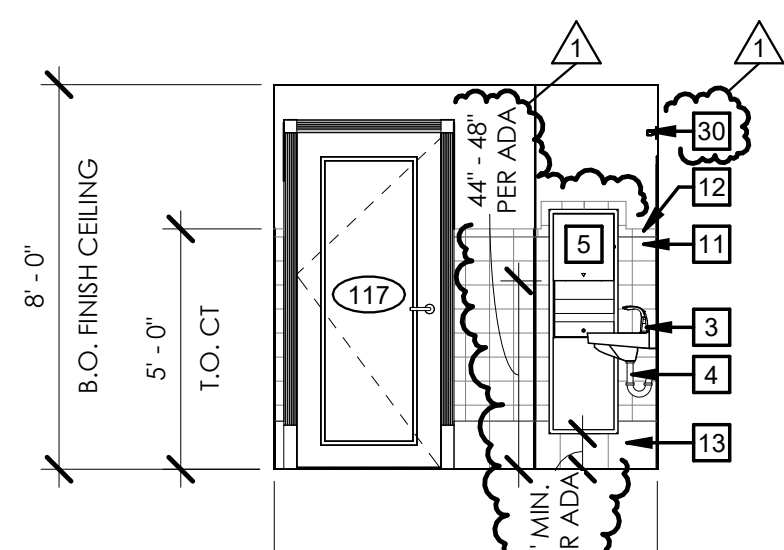
- REFER TO SPECIFICATIONS FOR BASIS OF DESIGN
- ABBREVIATIONS
- OFCI OWNER FURNISHED, CONTRACTOR INSTALL
- OFOI OWNER FURNISHED, OWNER INSTALL



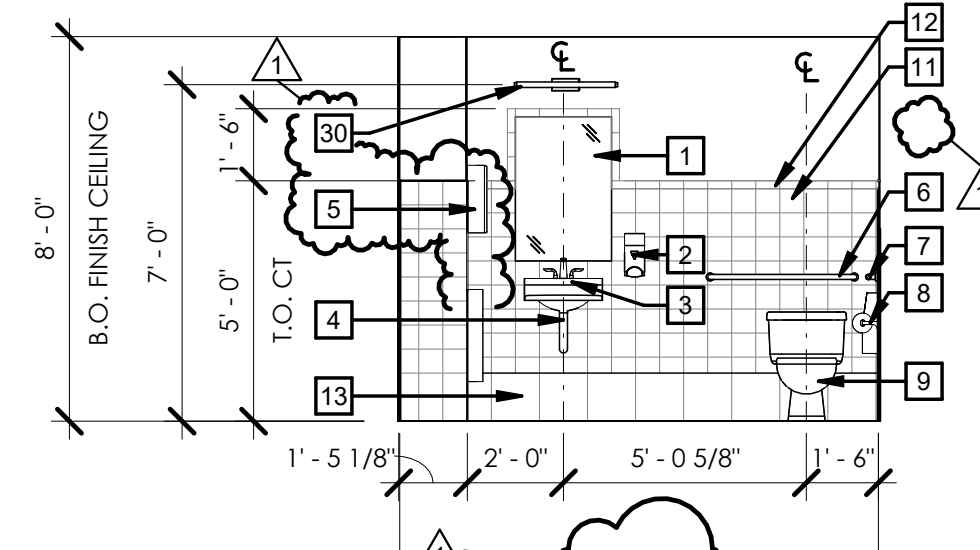
6 FIRST FLOOR TOILET ROOMS - FLOOR PLAN



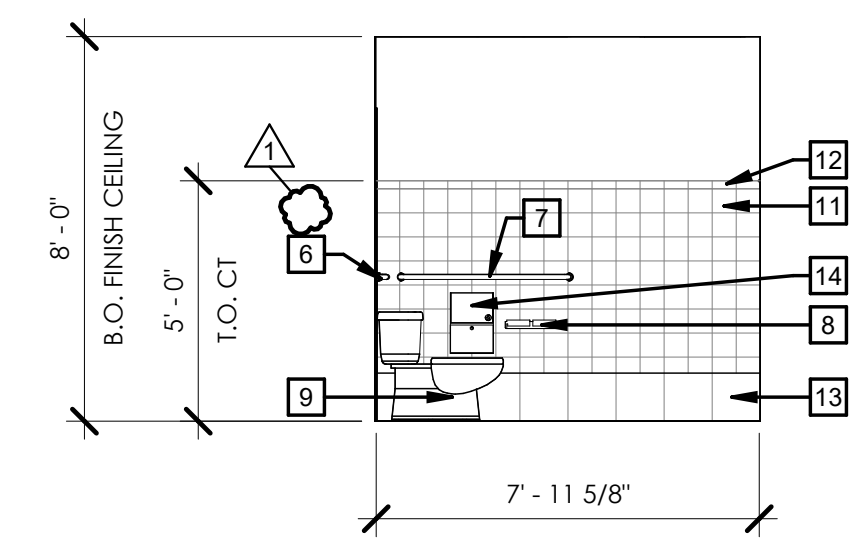
7 WOMEN'S TOILET - NORTH ELEVATION



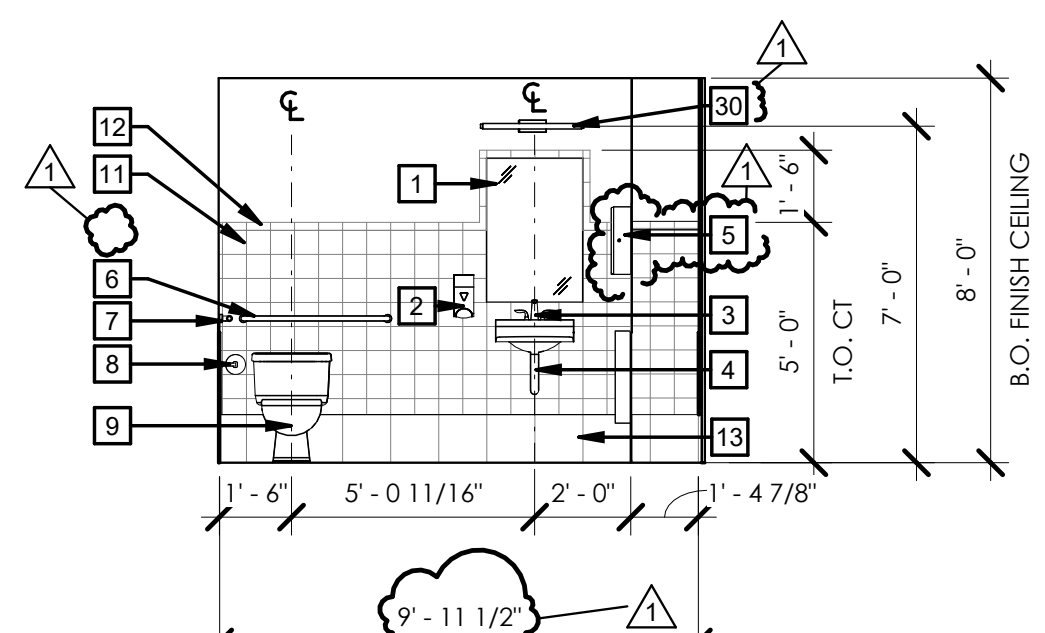
8 WOMEN'S TOILET - EAST ELEVATION



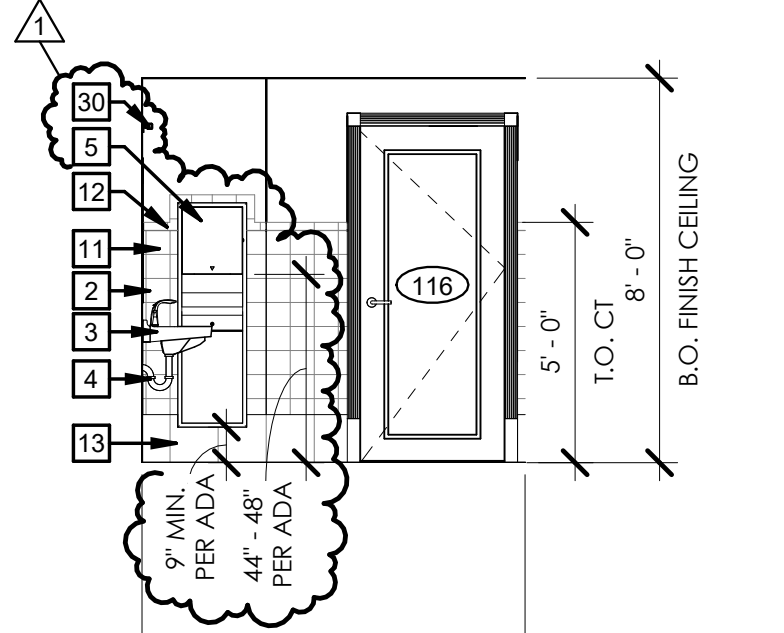
9 WOMEN'S TOILET - SOUTH ELEVATION



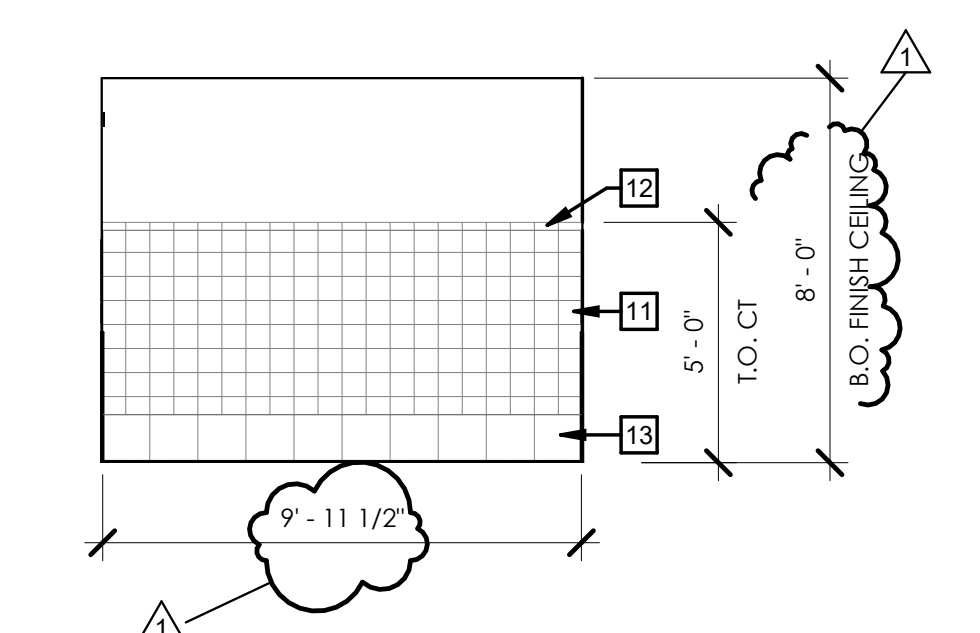
10 WOMEN'S TOILET - WEST ELEVATION



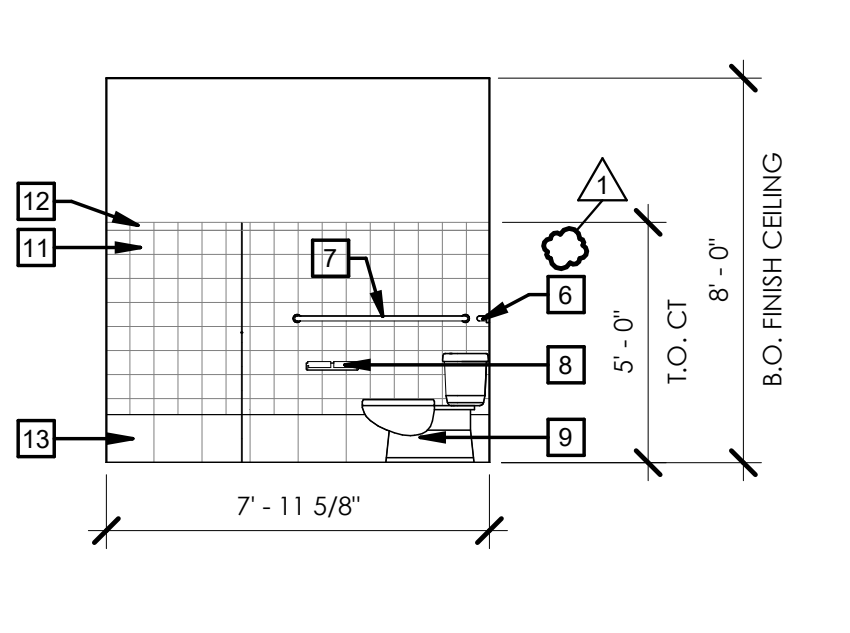
11 MEN'S TOILET - NORTH ELEVATION



12 MEN'S TOILET - EAST ELEVATION



13 MEN'S TOILET - SOUTH ELEVATION



14 MEN'S TOILET - WEST ELEVATION

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MACON, GA 31201



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4730 CASA COIA WAY, SUITE 200 (904) 757-6106
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INTERIOR ELEVATIONS - FIRST FLOOR TOILET ROOMS AND BATHROOM

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-400

DATE:
NOVEMBER 4, 2024

TOILET ROOM GENERAL NOTES:

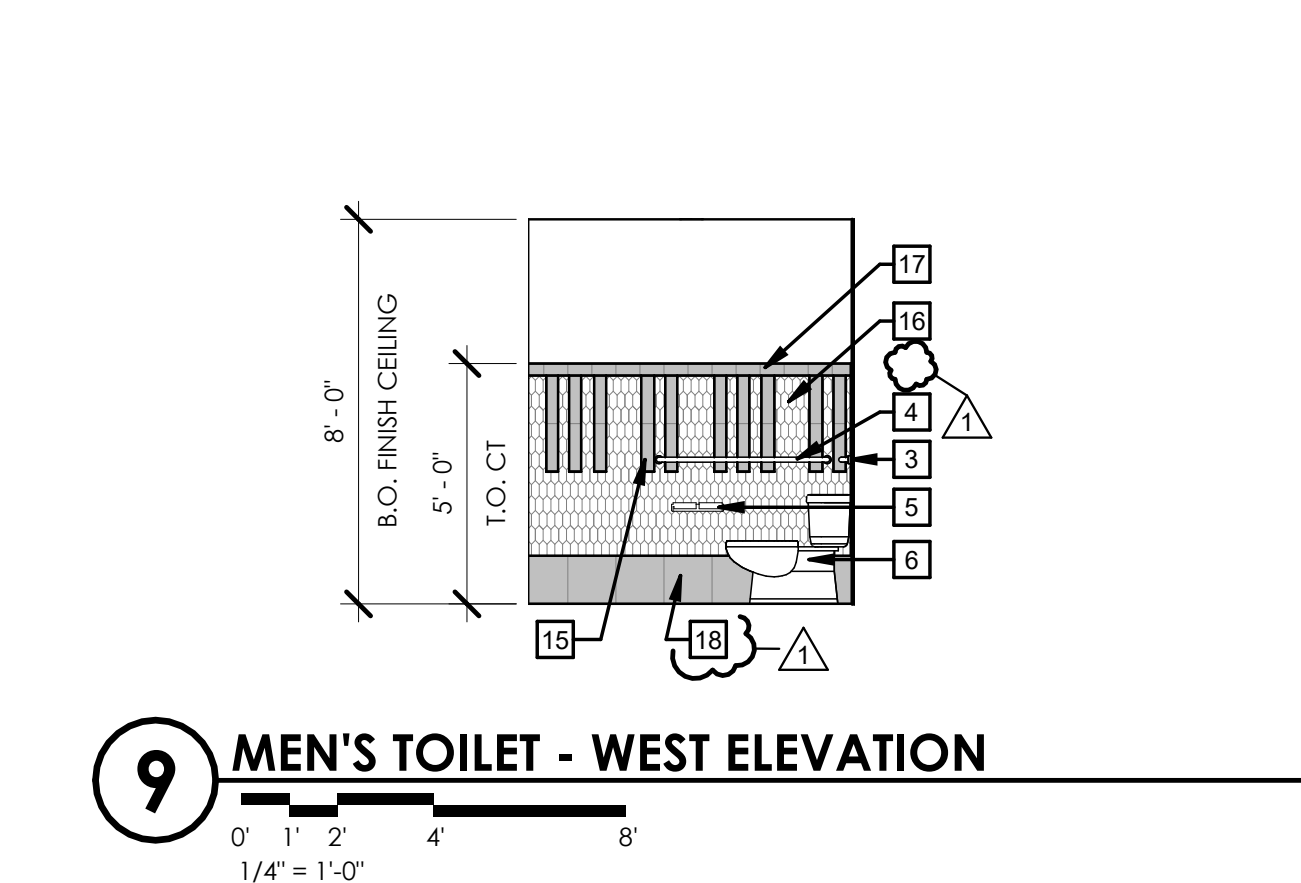
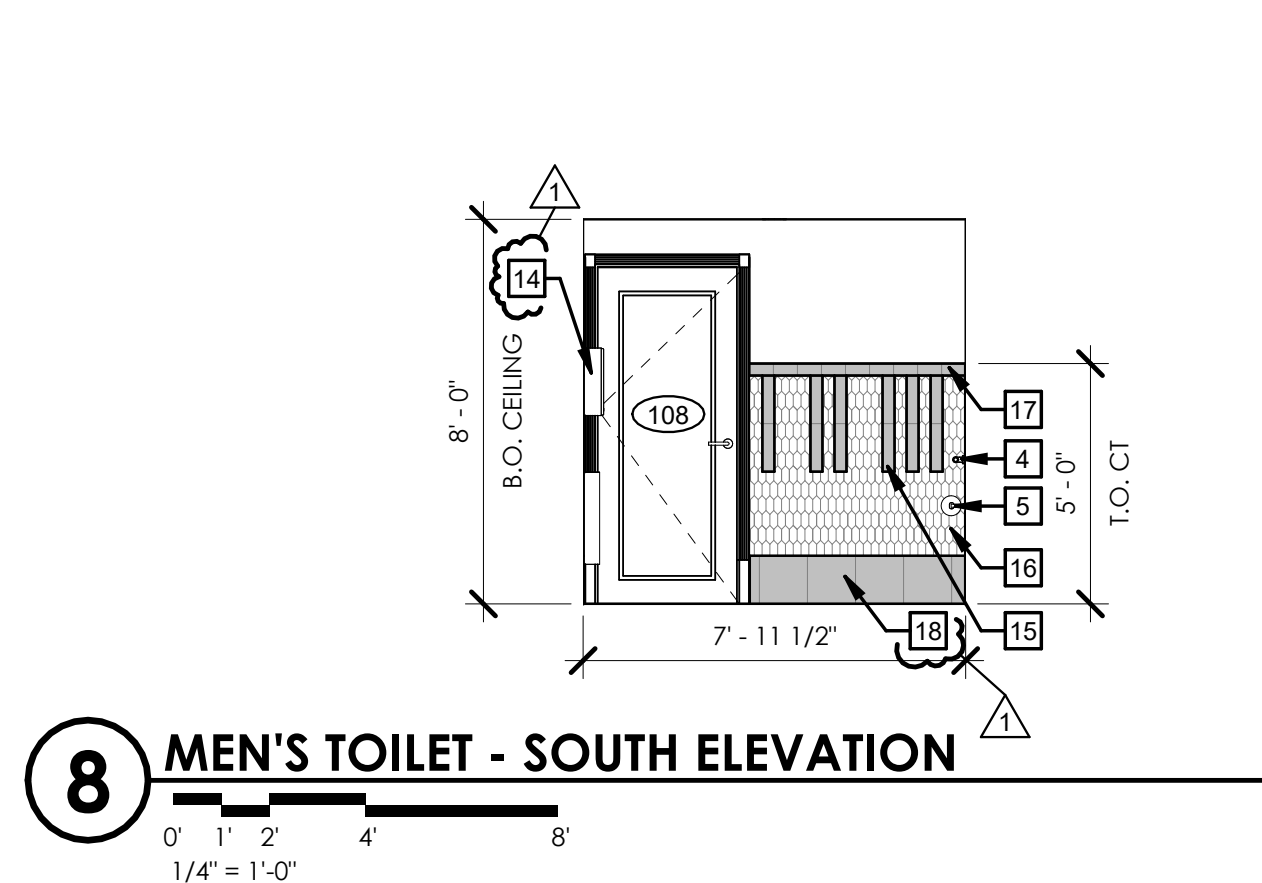
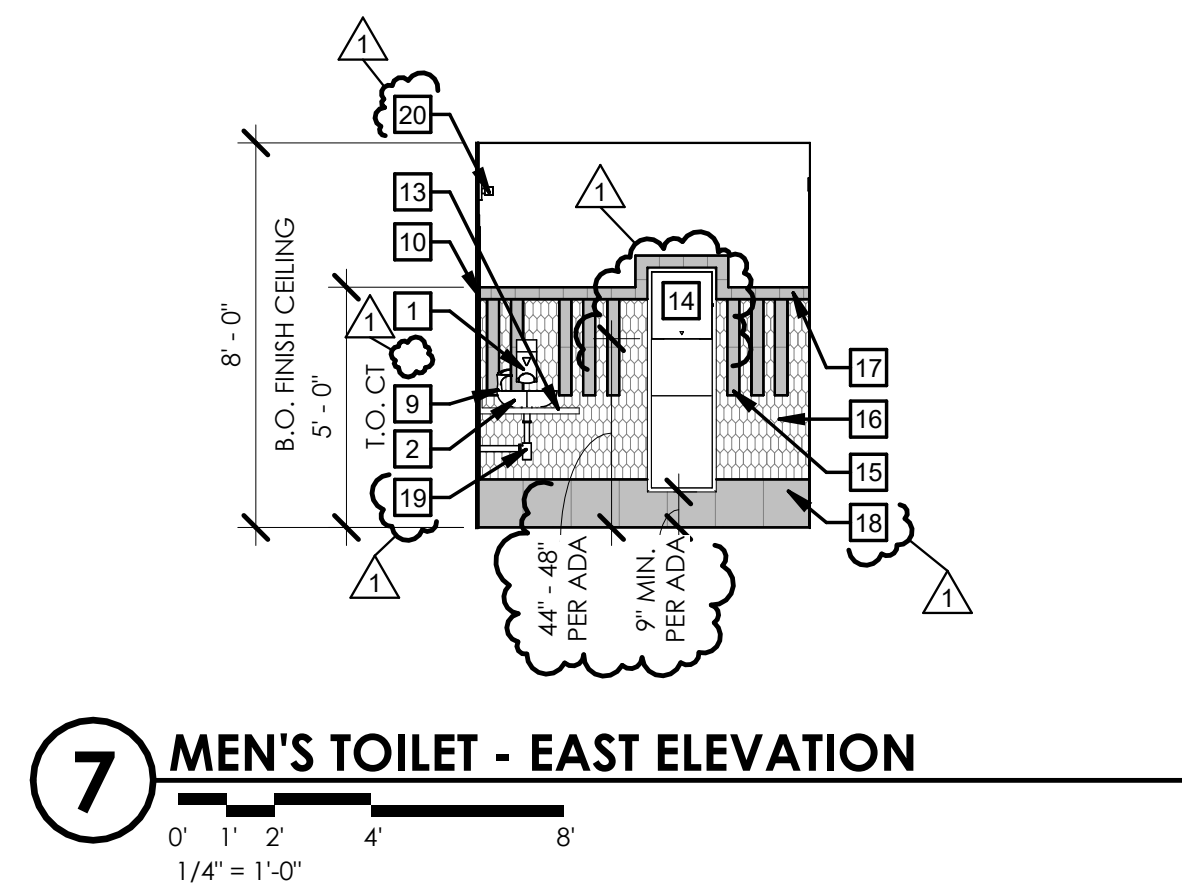
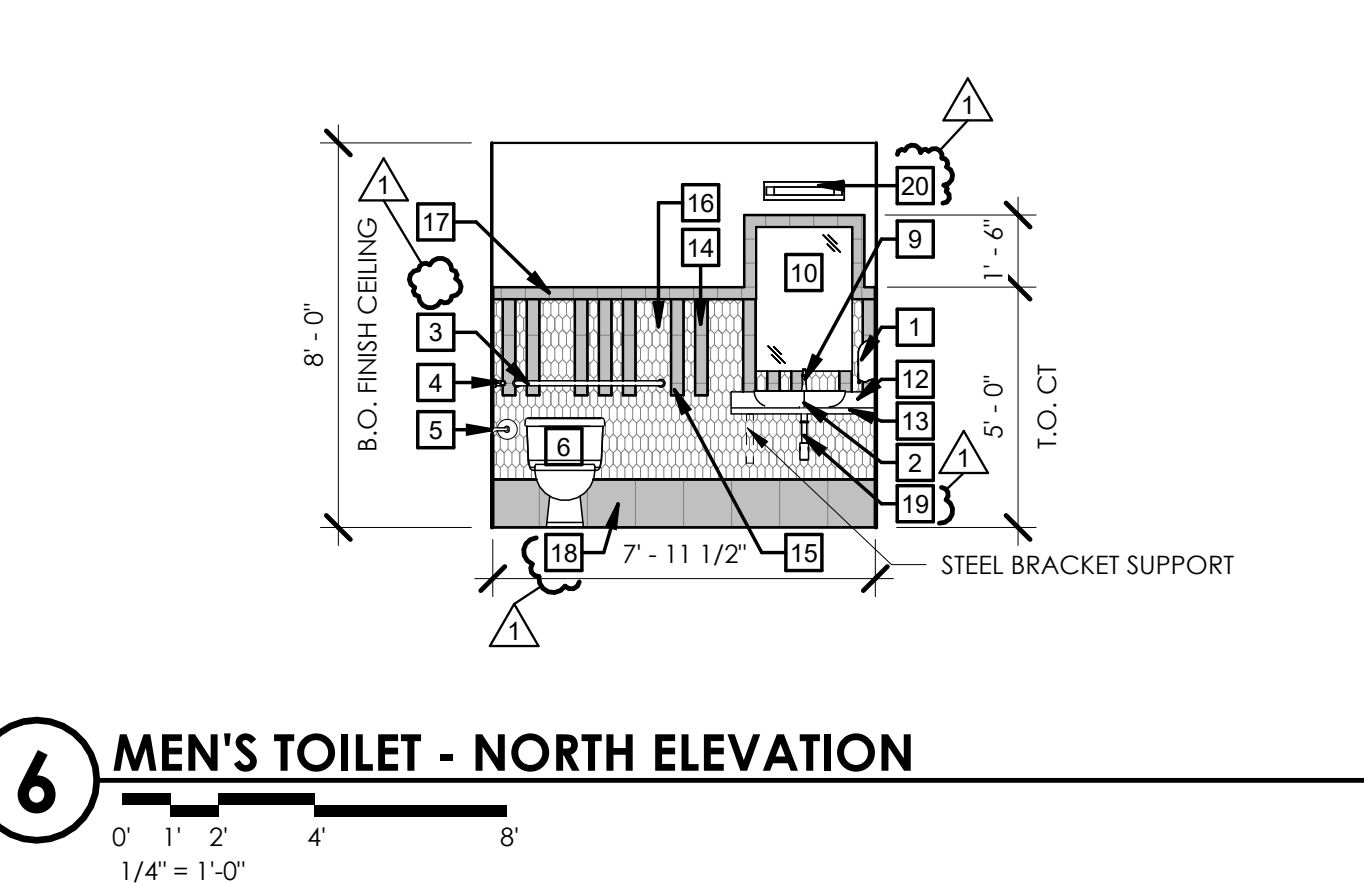
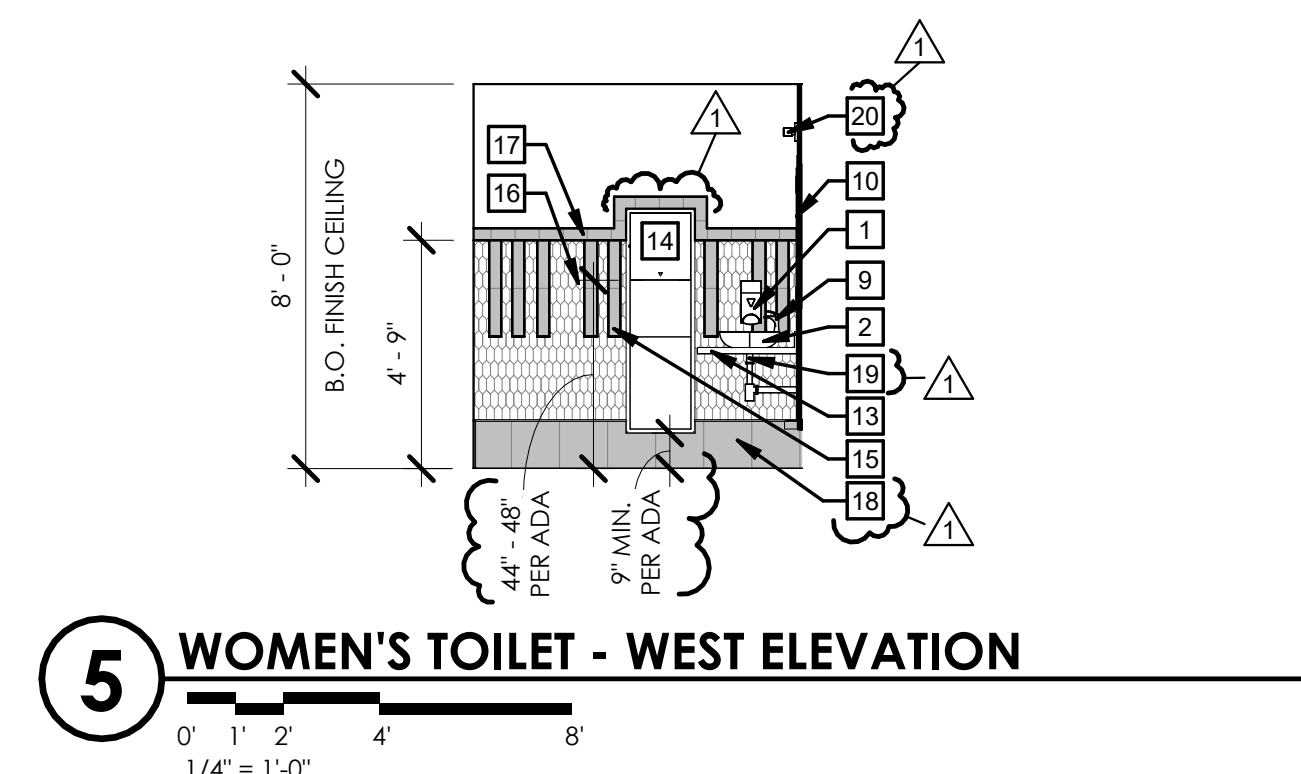
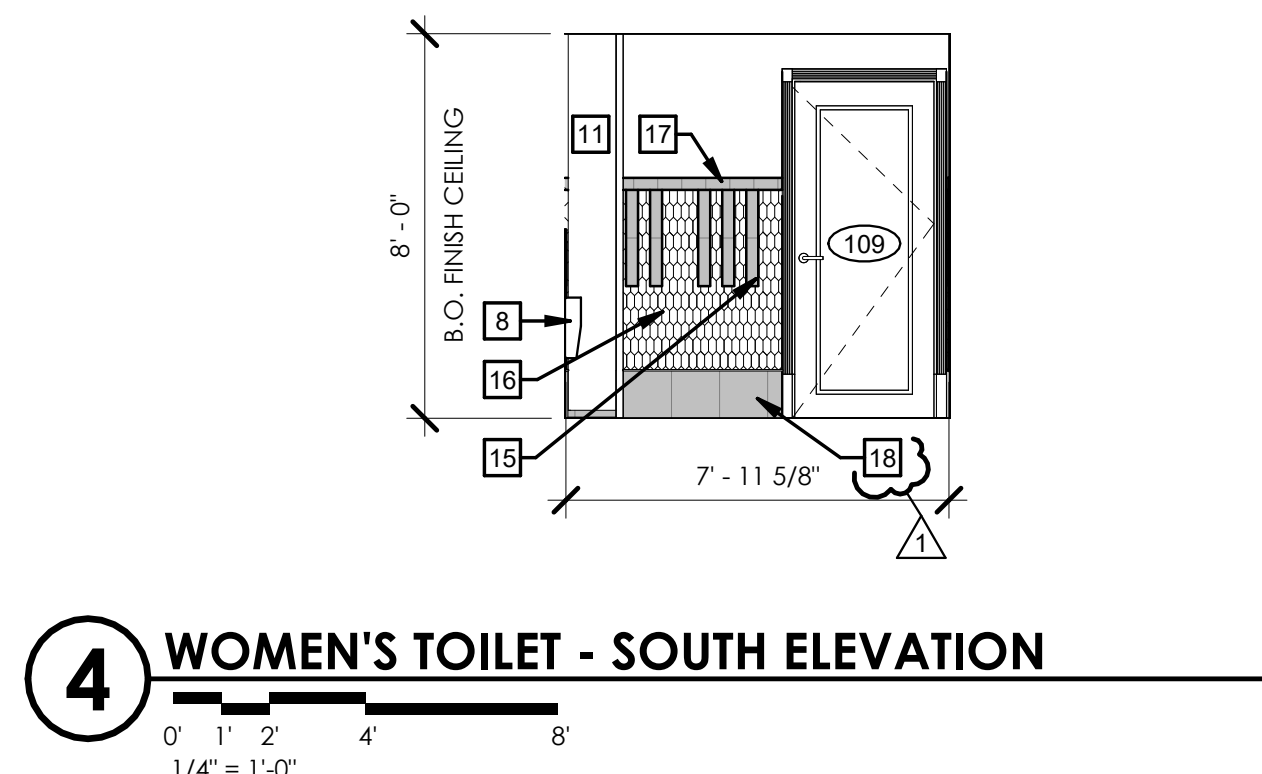
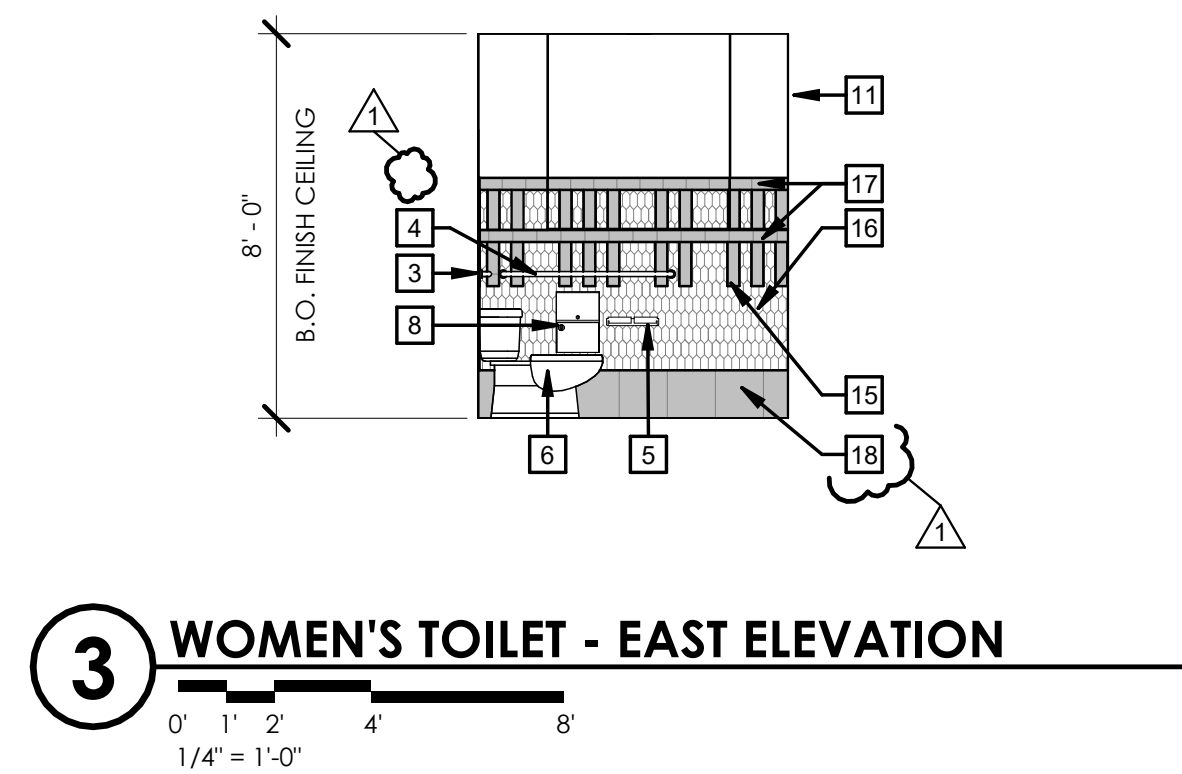
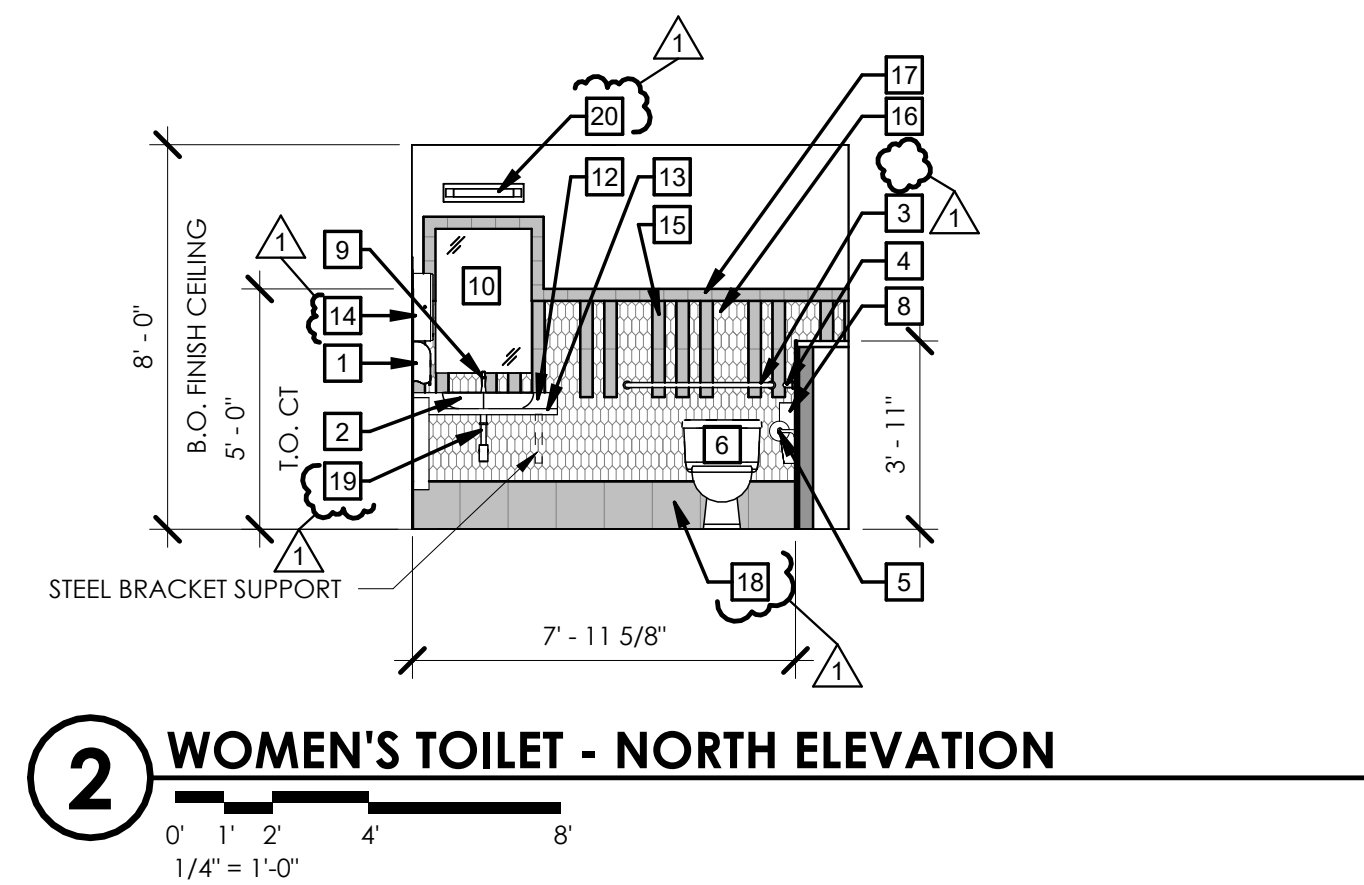
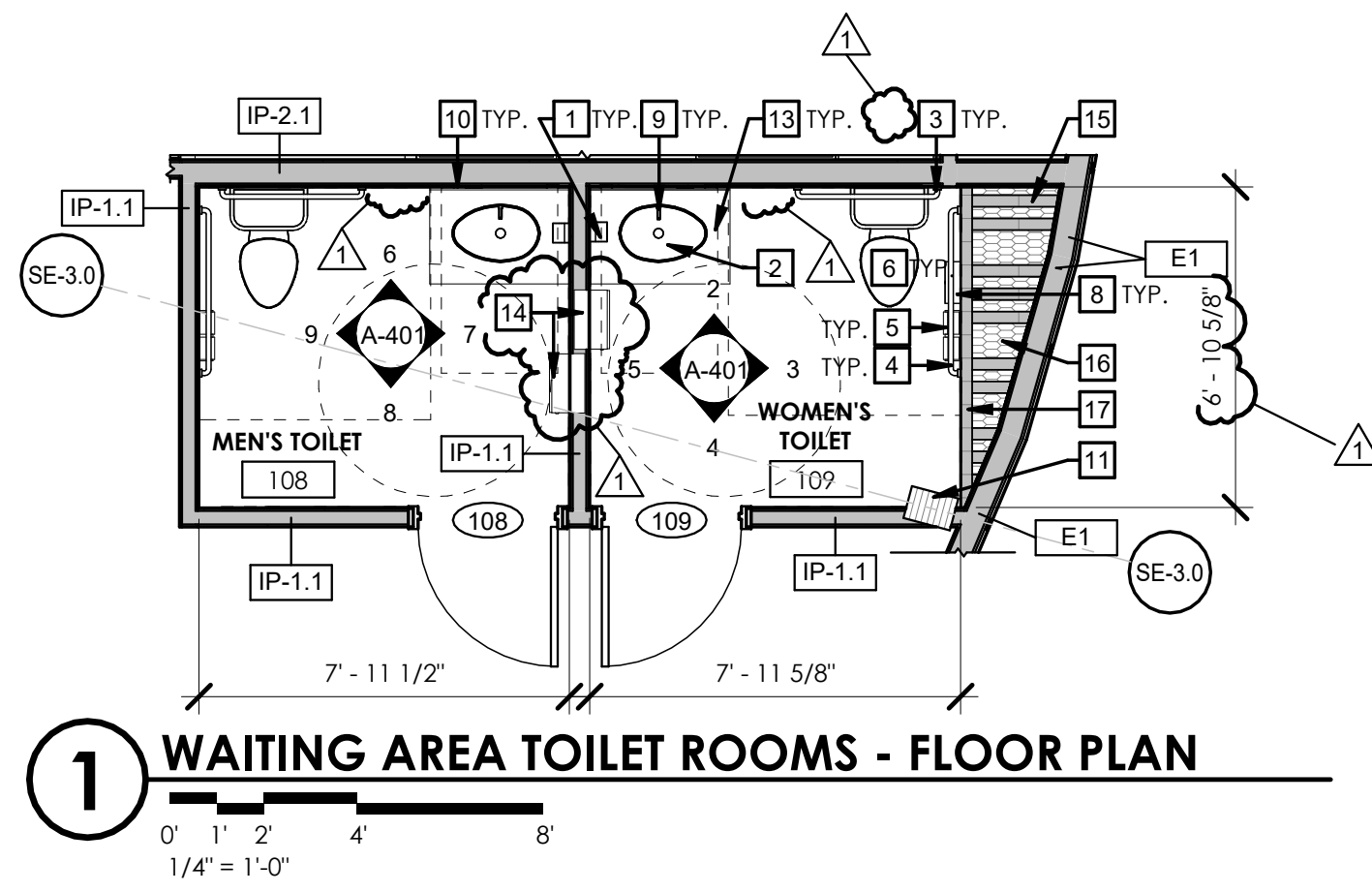
- PROVIDE BLOCKING FOR ALL CABINETS AND ACCESSORIES AS REQUIRED.
- REFER TO TYPICAL TOILET ROOM DIMENSIONS AND CLEARANCES ON SHEET **G-002** FOR ADDITIONAL INFORMATION, MOUNTING HEIGHTS, LOCATIONS, ETC.
- TOILET PAPER DISPENSERS SHALL BE 7 INCHES MINIMUM AND 9 INCHES MAXIMUM IN FRONT OF THE WATER CLOSET MEASURED TO THE CENTERLINE OF THE DISPENSER (2010 ADA STANDARDS FOR ACCESSIBLE DESIGN).
- REFER TO WALL TYPES ON SHEET **G-005**; DIMENSIONS ARE TO FINISH FACE AND INCLUDE 1/4" TILE AT RESTROOMS AND BATHROOM.
- REFER TO FINISH FLOOR PLANS AND SCHEDULES ON SHEETS **A-600, A-601, AND A-602** FOR ADDITIONAL FINISH INFORMATION.
- KEYNOTES ARE TYPICAL. NOT ALL INSTANCES ARE NOTED.

KEYNOTES - WAITING TOILET ROOMS

- 1 AUTOMATED FOAM SOAP DISPENSER, SURFACE-MOUNTED, BRADLEY 6A01-11
- 2 COUNTER-SET COMMERCIAL GRADE ADA-COMPLIANT VITREOUS CHINA VESSEL LAVATORY WITHOUT FAUCET SETTING; BOD: KOHLER VEIL, COLOR BLACK BLACK, MODEL K-20704-N
- 3 1-1/2" DIA. X 36" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X36
- 4 1-1/2" DIA. X 42" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X42
- 5 TOILET TISSUE DISPENSER WITH UTILITY SHELF, SURFACE-MOUNTED, BOBRICK B-2840
- 6 VITREOUS CHINA ADA COMPLIANT FLOOR-MOUNTED WATER CLOSET
- 7 NOT USED
- 8 SANITARY NAPKIN DISPOSAL, SURFACE-MOUNTED, BOBRICK B-270
- 9 ONE-HANDLE LAVATORY FAUCET; BOD: VIGO NORFOLK VESSEL BATHROOM FAUCET, COLOR MATTIE BLACK, MODEL VG03027/MB
- 10 24"W X 36"H MIRROR WITH FRAME, SURFACE-MOUNTED, BOBRICK B-165 2436
- 11 PROVIDE OIL-BASED POLYURETHANE SEMI-GLOSS FINISH COATING FOR EXPOSED GLULAM COLUMN
- 12 CAMBRIA BACKSPASH PER FINISH SCHEDULE (Q-2)
- 13 CAMBRIA GRANITE SLAB COUNTERTOP PER FINISH SCHEDULE (Q-2)
- 14 RECESSED-MOUNTED AUTOMATIC PAPER TOWEL DISPENSER WITH TRASH RECEPTACLE, BOBRICK B-3974, OFCI
- 15 3" X 12" TILE PER FINISH SCHEDULE (WT-4)
- 16 2' X 5' TILE PER FINISH SCHEDULE (WT-3)
- 17 3" X 6" BULLNOSE TILE PER FINISH SCHEDULE (BN-3)
- 18 1/2" X 12" TILE PER FINISH SCHEDULE WITH COVE BASE (WT-7)
- 19 ALL EXPOSED WATER AND DRAIN PIPES UNDER LAVATORY SHALL BE INSULATED OR OTHERWISE COVERED; THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER THE LAVATORY PER ADA
- 20 LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)

INTERIOR ELEVATION GENERAL NOTES:

- REFER TO SPECIFICATIONS FOR BASIS OF DESIGN
- ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFOI OWNER FURNISHED, OWNER INSTALL



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



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4730 CASA COIA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER STAN PRICE, PE
PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
DESIGNER KATIE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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**INTERIOR ELEVATIONS -
WAITING AREA TOILET
ROOMS**

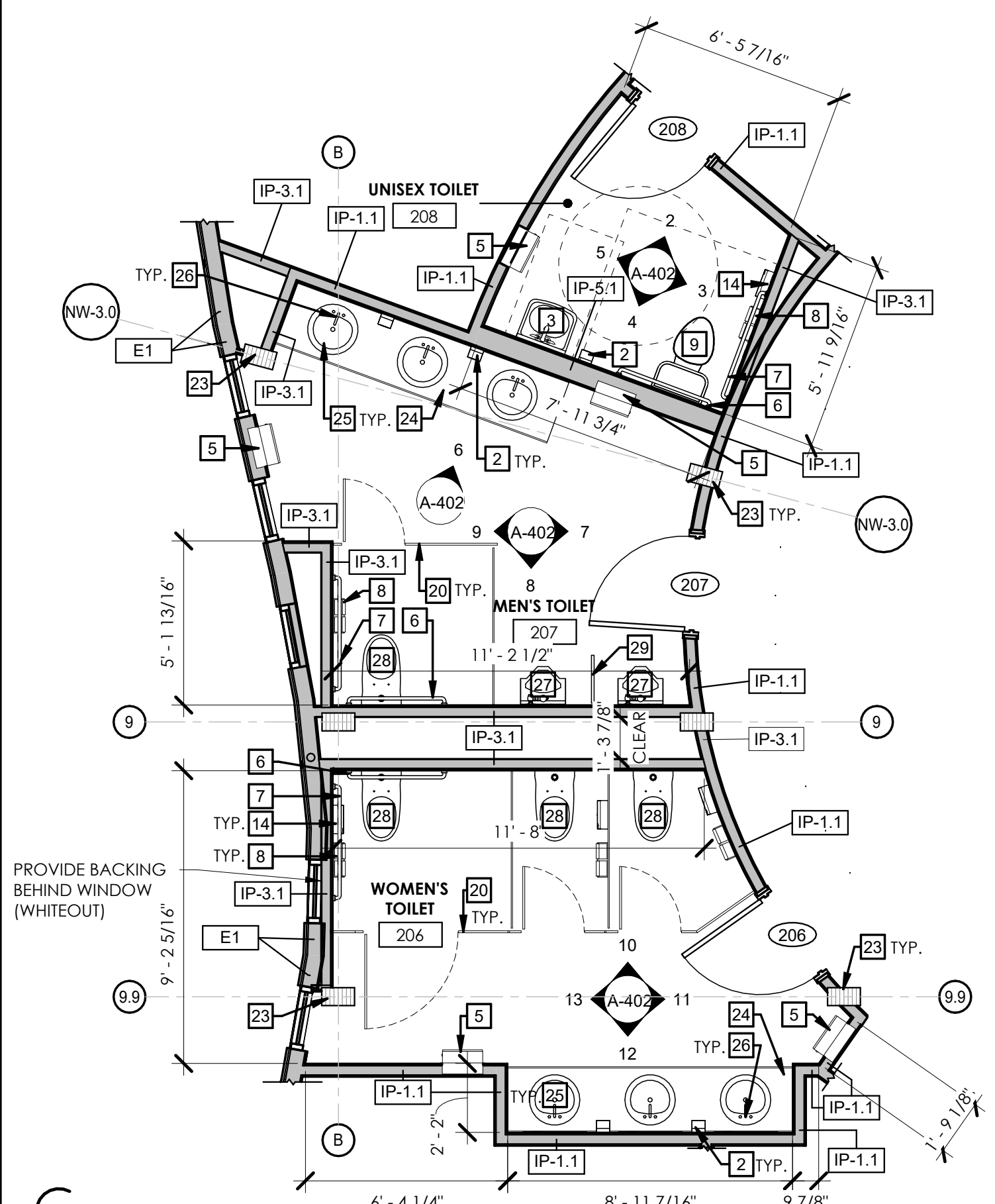
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

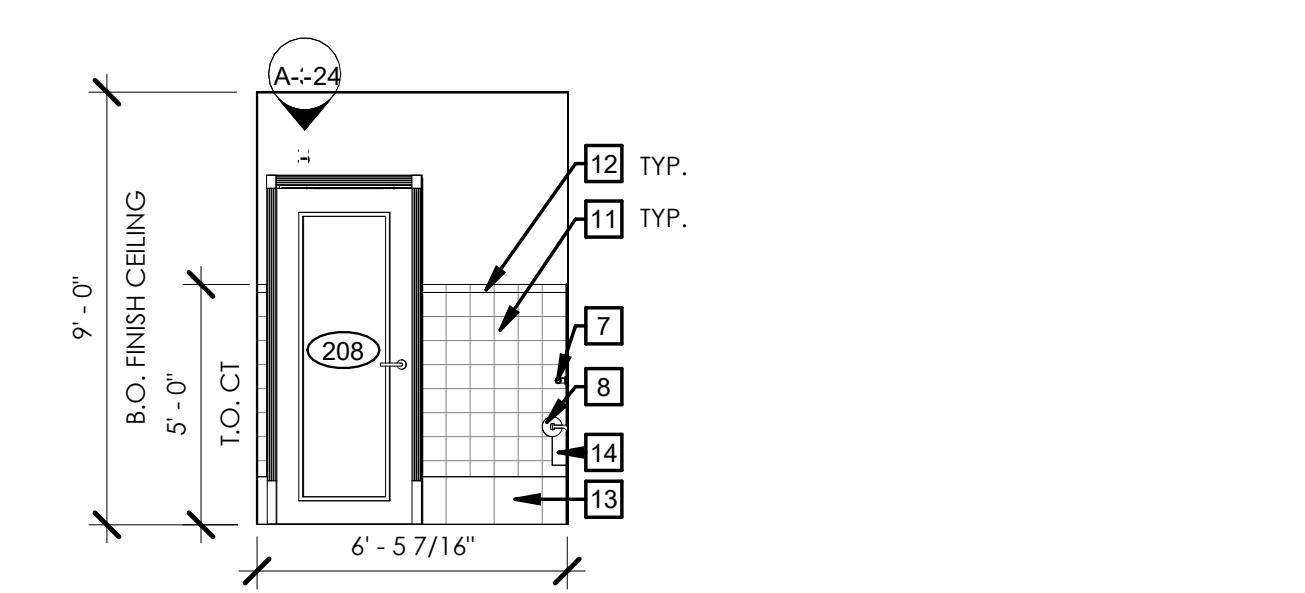
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-401

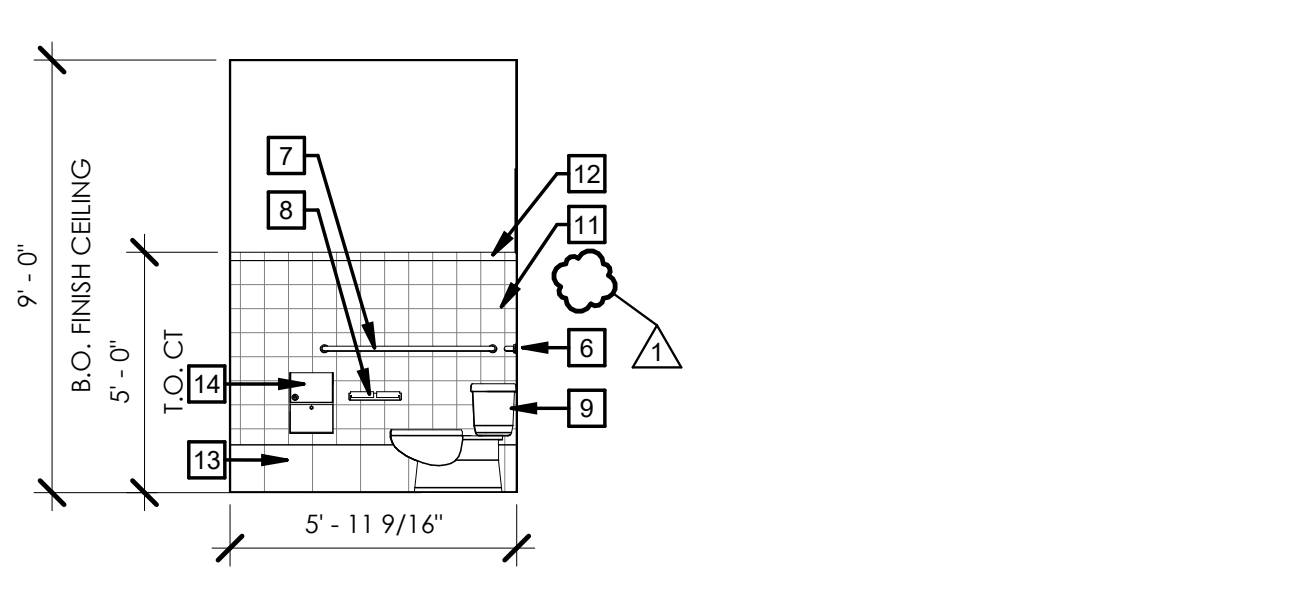
DATE:
NOVEMBER 4, 2024



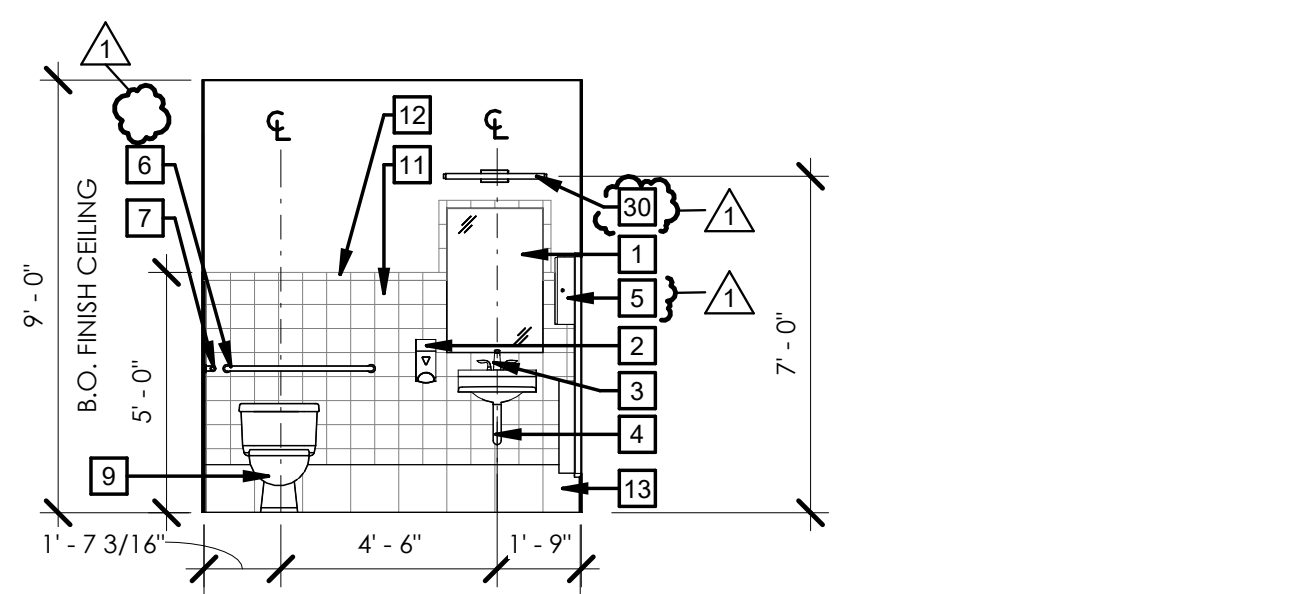
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1/4" = 1'-0"



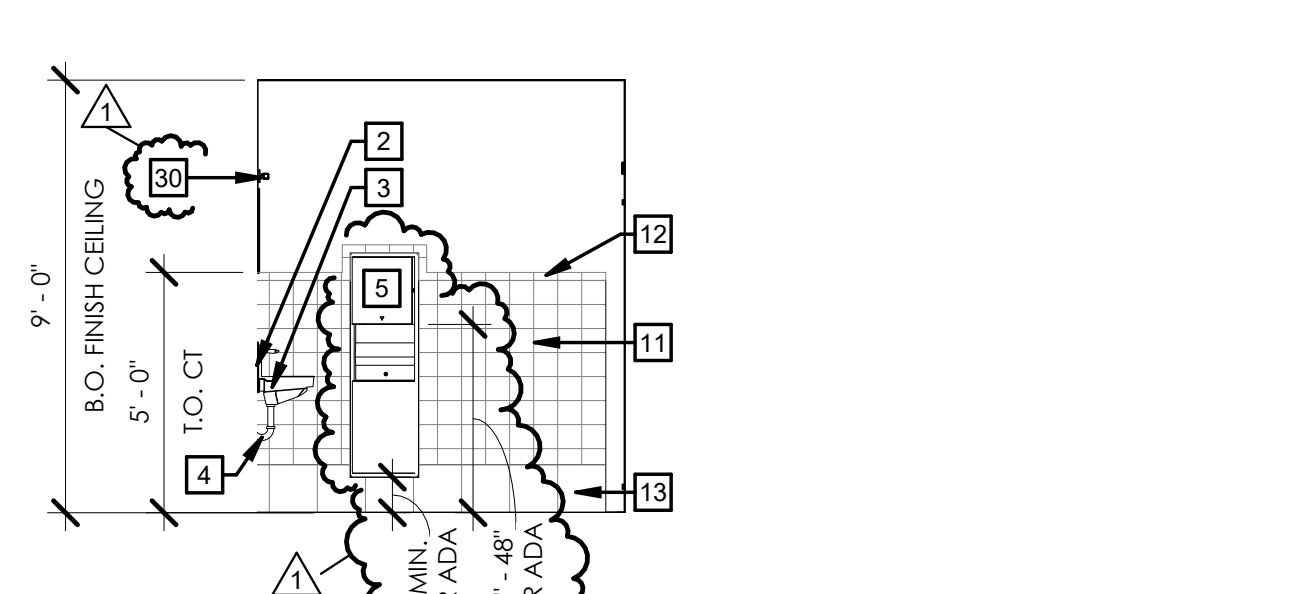
2 UNISEX TOILET - NORTH ELEVATION
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1/4" = 1'-0"



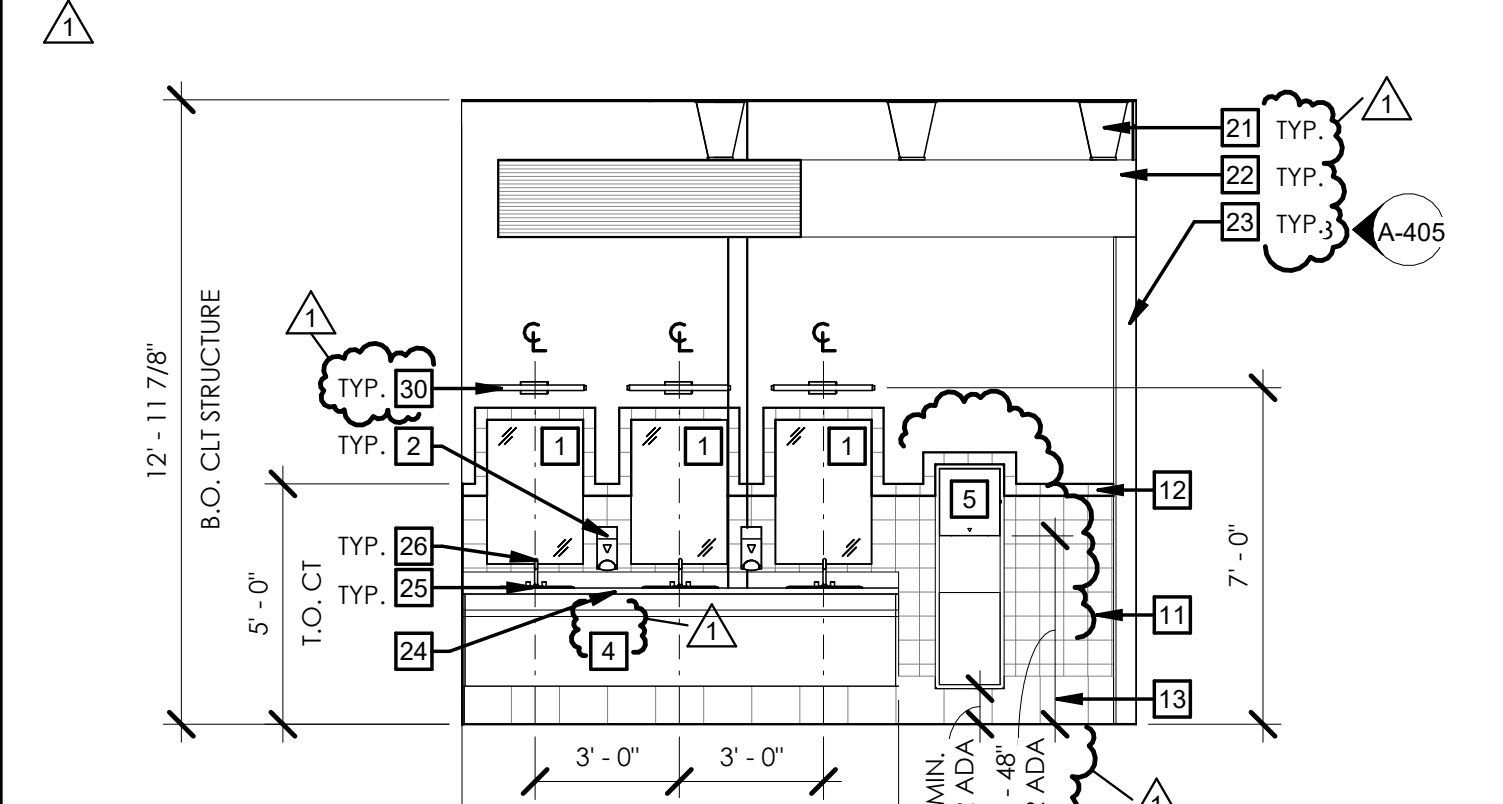
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0' 1' 2' 4' 8'
1/4" = 1'-0"



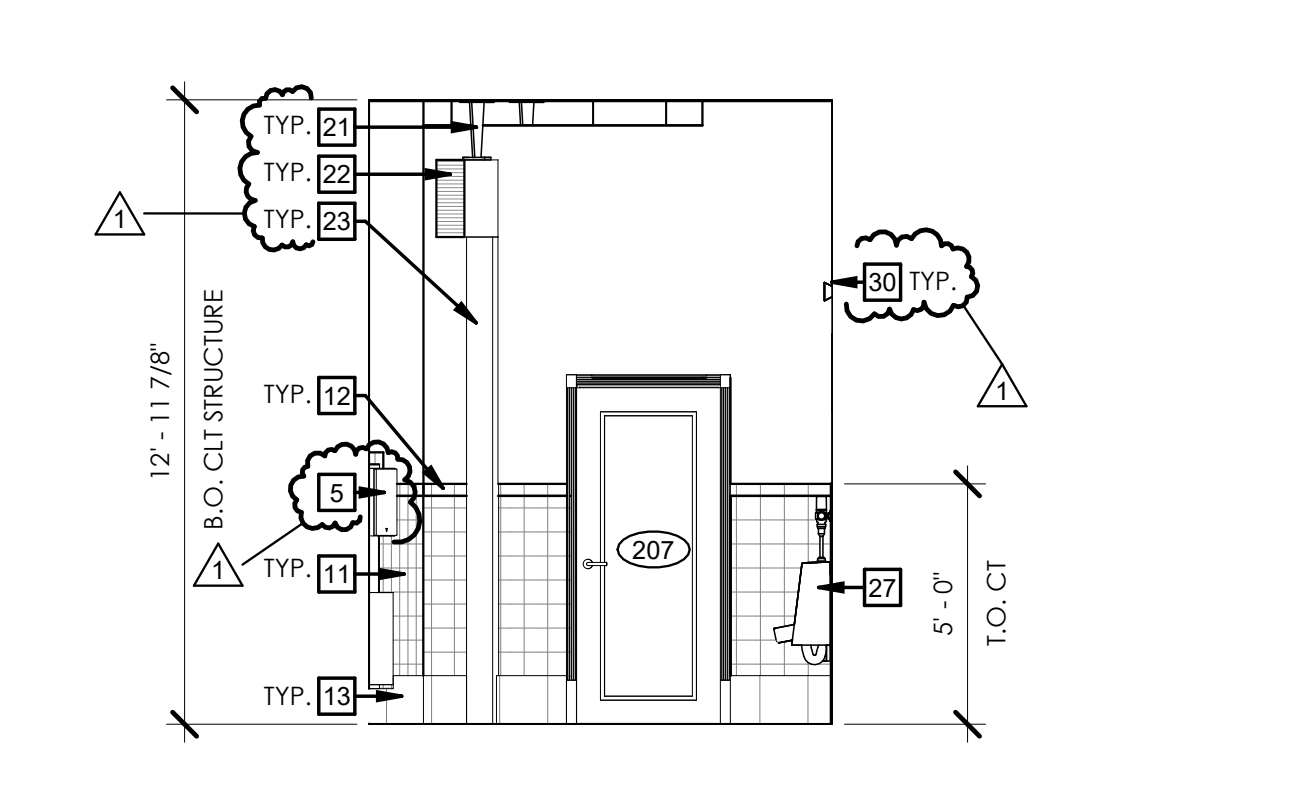
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0' 1' 2' 4' 8'
1/4" = 1'-0"



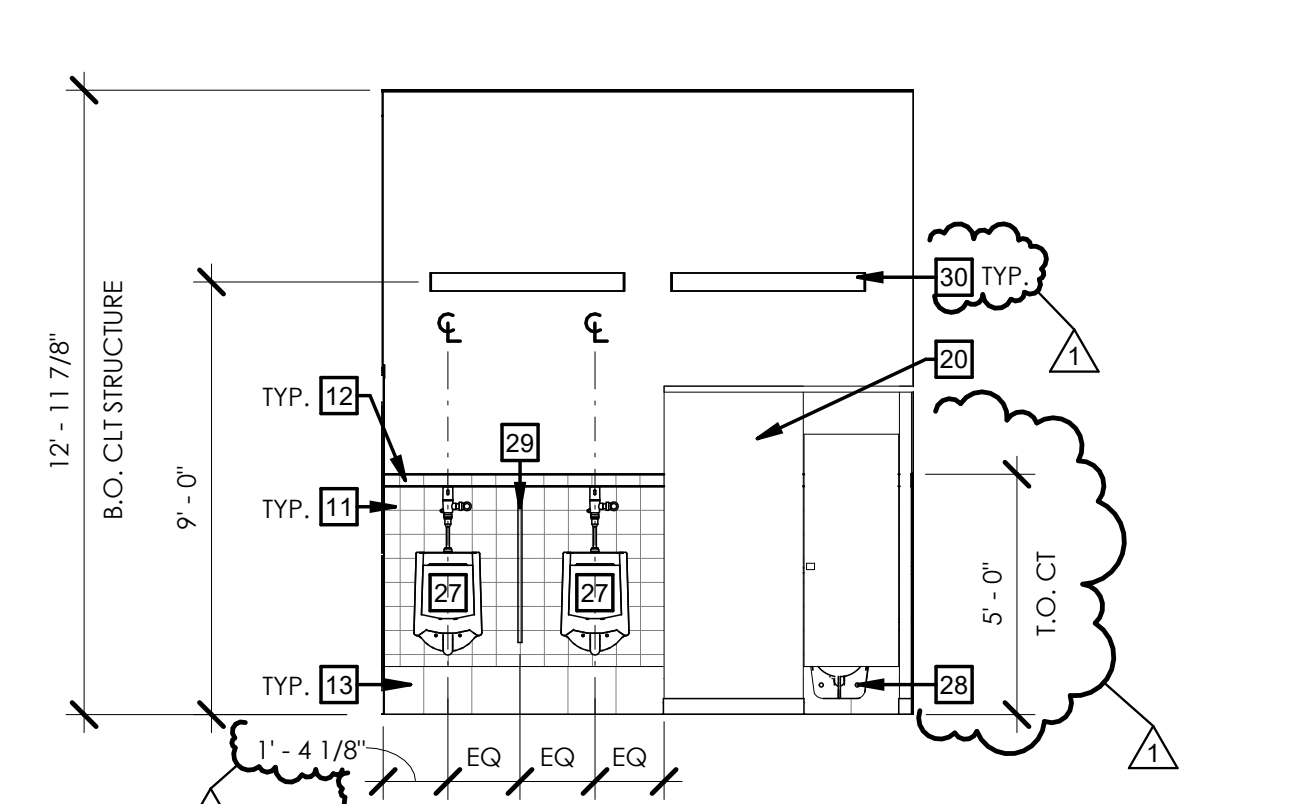
5 UNISEX TOILET - WEST ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



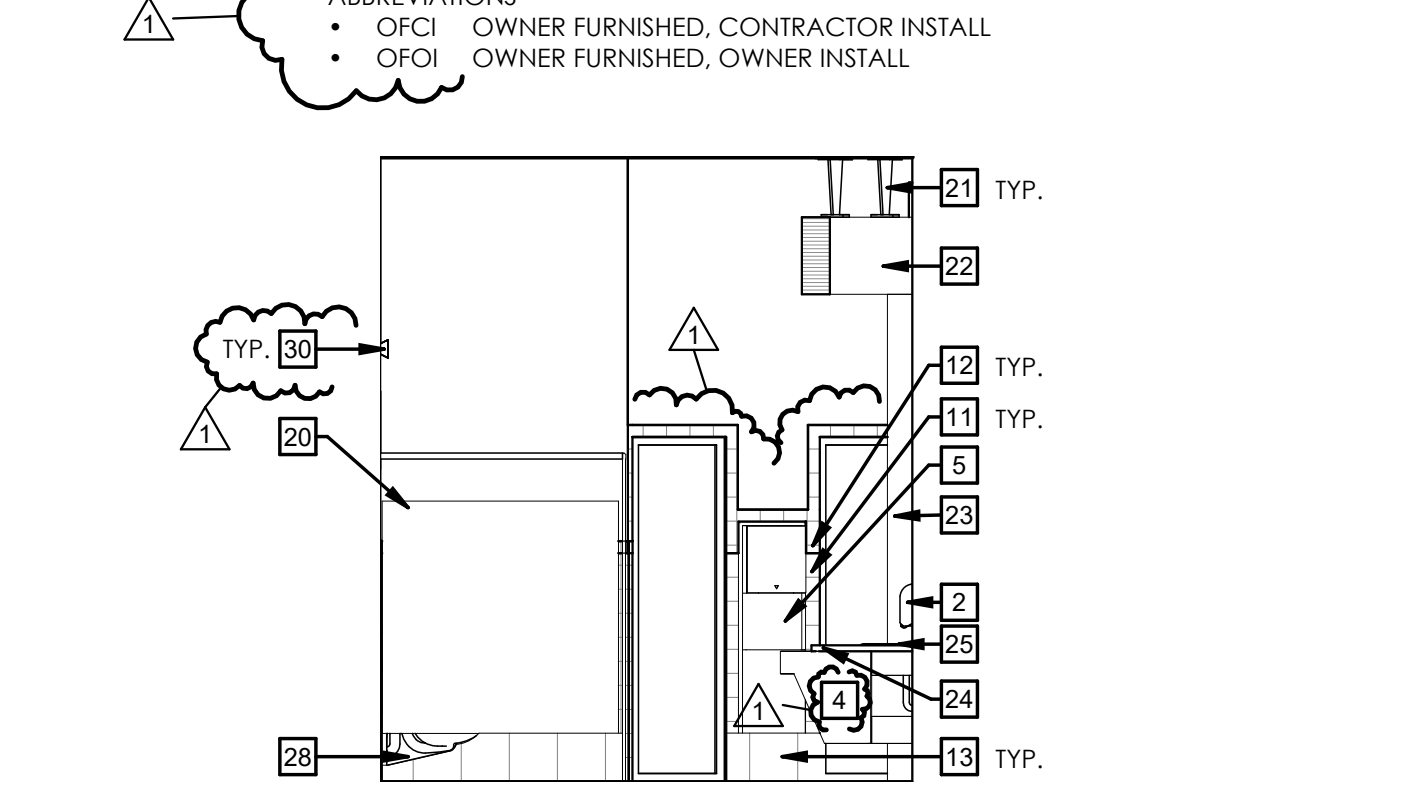
6 MEN'S TOILET - NORTH ELEVATION
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1/4" = 1'-0"



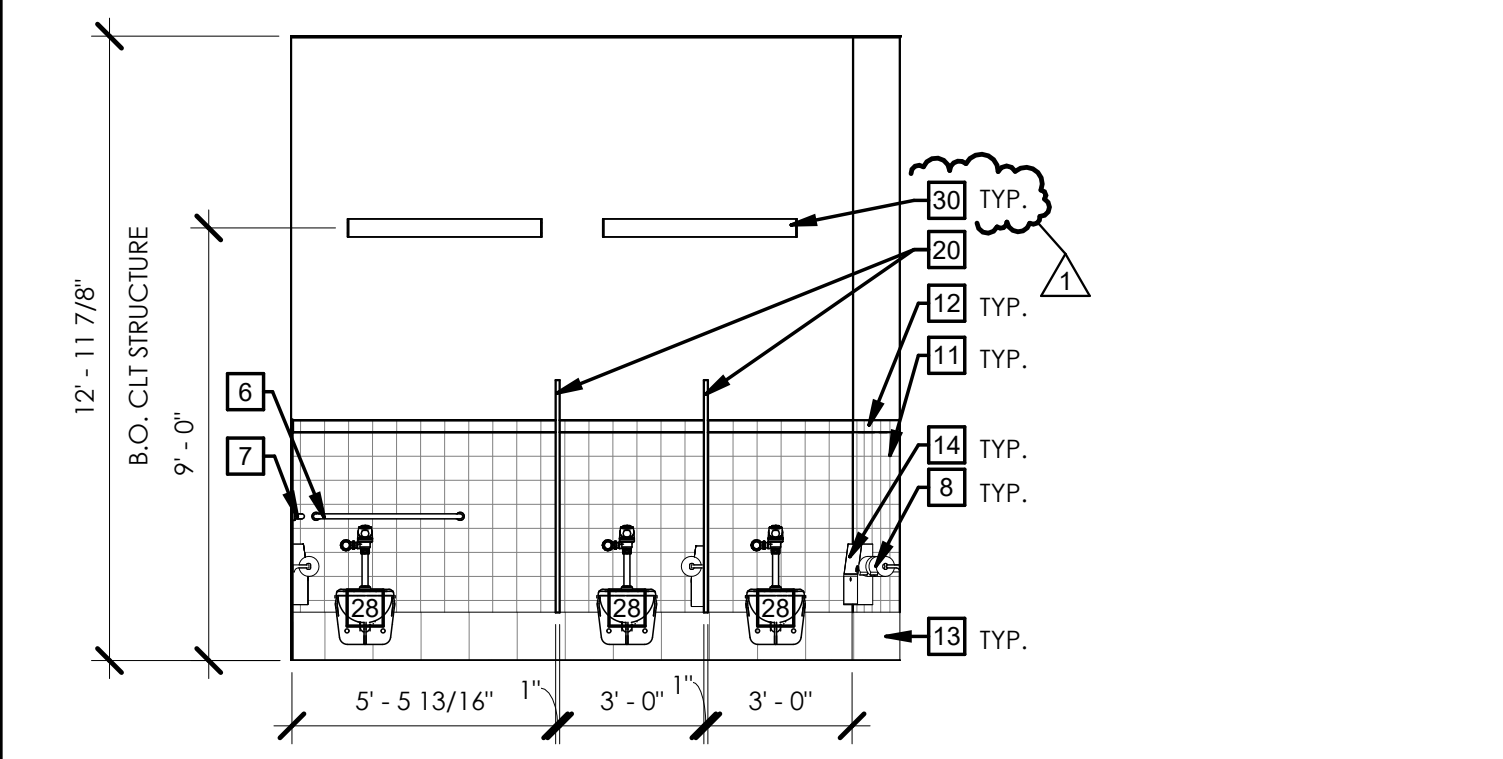
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1/4" = 1'-0"



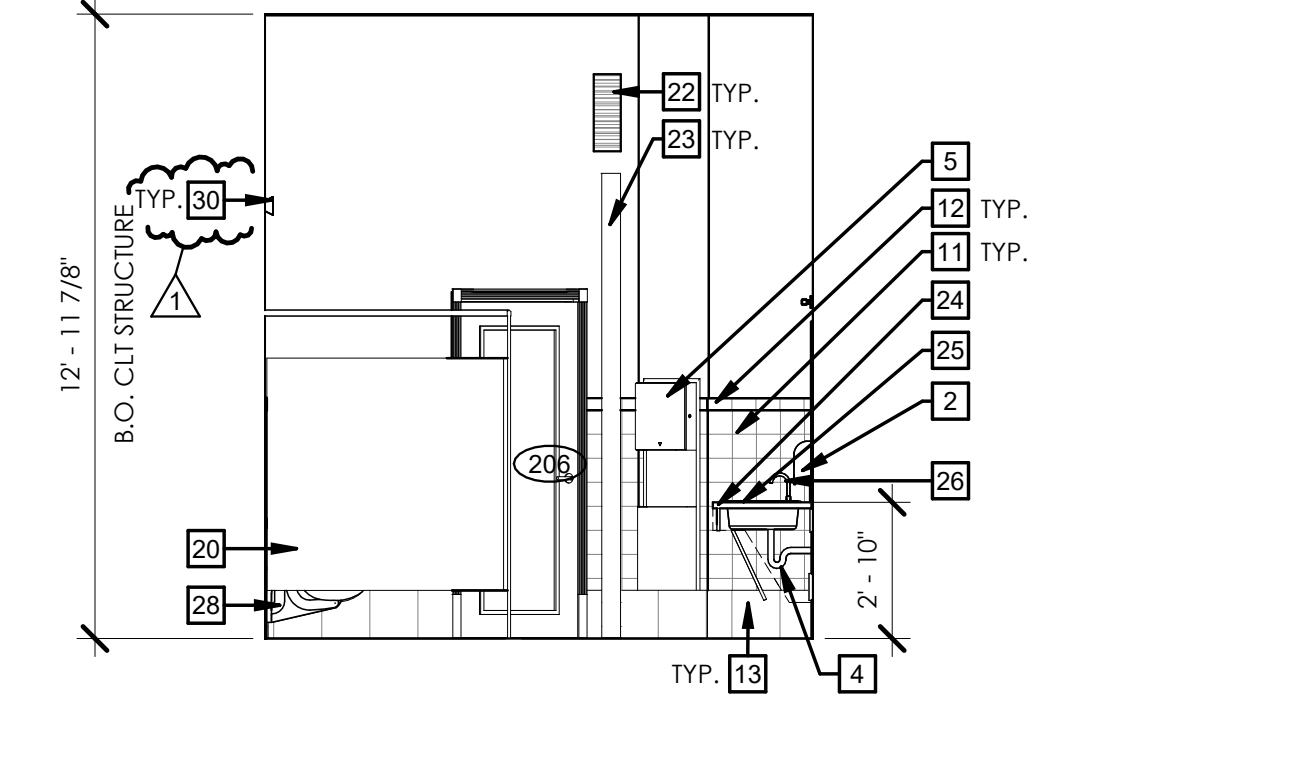
8 MEN'S TOILET - SOUTH ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



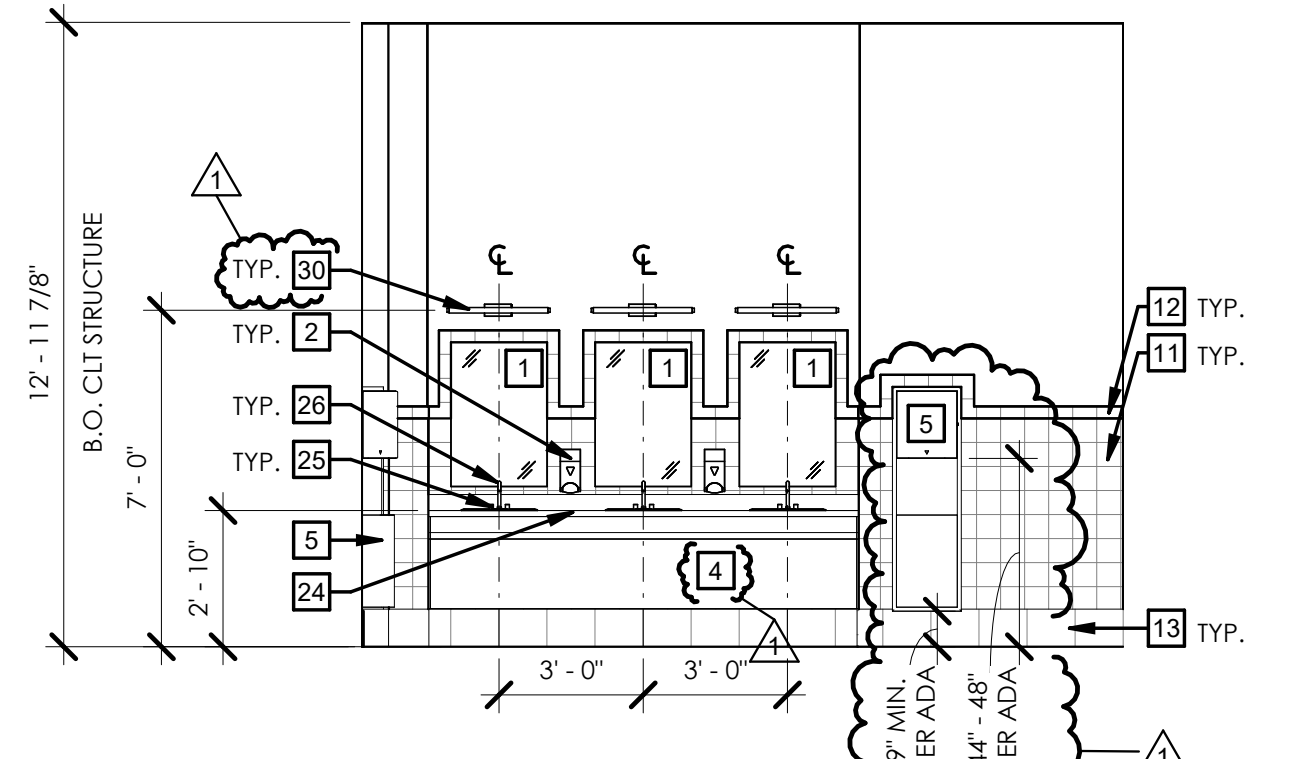
9 MEN'S TOILET - WEST ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



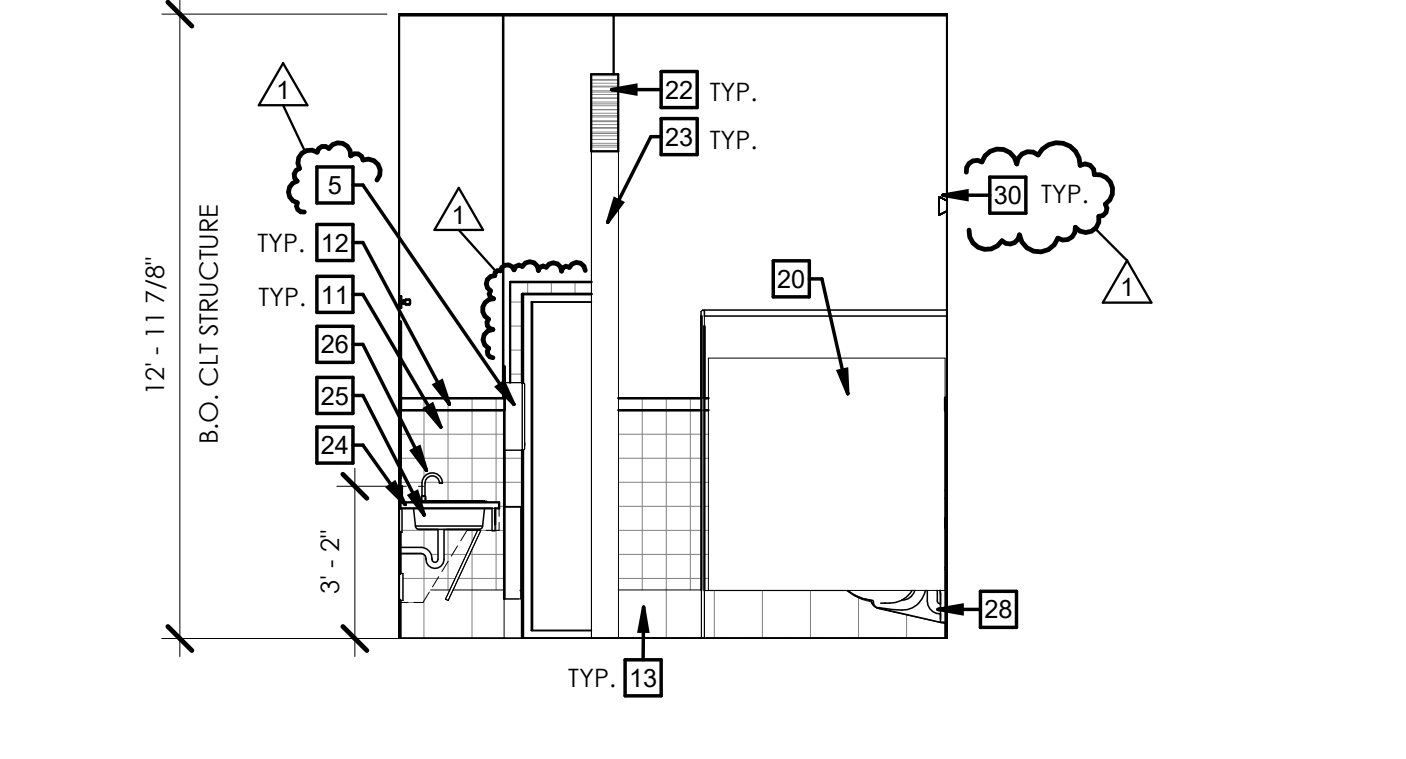
10 WOMEN'S TOILET - NORTH ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



11 WOMEN'S TOILET - EAST ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



12 WOMEN'S TOILET - SOUTH ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"



13 WOMEN'S TOILET - WEST ELEVATION
0' 1' 2' 4' 8'
1/4" = 1'-0"

TOILET ROOM GENERAL NOTES:

- PROVIDE BLOCKING FOR ALL CABINETS AND ACCESSORIES AS REQUIRED.
- REFER TO TYPICAL TOILET ROOM DIMENSIONS AND CLEARANCES ON SHEET **G-002** FOR ADDITIONAL INFORMATION, MOUNTING HEIGHTS, LOCATIONS, ETC.
- TOILET PAPER DISPENSERS SHALL BE 7 INCHES MINIMUM AND 9 INCHES MAXIMUM IN FRONT OF THE WATER CLOSET MEASURED TO THE CENTERLINE OF THE DISPENSER (2010 ADA STANDARDS FOR ACCESSIBLE DESIGN).
- REFER TO WALL TYPES ON SHEET **G-005**; DIMENSIONS ARE TO FINISH FACE AND INCLUDE 1/4" TILE AT RESTROOMS AND BATHROOM.
- REFER TO FINISH FLOOR PLANS AND SCHEDULES ON SHEETS **A-600, A-601, AND A-602** FOR ADDITIONAL FINISH INFORMATION.
- KEYNOTES ARE TYPICAL. NOT ALL INSTANCES ARE NOTED.

KEYNOTES - TOILET ROOMS

- 24"W X 36"H MIRROR WITH FRAME, SURFACE-MOUNTED, BOBRICK B-165 2436
- AUTOMATED FOAM SOAP DISPENSER, SURFACE-MOUNTED, BRADLEY 6A01-11
- WALL-MOUNTED COMMERCIAL GRADE VITREOUS CHINA LAVATORY AND POLISHED CHROME FAUCET WITH LEVER HANDLES
- ALL EXPOSED WATER AND DRAIN PIPES UNDER LAVATORY SHALL BE INSULATED OR OTHERWISE COVERED; THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER THE LAVATORY PER ADA
- RECESSED-MOUNTED AUTOMATIC PAPER TOWEL DISPENSER WITH TRASH RECEPTACLE, BOBRICK B-3974, OFCI
- 1-1/2" DIA. X 36" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X36
- 1-1/2" DIA. X 42" GRAB BAR WITH PEENED GRIPPING SURFACE, BOBRICK B6806.99X42
- TOILET TISSUE DISPENSER WITH UTILITY SHELF, SURFACE-MOUNTED, BOBRICK B-2840
- VITREOUS CHINA ADA COMPLIANT FLOOR-MOUNTED WATER CLOSET
- NOT USED
- 6" X 6" WALL TILE PER FINISH SCHEDULE (WT-1 OR WT-2)
- 3" X 6" BULLNOSE TILE PER FINISH SCHEDULE (BN-1)
- 12" X 12" WALL TILE PER FINISH SCHEDULE WITH COVE BASE (WT-5 OR WT-6)
- SANITARY NAPKIN DISPOSAL, SURFACE-MOUNTED, BOBRICK B-270
- ADA-COMPLIANT ROLL-IN SHOWER 63" X 34"; BOD: FREEDOM SHOWERS 63" X 34" ADA ROLL IN SHOWER, RIGHT
- ADA COMPLIANT 5/16" THICK SOLID PHENOLIC FOLDING SHOWER SEAT
- ADA COMPLIANT SHOWER COMPARTMENT CONTROLS AS PER ADA REQUIREMENTS
- ADA ACCESSIBLE HI/LO STAINLESS STEEL DRINKING FOUNTAIN (COOLER) WITH WATER BOTTLE REFILLING STATION WITH FILTER
- HEAVY DUTY SHOWER CURTAIN ROD AND CURTAIN WITH CONCEALED MOUNTING
- FLOOR-SUPPORTED SOLID PHENOLIC TOILET PARTITION; STALLS TO BE 3'-0" X 5'-0" DEEP MINIMUM
- 15X50 STEEL CLT SPACERS; REFER TO STRUCTURAL DRAWINGS FOR SPACING
- PROVIDE OIL-BASED POLYURETHANE SEMI-GLOSS FINISH COATING FOR EXPOSED GLULAM BEAMS, TYP.
- PROVIDE OIL-BASED POLYURETHANE SEMI-GLOSS FINISH COATING FOR EXPOSED GLULAM COLUMN, TYP.
- CAMBRIA GRANITE SLAB COUNTERTOP AND BACKSPASH PER FINISH SCHEDULE (Q-2 OR Q-3)
- COUNTER-SET COMMERCIAL GRADE VITREOUS CHINA VESSEL LAVATORY WITH SINGLE FAUCET HOLE; BOD: KOHLER K-21059-1
- SINGLE-HANDLE LAVATORY FAUCET; BOD: MOEN GIBSON MODEL 6145
- WALL-MOUNTED VITREOUS CHINA URINAL WITH FLUSH VALVE
- WALL-MOUNTED VITREOUS CHINA WATER CLOSET WITH FLUSH VALVE
- 18" DEEP X 55" HIGH X 3/4" THICK SOLID PHENOLIC WALL-MOUNTED URINAL PARTITION
- LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)

INTERIOR ELEVATION GENERAL NOTES:

- REFER TO SPECIFICATIONS FOR BASIS OF DESIGN
- ABBREVIATIONS
- OFCI - OWNER FURNISHED, CONTRACTOR INSTALL
- OFOI - OWNER FURNISHED, OWNER INSTALL



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE EMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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INTERIOR ELEVATIONS - SECOND FLOOR TOILET ROOMS

2178 FLIGHTLINE AVE

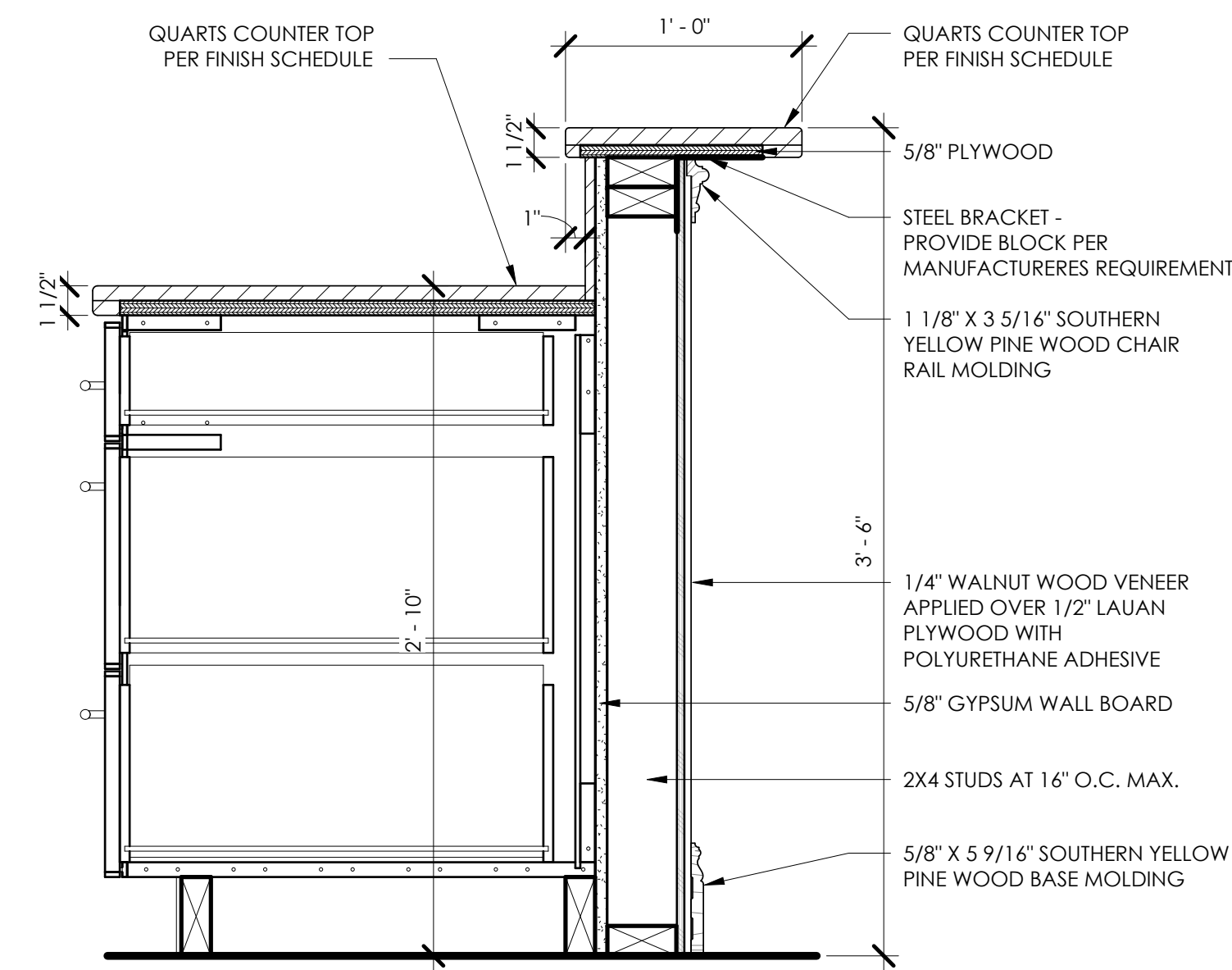
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

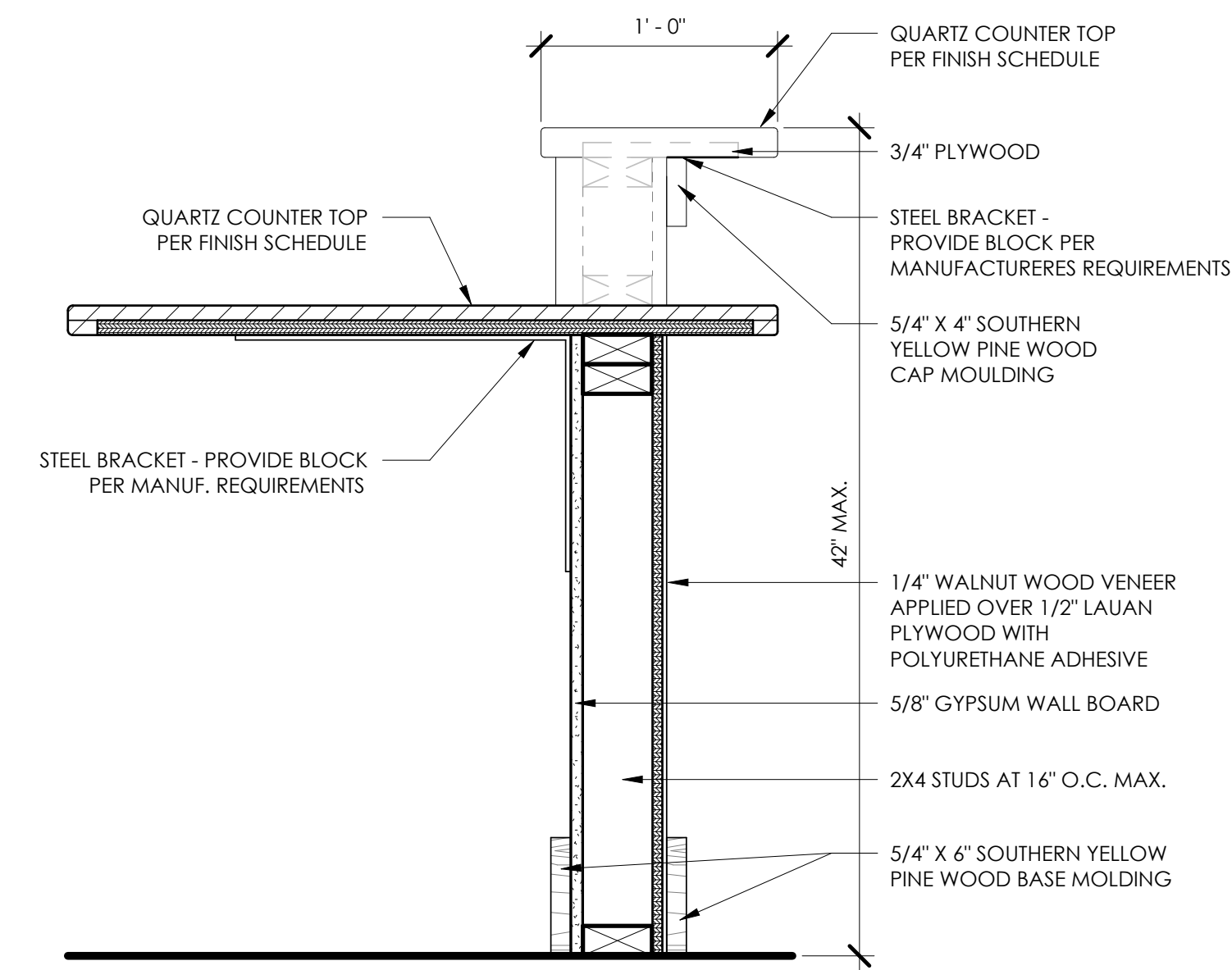
PROJECT NO.: 20202946.010A

DRAWING NO.: **A-402**

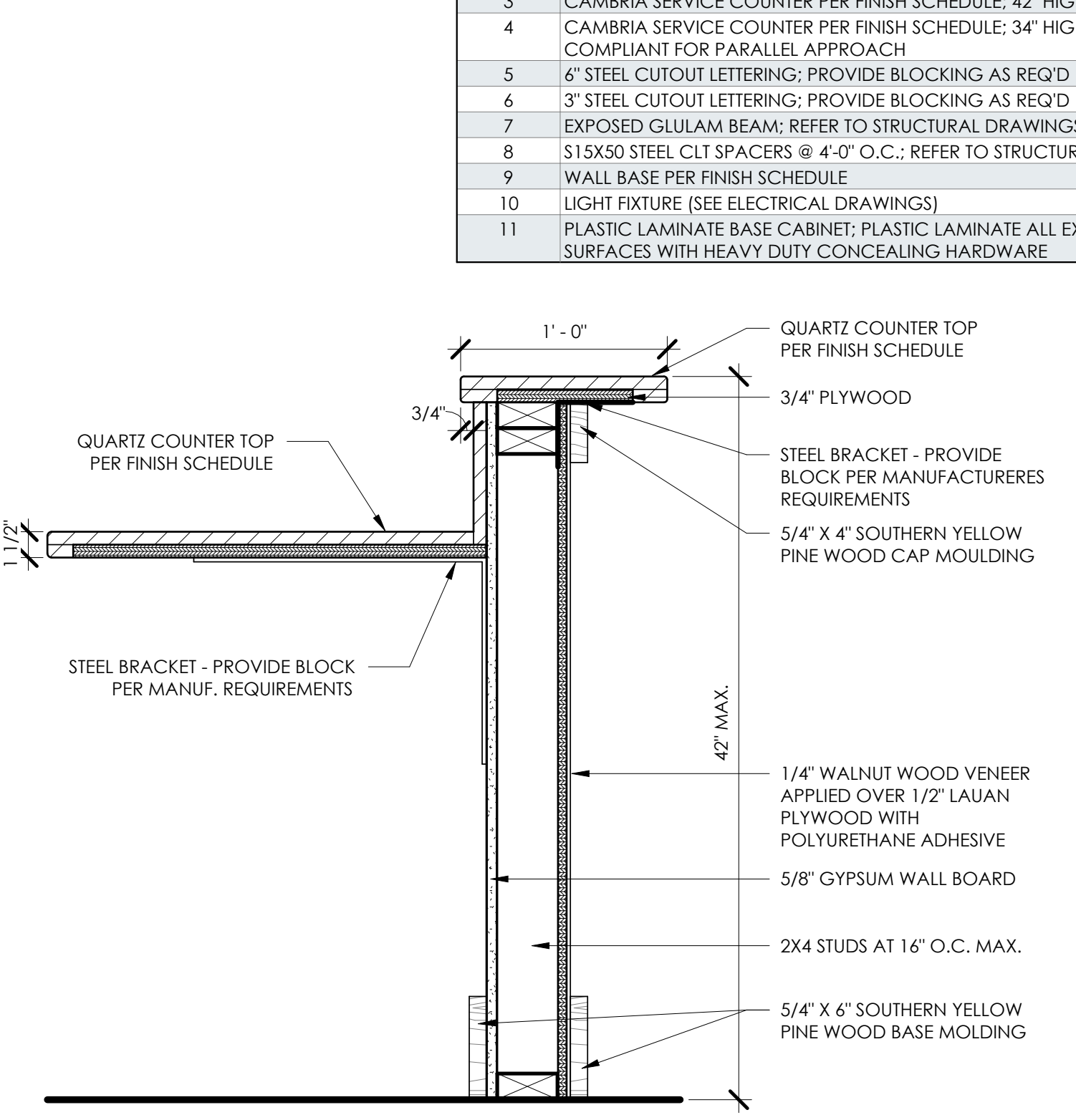
DATE: NOVEMBER 4, 2024



C RECEPTION DESK SECTION AT CASEWORK
 0' 1' 2' 4' 8'
 1 1/2" = 1'-0"



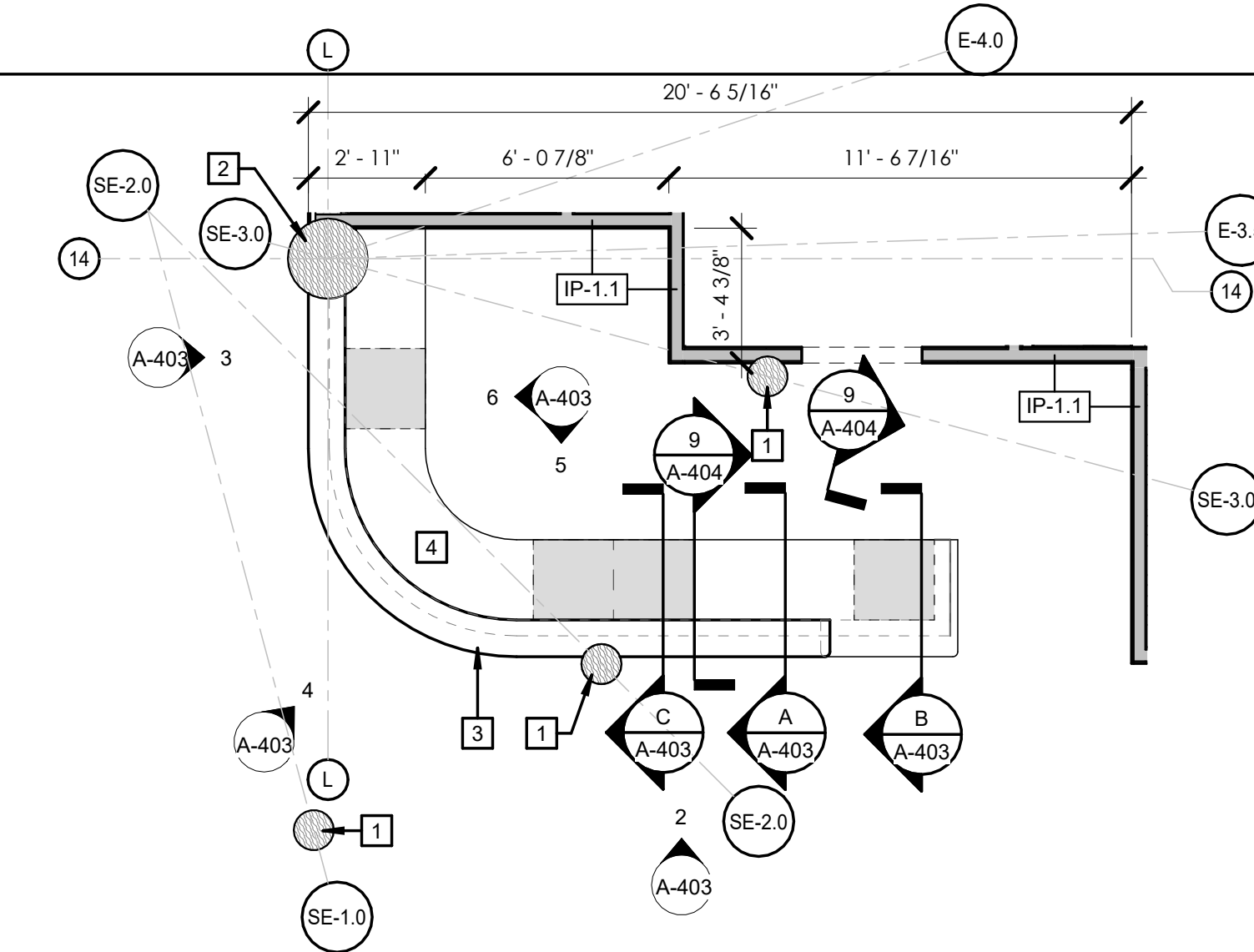
B ADA RECEPTION DESK SECTION
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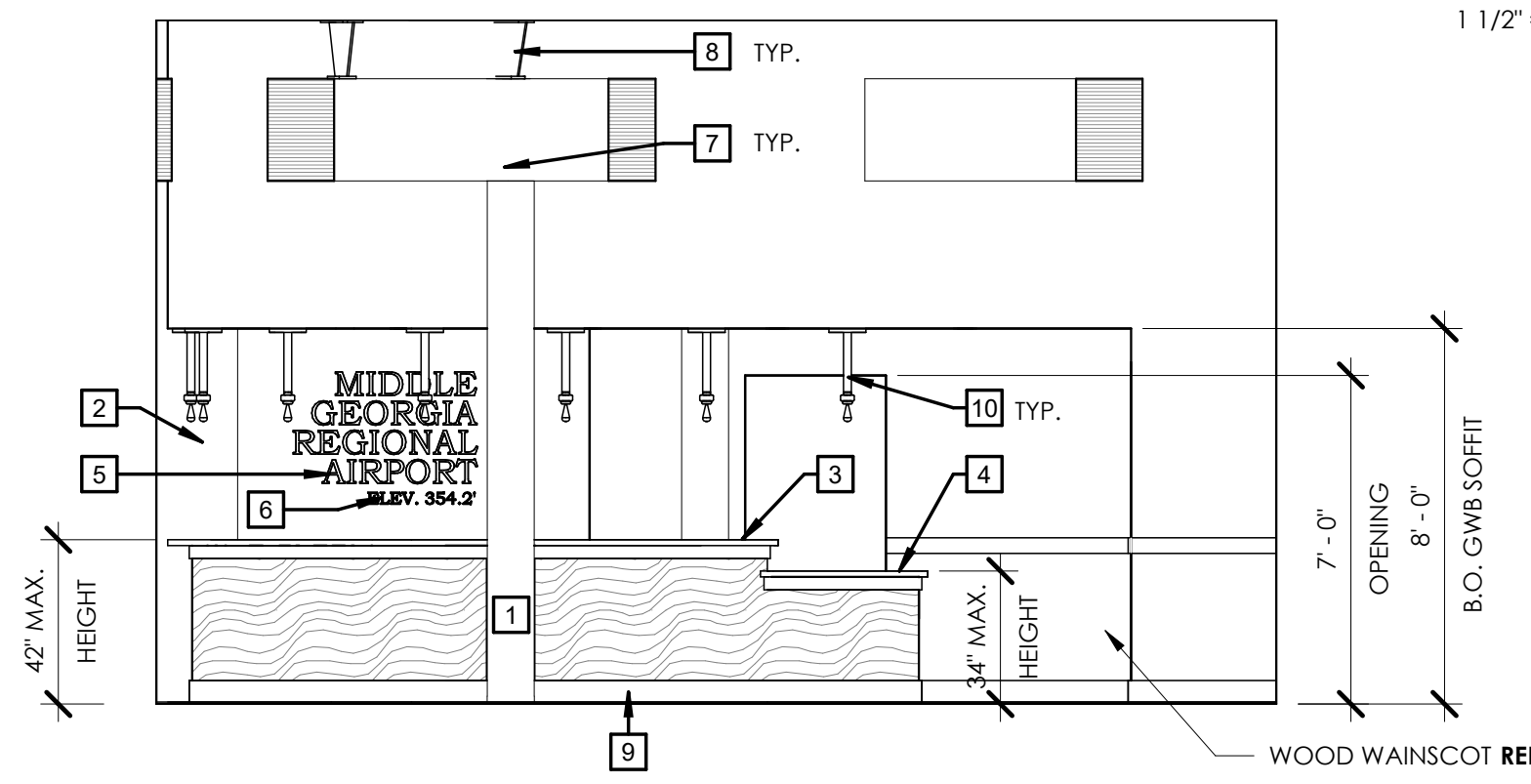
A RECEPTION DESK SECTION
 0' 1' 2' 4' 8'
 1 1/2" = 1'-0"

KEYNOTES - ELEVATIONS (RECEPTION) [0]

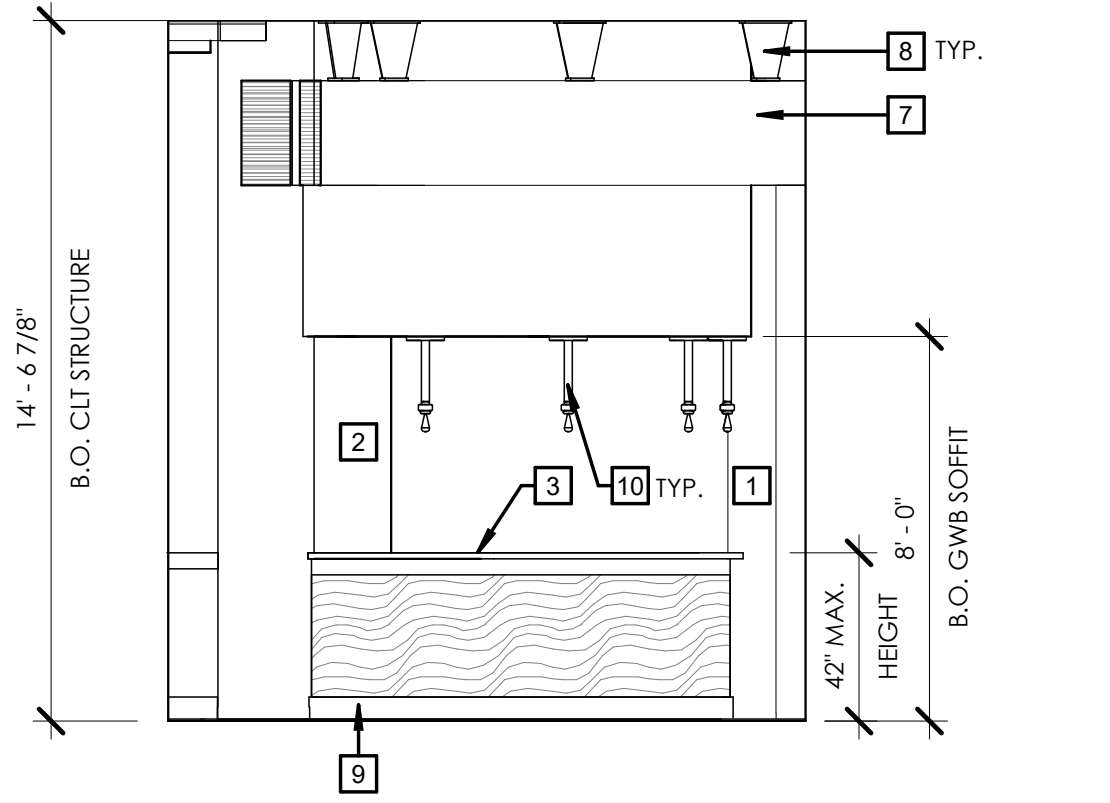
1	12" DIAMETER ROUND TREE COLUMN; REFER TO STRUCTURAL DRAWINGS
2	24" DIAMETER ROUND TREE COLUMN; REFER TO STRUCTURAL DRAWINGS
3	CAMBRIA SERVICE COUNTER PER FINISH SCHEDULE; 42" HIGH MAX.
4	CAMBRIA SERVICE COUNTER PER FINISH SCHEDULE; 34" HIGH MAX. ADA COMPLIANT FOR PARALLEL APPROACH
5	6" STEEL CUTOUT LETTERING; PROVIDE BLOCKING AS REQ'D
6	3" STEEL CUTOUT LETTERING; PROVIDE BLOCKING AS REQ'D
7	EXPOSED GLULAM BEAM; REFER TO STRUCTURAL DRAWINGS
8	S15X50 STEEL CLT SPACERS @ 4'-0" O.C.; REFER TO STRUCTURAL DRAWINGS
9	WALL BASE PER FINISH SCHEDULE
10	LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)
11	PLASTIC LAMINATE BASE CABINET; PLASTIC LAMINATE ALL EXPOSED SURFACES WITH HEAVY DUTY CONCEALING HARDWARE



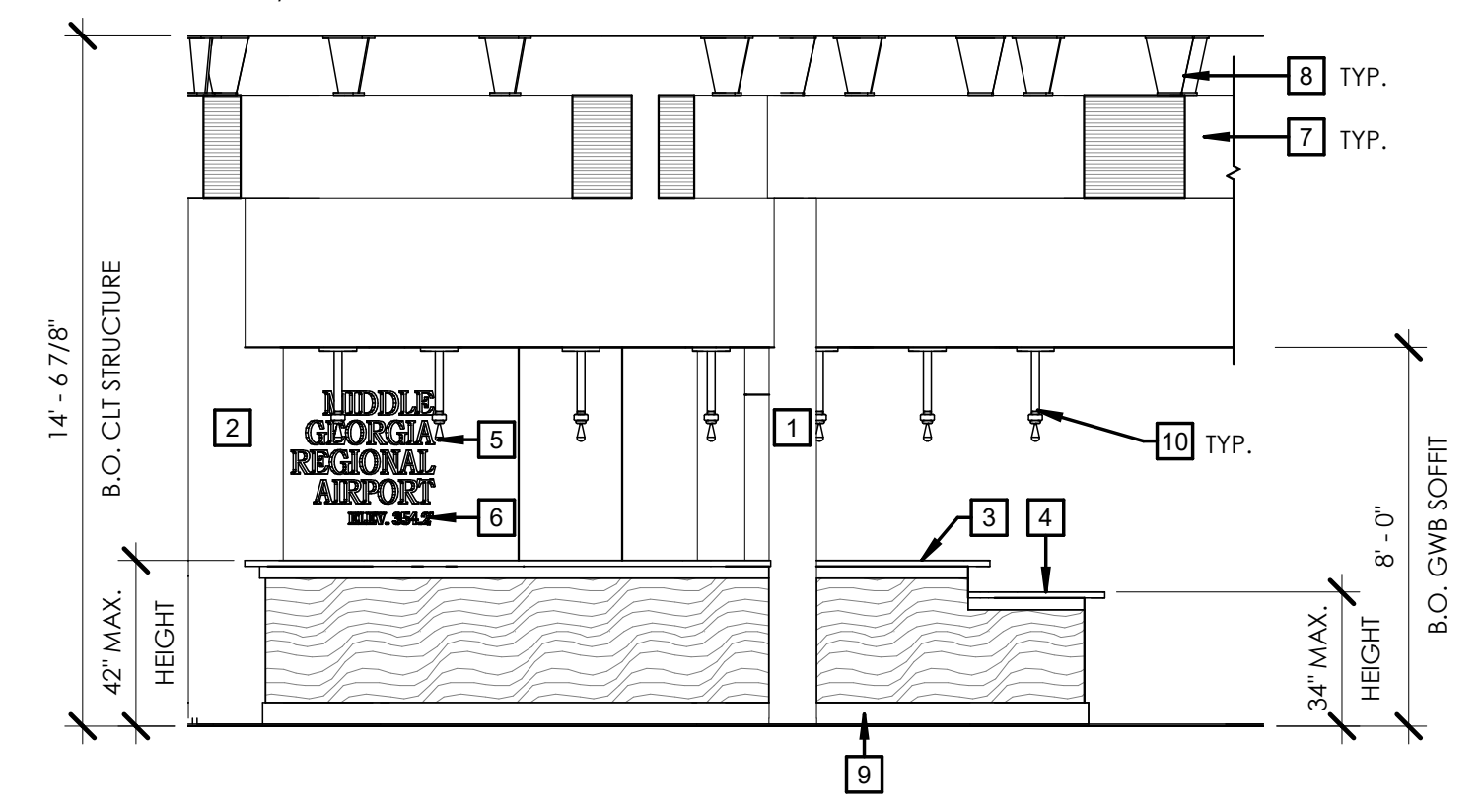
1 RECEPTION - ENLARGED PLAN
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 1/4" = 1'-0"



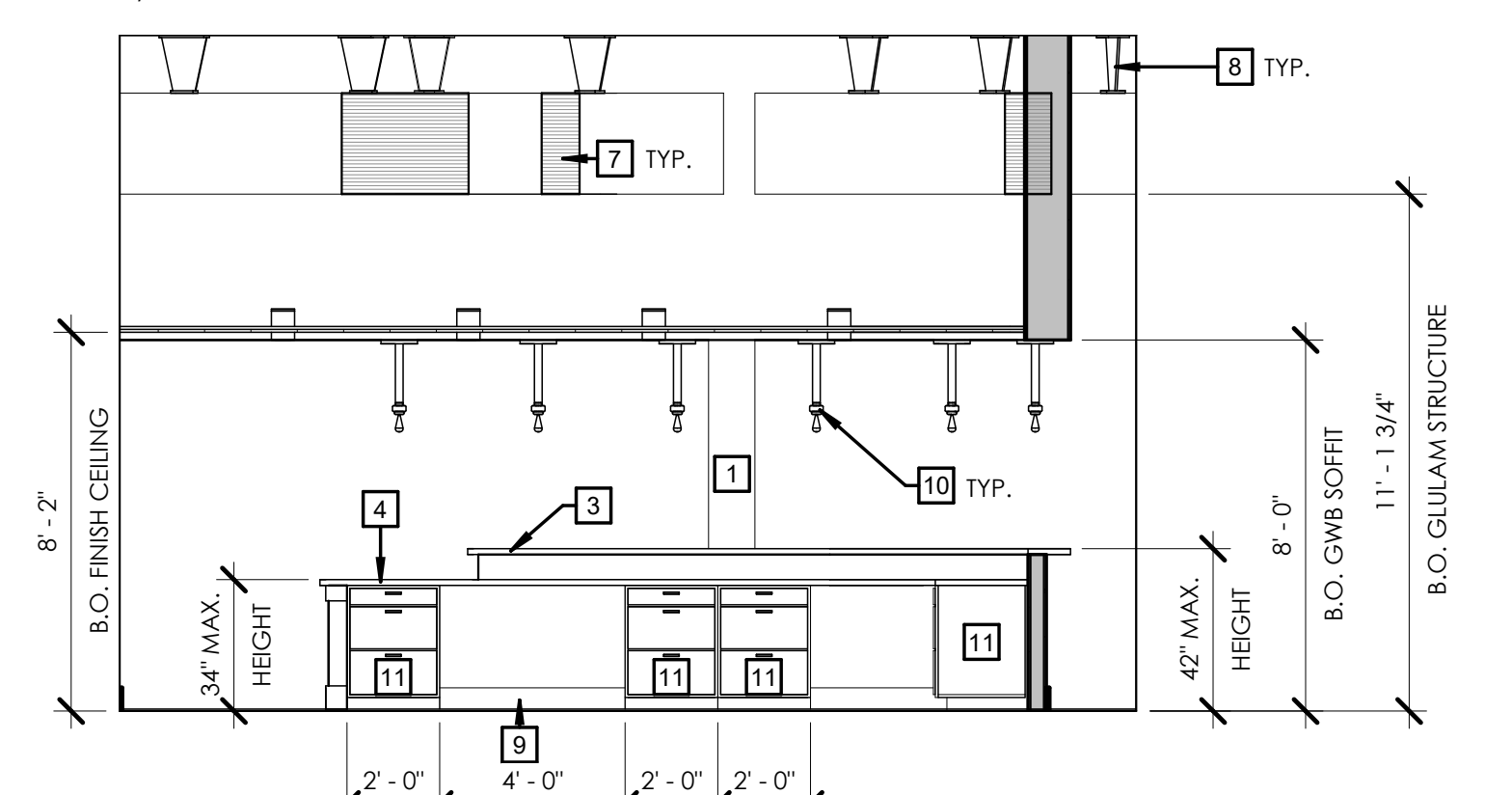
2 RECEPTION - NORTH ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



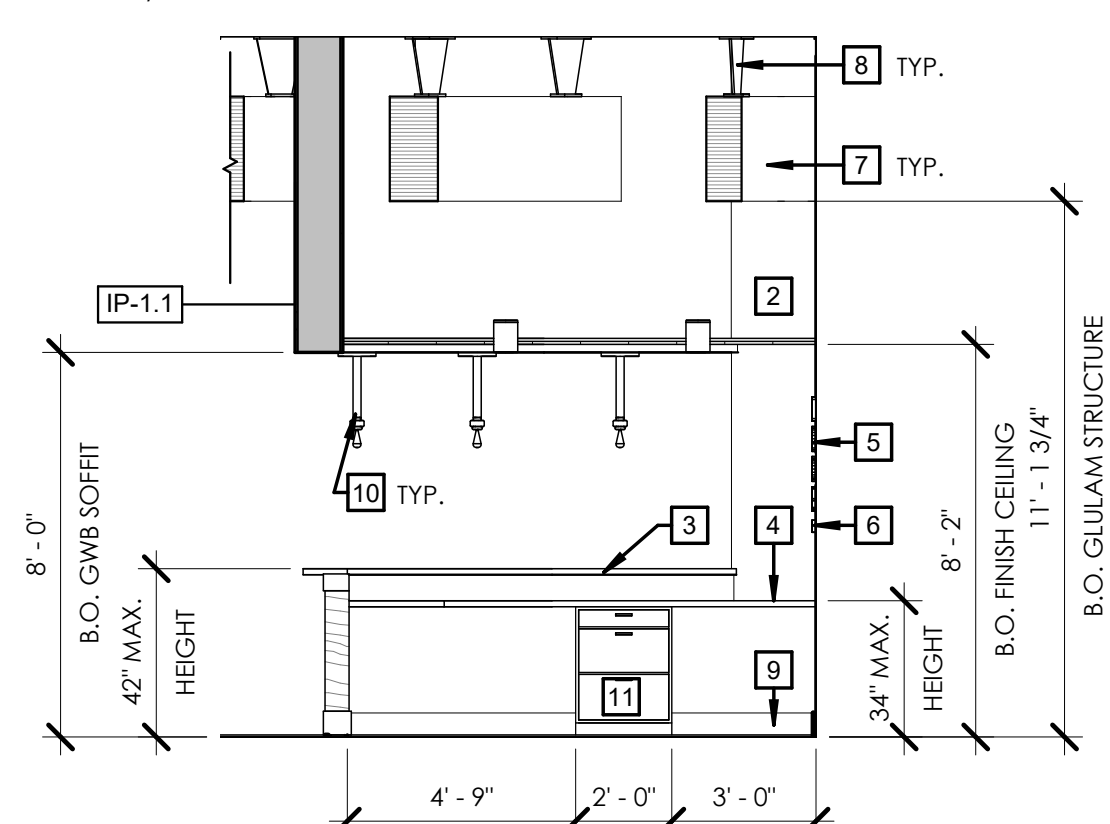
3 RECEPTION - EAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



4 RECEPTION - NORTHEAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



5 RECEPTION - SOUTH ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



6 RECEPTION - WEST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"

BID SET

CLIENT:
 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
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 DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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INTERIOR ELEVATIONS - RECEPTION

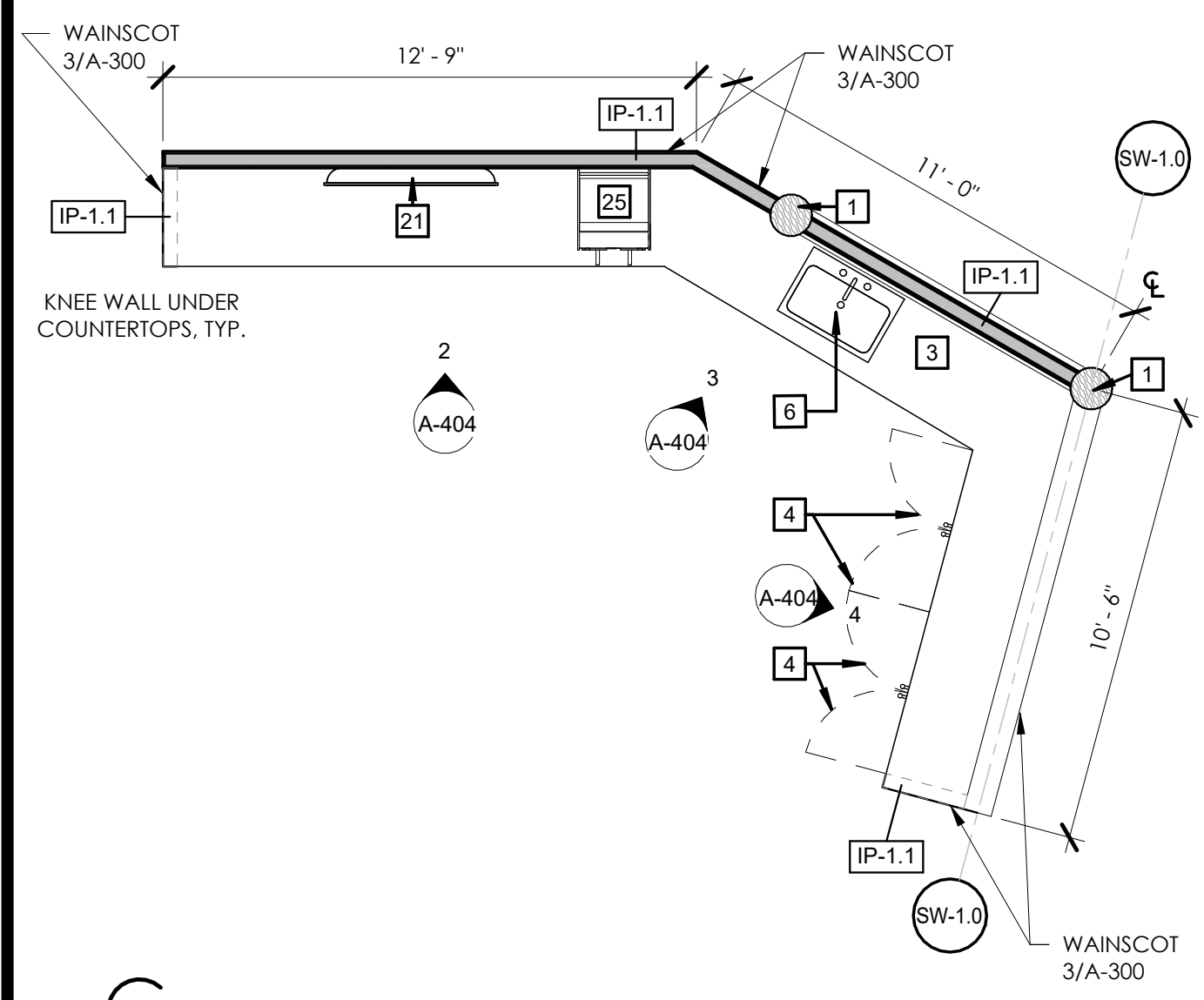
2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

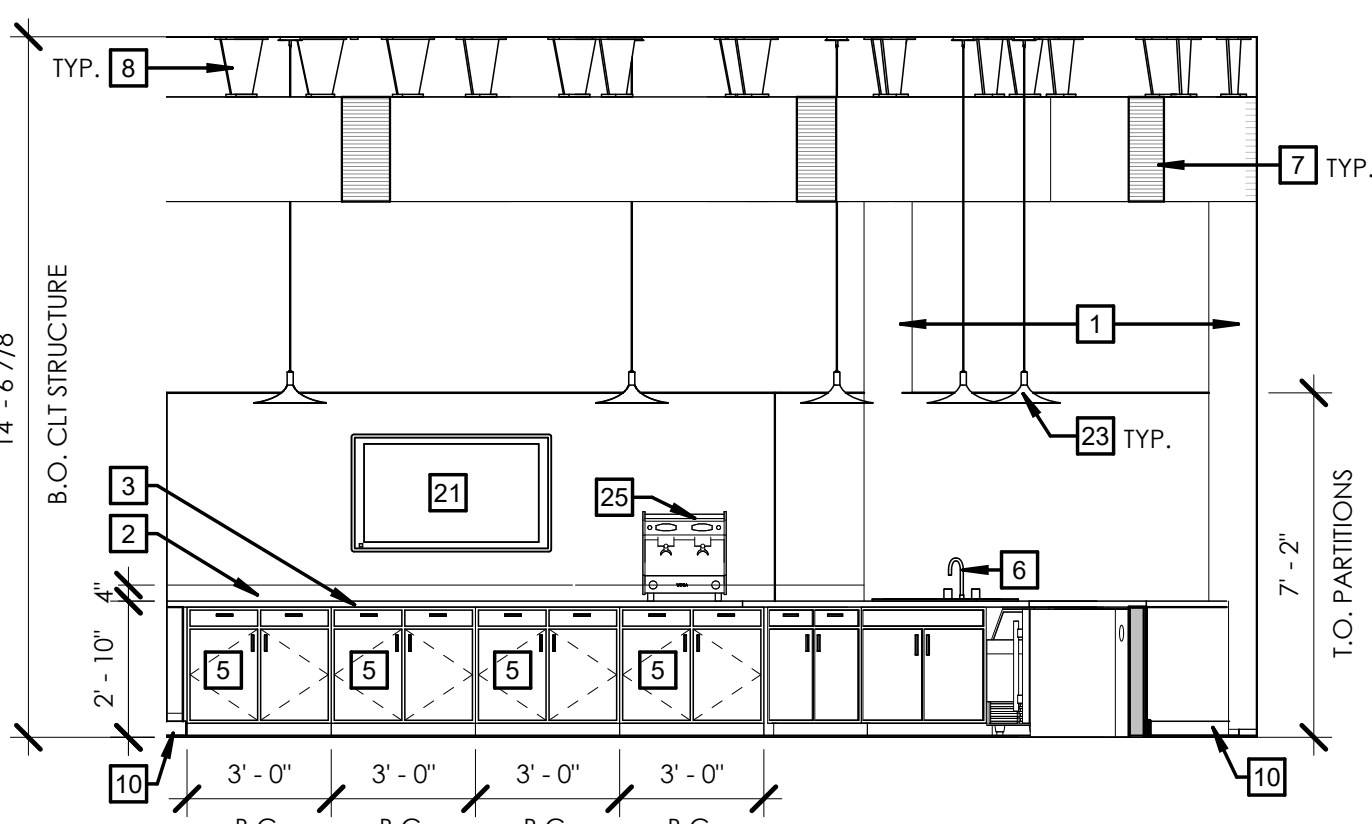
PROJECT NO.: 20202946.010A

DRAWING NO.: A-403

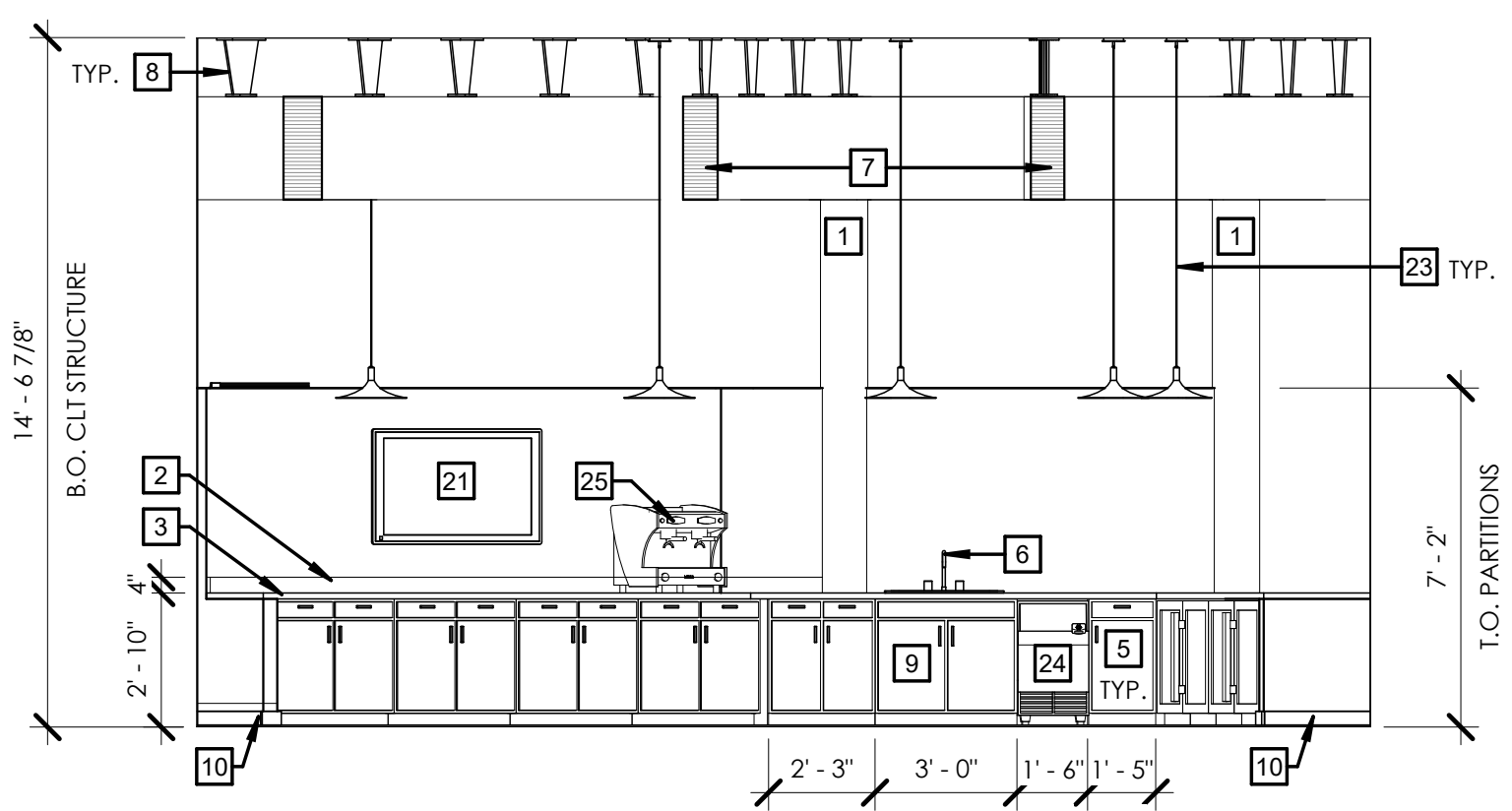
DATE: NOVEMBER 4, 2024



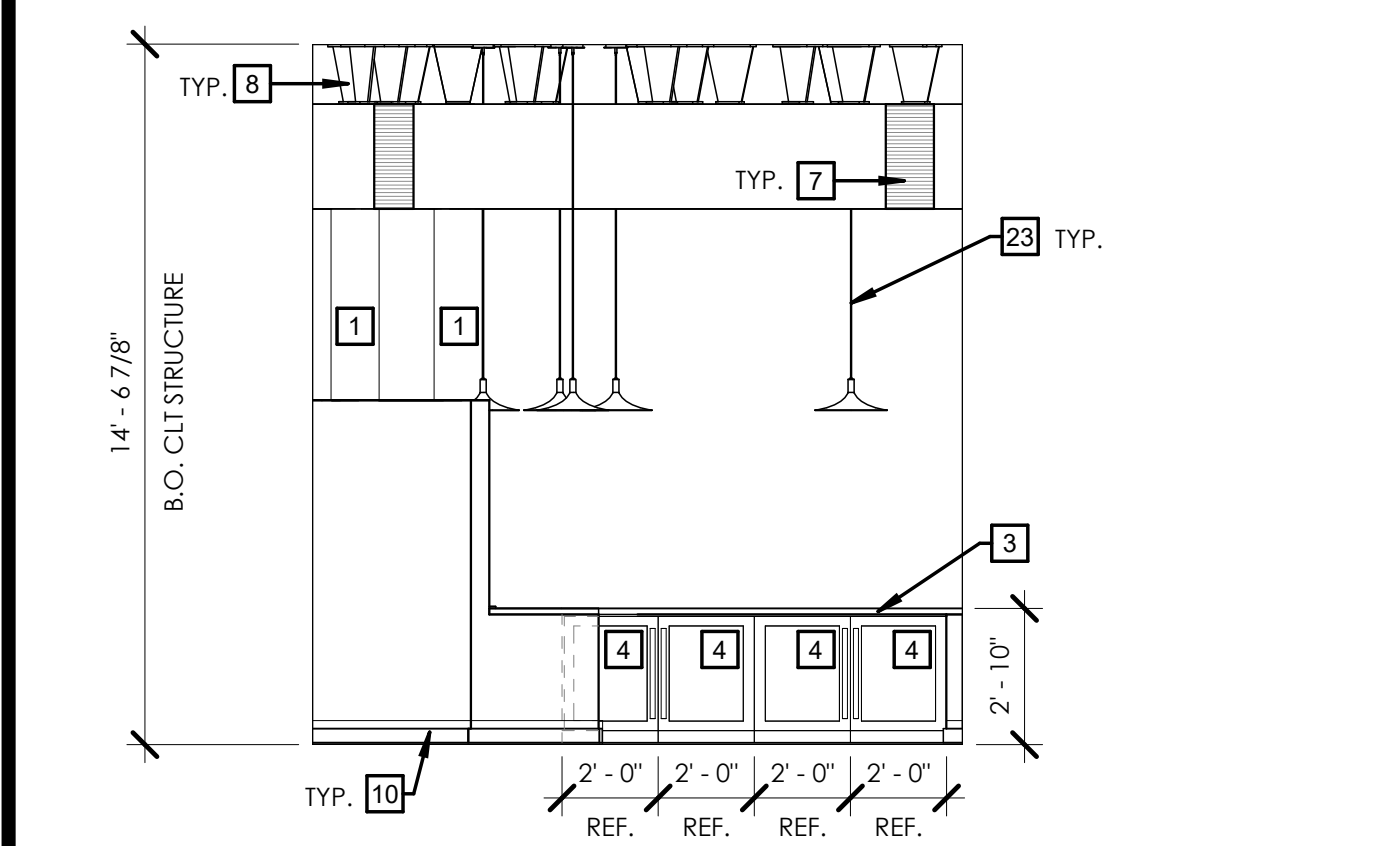
1 COFFEE / VENDING - ENLARGED FLOOR PLAN
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



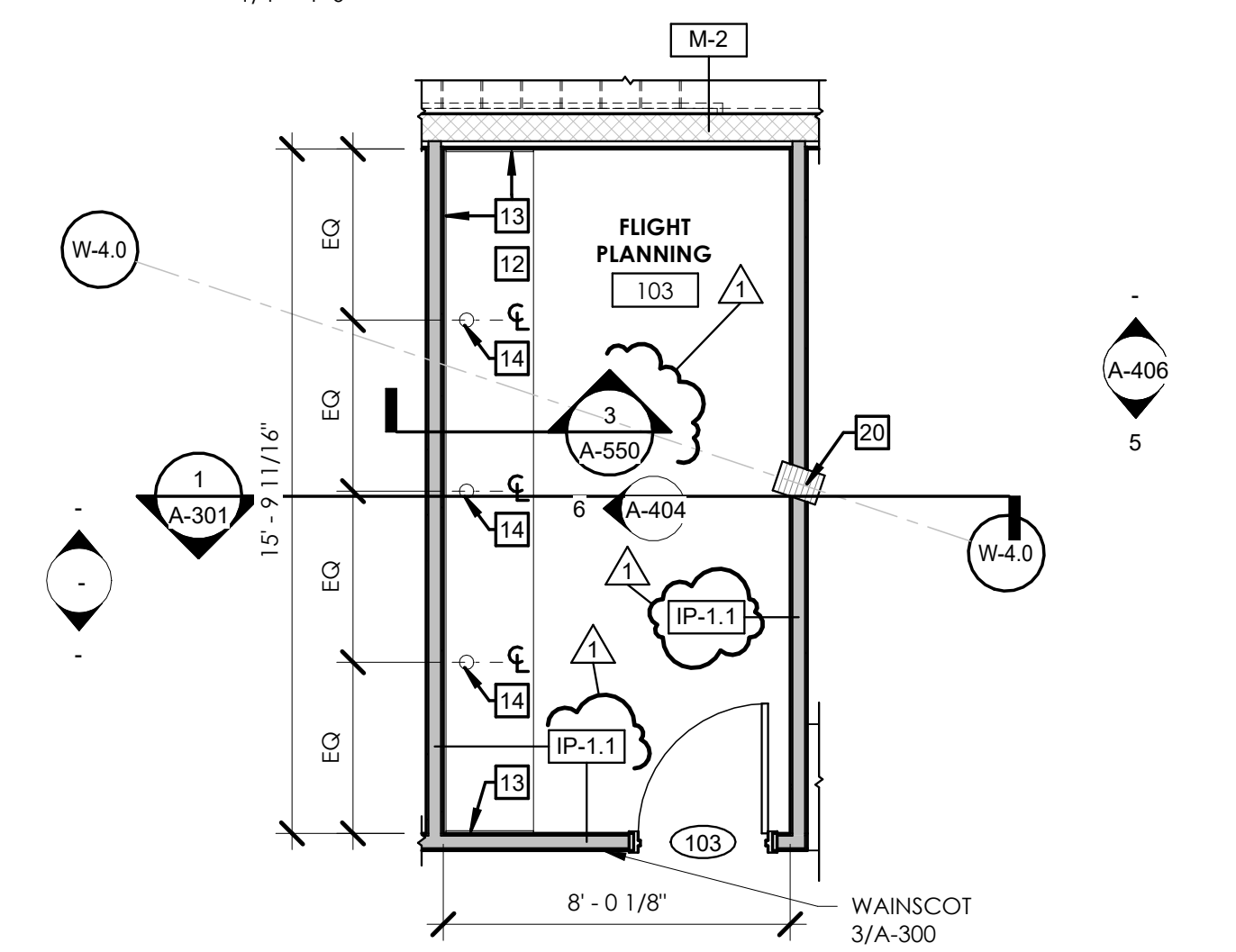
2 COFFEE / VENDING - NORTH ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



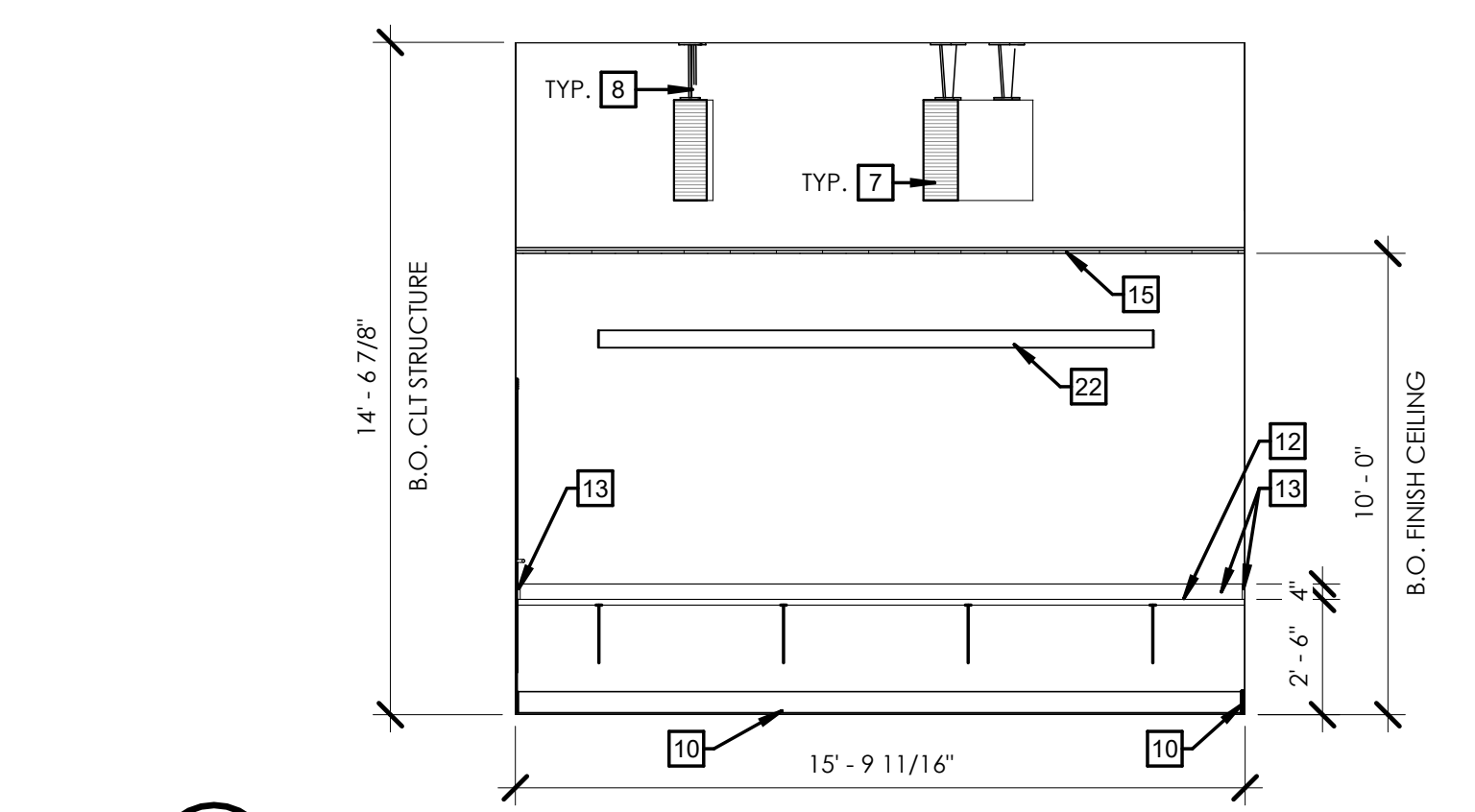
3 COFFEE / VENDING - NORTHEAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



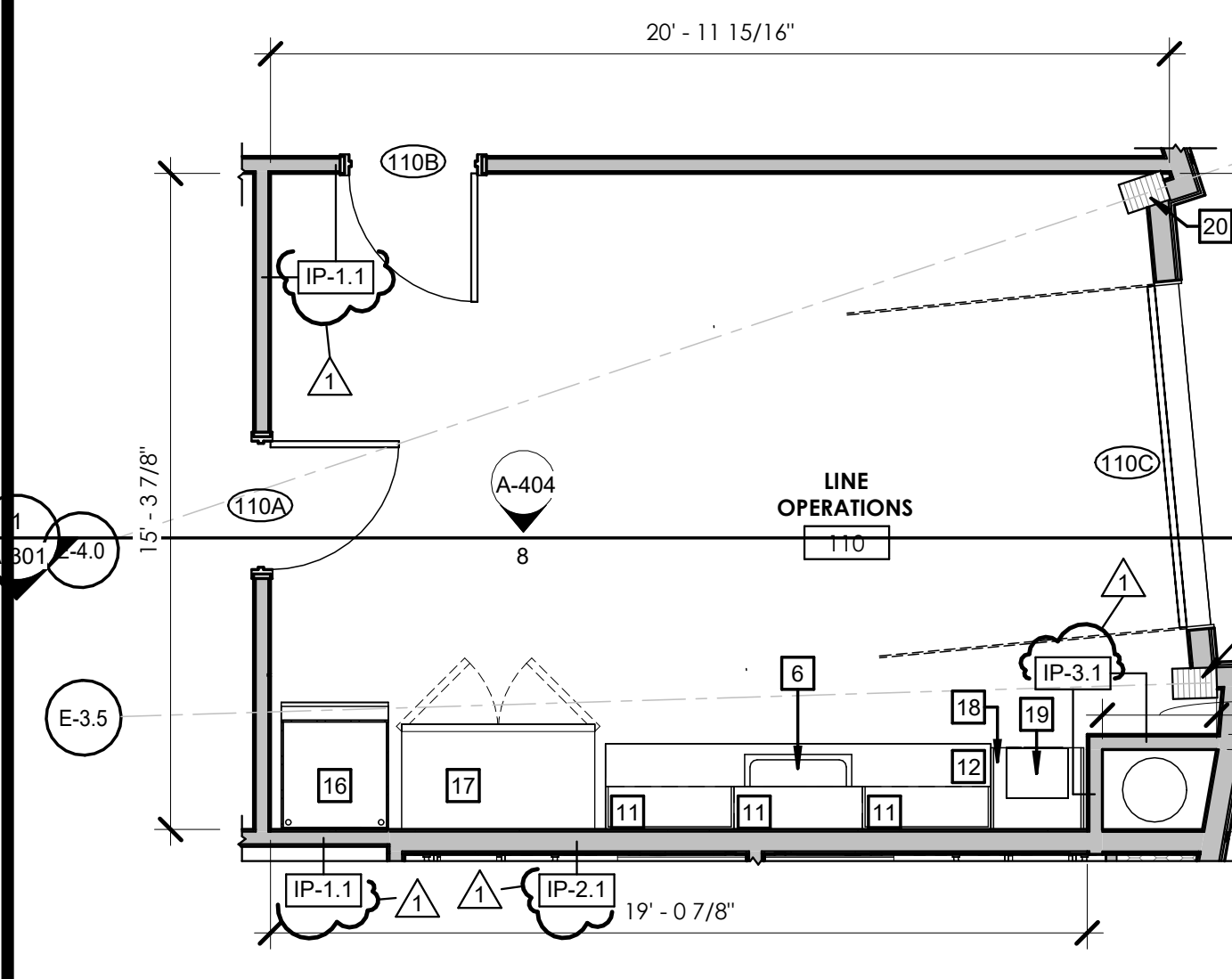
4 COFFEE / VENDING - EAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



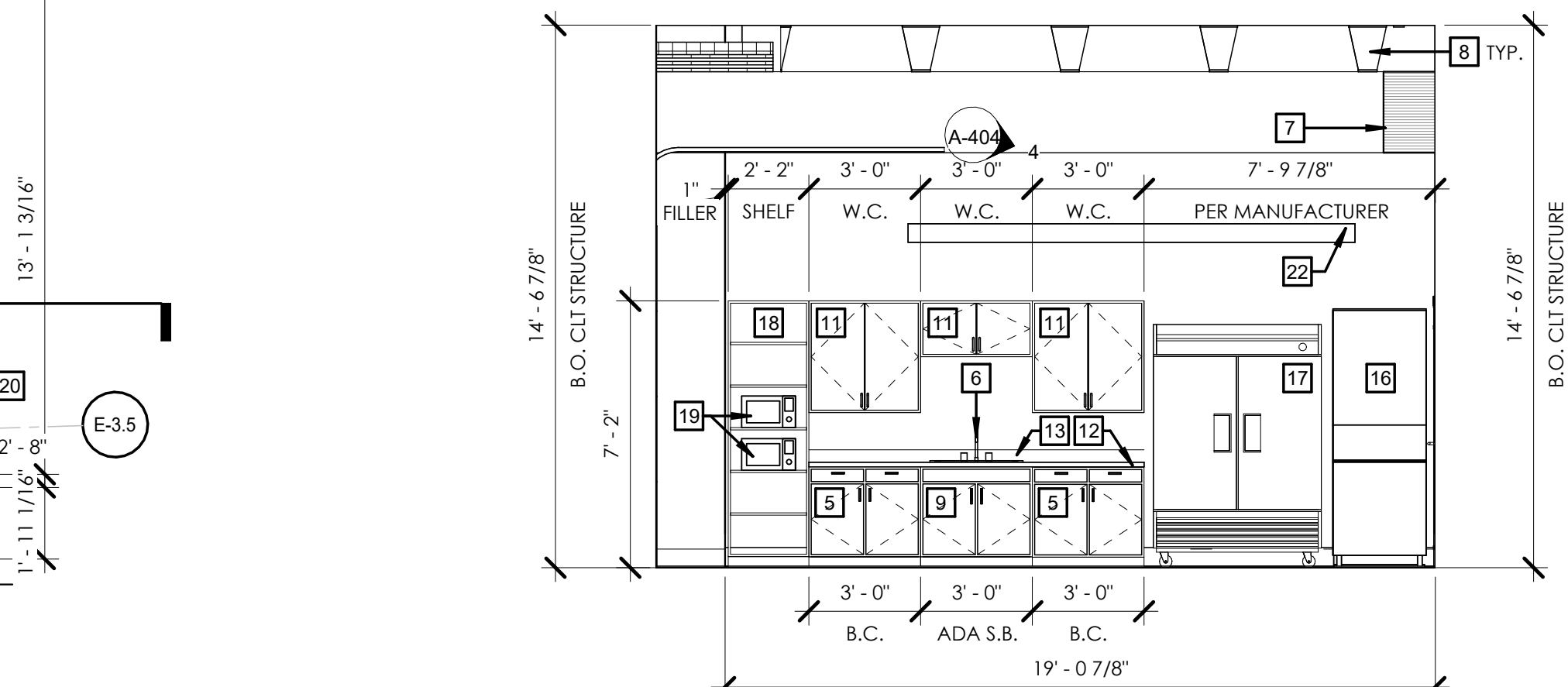
5 FLIGHT PLANNING - ENLARGED FLOOR PLAN
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



6 FLIGHT PLANNING - WEST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



7 LINE OPERATIONS - ENLARGED FLOOR PLAN
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



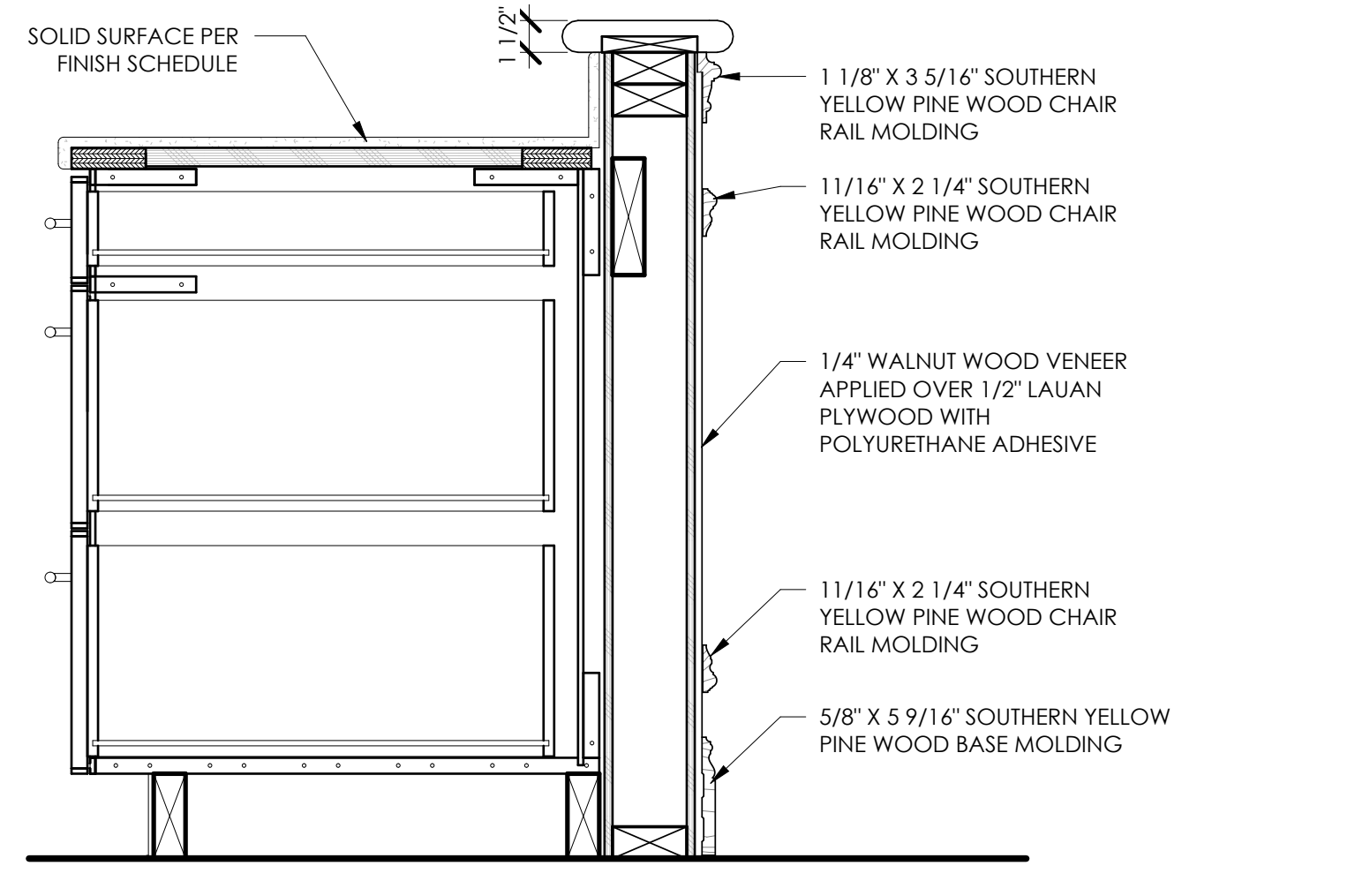
8 LINE OPERATIONS - SOUTH ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"

KEYNOTES - ELEVATIONS (COFFEE / VENDING, FLIGHT PLANNING, & LINE OP)

- 12" DIAMETER ROUND TREE COLUMN; REFER TO STRUCTURAL DRAWINGS
- CAMBRIA BACKSPASH PER FINISH SCHEDULE
- CAMBRIA COUNTERTOP PER FINISH SCHEDULE
- U-LINE 5.3 CUBIC FT ADA UNDERCOUNTER REFRIGERATOR WITH LOCK - BLACK CABINET WITH BLACK GLASS DOOR ADA24RGL - 24" ADA GLASS DOOR REFRIGERATOR OFC
- PLASTIC LAMINATE BASE CABINET WITH (1) ADJ. SHELF; PLASTIC LAMINATE ALL EXPOSED SURFACES WITH HEAVY DUTY CONCEALING HARDWARE
- ADA COMPLIANT 6" DEEP SURFACE-MOUNTED STAINLESS STEEL SINK WITH CHROME FAUCET WITH LEVER HANDLES
- EXPOSED GLULAM BEAM - REFER TO STRUCTURAL DRAWINGS
- S15X50 STEEL CLT SPACERS @ 4'-0" O.C.; REFER TO STRUCTURAL DRAWINGS
- ADA ACCESSIBLE SINK CABINET WITH INTEGRAL TOE-KICK
- WALL BASE PER FINISH SCHEDULE
- PLASTIC LAMINATE WALL CABINET WITH (2) ADJ. SHELF; PLASTIC LAMINATE ALL EXPOSED SURFACES WITH HEAVY DUTY CONCEALING HARDWARE
- SOLID SURFACE COUNTERTOP PER FINISH SCHEDULE
- SOLID SURFACE BACKSPASH PER FINISH SCHEDULE
- ALUMINUM CABLE/DESK GROMMET
- CEILING PER FINISH SCHEDULE
- FREESTANDING ICE MAKER, STAINLESS STEEL, 500 POUNDS, 430 POUNDS STORAGE BIN, AUTO SHUT-OFF, GRAVITY DRAIN, WATER FILTER OFC
- CATERER'S FRIDGE OFC
- OPEN CABINET SHELVES
- MICROWAVE OFC
- EXPOSED GLULAM COLUMN - REFER TO STRUCTURAL DRAWINGS
- HD LED FLAT-SCREEN SMART TELEVISION OFC
- LED UP/DOWN LINEAR COVE WALL MOUNTED FIXTURE
- LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)
- UNDERCOUNTER 52 POUND ICE MACHINE OFC
- COFFEE MAKER, OFC

INTERIOR ELEVATION GENERAL NOTES:

- REFER TO SPECIFICATIONS FOR BASIS OF DESIGN
- ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFOW OWNER FURNISHED, OWNER INSTALL



9 CABINERY SECTION W/ DRAWERS AND WAJNSCOT
 0' 1' 2' 4' 8'
 1/2" = 1'-0"

BID SET

STAMP:

CLIENT:
 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
 PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
 DESIGNER: KATIE EMEKIC, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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INTERIOR ELEVATIONS - COFFEE / VENDING, FLIGHT PLANNING & LINE OPERATIONS
2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

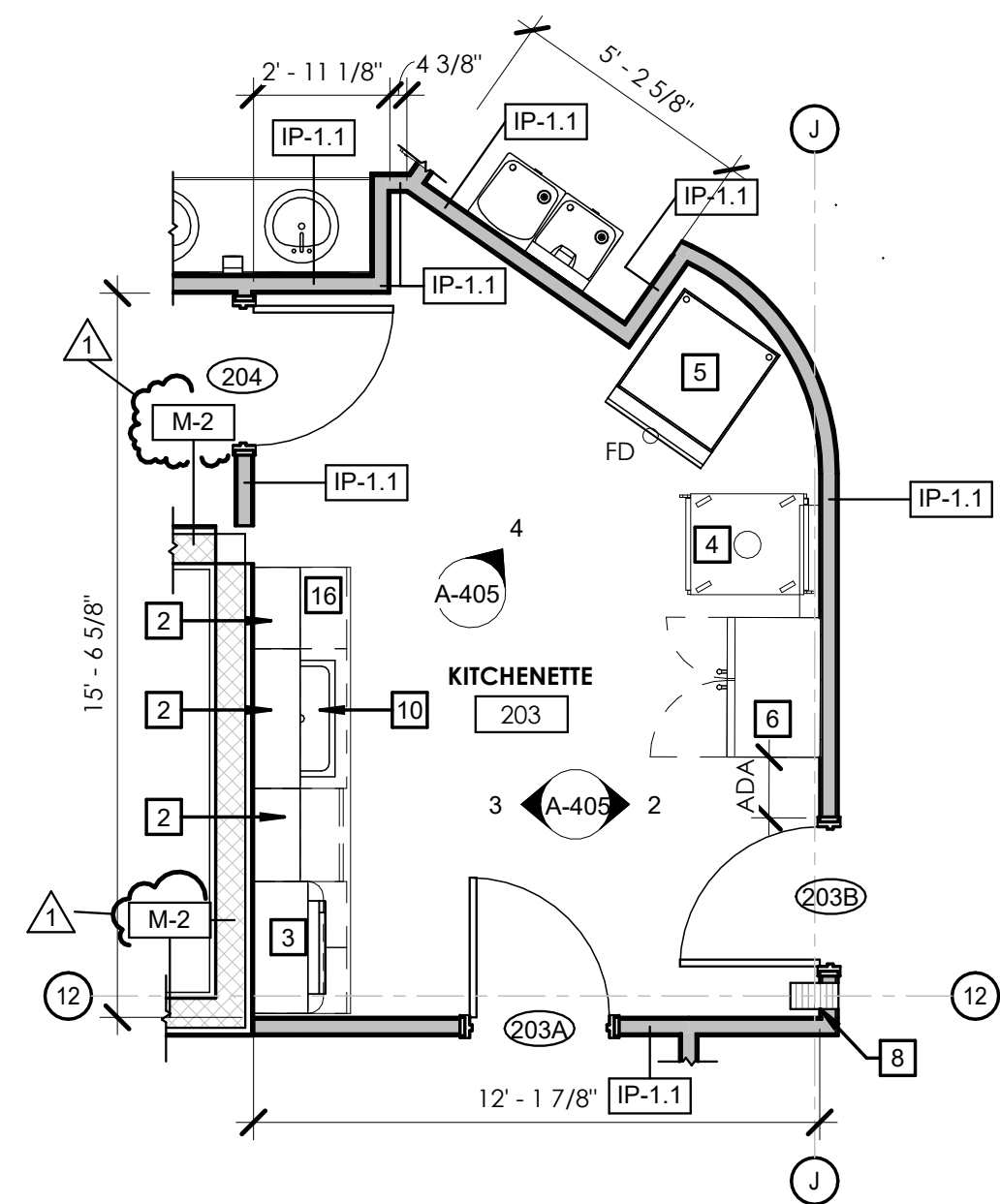
TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

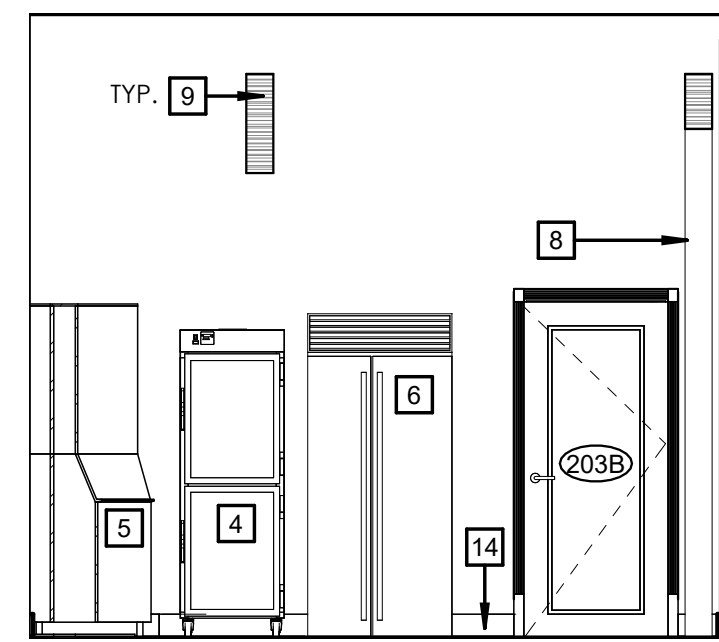
DRAWING NO.:
A-404

DATE:
NOVEMBER 4, 2024

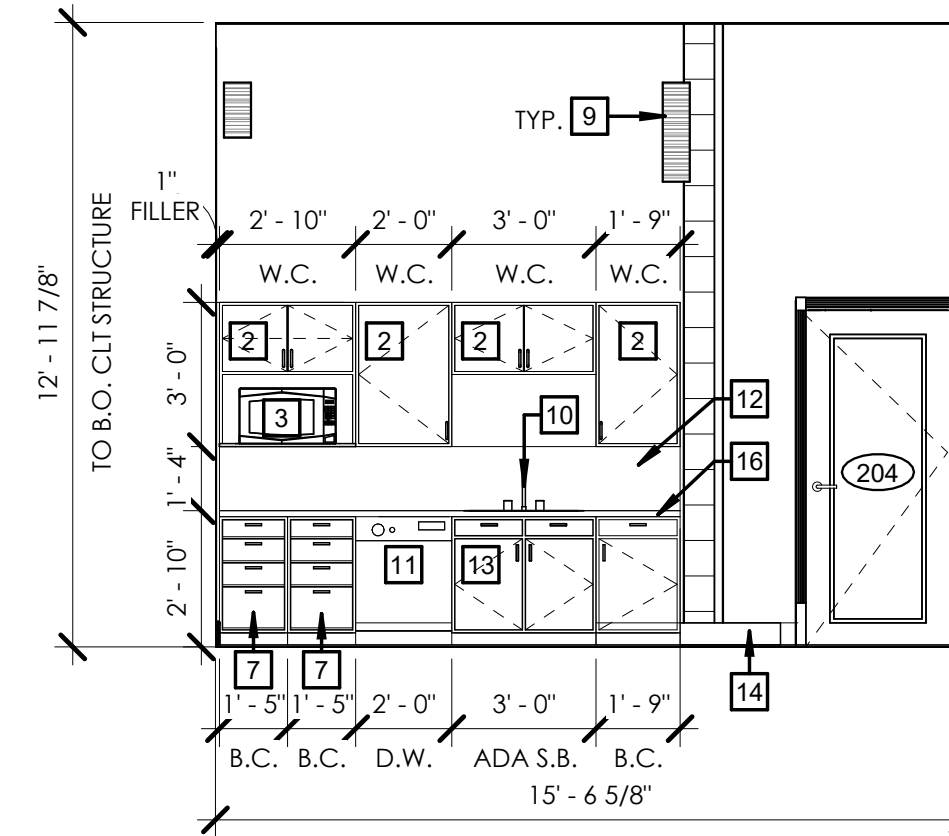
KEYNOTES - ELEVATIONS (KITCHENETTE AND ADMINISTRATIVE CONFERENCE ROOM)	
1	CAMBRIA COUNTERTOP PER FINISH SCHEDULE
2	PLASTIC LAMINATE WALL CABINET WITH (2) ADJ. SHELF; PLASTIC LAMINATE ALL EXPOSED SURFACES WITH HEAVY DUTY CONCEALING HARDWARE
3	MICROWAVE SHELF AND 1.4 CUBIC FT COUNTERTOP MICROWAVE, STAINLESS STEEL WITH CERAMIC ENAMEL INTERIOR OFOI
4	INSULATED 22 GA STAINLESS STEEL HOT CABINET WITH DUTCH DOORS, SOLID STATE ELECTRONIC CONTROL OFOI
5	FREESTANDING ICE MAKER, STAINLESS STEEL, 500 POUNDS, 430 POUNDS STORAGE BIN, AUTO SHUT-OFF, GRAVITY DRAIN, WATER FILTER OFOI
6	24.9 CUBIC FT SIDE BY SIDE REFRIGERATOR / FREEZER, STAINLESS STEEL, ADAPTIVE DEFROST, SPILL GUARD GLASS SHELVES OFOI
7	PLASTIC LAMINATE BASE CABINET WITH (1) ADJ. SHELF; PLASTIC LAMINATE ALL EXPOSED SURFACES WITH HEAVY DUTY CONCEALING HARDWARE
8	EXPOSED GLULAM COLUMN - REFER TO STRUCTURAL DRAWINGS
9	EXPOSED GLULAM BEAM - REFER TO STRUCTURAL DRAWINGS
10	ADA COMPLIANT 6" DEEP SURFACE-MOUNTED STAINLESS STEEL SINK WITH CHROME FAUCET WITH LEVER HANDLES
11	HIGH TEMPERATURE UNDER COUNTER COMMERCIAL DISHWASHER, STAINLESS STEEL, FULLY AUTOMATIC CYCLE OFCI
12	SOLID SURFACE BACKSPLASH PER FINISH SCHEDULE
13	ADA ACCESSIBLE SINK CABINET WITH INTEGRAL TOE-KICK
14	WALL BASE PER FINISH SCHEDULE
15	LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)
16	SOLID SURFACE COUNTERTOP PER FINISH SCHEDULE



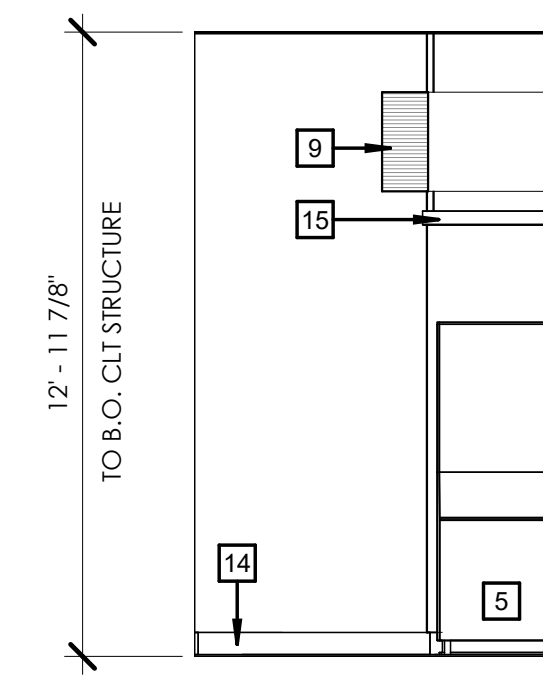
1 KITCHENETTE - ENLARGED FLOOR PLAN
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



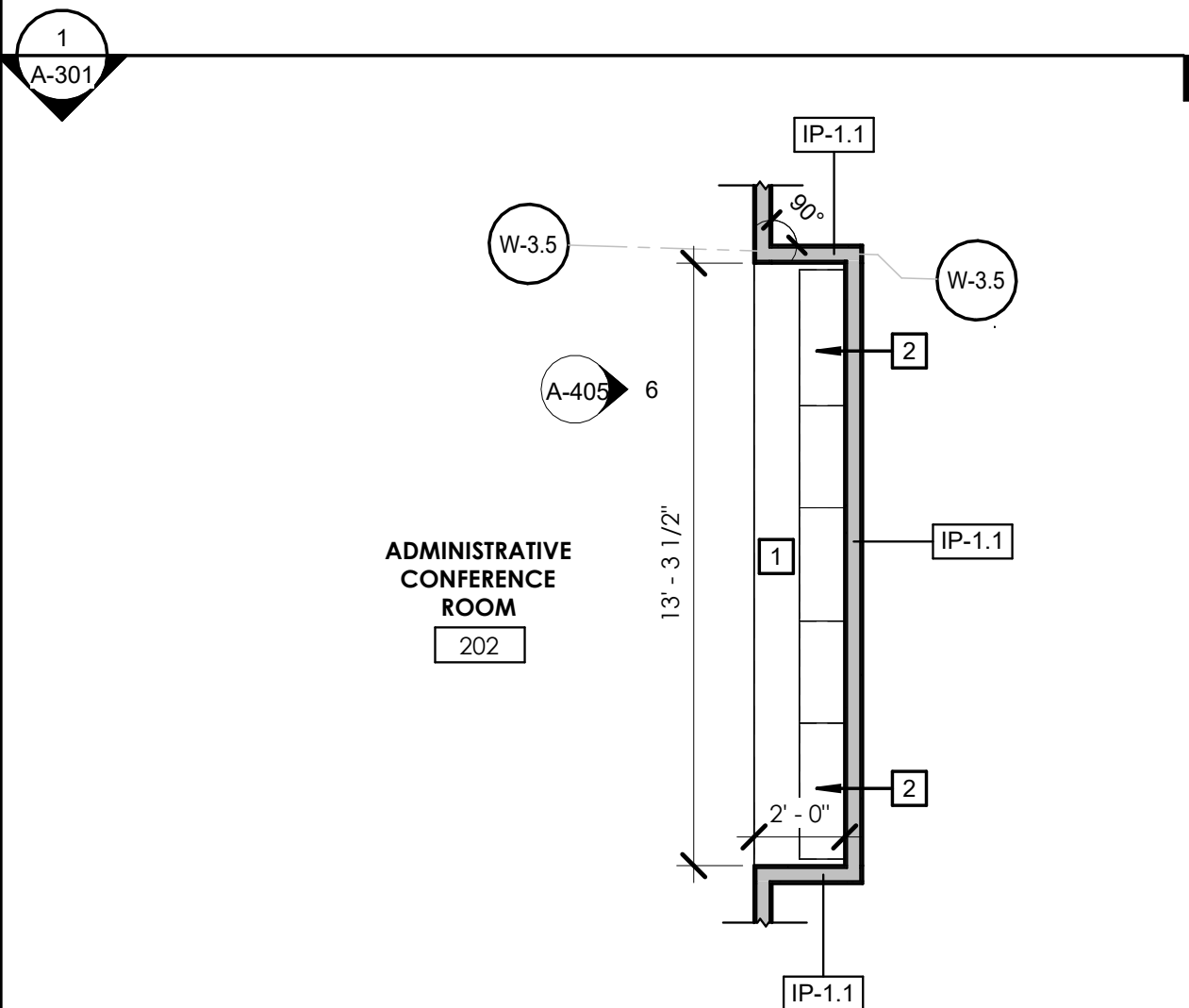
2 KITCHENETTE - EAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



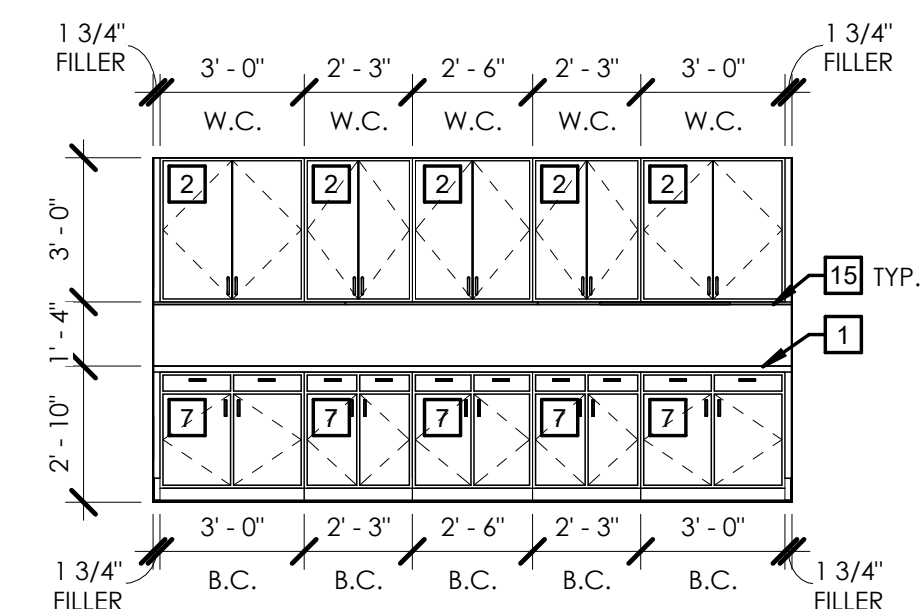
3 KITCHENETTE - WEST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



4 KITCHENETTE - NORTHEAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



5 ADMIN. CONFERENCE ROOM - ENLARGED PLAN
 0' 1' 2' 4' 8'
 1/4" = 1'-0"



6 ADMIN. CONFERENCE ROOM - EAST ELEVATION
 0' 1' 2' 4' 8'
 1/4" = 1'-0"

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 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COCA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER STAN PRICE, PE
 PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
 DESIGNER KATIE EMERICK, ASSOC., AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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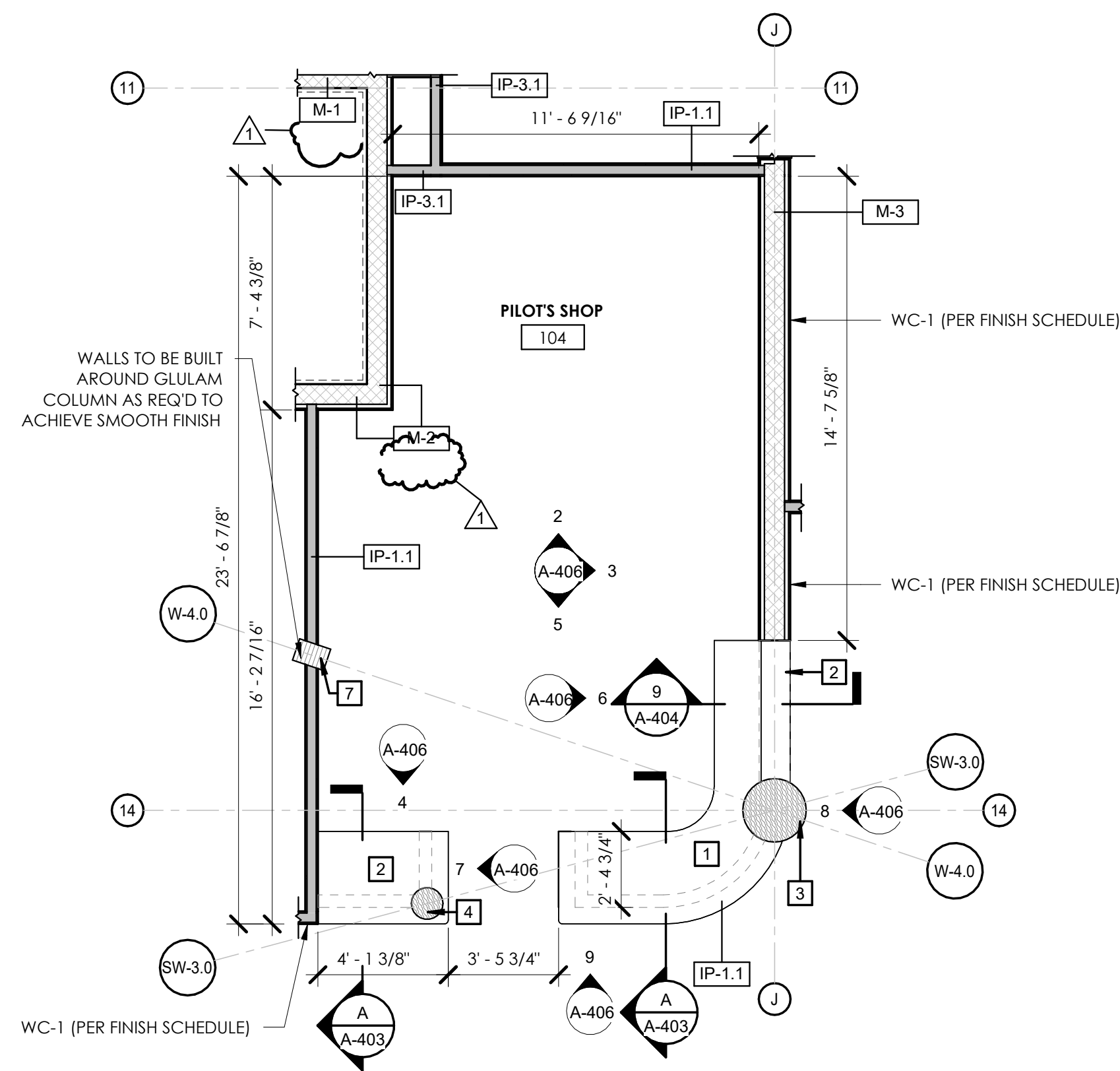
INTERIOR ELEVATIONS - KITCHENETTE AND ADMIN. CONFERENCE ROOM
2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: 20202946.010A

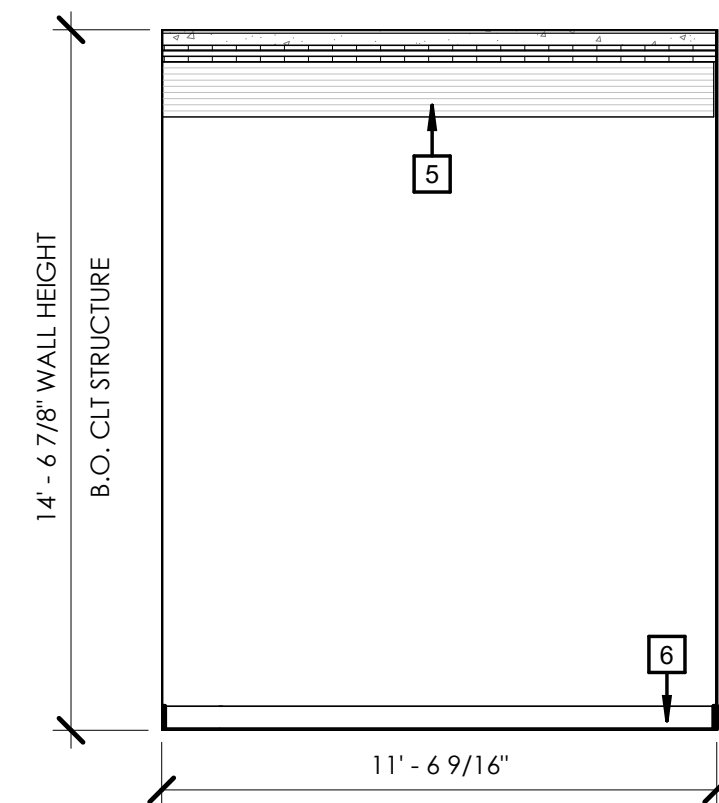
DRAWING NO.: **A-405**

DATE: NOVEMBER 4, 2024



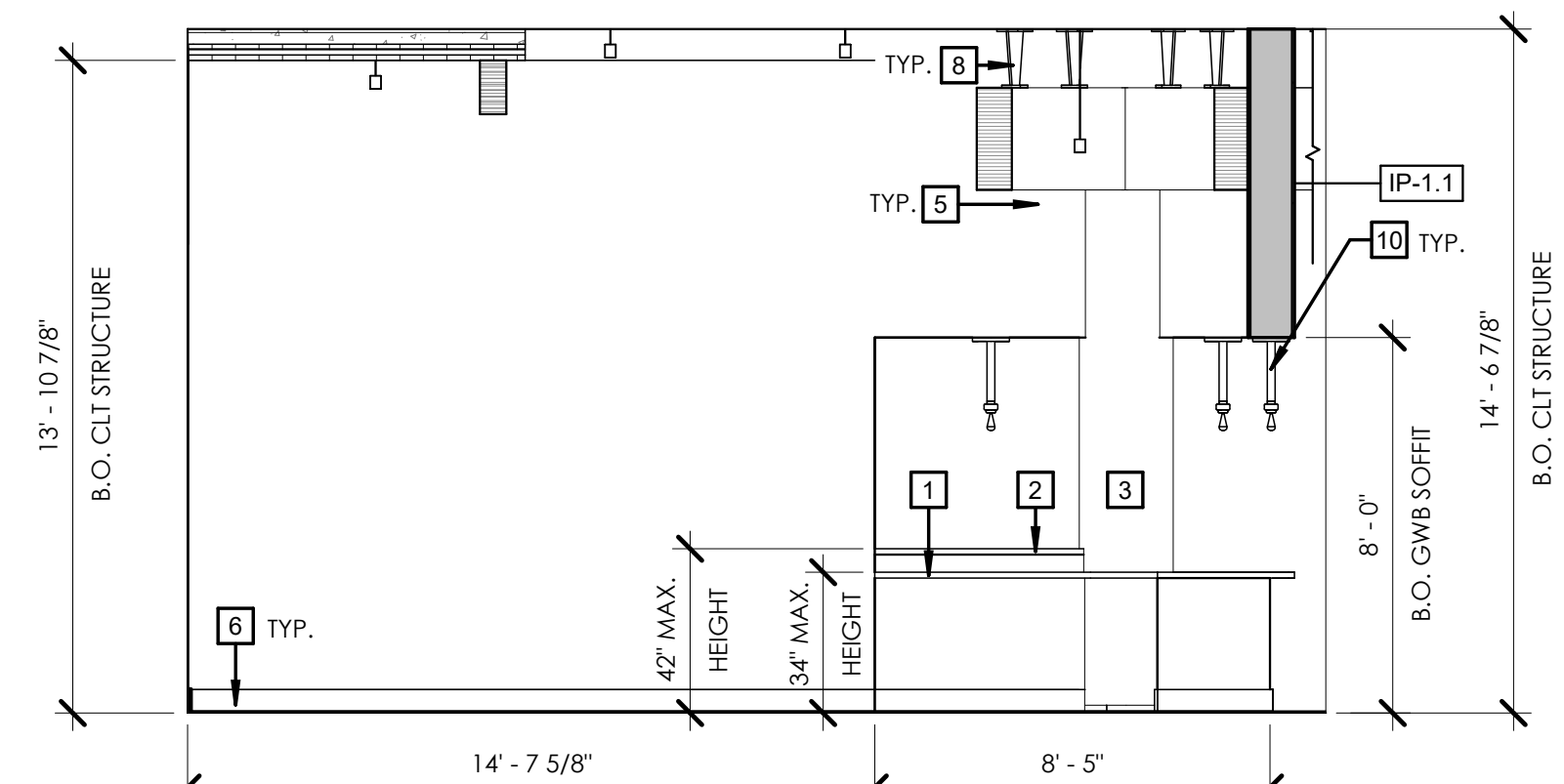
1 PILOT'S SHOP - ENLARGED FLOOR PLAN

0' 1' 2' 4' 8'
1/4" = 1'-0"



2 PILOT'S SHOP - NORTH ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"



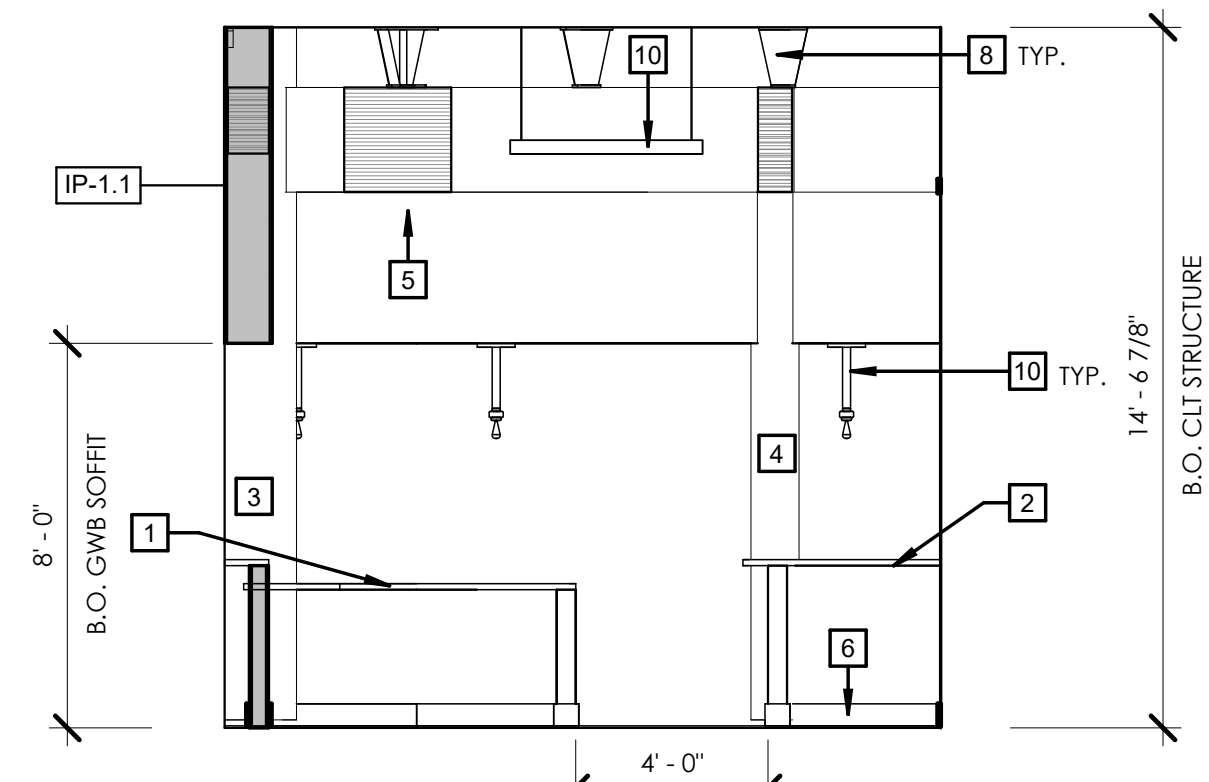
3 PILOT'S SHOP - EAST ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"

KEYNOTES - ELEVATIONS (PILOT'S SHOP)

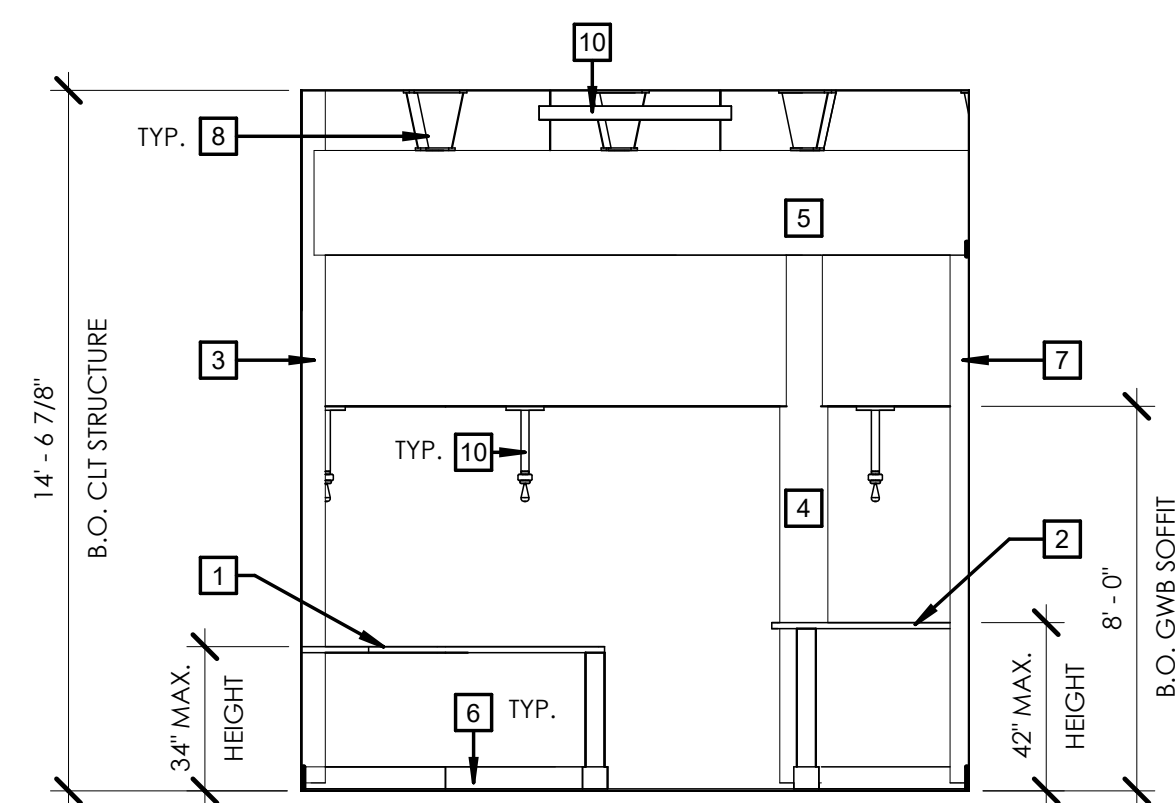
1	CAMBRIA SERVICE COUNTER PER FINISH SCHEDULE; 34" HIGH MAX. ADA COMPLIANT FOR PARALLEL APPROACH
2	CAMBRIA SERVICE COUNTER PER FINISH SCHEDULE; 42" HIGH MAX.
3	24" DIAMETER ROUND TREE COLUMN - REFER TO STRUCTURAL DRAWINGS; COUNTERTOP AND KNEE WALL TO BE BUILT AROUND COLUMN AS REQ'D TO ACHIEVE SMOOTH FINISH
4	12" DIAMETER ROUND TREE COLUMN; REFER TO STRUCTURAL DRAWINGS
5	EXPOSED GLULAM BEAM; REFER TO STRUCTURAL DRAWINGS
6	WALL BASE PER FINISH SCHEDULE
7	EXPOSED GLULAM COLUMN - REFER TO STRUCTURAL DRAWINGS
8	S15X50 STEEL CLT SPACERS @ 4'-0" O.C.; REFER TO STRUCTURAL DRAWINGS
9	HD LED FLAT-SCREEN SMART TELEVISION, OFCI
10	LIGHT FIXTURE (SEE ELECTRICAL DRAWINGS)

- INTERIOR ELEVATION GENERAL NOTES:**
- REFER TO SPECIFICATIONS FOR BASIS OF DESIGN
 - ABBREVIATIONS
 - OFCI OWNER FURNISHED, CONTRACTOR INSTALL
 - OFOI OWNER FURNISHED, OWNER INSTALL



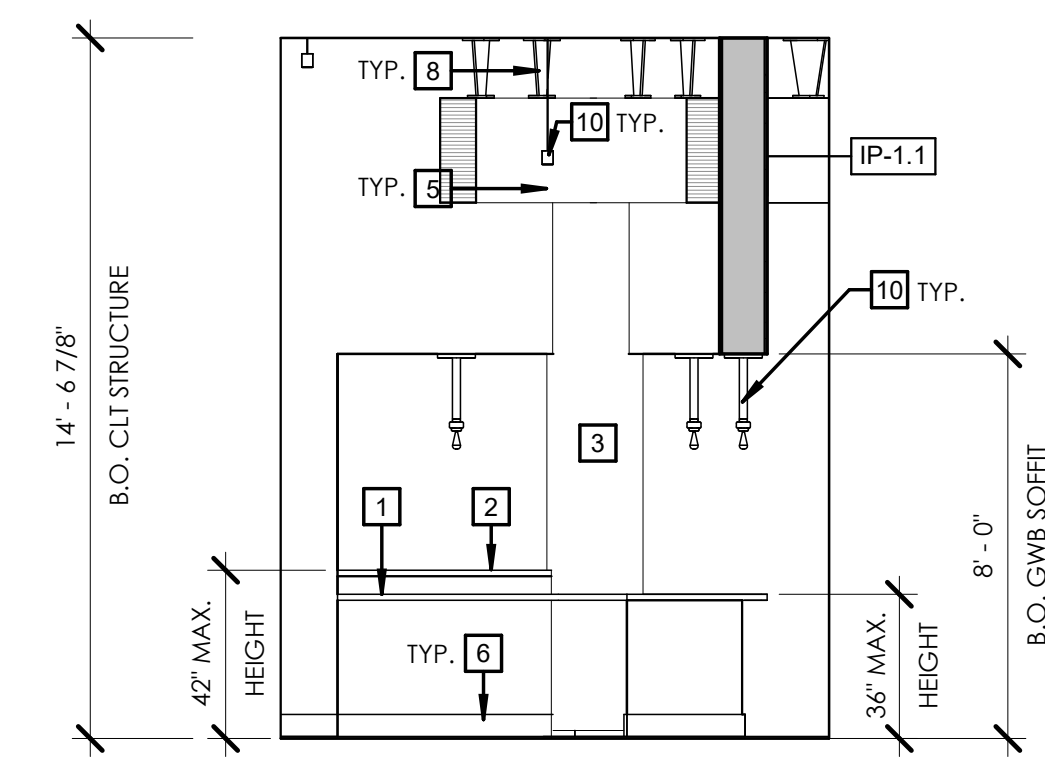
4 PILOT'S SHOP CASEWORK - SOUTH ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"



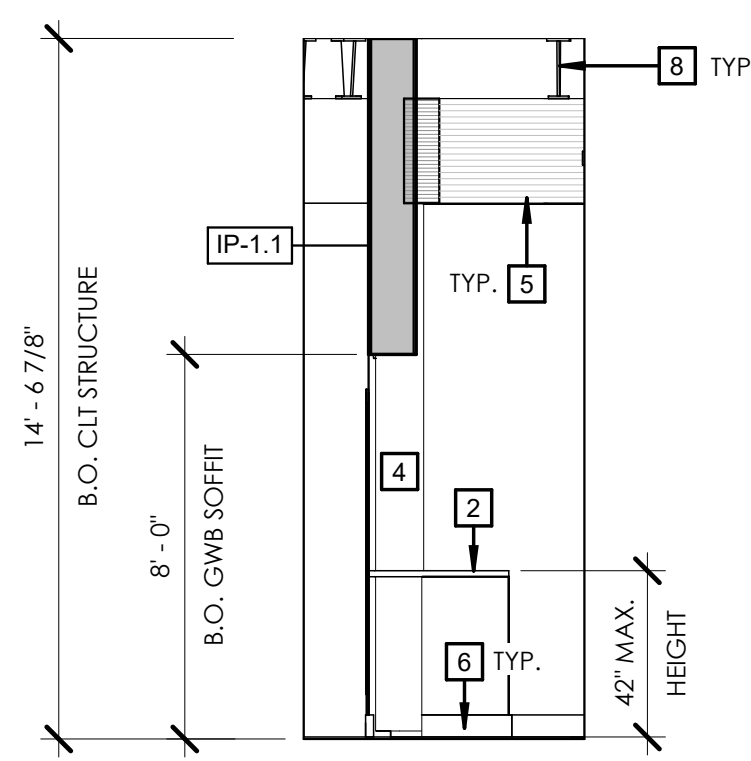
5 PILOT'S SHOP - SOUTH ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"



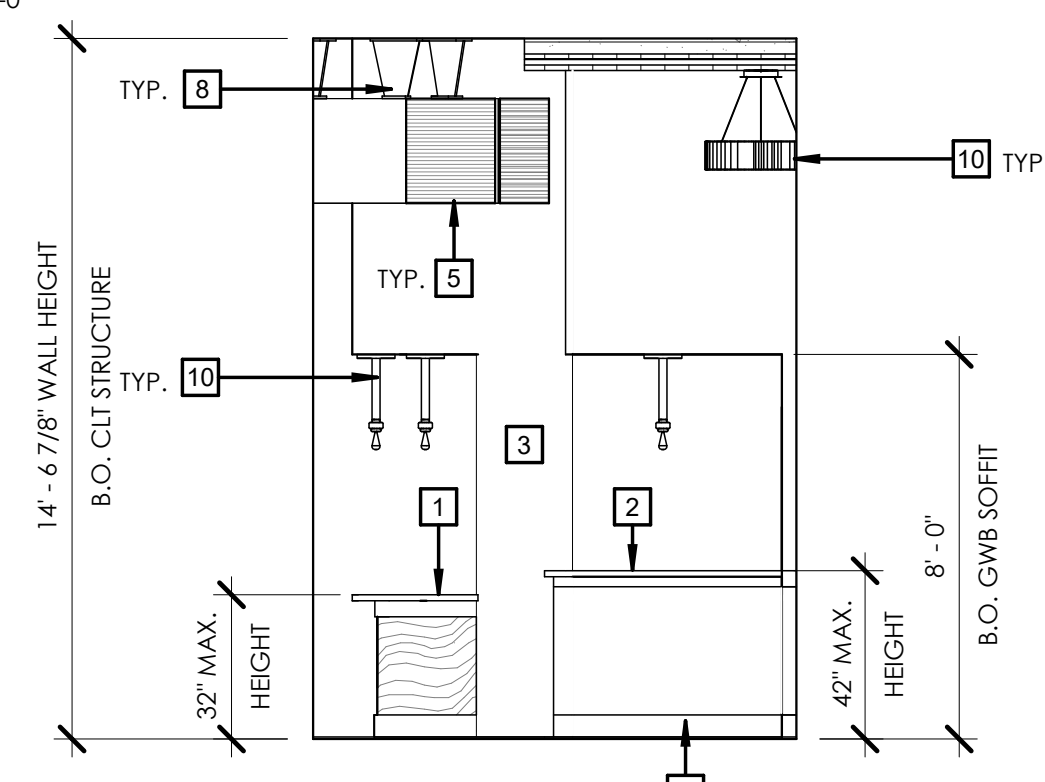
6 PILOT'S SHOP - CASEWORK EAST ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"



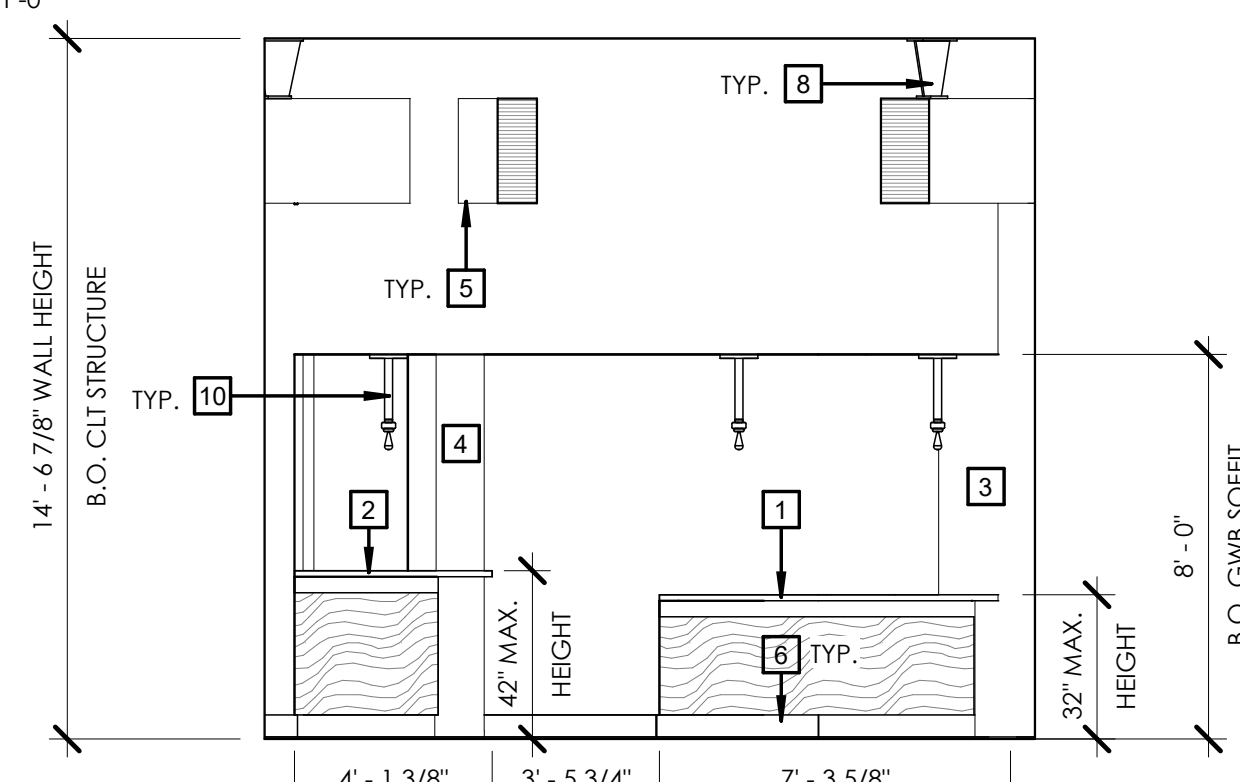
7 PILOT'S SHOP CASEWORK - WEST ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"



8 PILOT'S SHOP CASEWORK - WEST ELEVATION 2

0' 1' 2' 4' 8'
1/4" = 1'-0"



9 PILOT'S SHOP CASEWORK - NORTH ELEVATION

0' 1' 2' 4' 8'
1/4" = 1'-0"

BID SET

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MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COCA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE EMEKIC, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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INTERIOR ELEVATIONS - PILOT'S SHOP

2178 FLIGHTLINE AVE

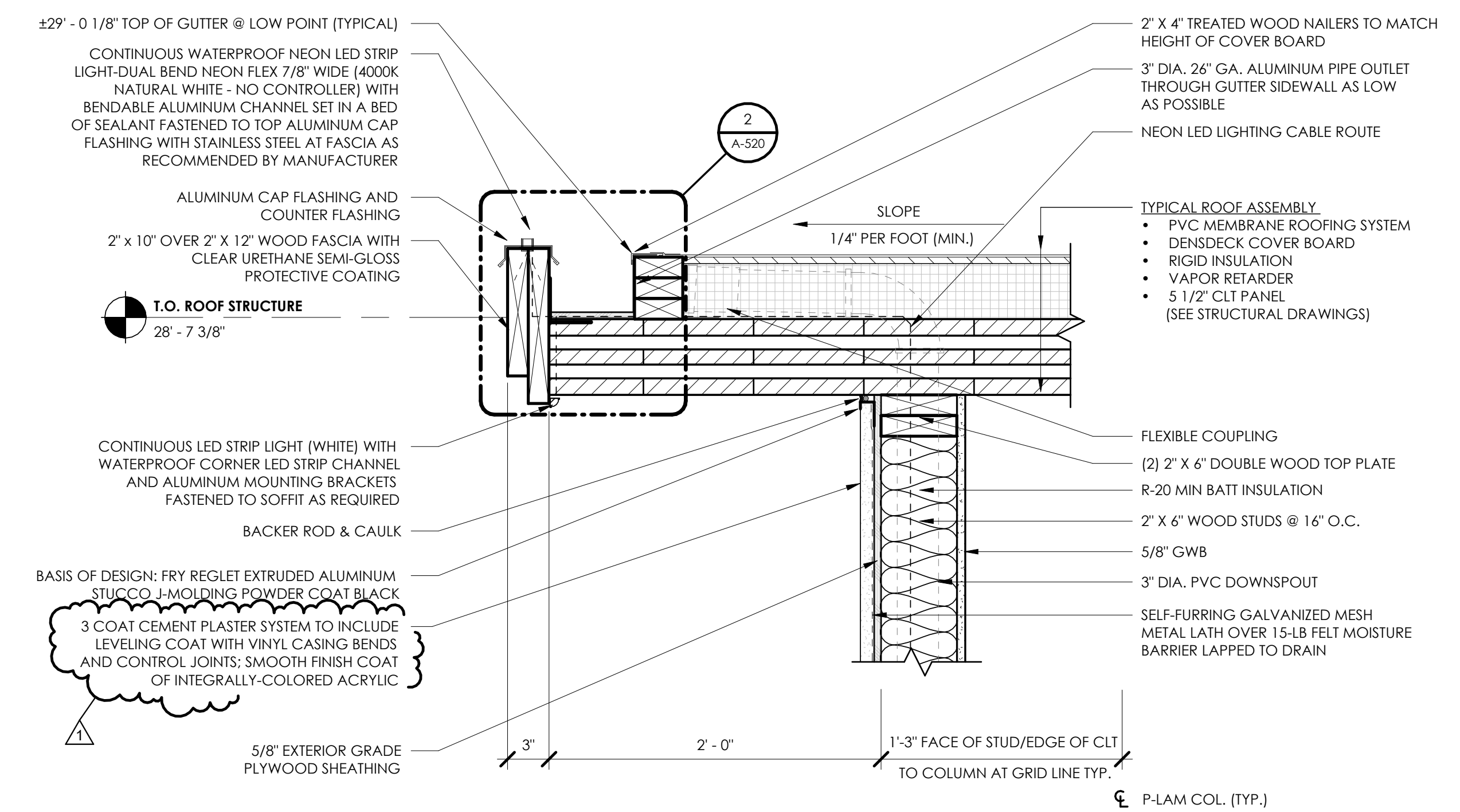
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-406

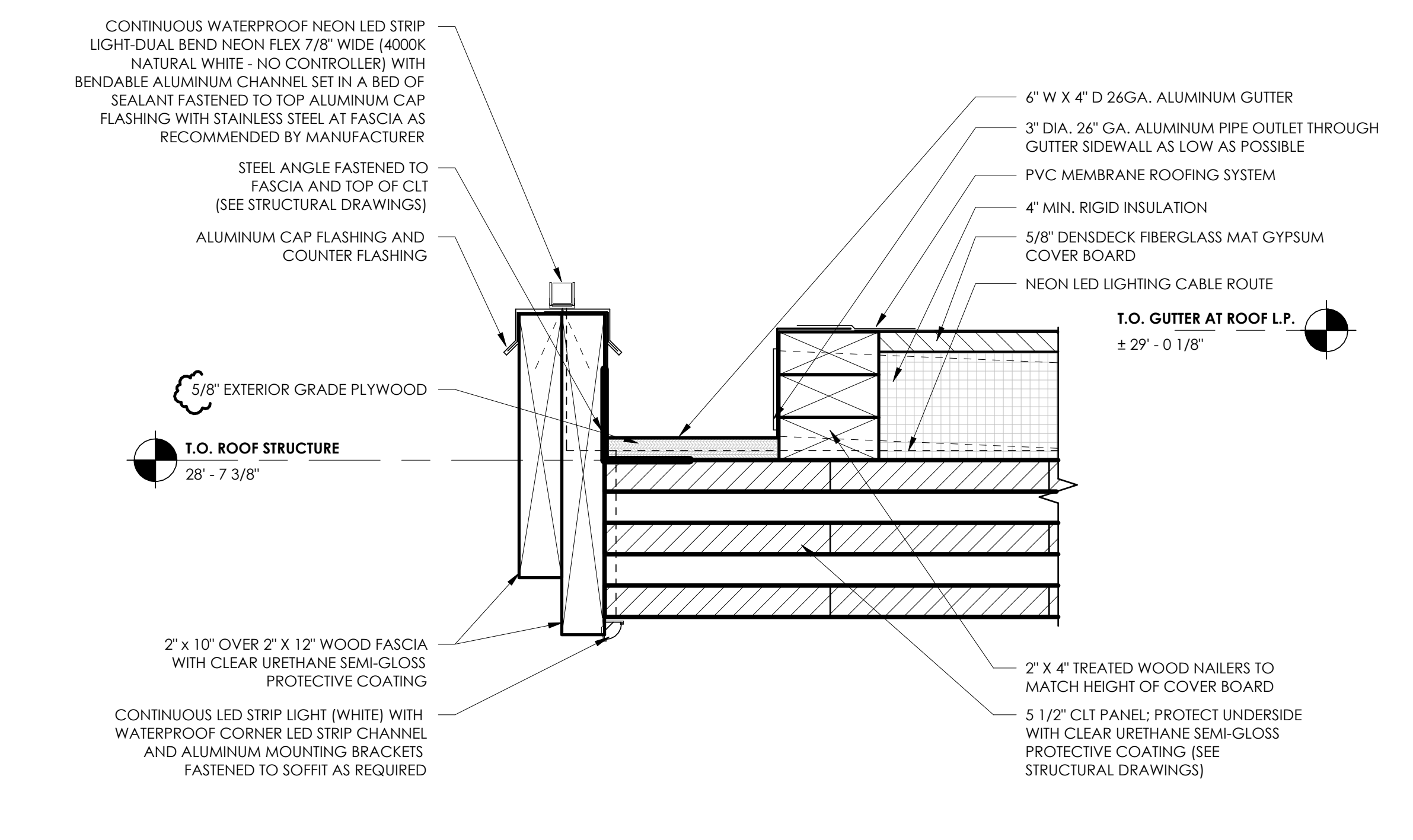
DATE:
NOVEMBER 4, 2024



1 TYP. SOFFIT DETAIL

0" 3" 6" 1' 2'

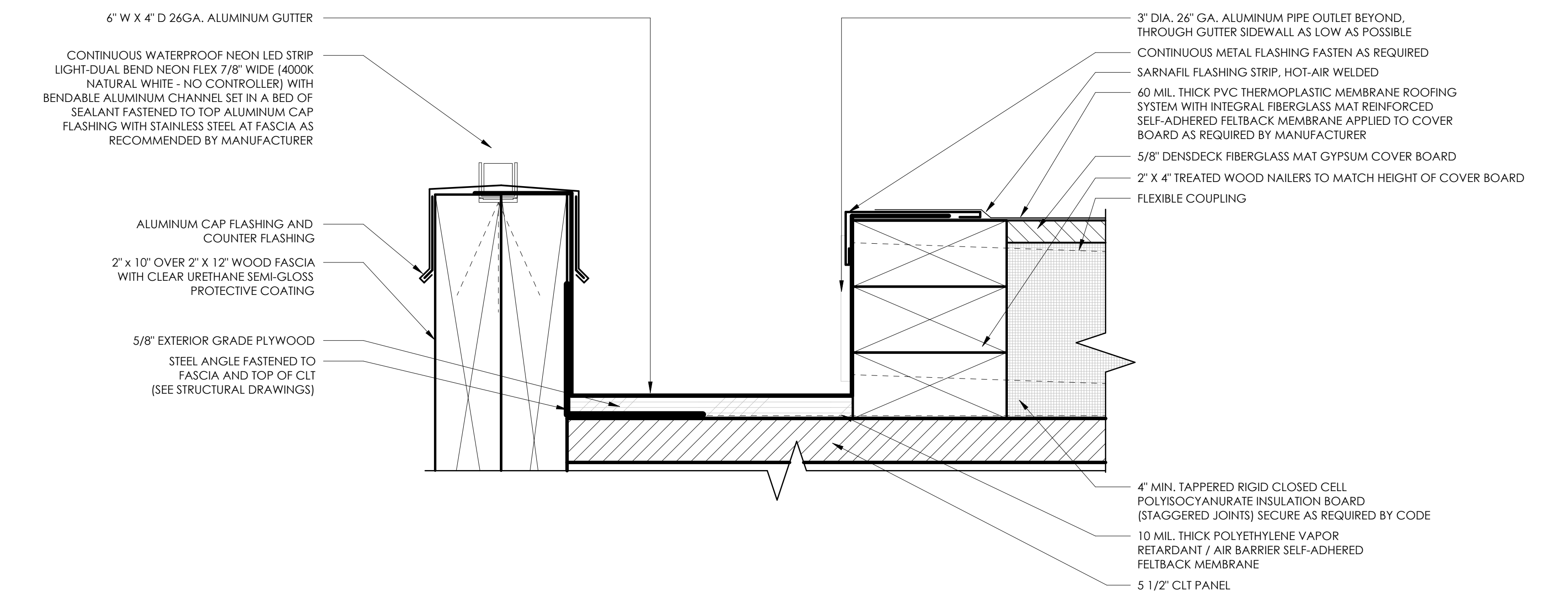
1 1/2" = 1'-0"



2 TYP. INSET GUTTER DETAIL

0" 3" 6" 1'

3" = 1'-0"



3 TYP. GUTTER FLASHING

0" 3" 6"

6" = 1'-0"

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COIA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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ROOFING DETAILS

2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
20202946.010A

DRAWING NO.:
A-520

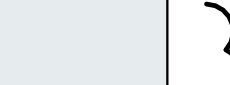
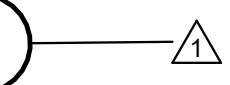
DATE:
NOVEMBER 4, 2024

ROOM FINISH SCHEDULE table with columns: ROOM #, ROOM NAME, FLOOR, BASE, NORTH WALL, EAST WALL, SOUTH WALL, WEST WALL, CEILING, NOTES. Includes T.O. SLAB AT FIRST FLOOR and SECOND FLOOR.

FINISH MATERIAL LEGEND table with columns: MATERIAL ID, DESCRIPTION, BASIS OF DESIGN. Lists items like BULLNOSE TILE, CARPET TILE, CERAMIC TILE, PLASTIC LAMINATE, etc.

FINISH MATERIAL LEGEND table with columns: MATERIAL ID, DESCRIPTION, BASIS OF DESIGN. Lists items like EPOXY-URETHANE CONCRETE, GYPSUM WALL BOARD, LUXURY VINYL TILE, etc.

FINISH MATERIAL LEGEND table with columns: MATERIAL ID, DESCRIPTION, BASIS OF DESIGN. Lists items like TIN CEILING TILE, TONGUE AND GROOVE CEILING, UNFINISHED CONCRETE, etc.



BID SET

STAMP:

CLIENT: MACON-BIBB COUNTY 700 POPLAR ST. MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 ST. AUGUSTINE, FL 32095 (904) 257-6106

PROJECT MANAGER: STAN PRICE, PE PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA DESIGNER: KATE EMICK, ASSOC. AIA

Table with columns: NO., DATE, BY, DESCRIPTION. Row 1: 1, 11/18/24, SR, AL, JRT, ADDENDUM #1.

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FINISH SCHEDULE

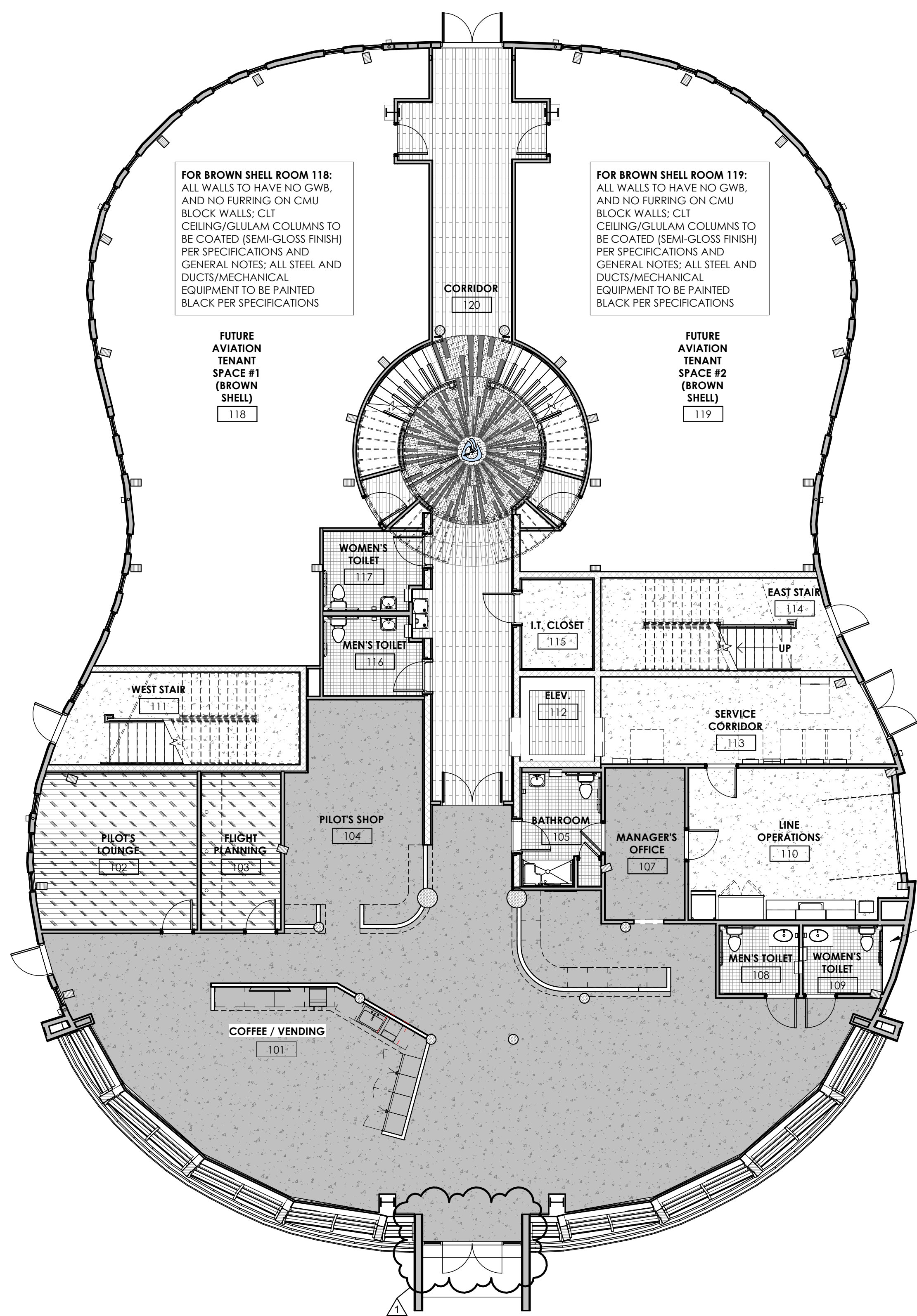
2178 FLIGHTLINE AVE CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON COUNTY: BIBB STATE: GEORGIA

20202946.010A

A-600

NOVEMBER 4, 2024



FOR BROWN SHELL ROOM 118:
 ALL WALLS TO HAVE NO GWB,
 AND NO FURRING ON CMU
 BLOCK WALLS; CLT
 CEILING/GLULAM COLUMNS TO
 BE COATED (SEMI-GLOSS FINISH)
 PER SPECIFICATIONS AND
 GENERAL NOTES; ALL STEEL AND
 DUCTS/MECHANICAL
 EQUIPMENT TO BE PAINTED
 BLACK PER SPECIFICATIONS

FOR BROWN SHELL ROOM 119:
 ALL WALLS TO HAVE NO GWB,
 AND NO FURRING ON CMU
 BLOCK WALLS; CLT
 CEILING/GLULAM COLUMNS TO
 BE COATED (SEMI-GLOSS FINISH)
 PER SPECIFICATIONS AND
 GENERAL NOTES; ALL STEEL AND
 DUCTS/MECHANICAL
 EQUIPMENT TO BE PAINTED
 BLACK PER SPECIFICATIONS

FUTURE
 AVIATION
 TENANT
 SPACE #1
 (BROWN
 SHELL)
 118

FUTURE
 AVIATION
 TENANT
 SPACE #2
 (BROWN
 SHELL)
 119

SEE SHEET A-401 FOR TILED SHELF

- FINISH PLAN GENERAL NOTES:**
- ALL CERAMIC TILE FLOORING TO BE SET IN DRYSET MORTAR.
 - ALL INTERIOR EXPOSED WOOD TO RECEIVE 2 COATS CLEAR OIL-BASED POLYURETHANE SEMI-GLOSS FINISH.

FLOOR FINISH LEGEND

- 22 OZ/SY WEIGHT MIN., PATTERN LOOP CARPET TILE (CPT-1)
- LUXURY VINYL TILE (LVT-1)
- LUXURY VINYL TILE (LVT-1) IN ROTUNDA, PROVIDE LAYOUT AS SHOWN
- LUXURY VINYL TILE (LVT-2) IN ROTUNDA, PROVIDE LAYOUT AS SHOWN
- CERAMIC TILE (CT-1 — CT-4)
- UNFINISHED CONCRETE (UC-1)
- BASIS OF DESIGN: SHERWIN WILLIAMS ACRYDUR 4503 TERRAZZO ACRYLIC SEALER TO BE CLEAR (SC-1)
- BASIS OF DESIGN: MAXXON COMMERCIAL THREE-COAT SYSTEM OVER SOUND CONTROL TO BE CLEAR (SC-2)
- BASIS OF DESIGN: DUR-A-FLEX REFLEXIONS FOUR-COAT SYSTEM TO INCLUDE FOUR COLORS AS SELECTED BY OWNER (EUC-1)
- BASIS OF DESIGN: DUR-A-FLEX DUR-A-GLAZE GRIND AND SEAL SYSTEM WITH ULTRA-CLEAR TO BE CLEAR (EUC-2)
- BALCONY FINISH SURFACE BASIS OF DESIGN: TILETECH 24" X 24" X 3/4" PORCELAIN PAVER AND WIND UPLIFT HYBRID PEDESTAL SYSTEM (TP); PAVES TO HAVE SLIP-RESISTANT FINISH
- BALCONY PERIMETER SURFACE BASIS OF DESIGN: MSI TRAVERTINE BULLNOSE COPING. PROVIDE LAYOUT AS SHOWN

BID SET

CLIENT:
 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER: STAN PRICE, PE
 PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
 DESIGNER: KATIE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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FIRST FLOOR FINISH PLAN

2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

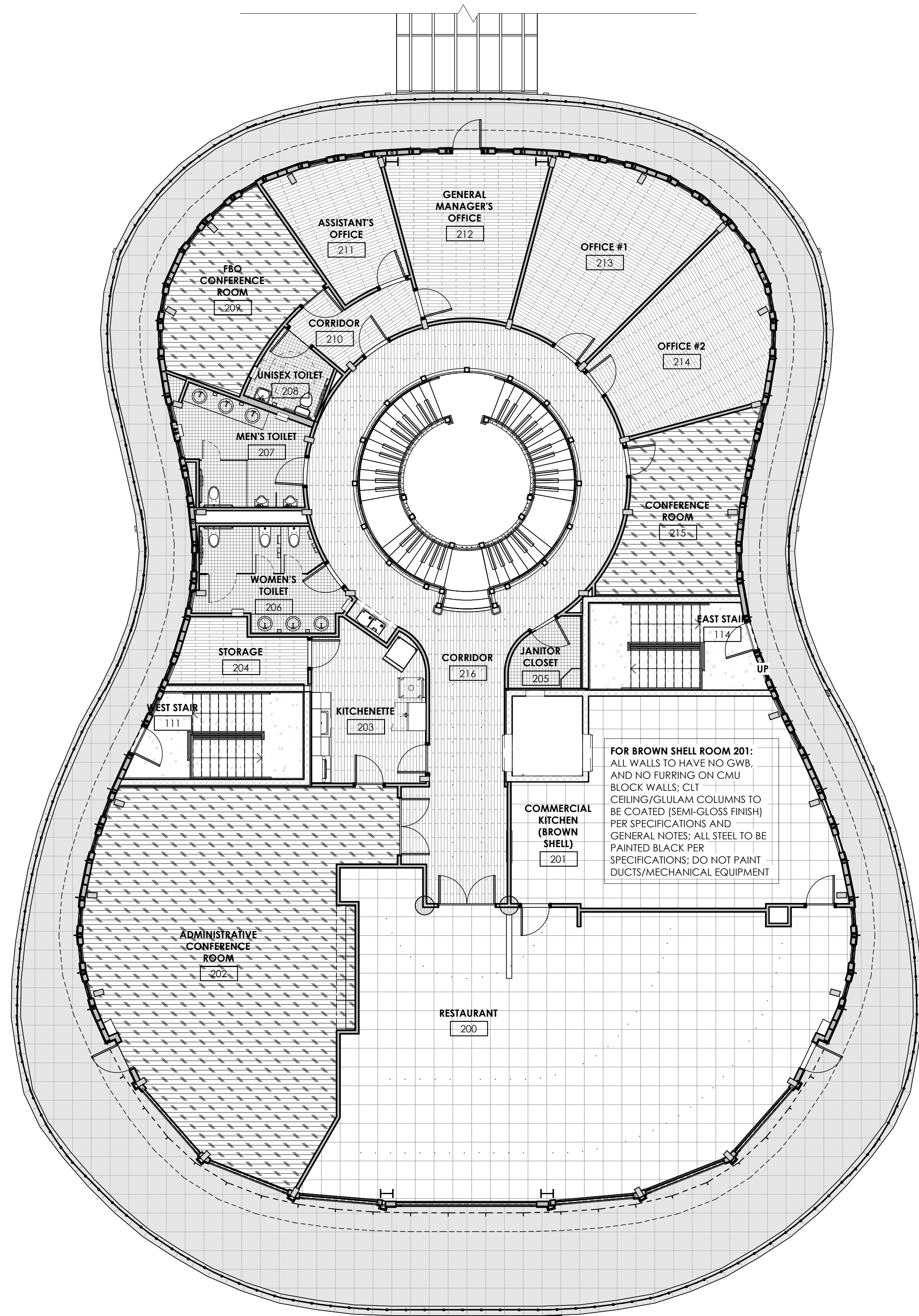
PROJECT NO.:
20202946.010A

DRAWING NO.:
A-601

DATE:
NOVEMBER 4, 2024



1 FIRST FLOOR FINISH PLAN
 0' 2' 4' 8' 16'
 1/8" = 1'-0"



FOR BROWN SHELL ROOM 201:
 ALL WALLS TO HAVE NO GWB,
 AND NO FURRING ON CMU
 BLOCK WALLS; CLT
 CEILING/GLULAM COLUMNS TO
 BE COATED (SEMI-GLOSS FINISH)
 PER SPECIFICATIONS AND
 GENERAL NOTES; ALL STEEL TO BE
 PAINTED BLACK PER
 SPECIFICATIONS; DO NOT PAINT
 DUCTS/MECHANICAL EQUIPMENT

FINISH PLAN GENERAL NOTES:

- ALL CERAMIC TILE FLOORING TO BE SET IN DRYSET MORTAR.
- ALL INTERIOR EXPOSED WOOD TO RECEIVE 2 COATS CLEAR OIL-BASED POLYURETHANE SEMI-GLOSS FINISH.

FLOOR FINISH LEGEND

- 22 OZ/SY WEIGHT MIN., PATTERN LOOP CARPET TILE (CPT-1)
- LUXURY VINYL TILE (LVT-1)
- LUXURY VINYL TILE (LVT-1) IN ROTUNDA, PROVIDE LAYOUT AS SHOWN
- LUXURY VINYL TILE (LVT-2) IN ROTUNDA, PROVIDE LAYOUT AS SHOWN
- CERAMIC TILE (CT-1 — CT-4)
- UNFINISHED CONCRETE (UC-1)
- BASIS OF DESIGN: SHERWIN WILLIAMS ACRYDYL 4503 TERRAZZO ACRYLIC SEALER TO BE CLEAR (SC-1)
- BASIS OF DESIGN: MAXXON COMMERCIAL THREE-COAT SYSTEM OVER SOUND CONTROL TO BE CLEAR (SC-2)
- BASIS OF DESIGN: DUR-A-FLEX REFLEXIONS FOUR-COAT SYSTEM TO INCLUDE FOUR COLORS AS SELECTED BY OWNER (EUC-1)
- BASIS OF DESIGN: DUR-A-FLEX DUR-A-GLAZE GRIND AND SEAL SYSTEM WITH ULTRA-CLEAR TO BE CLEAR (EUC-2)
- BALCONY FINISH SURFACE BASIS OF DESIGN: TILETECH 24" X 24" X 3/4" PORCELAIN PAVER AND WIND UPLIFT HYBRID PEDESTAL SYSTEM (TP); PAVER TO HAVE SLIP-RESISTANT FINISH
- BALCONY PERIMETER SURFACE BASIS OF DESIGN: MSI TRAVERTINE BULLNOSE COPING, PROVIDE LAYOUT AS SHOWN

BID SET

STAMP:

CLIENT:
 MACON-BIBB COUNTY
 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER: STAN PRICE, PE
 PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
 DESIGNER: KATIE EMERICK, ASSOC., AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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SECOND FLOOR FINISH PLAN

2178 FLIGHTLINE AVE
 CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:
 20202946.010A

DRAWING NO.:
 A-602

DATE:
 NOVEMBER 4, 2024

1 SECOND FLOOR FINISH PLAN

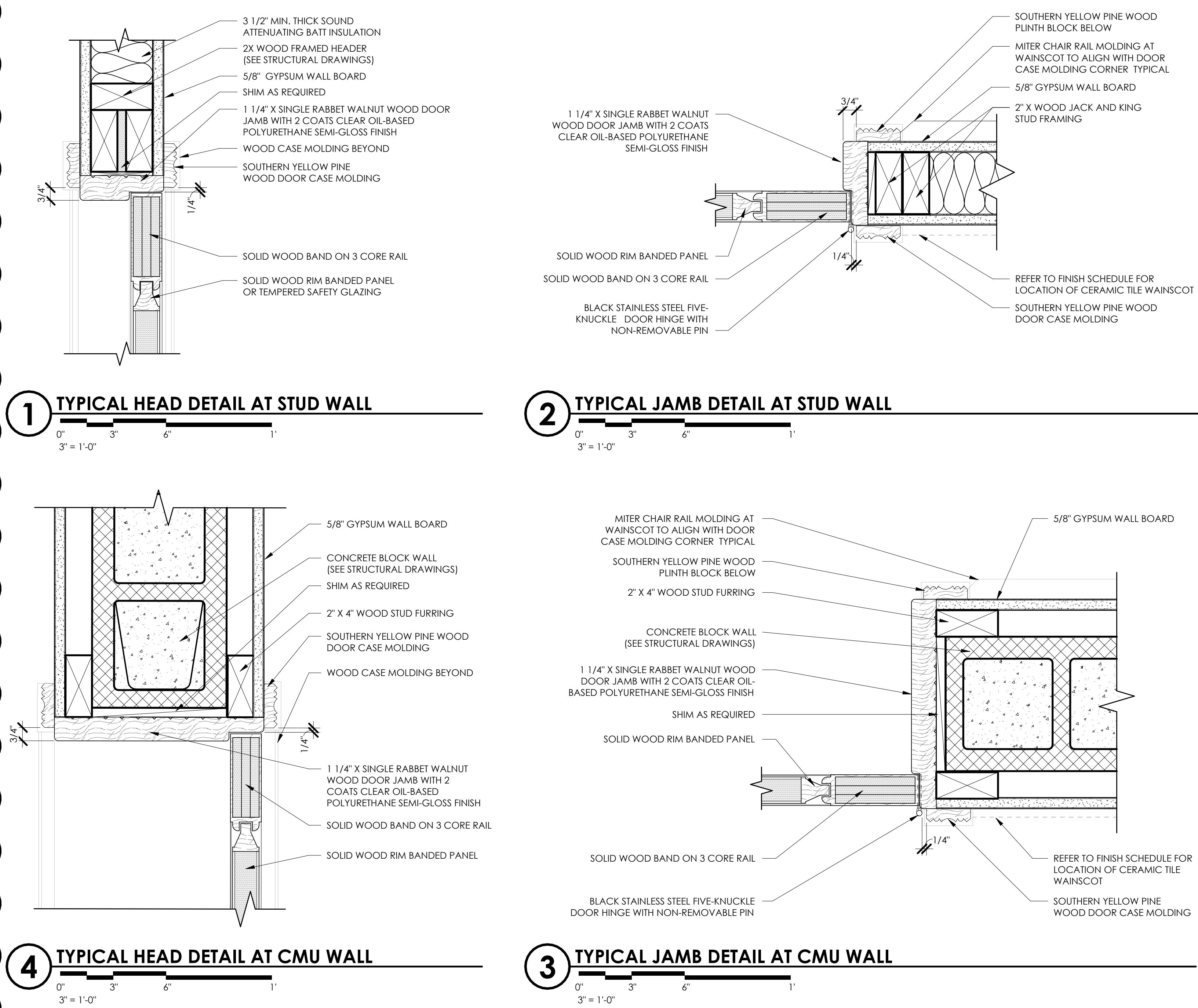
0' 2' 4' 8' 16'
 1/8" = 1'-0"



DOOR HARDWARE SCHEDULE				
HW SET NUMBER	QUANTITY	HARDWARE SET	FINISH	MANUFACTURER
1	2 EA	- HINGING: CONTINUOUS GEAR HINGE	- BLACK ANODIZED	- KAWNEER
	2 EA	- LOCKING: 1686 MEL CONCEALED EXIT DEVICE MORTISE TYPE CYLINDER	- BLACK ANODIZED	- KAWNEER
	1 EA	- CYLINDER: MORTISE KEYPED EXTENSION THREE POINT LOCK 4085	- BLACK ANODIZED	- KAWNEER
	2 EA	- PULLS: ARCHITECT'S CLASSIC CO-12 PULL	- BLACK ANODIZED	- KAWNEER
	2 EA	- CLOSERS: STANDARD CONCEALED OVERHEAD CLOSER W/ SINGLE ACTING OFF-SET ARM	- BLACK ANODIZED	- KAWNEER
	2 EA	- WEATHER STRIPPING: MANUFACTURER'S STANDARD POLYMERIC BULB	- BLACK BULB	- KAWNEER
	1 EA	- THRESHOLD: 2005_T 5" X 1/2" BUMPER ADA COMPLIANT	- BLACK ANODIZED	- PEMKO
2	1 EA	- HINGING: CONTINUOUS GEAR HINGE	- BLACK ANODIZED	- KAWNEER
	1 EA	- LOCKING: 1686 MEL CONCEALED EXIT DEVICE MORTISE TYPE CYLINDER	- BLACK ANODIZED	- KAWNEER
	1 EA	- CYLINDER: MORTISE KEYPED EXTENSION THREE POINT LOCK 4085	- BLACK ANODIZED	- KAWNEER
	1 EA	- PULLS: ARCHITECT'S CLASSIC CO-12 PULL	- BLACK ANODIZED	- KAWNEER
	1 EA	- CLOSERS: STANDARD CONCEALED OVERHEAD CLOSER W/ SINGLE ACTING OFF-SET ARM	- BLACK ANODIZED	- KAWNEER
	1 EA	- WEATHER STRIPPING: MANUFACTURER'S STANDARD POLYMERIC BULB	- BLACK BULB	- KAWNEER
	1 EA	- THRESHOLD: 2005_T 5" X 1/2" BUMPER ADA COMPLIANT	- BLACK ANODIZED	- PEMKO
3	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99XNRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8900 X ETL F04 MORTISE LOCK EXIT DEVICE H010 LEVER	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- CLOSERS: 351-0 JAMB MOUNTING WITH 351-A MOUNTING PLATE	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- WEATHER STRIPPING: 2902_V HEAVY DUTY - STANDARD JAMB	- BLACK SUEDE POWDER COAT	- PEMKO
	1 EA	- THRESHOLD: 2005_T 5" X 1/2" BUMPER ADA COMPLIANT	- BLACK ANODIZED	- PEMKO
	1 EA	- RAIN DRIP: 346C_40 OVERHEAD RAIN DRIP (MOUNTED TO DOOR FRAMED)	- BLACK SUEDE POWDER COAT	- PEMKO
4	6 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8205 MORTISE ENTRY F-04 H010 LEVER	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- LOCKING: 8293 MORTISE TRIM DUMMY WITH 4298 TEMPLATE H010 LEVER	- BLACK SUEDE POWDER COAT	- SARGENT
	2 EA	- CLOSERS: 351-0 JAMB MOUNTING WITH 351-A MOUNTING PLATE	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- BOLTS: 555 LEVER EXTENSION FINISH BOLTS TOP AND BOTTOM	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	2 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	2 EA	- WEATHER STRIPPING: 2902_V HEAVY DUTY - STANDARD JAMB	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- THRESHOLD: 2005_T 5" X 1/2" BUMPER ADA COMPLIANT	- BLACK SUEDE POWDER COAT	- PEMKO
	2 EA	- KICK PLATE: 0.50" THICK COUNTERSUNK HOLES 34" X 17"	- BLACK STAINLESS STEEL	- ROCKWOOD
	1 EA	- RAIN DRIP: 346C_76 OVERHEAD RAIN DRIP (MOUNTED TO DOOR FRAMED)	- BLACK SUEDE POWDER COAT	- PEMKO
5		- HINGING: QUANTITY AND TYPE PER MANUFACTURER	- BLACK	- EURO-WALL
		- LOCKING: MULTI POINT 5 POINT LOCKING WITH LEVER HANDLE	- BLACK	- EURO-WALL
		- THRESHOLD: 2005_T 5" X 1/2" BUMPER ADA COMPLIANT	- BLACK	- EURO-WALL
6	6 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8221 MORTISE DEADLOCK F17	- BLACK SUEDE POWDER COAT	- SARGENT
	2 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- BOLTS: 2942 AUTOMATIC FLUSH BOLT SET	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	2 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	2 EA	- PULLS: HAND FORGED TREBLE CLEF HANDLE BLACKSMITH MADE MUSIC NOTE	- BLACK FINISH COAT	- CARTERCONLEYIRONWORK
	2 EA	- PUSH: ACORN MANUF PUSH PLATE 15 3/4"	- BLACK FINISH COAT	- VAN DYKES RESTORE
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
7	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8245 MORTISE PRIVACY BATH F22	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
8	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8236 MORTISE CLOSET (NOT FOR EGRESS)	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
9	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8204 MORTISE STOREROOM OR CLOSET F07	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
10	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8205 MORTISE OFFICE OR ENTRY F04	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
11	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- LOCKING: 8215 MORTISE PASSAGE F01	- BLACK SUEDE POWDER COAT	- SARGENT
	1 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
12	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- PULLS: ACORN MANUF HAND FORGED IRON ART SQ END PULL & BACKPLATE 15 3/4"	- BLACK FINISH COAT	- VAN DYKES RESTORE
	1 EA	- PUSH: ACORN MANUF PUSH PLATE 15 3/4"	- BLACK FINISH COAT	- VAN DYKES RESTORE
	1 EA	- KICK PLATE: 0.50" THICK COUNTERSUNK HOLES 34" X 17"	- BLACK STAINLESS STEEL	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
13	3 EA	- HINGING: FULL MORTISE HVY WT BALL BEARING MPB99 X NRP 4 1/2" X 4 1/2"	- BLACK STAINLESS STEEL	- MCKINNEY
	1 EA	- CLOSERS: 4040XPT STOP FACE (PUSH) SIDE MOUNTING	- BLACK POWDER COAT	- LCN
	1 EA	- STOPS: 528 HEAVY DUTY HINGE PIN STOP WITH RUBBER BUMPERS	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- PUSH/PULL: 111x73C/73CL CONCEALED MOUNT PL SET - 4" x 16" w/ 1" ROUND PULL 10" CTC	- BLACK SUEDE POWDER COAT	- ROCKWOOD
	1 EA	- KICK PLATE: 0.50" THICK COUNTERSUNK HOLES 34" X 17"	- BLACK STAINLESS STEEL	- ROCKWOOD
	1 EA	- SILENCER: 608CA SELF-ADHESIVE	- CLEAR RUBBER	- ROCKWOOD
14		PER MANUFACTURER AS SELECTED BY OWNER		

DOOR GENERAL NOTES:

- MANUFACTURERS AND PRODUCTS ARE LISTED AS A BASIS OF DESIGN; ALTERNATES WILL BE REVIEWED ON AN "OR EQUAL" BASIS.
- ALL HARDWARE TO COMPLY WITH ADA REQUIREMENTS.
- HARDWARE LISTED ABOVE IS TO CONVEY DESIGN INTENT. ALL REQUIRED HARDWARE MAY NOT BE LISTED, PROVIDE ADDITIONAL HARDWARE AS REQUIRED.
- ALL EXTERIOR/INSULATED DOORS TO HAVE THRESHOLDS AND GASKETING.
- PROVIDE A KEY CONTROL SYSTEM, ALL AS RECOMMENDED BY SYSTEM MANUFACTURER, WITH CAPACITY OF 150 PERCENT OF NUMBER OF LOCKS REQUIRED FOR THE PROJECT.
- REVIEW THE KEYING SYSTEM WITH OWNER AND PROVIDE MASTER SYSTEM.
- ALL CORES AND KEYS THROUGHOUT BUILDING SHALL BE MARSHALL BEST SECURITY CORES.
- PROVIDE CONDUIT FROM I.T. TO ALL EXTERIOR POINTS OF ENTRY, INCLUDING CONDUIT FROM DOOR 100 TO RECEPTION DESK ROOM 106 (SEE ELECTRICAL DRAWINGS).
- DOOR AND FRAME COLOR TO BE SELECTED BY ARCHITECT (EXTERIOR DOORS AND FRAMES TO BE BLACK).
- ALL DOORS SHALL HAVE ACCESSIBLE LATCHES, LOCKS, AND OTHER OPERATING DEVICES, INCLUDING THRESHOLDS AS PER ADA REQUIREMENTS. DOOR OPENING FORCE SHALL BE EQUAL TO OR LESS THAN FIVE POUNDS.
- REFER TO STRUCTURAL FOR WIND PRESSURES. CONTRACTOR SHALL COORDINATE PROPER ATTACHMENT OF FRAMES TO WALLS AS PER BUILDING CODES.
- WOOD DOORS TO BE WALNUT VENEER WITH HONEY STAIN IN COLOR WHEAT WH18 AS PER SPECIFICATIONS.
- ALL DOORS SHALL COMPLY WITH NFPA 101 7.2.1.
- PROVIDE WALL OR FLOOR STOPS FOR INTERIOR DOORS.
- THRESHOLD SHALL BE ALUMINUM WATER RESISTANT. THRESHOLD SET IN TWO BEADS OF SEALANT.
- ALL EGRESS DOORS SHALL COMPLY WITH NFPA 101 7.2.1.9.
- CONTRACTOR SHALL WET SEAL ALL STOREFRONT DOOR ASSEMBLIES TYPICAL.
- REVIEW HARDWARE SCHEDULE WITH OWNER PRIOR TO FINAL ORDER.
- KEYED ACCESS EXTERIOR, THUMBTURN INSIDE.
- ALL EXIT DOORS TO COMPLY WITH NFPA 101, 7.2.1.5 AND 7.2.1.7.
- POST SIGN ADJACENT EXIT DOOR IN ACCORDANCE WITH 7.2.1.5.1 EXCEPTION 2 (b), 7.2.1.3.1. DOORS SHALL BE ARRANGED TO BE OPENED READILY FROM THE EGRESS SIDE WHENEVER THE BUILDING IS OCCUPIED. LOCKS, IF PROVIDED, SHALL NOT REQUIRE THE USE OF A KEY, A TOOL, OR SPECIAL KNOWLEDGE OR EFFORT FOR OPERATION FROM THE EGRESS SIDE.
- EXCEPTION NO. 2: EXTERIOR DOORS SHALL BE PERMITTED TO HAVE KEY OPERATED LOCKS FROM THE EGRESS SIDE, PROVIDED THAT THE FOLLOWING CRITERIA ARE MET:
 - PERMISSION TO USE THIS EXCEPTION IS PROVIDED IN CHAPTER 12 THROUGH 42 FOR THE SPECIFIC OCCUPANCY.
 - ON OR ADJACENT TO THE DOOR, THERE IS A READILY VISIBLE, DURABLE SIGN IN LETTERS IN NOT LESS THAN 1 IN. HIGH ON A CONTRASTING BACKGROUND THAT READS AS FOLLOWS: THIS DOOR TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED
 - THE LOCKING DEVICE IS OF A TYPE THAT IS READILY DISTINGUISHABLE AS LOCKED.
 - A KEY IS IMMEDIATELY AVAILABLE TO ANY OCCUPANT INSIDE THE BUILDING WHEN IT IS LOCKED.
- IN ADDITION, DEADBOLT OPERATION FROM INSIDE SHALL PROHIBIT REMOVAL OF KEY FROM CYLINDER FROM INSIDE WHEN LOCKED FROM INSIDE PER 7.2.1.5.1.
- EXCEPTION NO. 3: WHERE PERMITTED IN CHAPTERS 12 THROUGH 42, KEY OPERATION SHALL BE PERMITTED, PROVIDED THAT THE KEY CANNOT BE REMOVED WHEN THE DOOR IS LOCKED FROM THE SIDE WHICH THE EGRESS IS TO BE MADE.



BID SET

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MACON, GA 31201



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ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATE EMERICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	11/18/24	SR, AL, JRT	ADDENDUM #1

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DOOR HARDWARE & DETAILS

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

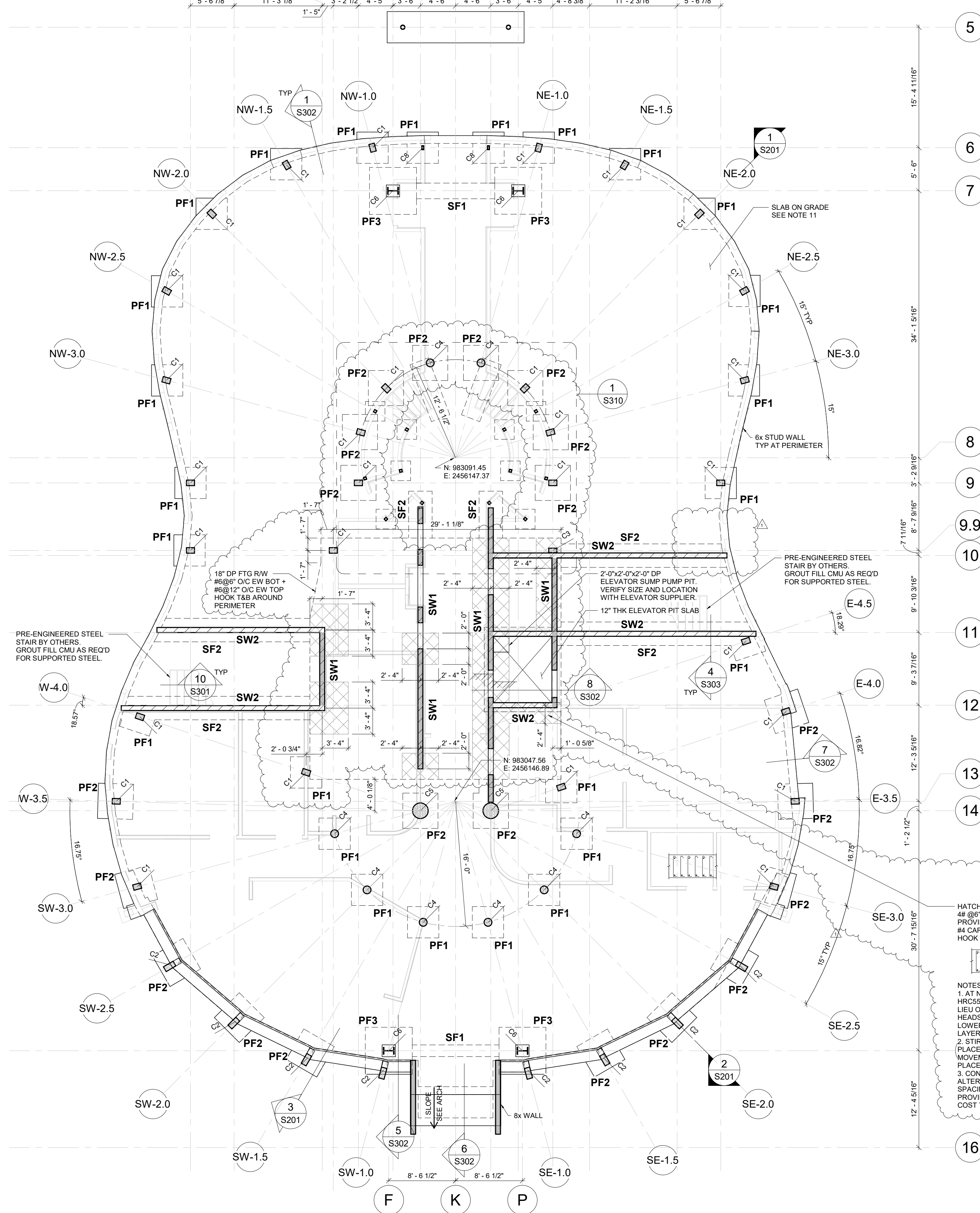
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: 20202946.010A

DRAWING NO.: A-604

DATE: NOVEMBER 4, 2024

A B C D E G J K L N Q R S T



- SHEET NOTES:**
- REFER TO GEOTECHNICAL REPORT FOR SUBGRADE REQUIREMENTS INCLUDING VAPOR BARRIER AT SLABS-ON-GROUND AND FOOTINGS.
 - WHERE FOOTINGS ARE CAST MONOLITHIC WITH OTHER FOOTINGS, TENSION LAP REINFORCING PER GENERAL NOTES SCHEDULE.
 - TOP OF FOOTING EL. = 1'-0" BELOW TOP OF SLAB-ON-GRADE, EXCEPT LOWER ENTIRE FOOTING AS REQUIRED TO ACHIEVE FIRM BEARING OR PERMIT MECHANICAL/ELECTRICAL SERVICES TO PASS.
 - MAINTAIN 1:5:1.0 MAXIMUM SLOPE BETWEEN UNDERSIDE OF ADJACENT FOOTINGS.
 - FOOTINGS DEPTHS MAY EXCEED THICKNESSES SHOWN IN ORDER TO MAINTAIN 1:5:1.0 SLOPE OF UNDERSIDE OF FOOTING. SOILS CONSULTANT TO CONFIRM ON SITE DURING EXCAVATION.
 - CAST SIDES OF CORE FOOTINGS AGAINST SIDES OF EXCAVATION. OTHER FOOTINGS MAY BE CAST AGAINST SIDES OF EXCAVATION. MAINTAIN MINIMUM DIMENSIONS INDICATED.
 - COLUMN AND FOOTING CENTERS TO MATCH TYPICAL UNO.
 - SEE S300 SERIES DRAWINGS FOR TYPICAL DETAILS.
 - COORDINATE FINAL SLAB EDGES, OPENINGS AND STEPS WITH ARCHITECTURAL CONTROL PLANS.
 - TYPICAL INTERIOR SLAB ON GRADE TO BE 5" THICK, RW #5@12" AT MID HEIGHT. TOP OF SLAB EL. = 0'-0" UNO. PLACE ADDITIONAL BARS AT RE-ENTRANT CORNERS, OPENINGS AND PENETRATIONS PER TYPICAL DETAILS.
 - SLAB ON GRADE CONSTRUCTION JOINTS PER 5/S301, TYP. LOCATIONS TO BE APPROVED BY ENGINEER AND ARCHITECT.

CMU WALL SCHEDULE

TAG	SIZE	GROUT	VERT REINF	HORIZ REINF	CORNERS & WALL ENDS
SW1	8" CMU	FULLY GROUTED	#4@16"	STD WIRE PER GEN NOTES	#5
SW2	8" CMU	PARTIALLY GROUTED (ONLY REINF CELLS)	#4@32"	STD WIRE PER GEN NOTES	2#4

STUD WALL SCHEDULE

TAG	FRAMING	SHEATHING
4x WALL (INTERIOR)	2x4 STUD @16" OC	GYP
6x WALL (EXTERIOR)	2x6 SP#2 @12" OC	5/8" PLYWOOD
8x WALL (EXTERIOR)	2x8 SP#2 @16" OC	5/8" PLYWOOD

FOOTING SCHEDULE

MARK	TYPE	FOOTING DIMENSION	REINFORCEMENT
PF1	PAD	4'-0"x4'-0"x1'-0" DP	4#5 H2E BOT EW
PF2	PAD	4'-6"x4'-6"x1'-0" DP	5#5 H2E BOT EW
PF3	PAD	6'-0"x6'-0"x1'-4" DP	5#5 H2E TOP 5#5 H2E BOT EW
SF1	STRIP	2'-0"x1'-0" DP	3#4 CONT T&B + #4@12" SHORT WAY H2E T&B
SF2	STRIP	3'-0"x1'-0" DP	3#5 CONT T&B + #5@12" SHORT WAY T&B
SF3	STRIP	4'-0"x1'-4" DP	6#5 CONT H2E T&B + #5@12" SHORT WAY BOT

COLUMN SCHEDULE

MARK	TYPE	SIZE	BASE PLATE	STUB COLUMN	BEARING PLATE	DETAIL
C1	WOOD	GL8 1/2x12 3/8	PL 1x12x1'-3"	W8x21	PL 3/4x6x0'-10"	4/S302
C2	WOOD	GL8 1/2x16 1/2 SLOPED	PL 1x12x1'-6"	W12x22	PL 3/4x8x1'-2"	4/S302
C3	WOOD	GL6 3/4x12 3/8 (POST-UP)	-	-	-	-
C4	WOOD	TR12"Ø	PL 1x12x1'-0"	HSS 8.625x0.375	PL 3/4x9'Ø	4/S302
C5	WOOD	TR24"Ø	PL 1x18x1'-6"	HSS 12.75x0.500	PL 3/4x18'Ø	4/S302
C6	STEEL	W16x77	PL 1x14x1'-8"	-	-	1/S306, TYPE W
C7	STEEL	HSS 4x4x1/4	PL 3/4x10x0'-10"	-	-	1/S306, TYPE A
C8	STEEL	HSS 6x3x3/8	PL 3/4x9x1'-0"	-	-	1/S306, TYPE A
C9	STEEL	HSS 6.625x0.375	PL 1x12x1'-0"	-	-	1/S306, TYPE C

BID SET

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CLIENT:
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700 POPLAR ST.
MACON, GA 31201



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PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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FOUNDATION / MAIN FLOOR FRAMING PLAN
2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

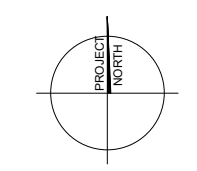
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

23121

DRAWING NO.: **S101**

DATE: **NOVEMBER 18, 2024**

FOUNDATION / MAIN FLOOR FRAMING PLAN
1/8" = 1'-0" REFERENCE ELEVATION = 0'-0"



- SHEET NOTES:**
1. ALL ELEVATIONS NOTED ARE RELATIVE TO THE REFERENCE ELEVATION.
 2. FOR GENERAL NOTES REFER TO SHEETS S001 THROUGH S003.
 3. UNLESS NOTED OTHERWISE, STRUCTURAL MEMBERS ARE CENTERED ON GRID LINES.
 4. TOP OF GLULAM BEAMS = -1'-10 1/8" UNO.
 5. COORDINATE FINAL SLAB EDGES, OPENINGS AND STEPS WITH ARCHITECTURAL CONTROL PLANS.

CMU WALL SCHEDULE					
TAG	SIZE	GROUT	VERT REINF	HORIZ REINF	CORNERS & WALL ENDS
SW1	8" CMU	FULLY GROUTED	#4@16"	STD WIRE PER GEN NOTES	#5
SW2	8" CMU	PARTIALLY GROUTED (ONLY REINF CELLS)	#4@32"	STD WIRE PER GEN NOTES	#4

COLUMN SCHEDULE						
MARK	TYPE	SIZE	BASE PLATE	STUB COLUMN	BEARING PLATE	DETAIL
C1	WOOD	GL8 1/2x12 3/8	PL1x12x1'-3"	W8x21	PL3/4x6x0'-10"	4/S302
C2	WOOD	GL8 1/2x16 1/2 SLOPED	PL1x12x1'-6"	W12x22	PL3/4x6x1'-2"	4/S302
C3	WOOD	GL6 3/4x12 3/8 (POST-UP)	-	-	-	-
C4	WOOD	TR12"Ø	PL1x12x1'-0"	HSS 8.625x0.375	PL3/4x9"Ø	4/S302
C5	WOOD	TR24"Ø	PL1x18x1'-6"	HSS 12.75x0.500	PL3/4x18"Ø	4/S302
C6	STEEL	W16x77	PL1x14x1'-8"	-	-	1/S306, TYPE W
C7	STEEL	HSS 4x4x1/4	PL3/4x10x0'-10"	-	-	1/S306, TYPE A
C8	STEEL	HSS 6x3x3/8	PL3/4x9x1'-0"	-	-	1/S306, TYPE A
C9	STEEL	HSS 6.625x0.375	PL1x12x1'-0"	-	-	1/S306, TYPE C

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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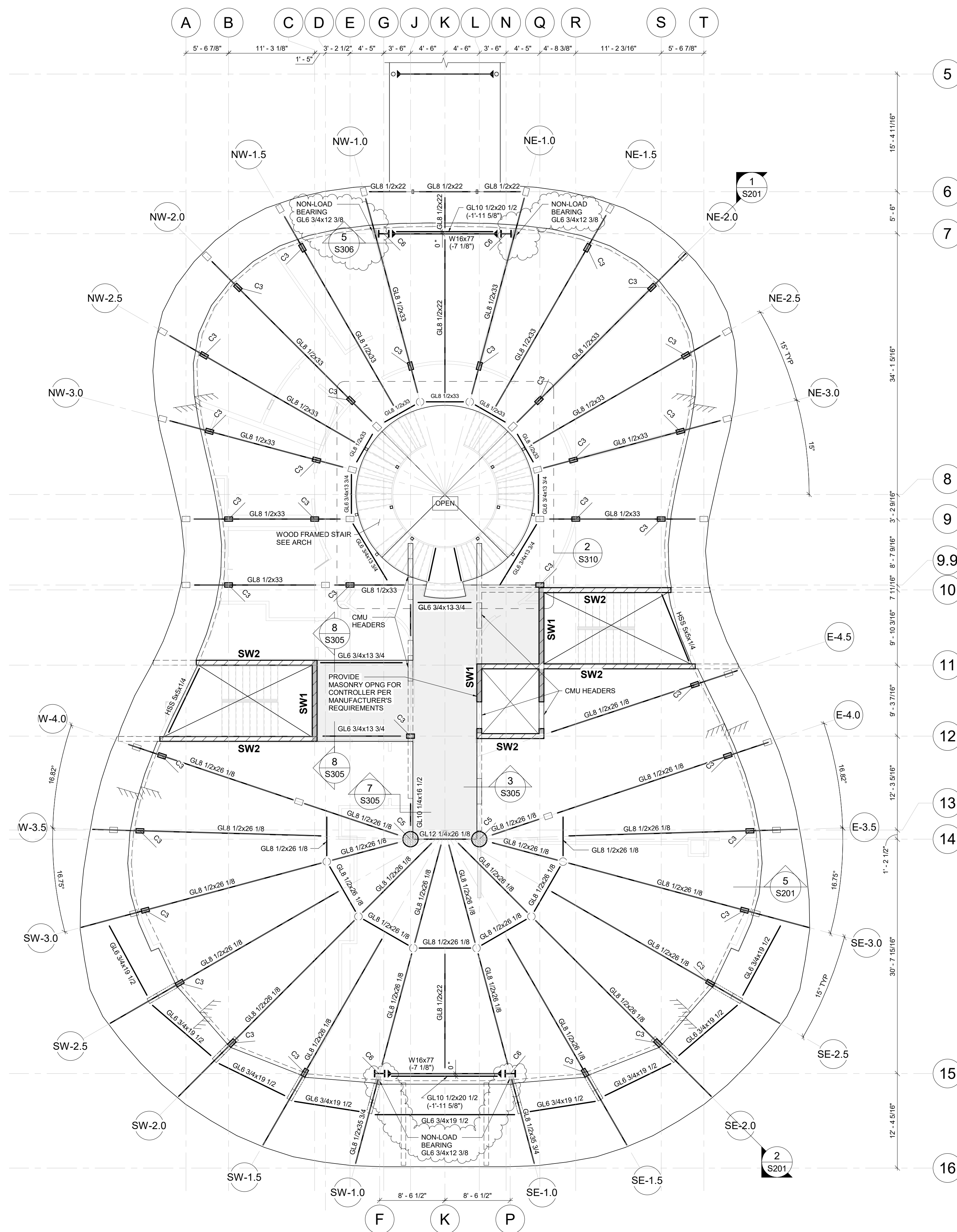
SECOND FLOOR FRAMING PLAN
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

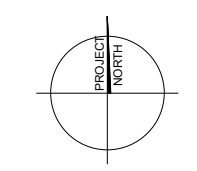
23121

DRAWING NO.: **S102**

DATE: **NOVEMBER 18, 2024**



SECOND FLOOR FRAMING PLAN
1/8" = 1'-0" REFERENCE ELEVATION = 15'-2"



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700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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SECOND FLOOR DIAPHRAGM PLAN
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

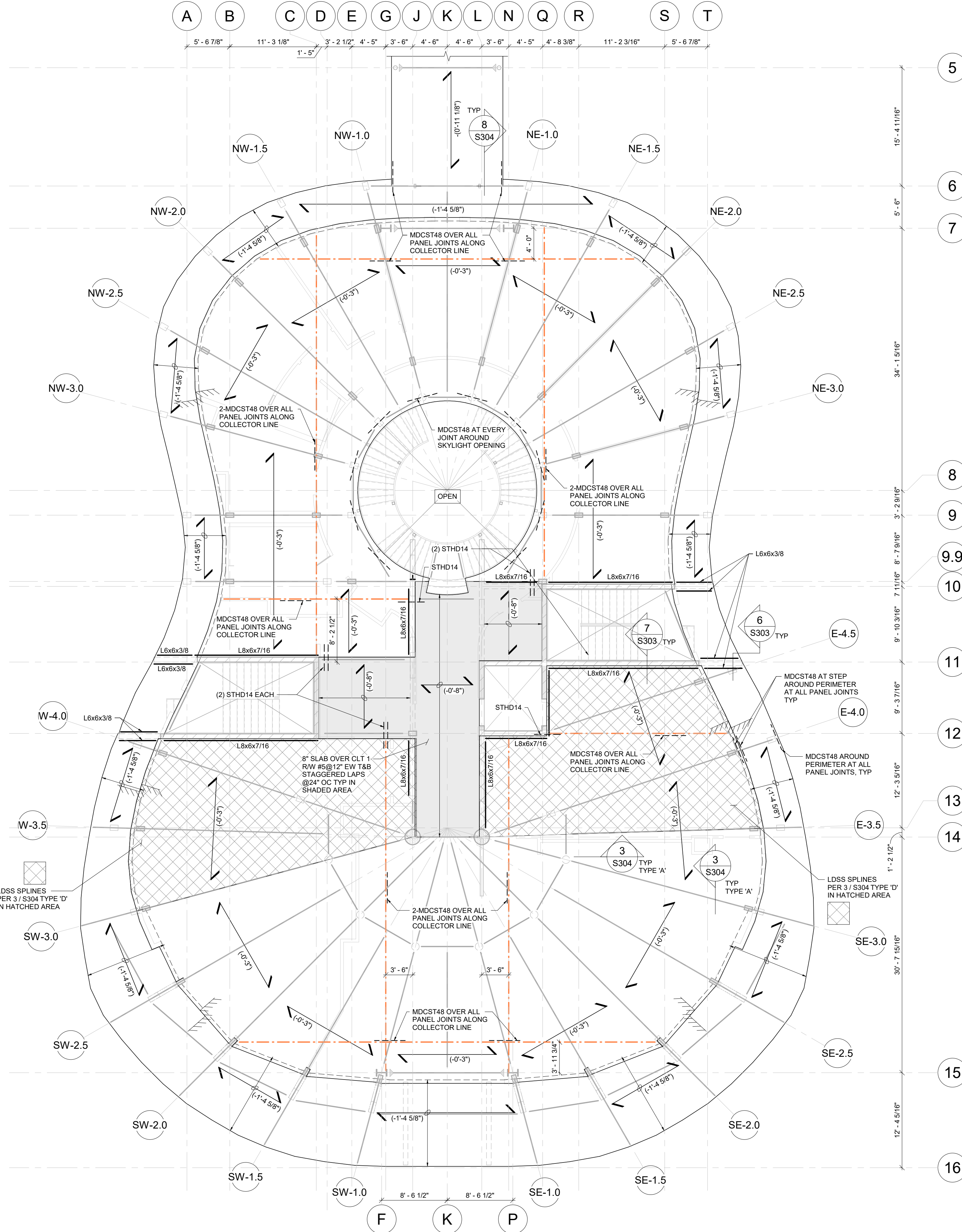
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DRAWING NO.:
S102A

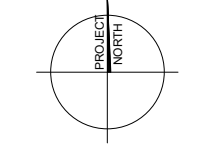
DATE:
NOVEMBER 18, 2024

SHEET NOTES:
1. ALL ELEVATIONS NOTED ARE RELATIVE TO THE REFERENCE ELEVATION.
2. AT END OF PORTE-COCHERE, ATTACH STEEL BEAM TO CLT IN THE MANNER SHOWN IN 3/S110 PRIOR TO FINAL CLT PANEL.

CLT PANEL TYPE SCHEDULE							
TYPE	LOCATIONS	LAYER	LAYER THICKNESS	TOTAL THICKNESS	LAYER ORIENTATION	SPECIES	GRADE (P&G 320)
1	INTERIOR L2 AND GUITAR HEAD	1 (TOP)	1 3/8"	4 1/8"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION A)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		4 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION B)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	11/16"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		0°	SYP	No. 2
		4	11/16"		90°	SYP	MSR 1.5F-1.6E
		5 (BOT)	1 3/8"		0°	SYP	No. 2
3	GUITAR NECK	1 (TOP)	1 3/8"	6 7/8"	0°	SYP	V3
		2	1 3/8"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	1 3/8"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	
4 (OPTION A)	ROOF	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	No. 2
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		4	1 3/8"		0°	SYP	V3
4 (OPTION B)	ROOF	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	V3
		2	11/16"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	11/16"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	



SECOND FLOOR DIAPHRAGM PLAN
1/8" = 1'-0"
REFERENCE ELEVATION = 15'-2"



BID SET

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CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE SMOCK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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**SECOND FLOOR
GLULAM REACTION
PLAN**
2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

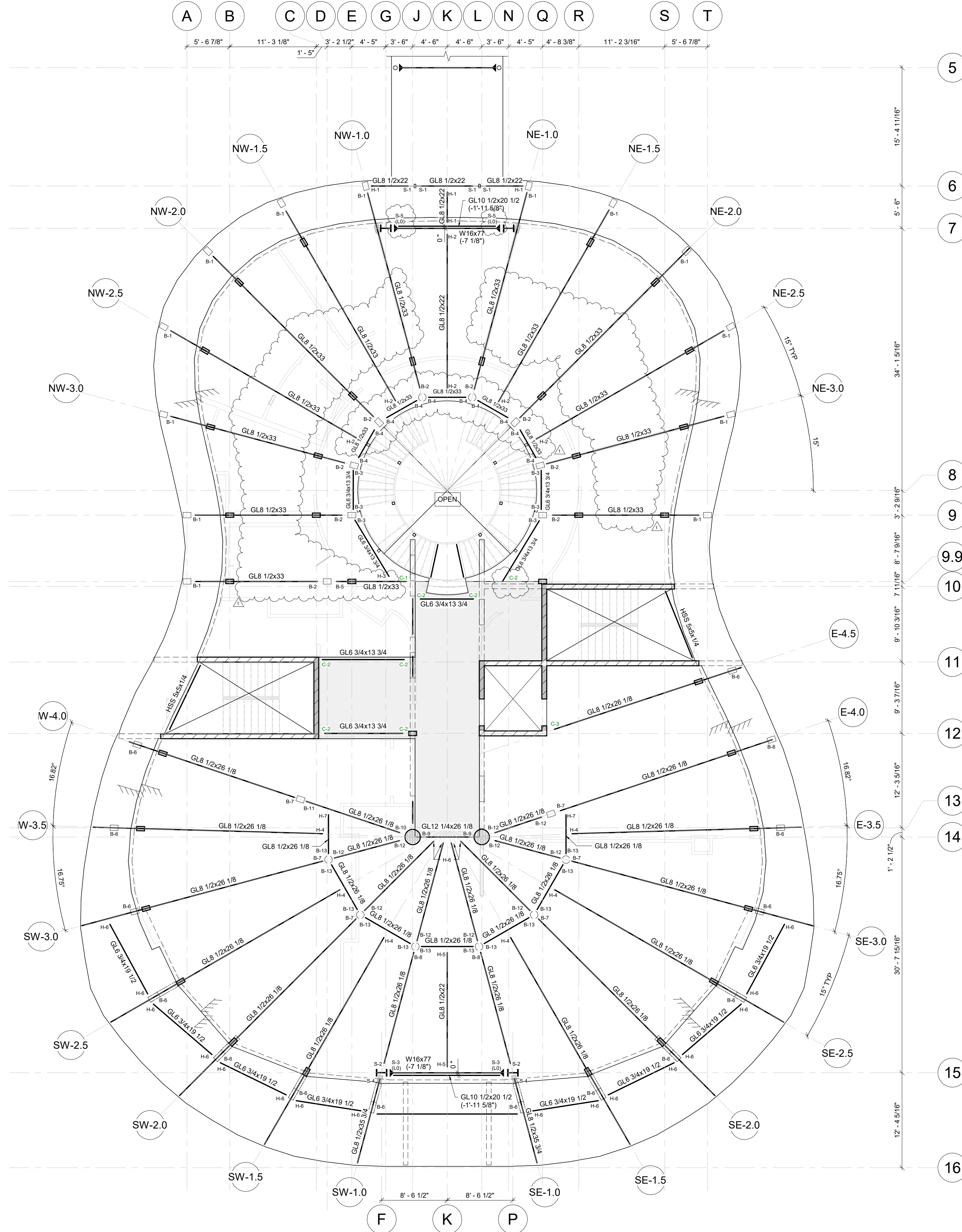
23121

DRAWING NO.:
S102B

DATE:
NOVEMBER 18, 2024

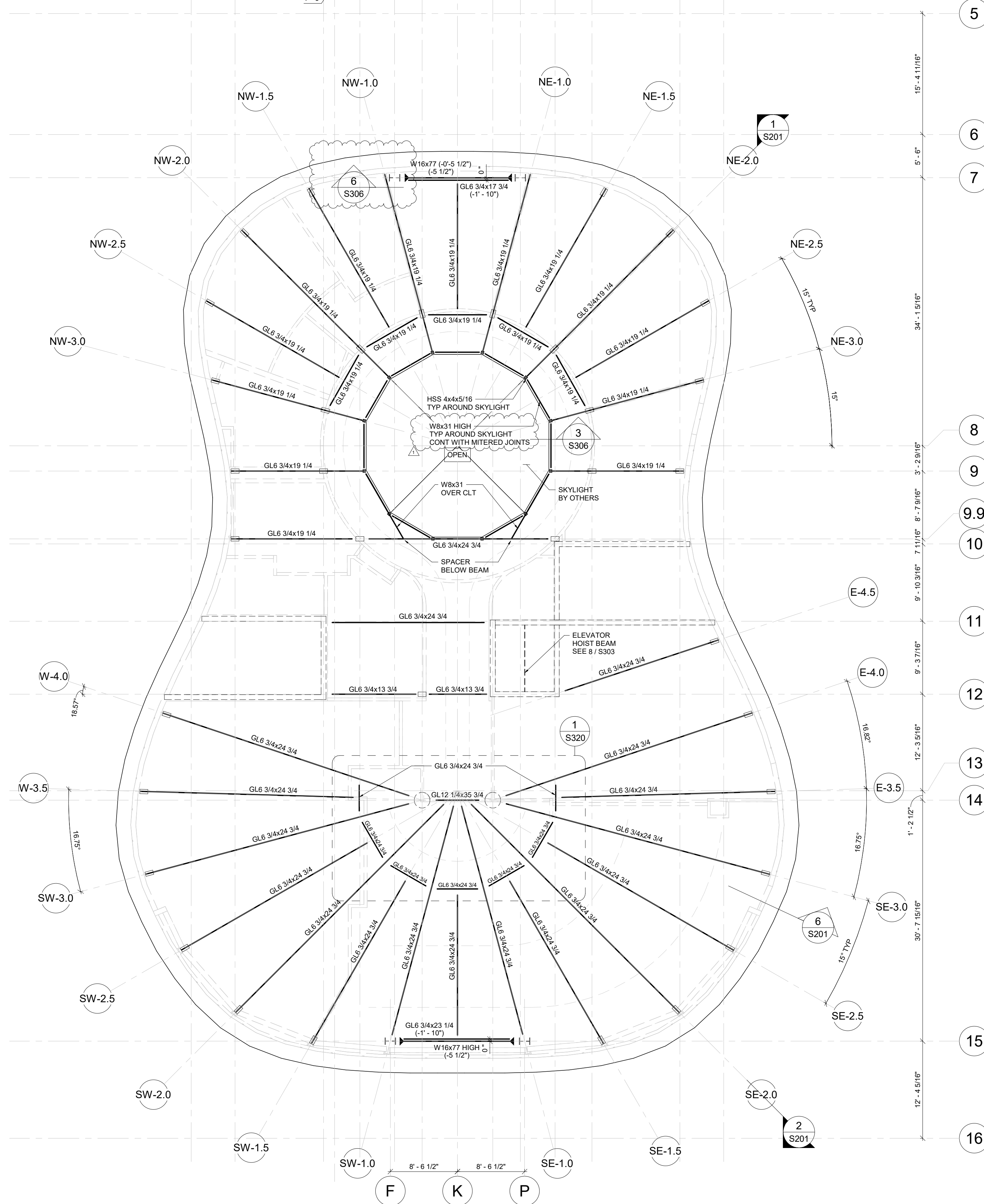
BEAM END REACTIONS FOR DELEGATED DESIGN			
TAG	DL (k)	LL (k)	DETAIL REFERENCE
B-1	12.3	18.5	1 / S305
B-2	12.7	14.4	1 / S305
B-3	1.6	3.9	2 / S304
B-4	2.6	4.9	2 / S304
B-5	8.0	9.5	1 / S305
B-6 (VERT)	17.1	28.1	1 / S305
B-7	4.6	8.5	1 / S305
B-8	4.6	8.5	1 / S305
B-9	3.0	5.8	1 / S305
B-10	3.3	7.7	1 / S305
B-11	4.5	9.9	1 / S305
B-12	1.9	4.8	1 / S305
B-13	2.3	4.3	1 / S305
H-1	1.6	4.0	2 / S304
H-2	5.2	9.7	2 / S304
H-3	1.6	3.9	2 / S304
H-4	4.6	8.5	2 / S304
H-5	2.1	5.3	2 / S304
H-6	1.5	3.6	2 / S304
H-7	2.3	4.3	2 / S304
S-1	1.8	2.8	6 / S304
S-2	2.1	5.3	6 / S304
S-3	1.1	2.7	6 / S304
S-4	-1.3	-3.1	6 / S304
S-5	3.4	6.9	6 / S304
C-1	4.7	7.1	1 / S303
C-2	5.0	3.6	1 / S303
C-3	4.3	10.7	1 / S303

- NOTES:**
- ALL LOADS ARE GIVEN UNFACTORED.
 - WHERE NOTED AS (*), CONNECTION IS NOT DELEGATED. REACTIONS ARE PROVIDED FOR REFERENCE ONLY.
 - IMPOSED LOADS ARE VERTICAL UNLESS NOTED OTHERWISE. A NEGATIVE SIGN INDICATES AN UPWARD IMPOSED LOAD.
 - BEAM END CONNECTIONS MUST BE DESIGNED FOR 5% TYING FORCE IN ACCORDANCE WITH ASCE 7-16 1.4.3.
 - BEAM END CONNECTIONS AT COLUMNS MUST BE DESIGNED TO PROVIDE ADEQUATE BRACING TO COLUMN. REFER TO PROVISIONS IN AISC 360-16 APPENDIX 6.2.
 - TAG NOMENCLATURE:
- R = ROOF
- B = BEARING CONNECTION (GLULAM-TO-GLULAM)
- H = HANGER CONNECTION (GLULAM-TO-GLULAM)
- S = CONNECTION TO STEEL
- C = CONNECTION TO CMU



SECOND FLOOR GLULAM REACTION PLAN
1/8" = 1'-0"

A B C D E G J K L N Q R S T



- SHEET NOTES:**
1. ALL ELEVATIONS NOTED ARE RELATIVE TO THE REFERENCE ELEVATION.
 2. FOR GENERAL NOTES REFER TO SHEETS S001 THROUGH S003.
 3. UNLESS NOTED OTHERWISE, STRUCTURAL MEMBERS ARE CENTERED ON GRID LINES.
 4. TOP OF GLULAM BEAMS = -1'-8 1/2" UNO.
 5. COORDINATE FINAL SLAB EDGES, OPENINGS AND STEPS WITH ARCHITECTURAL CONTROL PLANS.



BID SET

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 700 POPLAR ST.
 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095
 PROJECT MANAGER: STAN PRICE, PE
 PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
 DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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ROOF FRAMING PLAN

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL
 BUILDING AND PARKING LOT
 REHABILITATION

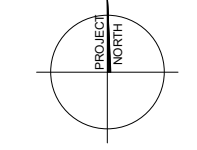
TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: 23121

DRAWING NO.: S103

DATE: NOVEMBER 18, 2024

ROOF FRAMING PLAN
 1/8" = 1'-0" REFERENCE ELEVATION = 28'-7 3/8"



- SHEET NOTES:**
1. ALL ELEVATIONS NOTED ARE RELATIVE TO THE REFERENCE ELEVATION.
 2. CLT PANELIZATION MUST BE INFORMED BY THE CLT SUPPLIER. PLACEMENT OF STEEL SPACERS BETWEEN BEAMS AND CLT IS DEPENDANT ON CLT PANELIZATION. FOR PRICING, ASSUME TOTAL OF 600 SPACERS IN THE BUILDING. BIDDERS TO PROVIDE UNIT ADD/DEDUCT PRICING.
 3. _____ INDICATES COLLECTOR LINE. INSTALL STRAPS AS NOTED ON PLAN AT ALL PANEL JOINTS.
 4. TOP OF CLT = (0'-0"); SEE PLAN FOR REFERENCE ELEVATION.

CLT PANEL TYPE SCHEDULE							
TYPE	LOCATIONS	LAYER	LAYER THICKNESS	TOTAL THICKNESS	LAYER ORIENTATION	SPECIES	GRADE (PRG 320)
1	INTERIOR L2 AND GUITAR HEAD	1 (TOP)	1 3/8"	4 1/8"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION A)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		4 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION B)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	11/16"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		0°	SYP	No. 2
		4	11/16"		90°	SYP	MSR 1.5F-1.6E
		5 (BOT)	1 3/8"		0°	SYP	No. 2
3	GUITAR NECK	1 (TOP)	1 3/8"	6 7/8"	0°	SYP	V3
		2	1 3/8"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	1 3/8"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	
4 (OPTION A)	ROOF	1 (TOP)	1 3/8"	5 1/2"	90°	SYP	No. 2
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		0°	SYP	V3
		4	1 3/8"		0°	SYP	
4 (OPTION B)	ROOF	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	V3
		2	11/16"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	11/16"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	

BID SET

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MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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ROOF DIAPHRAGM PLAN

2178 FLIGHTLINE AVE

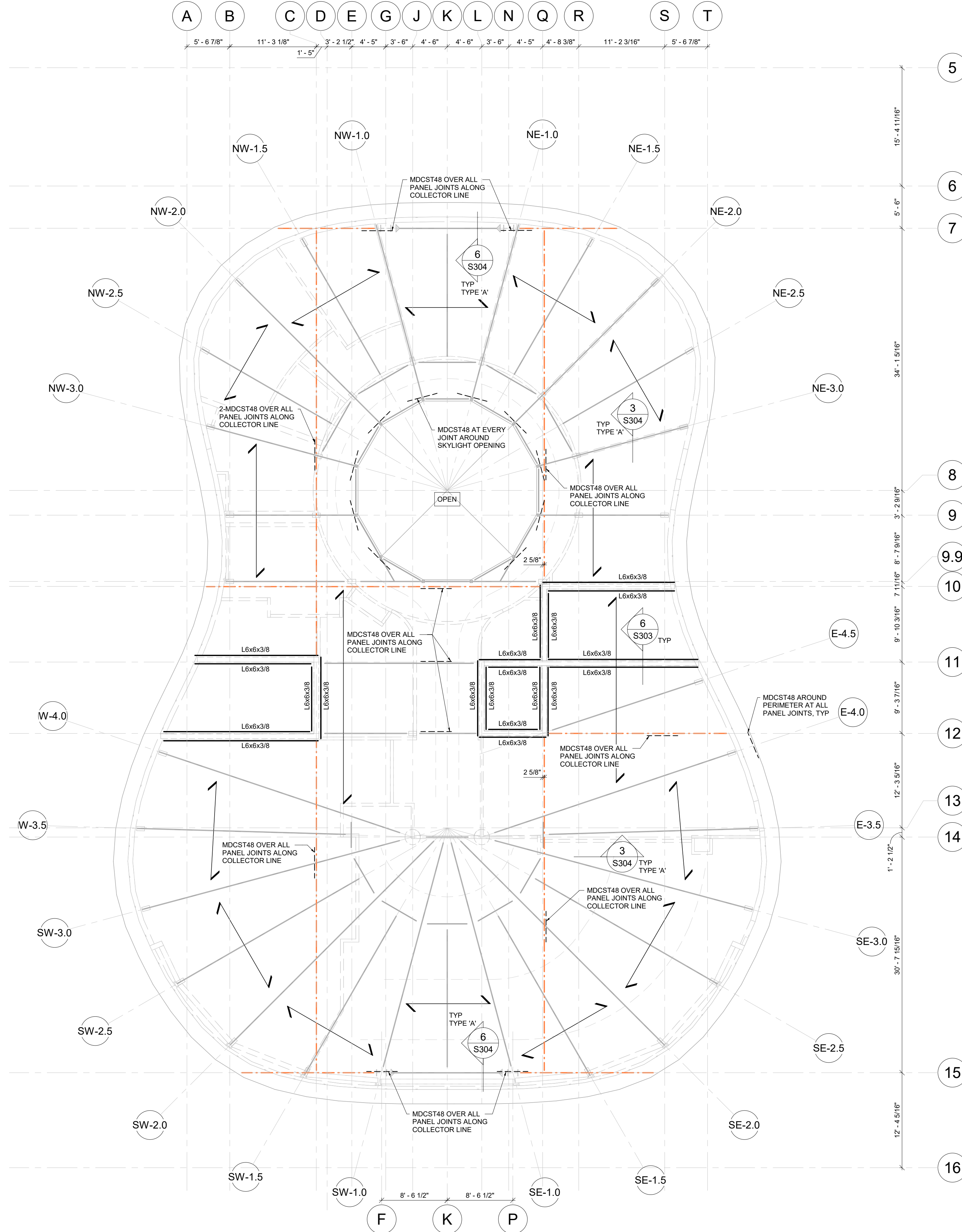
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

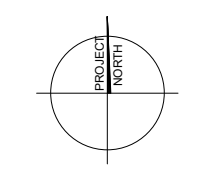
PROJECT NO.: 23121

DRAWING NO.: S103A

DATE: NOVEMBER 18, 2024



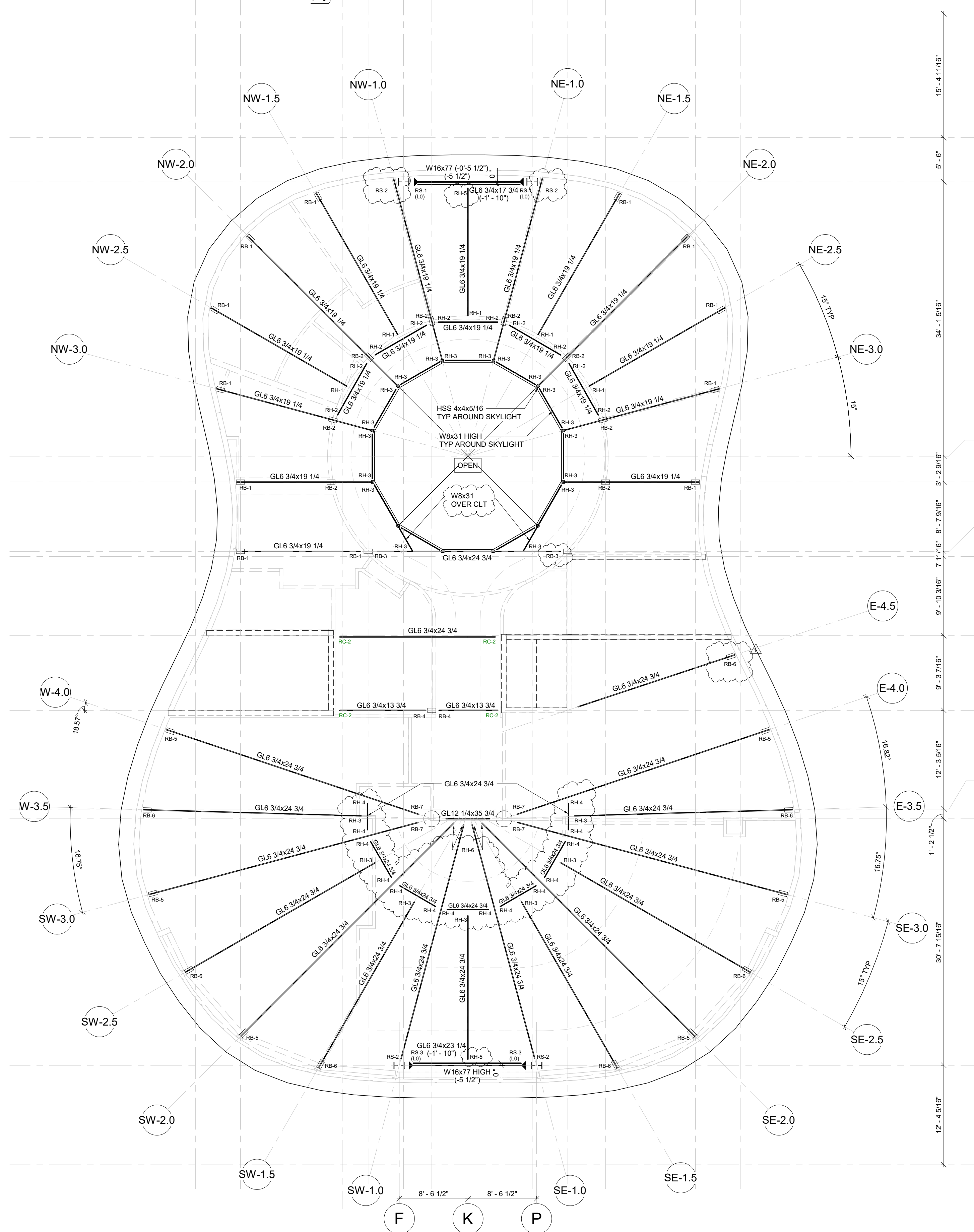
ROOF DIAPHRAGM PLAN
1/8" = 1'-0"
REFERENCE ELEVATION = 28'-7 3/8"



A B C D E G J K L N Q R S T

5'-6 7/8" 11'-3 1/8" 1'-5" 3'-2 1/2" 4'-5" 3'-6" 4'-6" 4'-6" 3'-6" 4'-5" 4'-8 3/8" 11'-2 3/16" 5'-6 7/8"

5
6
7
8
9
9.9
10
11
12
13
14
15
16



BEAM END REACTIONS FOR DELEGATED DESIGN			
TAG	DL (k)	LL (k)	DETAIL REFERENCE
RB-1	4.5	3.1	1/S305
RB-2	8.0	5.4	1/S305
RB-3	3.8	2.9	1/S305
RB-4	1.7	1.3	1/S305
RB-5	5.4	3.1	1/S305
RB-6	3.9	2.4	1/S305
RH-1	2.5	1.6	2/S304
RH-2	1.3	0.8	2/S304
RH-3	2.9	1.7	2/S304
RH-4	1.5	0.9	2/S304
RH-5	3.9	2.4	2/S304
RH-6	4.8	2.5	2/S304
RS-1	2.0	1.2	6/S304
RS-2	5.4	3.1	6/S304
RS-3	2.0	1.2	6/S304
RC-1	2.8	2.1	1/S303
RC-2	1.7	1.3	1/S303

NOTES:

- ALL LOADS ARE GIVEN UNFACTORED.
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- IMPOSED LOADS ARE VERTICAL UNLESS NOTED OTHERWISE. A NEGATIVE SIGN INDICATES AN UPWARD IMPOSED LOAD.
- BEAM END CONNECTIONS MUST BE DESIGNED FOR 5% TYING FORCE IN ACCORDANCE WITH ASCE 7-16 1.4.3.
- BEAM END CONNECTIONS AT COLUMNS MUST BE DESIGNED TO PROVIDE ADEQUATE BRACING TO COLUMN. REFER TO PROVISIONS IN AISC 360-16 APPENDIX 6.2.
- TAG NOMENCLATURE:
 - R = ROOF
 - B = BEARING CONNECTION (GLULAM-TO-GLULAM)
 - H = HANGER CONNECTION (GLULAM-TO-GLULAM)
 - S = CONNECTION TO STEEL
 - C = CONNECTION TO CMU

BID SET

CLIENT:
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 MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
 ST. AUGUSTINE, FL 32095

PROJECT MANAGER: STAN PRICE, PE
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ROOF GLULAM REACTION PLAN

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

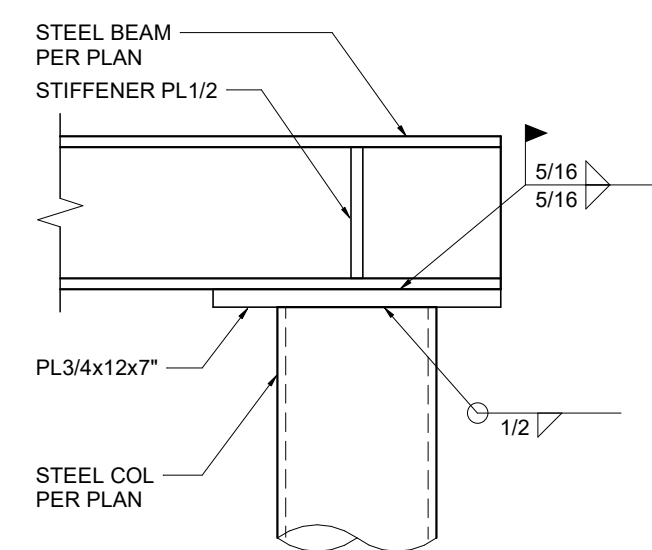
TOWN/CITY: MACON
 COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: 23121

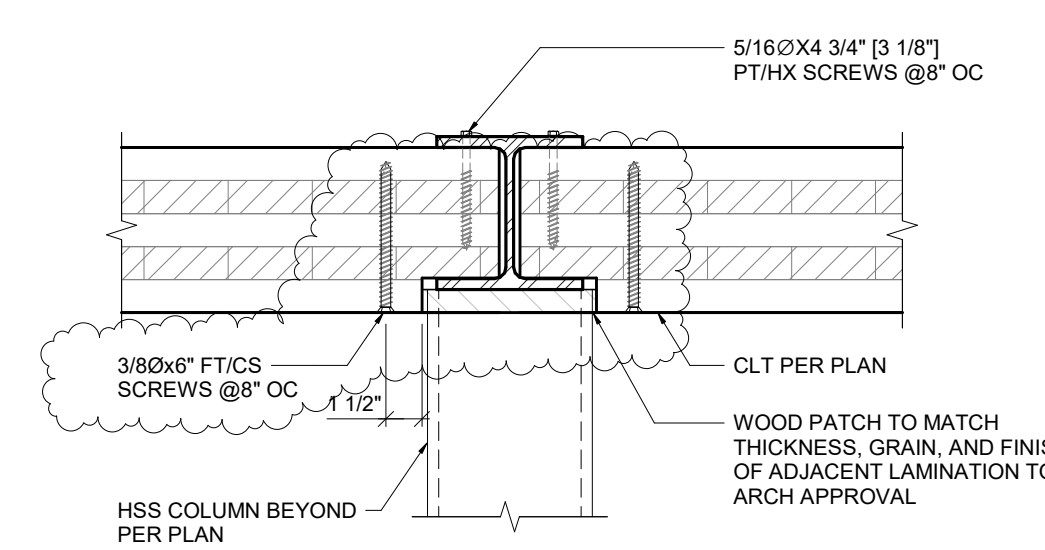
DRAWING NO.: S103B

DATE: NOVEMBER 18, 2024

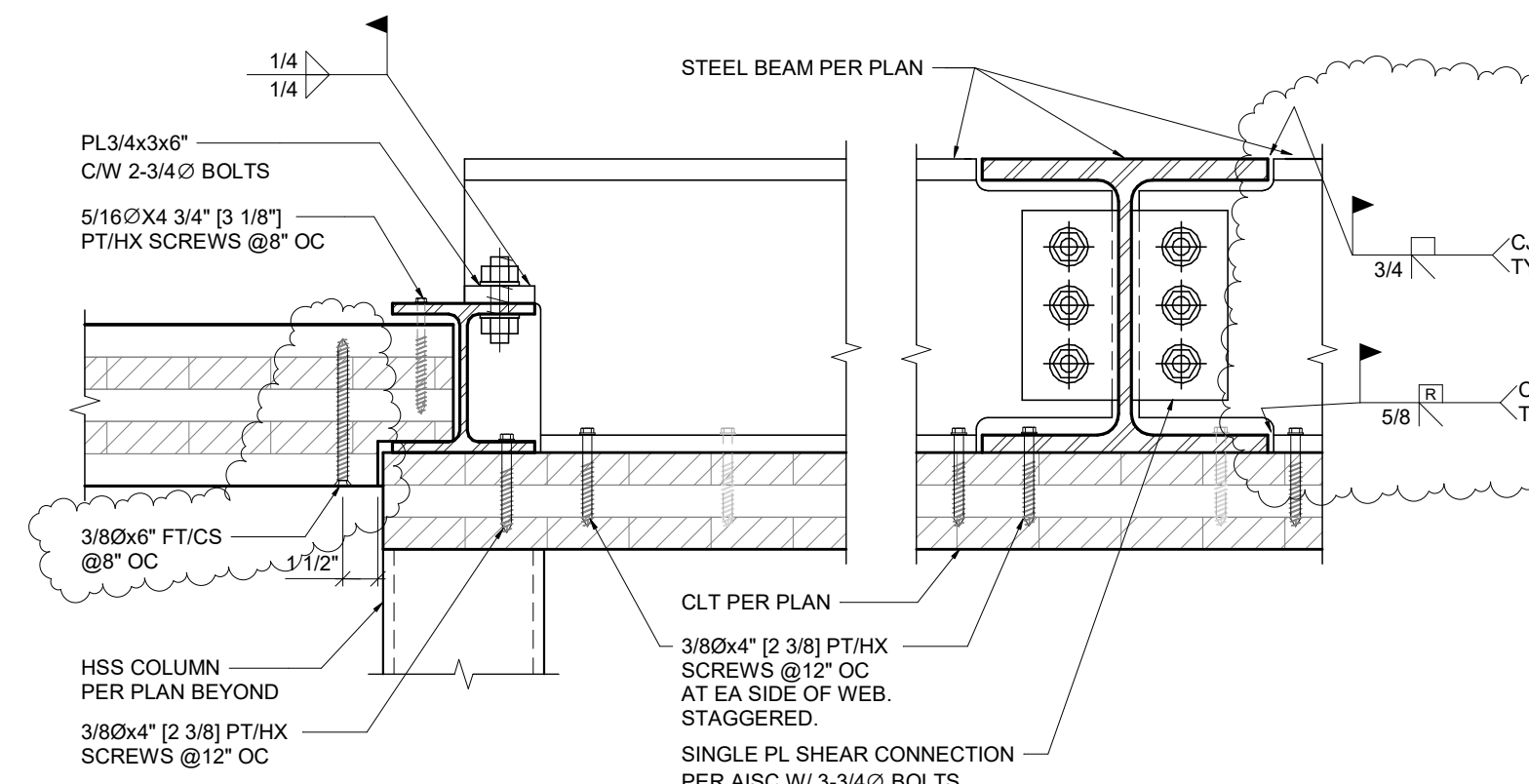
ROOF GLULAM REACTION PLAN
 1/8" = 1'-0"



5 PORTE-COCHÈRE MOMENT CONNECTION
1/2" = 1'-0"



4 WIDE FLANGE INTEGRAL WITH GUITAR NECK CLT
1/2" = 1'-0"



3 GUITAR HEAD FRAMING
1/2" = 1'-0"

SHEET NOTES:
1. ALL ELEVATIONS NOTED ARE RELATIVE TO THE REFERENCE ELEVATION.
2. AT END OF PORTE-COCHÈRE, ATTACH STEEL BEAM TO CLT IN THE MANNER SHOWN IN 3/S110 PRIOR TO FINAL CLT PANEL.

FOOTING SCHEDULE

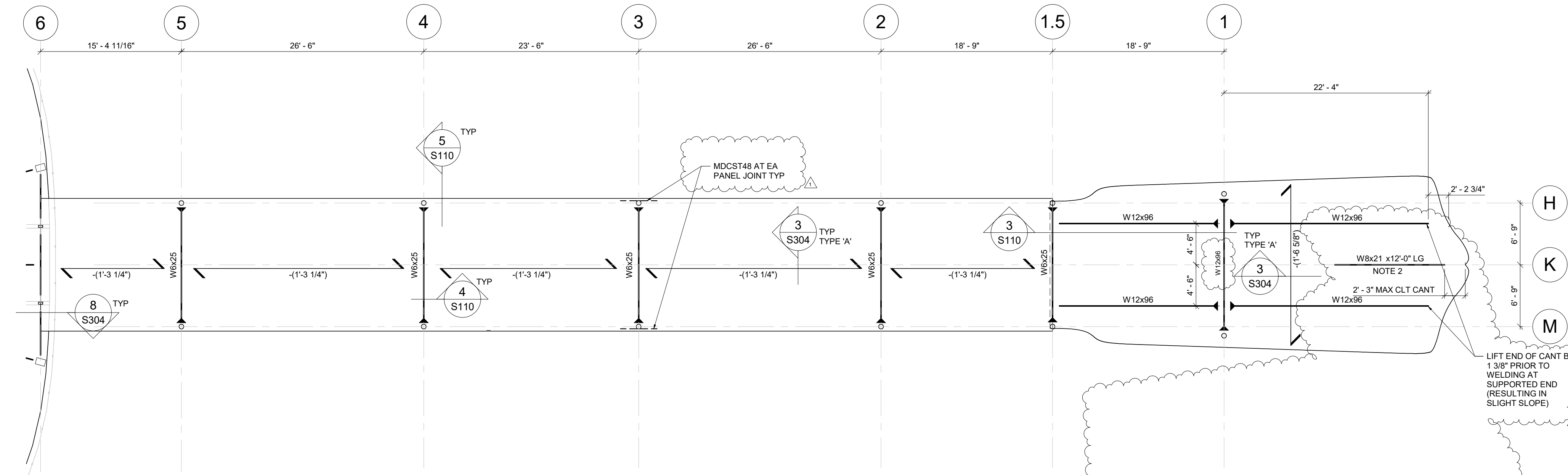
MARK	TYPE	FOOTING DIMENSION	REINFORCEMENT
PF1	PAD	4'-0"x4'-0"x1'-0" DP	#45 H2E BOT EW
PF2	PAD	4'-6"x4'-6"x1'-0" DP	#45 H2E BOT EW
PF3	PAD	6'-0"x6'-0"x1'-4" DP	#45 H2E TOP
SF1	STRIP	2'-0"x1'-0" DP	#4 CONT T&B + #4@12" SHORT WAY H2E T&B
SF2	STRIP	3'-0"x1'-0" DP	#45 CONT T&B + #5@12" SHORT WAY T&B
SF3	STRIP	4'-0"x1'-4" DP	#45 CONT H2E T&B + #5@12" SHORT WAY BOT

COLUMN SCHEDULE

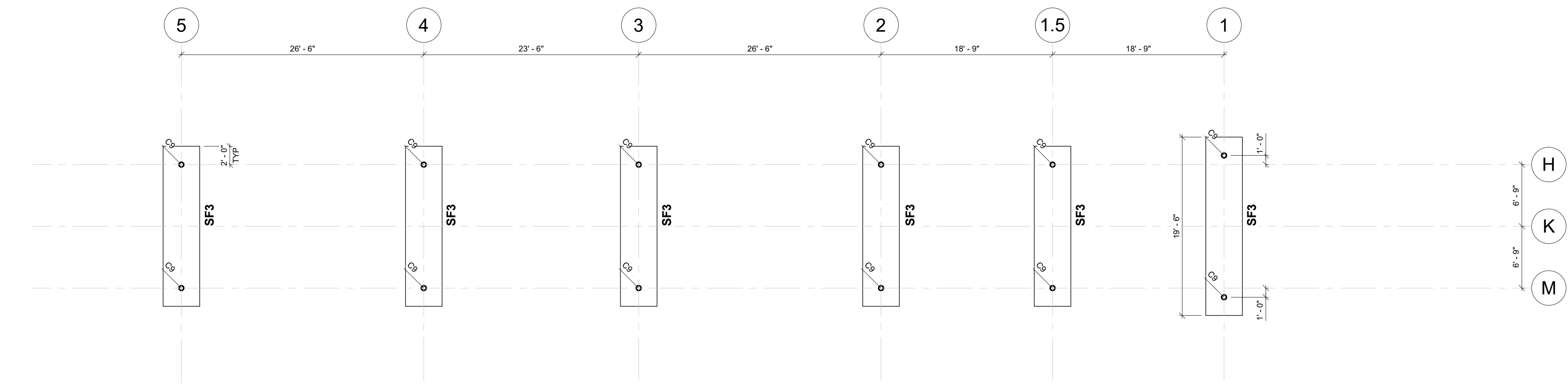
MARK	TYPE	SIZE	BASE PLATE	STUB COLUMN	BEARING PLATE	DETAIL
C1	WOOD	GL 8 1/2x12 3/8	PL 1x12x1'-3"	W8x21	PL 3/4x6x0'-10"	4/S302
C2	WOOD	GL 8 1/2x12 1/2 SLOPED	PL 1x12x1'-6"	W12x22	PL 3/4x6x1'-2"	4/S302
C3	WOOD	GL 6 3/4x12 3/8 (POST-UP)	-	-	-	-
C4	WOOD	TR 24"Ø	PL 1x12x1'-0"	HSS 8.625x0.375	PL 3/4x9"Ø	4/S302
C5	WOOD	TR 24"Ø	PL 1x18x1'-6"	HSS 12.75x0.500	PL 3/4x18"Ø	4/S302
C6	STEEL	W16x77	PL 1x14x1'-8"	-	-	1/S306, TYPE W
C7	STEEL	HSS 4x4x1/4	PL 3/4x10x0'-10"	-	-	1/S306, TYPE A
C8	STEEL	HSS 6x3x3/8	PL 3/4x9x1'-0"	-	-	1/S306, TYPE A
C9	STEEL	HSS 6.625x0.375	PL 1x12x1'-0"	-	-	1/S306, TYPE C

CLT PANEL TYPE SCHEDULE

TYPE	LOCATIONS	LAYER	LAYER THICKNESS	TOTAL THICKNESS	LAYER ORIENTATION	SPECIES	GRADE (PRG 320)
1	INTERIOR L2 AND GUITAR HEAD	1 (TOP)	1 3/8"	4 1/8"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION A)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		4 (BOT)	1 3/8"		0°	SYP	No. 2
2 (OPTION B)	EXTERIOR L2 (SEE PLAN)	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	MSR 1.5F-1.6E
		2	1 1/16"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		0°	SYP	No. 2
		4	1 1/16"		90°	SYP	MSR 1.5F-1.6E
		5 (BOT)	1 3/8"		0°	SYP	No. 2
3	GUITAR NECK	1 (TOP)	1 3/8"	6 7/8"	0°	SYP	V3
		2	1 3/8"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	1 3/8"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	
4 (OPTION A)	ROOF	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	No. 2
		2	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		3	1 3/8"		90°	SYP	MSR 1.5F-1.6E
		4	1 3/8"		0°	SYP	V3
4 (OPTION B)	ROOF	1 (TOP)	1 3/8"	5 1/2"	0°	SYP	V3
		2	1 1/16"		90°	SYP	
		3	1 3/8"		0°	SYP	
		4	1 1/16"		90°	SYP	
		5 (BOT)	1 3/8"		0°	SYP	



2 SECOND FLOOR FRAMING & DIAPHRAGM PLAN - PORTE-COCHÈRE
1/8" = 1'-0" REFERENCE ELEVATION = 15'-2"



1 FOUNDATION / MAIN FLOOR FRAMING PLAN - PORTE-COCHÈRE
1/8" = 1'-0" REFERENCE ELEVATION = 0'-0"

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MACON, GA 31201



Passero Associates
4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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PORTE-COCHÈRE PLANS AND DETAILS
2178 FLIGHTLINE AVE
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.: 23121
DRAWING NO.: S110
DATE: NOVEMBER 18, 2024

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MACON-BIBB COUNTY
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MACON, GA 31201



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4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
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DESIGNER: KATIE KIMBICK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
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BUILDING SECTIONS

2178 FLIGHTLINE AVE

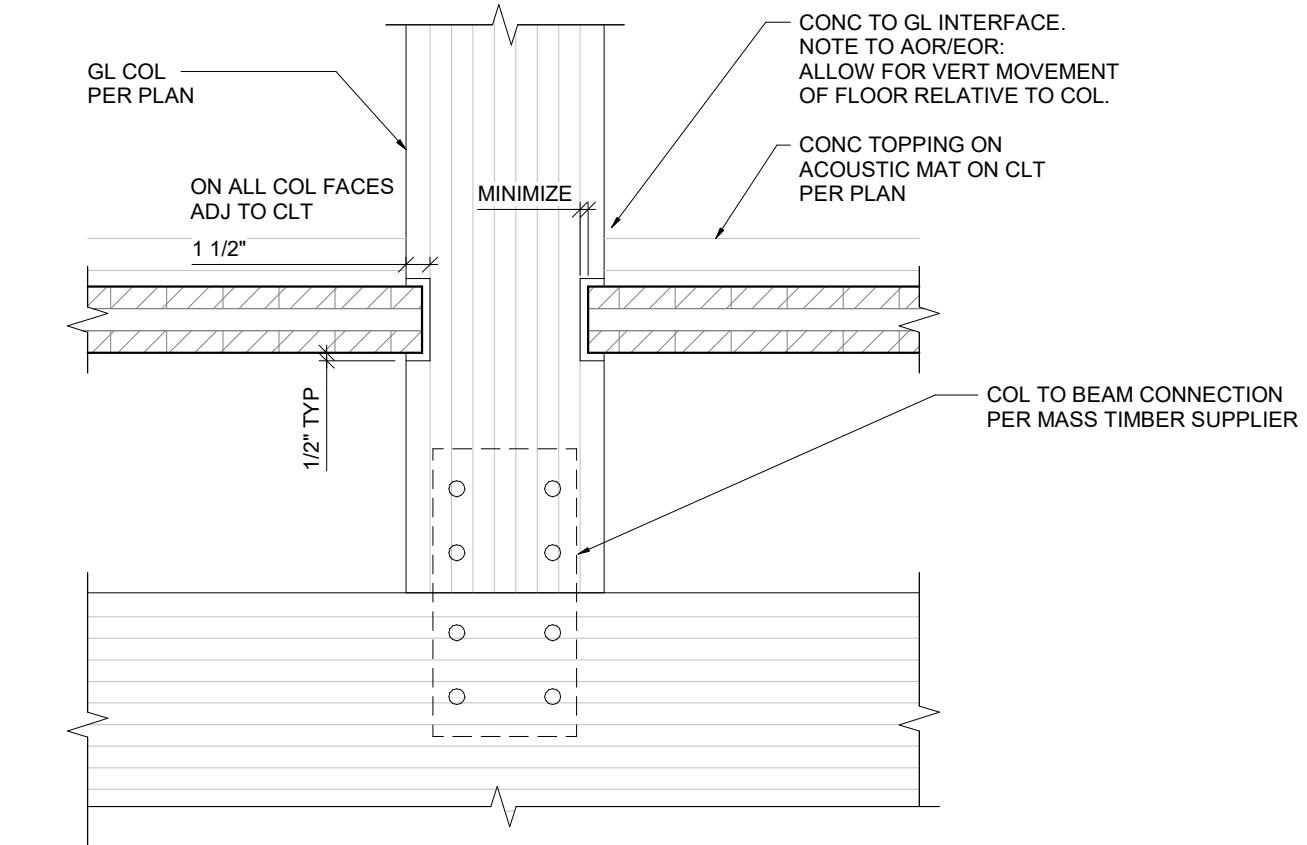
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

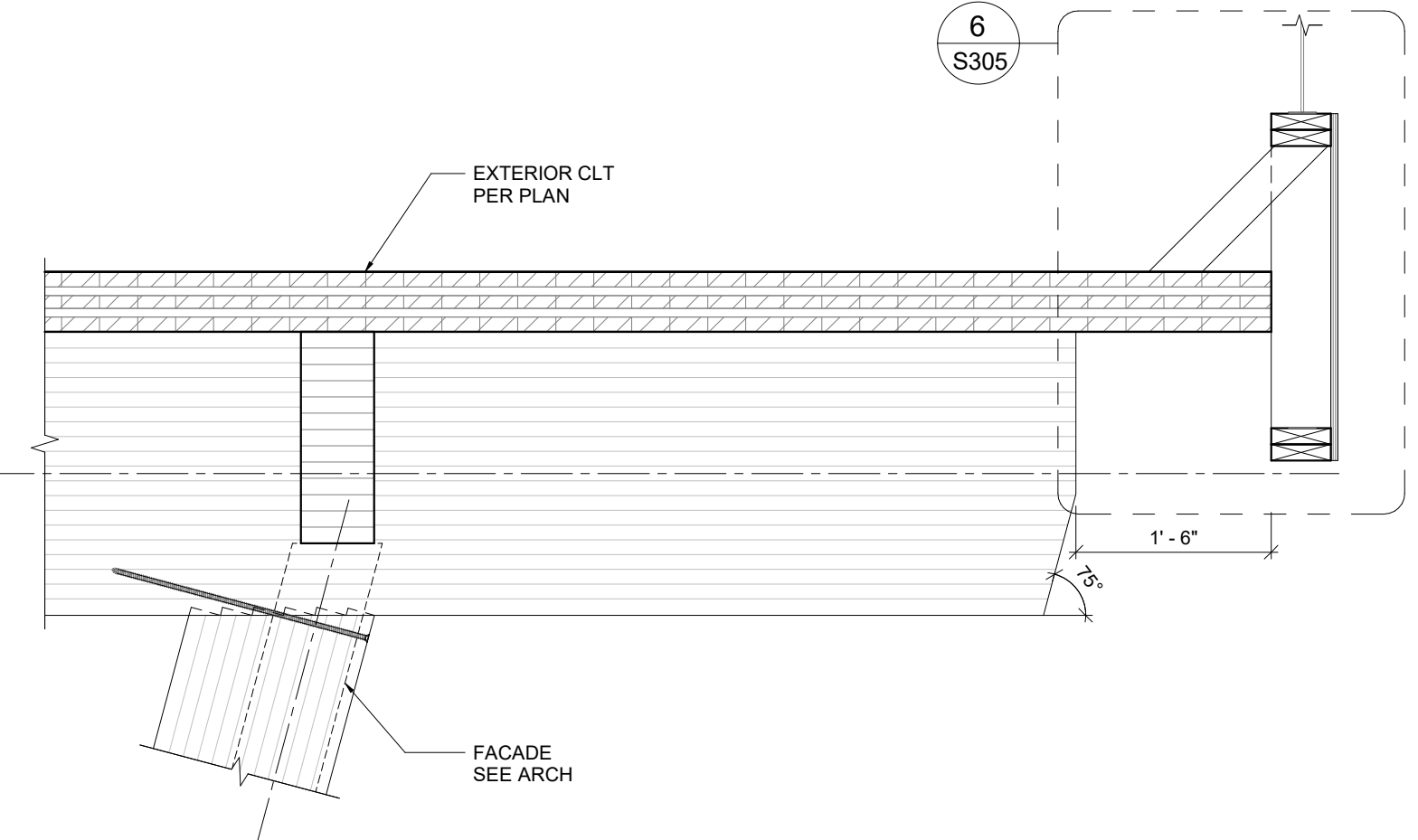
PROJECT NO.: 23121

DRAWING NO.: S201

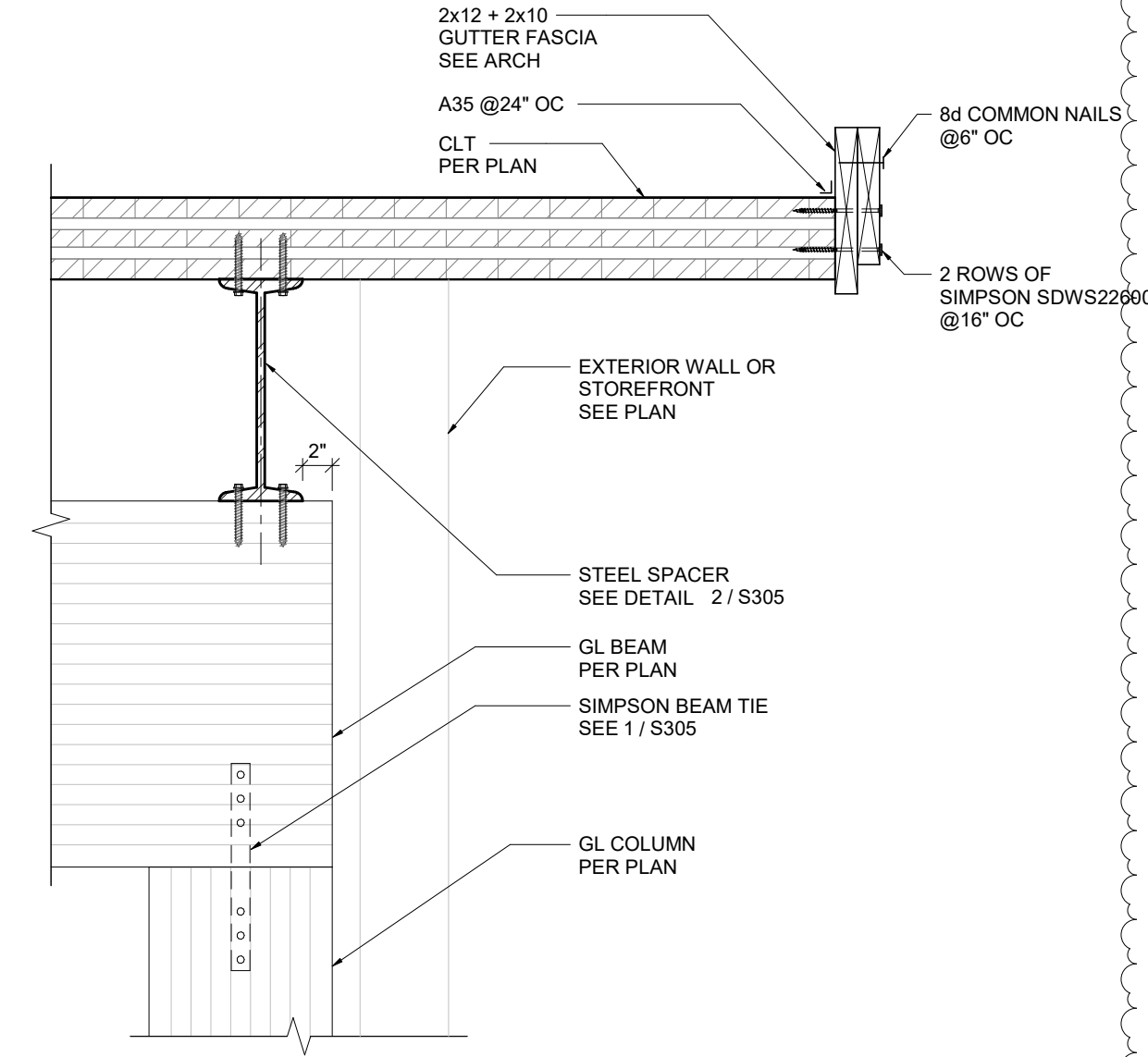
DATE: NOVEMBER 18, 2024



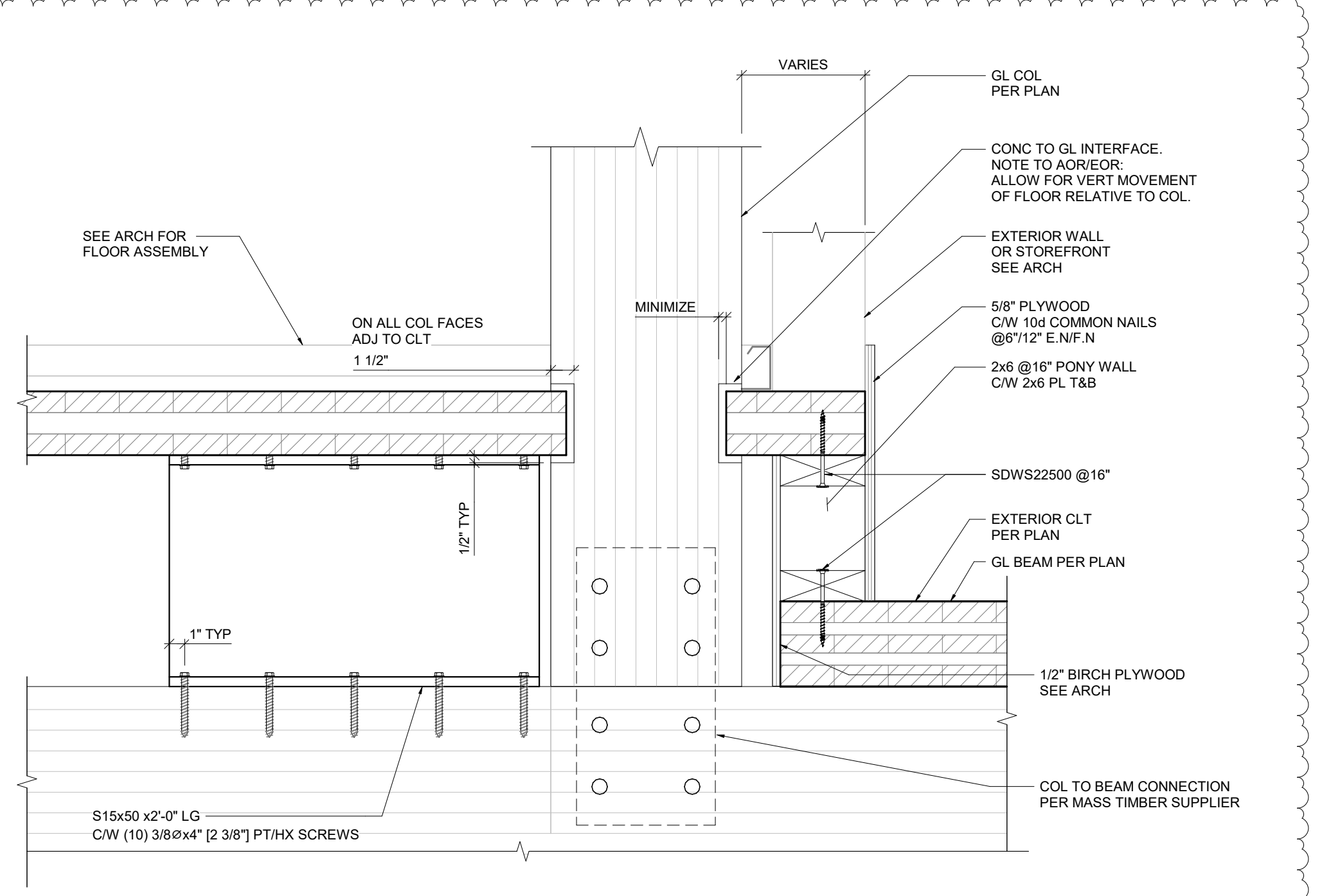
7 COLUMN TO CLT PANEL CONNECTIONS AT L2
1" = 1'-0"



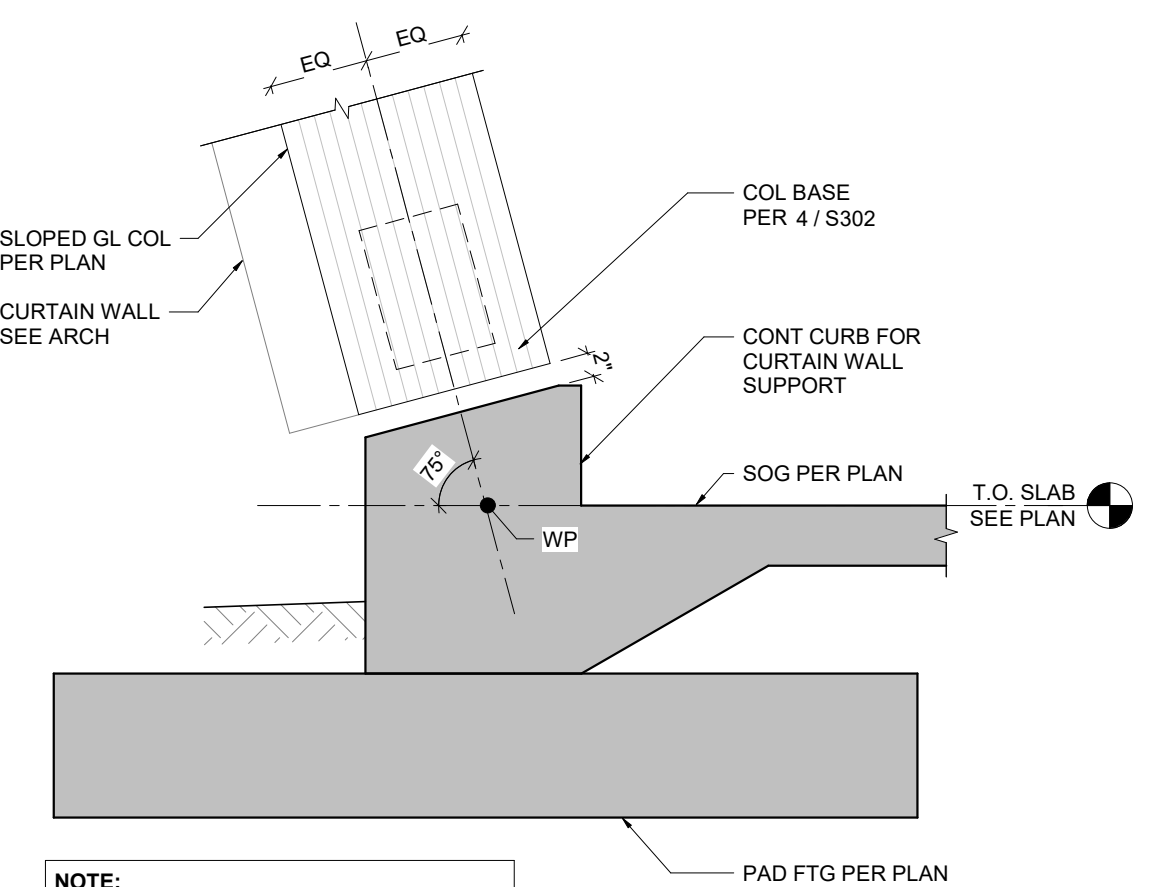
4 L2 SOUTH BALCONY SECTION
3/4" = 1'-0"



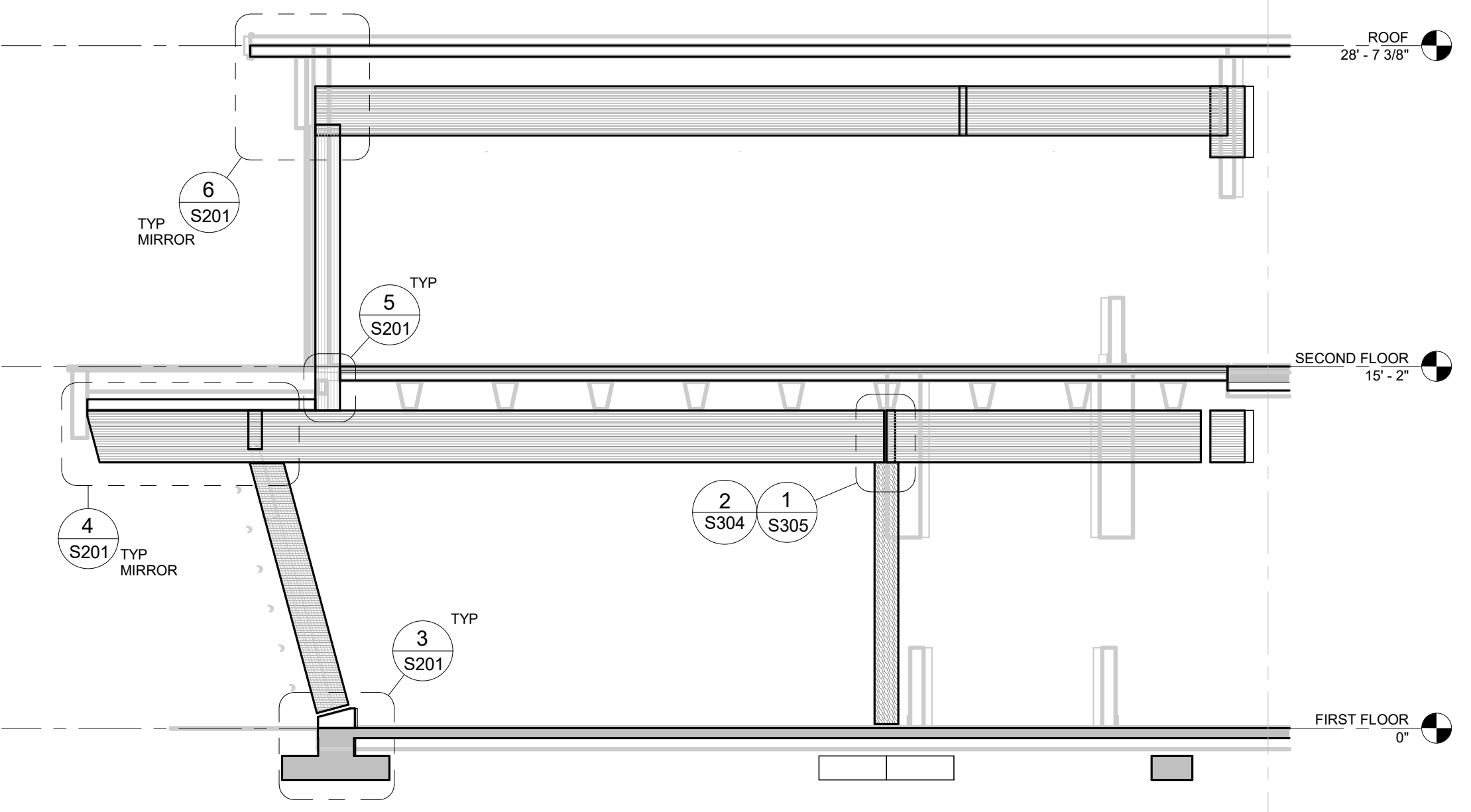
6 ROOF OVERHANG FRAMING
1" = 1'-0"



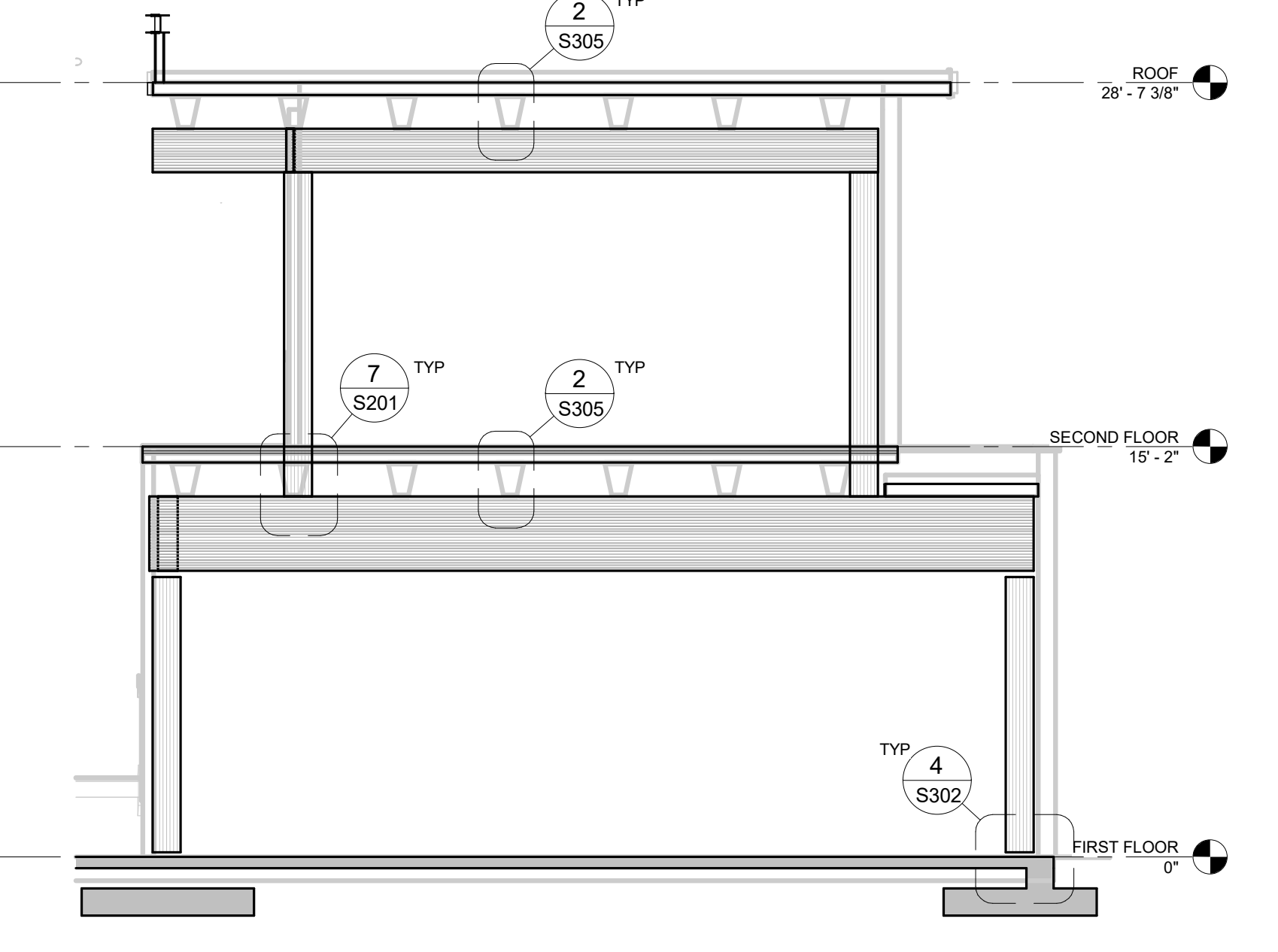
5 TYPICAL STEP AT L2 FRAMING DETAIL
1 1/2" = 1'-0"



3 SLANTED GLULAM COLUMN BASE DETAIL
3/4" = 1'-0"



2 TYPICAL BUILDING SECTION AT SOUTH SIDE SLOPED COLUMNS
NTS



1 TYPICAL BUILDING SECTION AT TRANSFERRED COLUMNS
NTS

SW-2.0

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MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER STAN PRICE, PE
PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
DESIGNER KATIE KEMOCK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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TYPICAL CONCRETE DETAILS

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.:

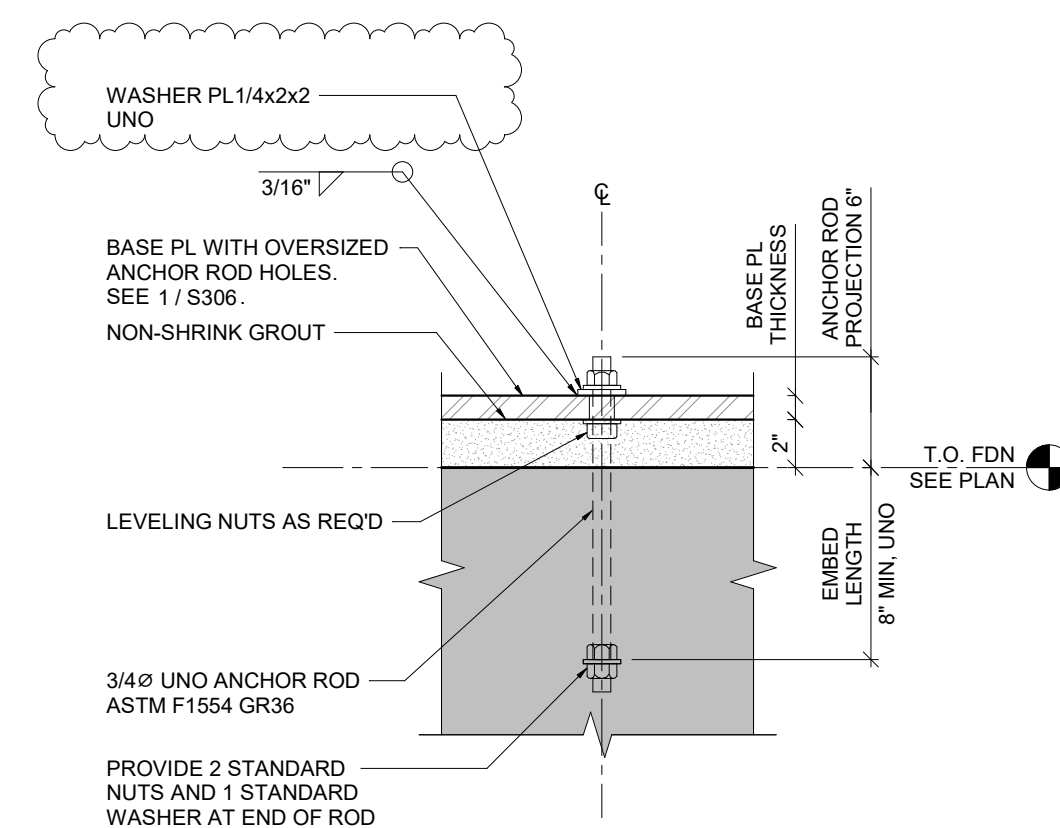
23121

DRAWING NO.:

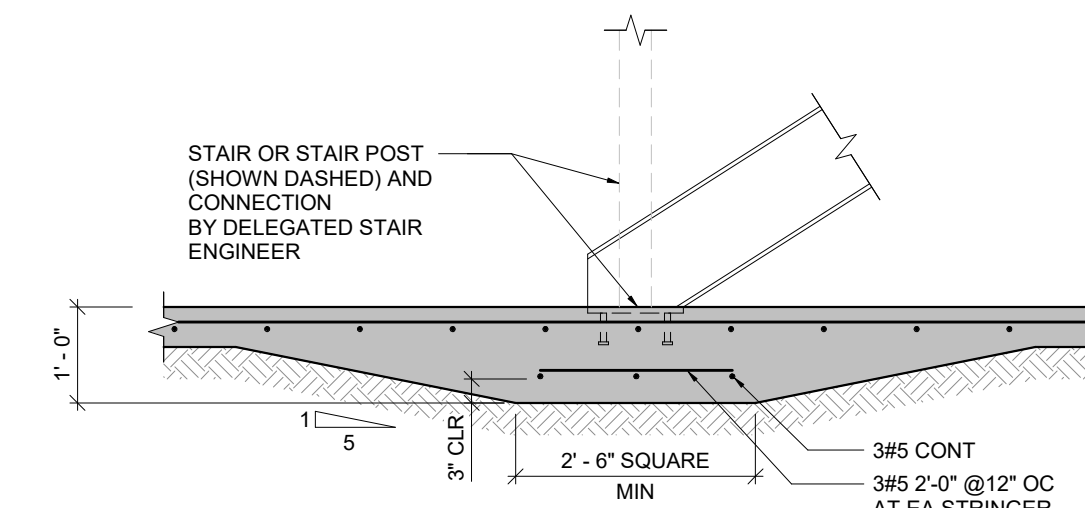
S301

DATE:

NOVEMBER 18, 2024

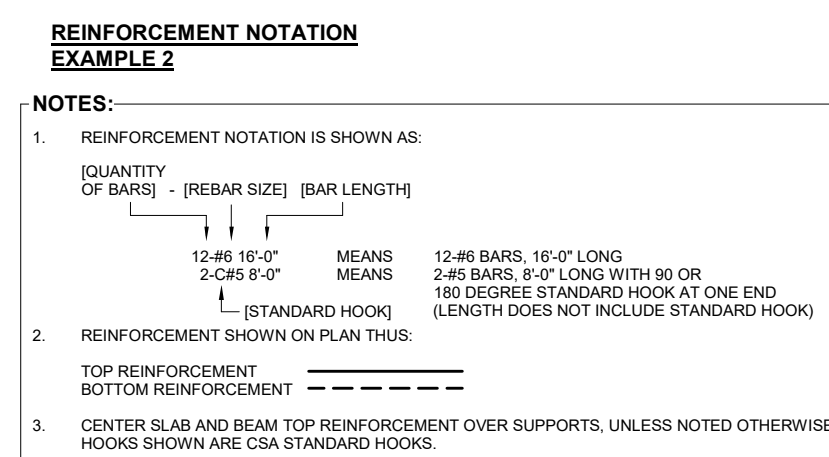
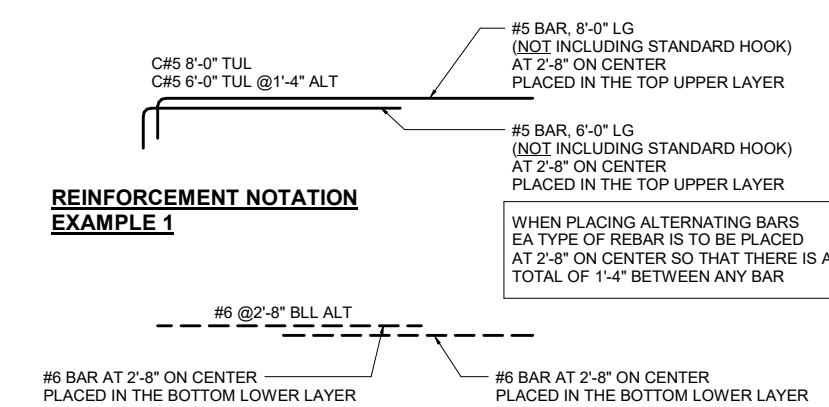


11 TYPICAL GRAVITY COLUMN ANCHOR ROD DETAIL
NTS

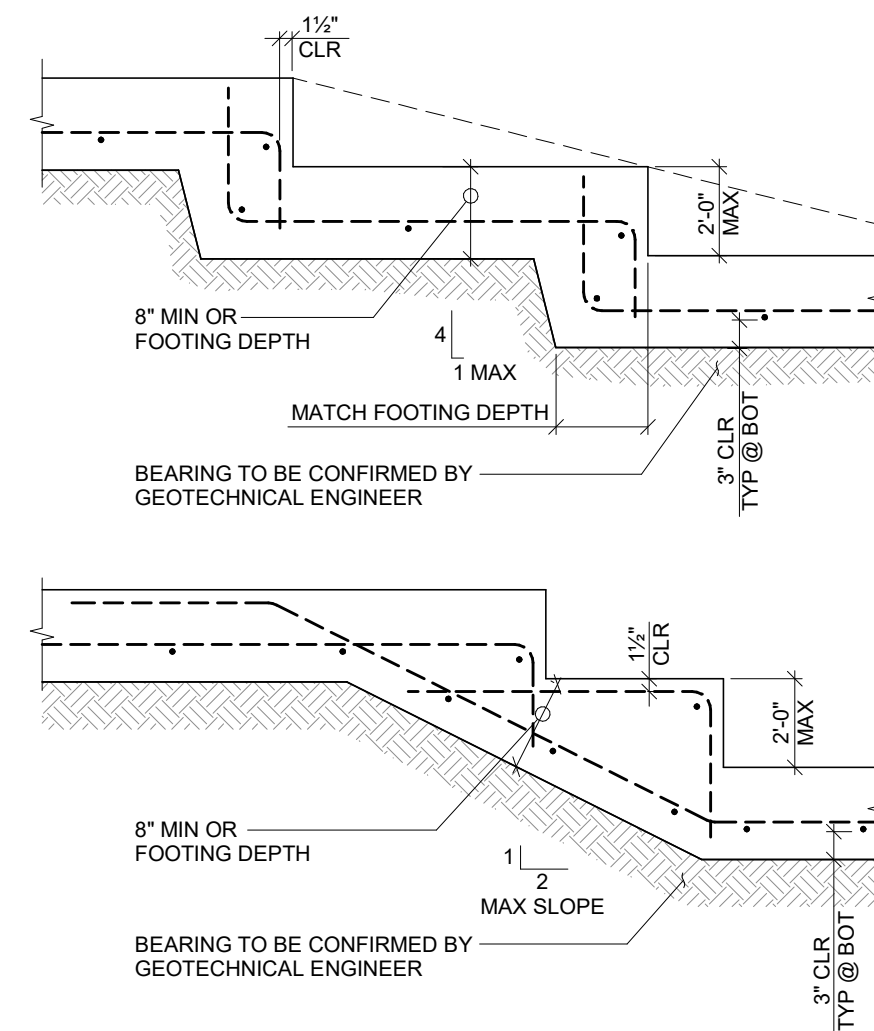


NOTES:
1. COORDINATE POST AND STRINGER LOCATIONS WITH ARCH & STEEL STAIR DESIGNER.
2. BASE PLATES TO BE DESIGNED AND LOCATED SO AS TO BE HIDDEN IN SPACE UNDER STAIRS PER ARCH. LENGTH EQUALS WIDTH OF STAIRS PLUS 18".

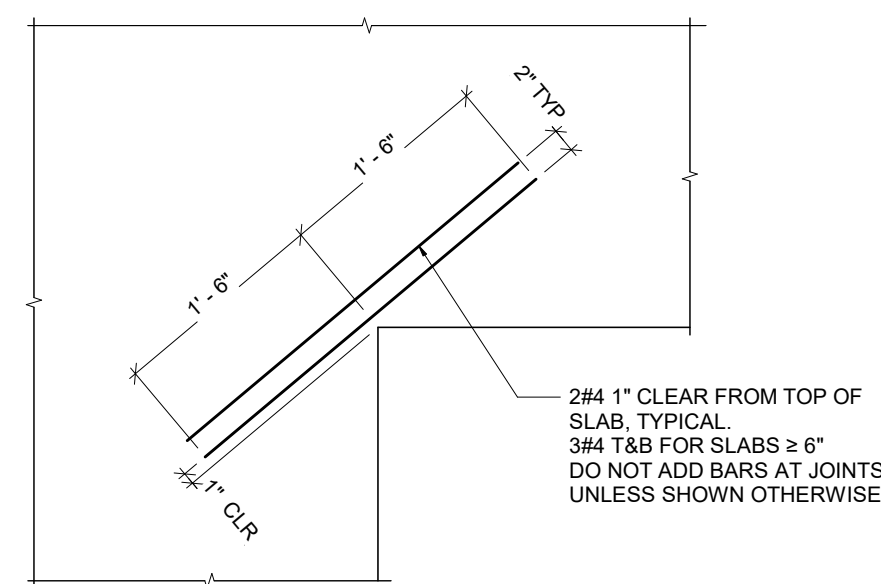
10 TYPICAL DETAIL AT STRINGER / STAIR POST
NTS



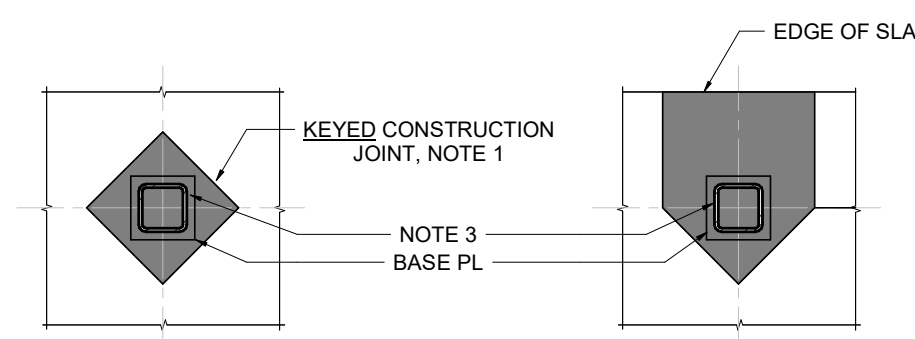
9 TYPICAL REINFORCING REPRESENTATION
NTS



8 TYPICAL STEPPED STRIP FOOTING
NTS

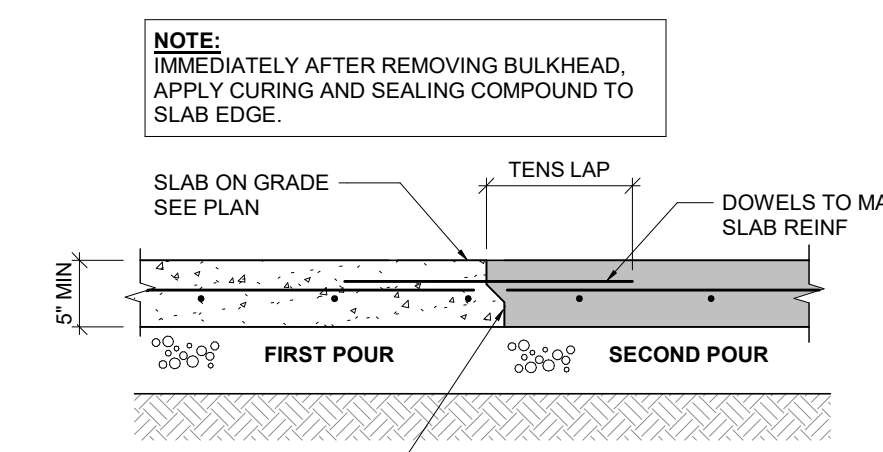


7 TYPICAL SLAB ON GRADE ADDITIONAL REINFORCING
NTS



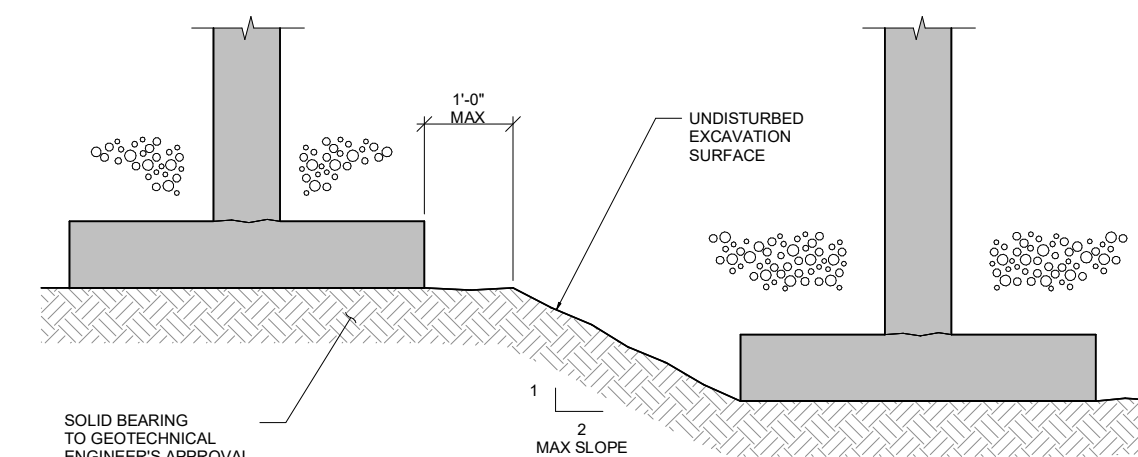
NOTES:
1. SEE TYP. COLUMN AND FOOTING DETAIL FOR ADDITIONAL INFORMATION.
2. INFILL A MIN OF 28 DAYS AFTER PLACING SLAB ON GROUND.
3. AT WIDE FLANGE COLUMNS, INDENT ISOLATION JOINT MATERIAL TO FOLLOW SECTION PROFILE. JOINT FILLER STRIP PER SPECIFICATIONS.

6 TYPICAL SLAB ISOLATION JOINT AROUND COLUMN
NTS

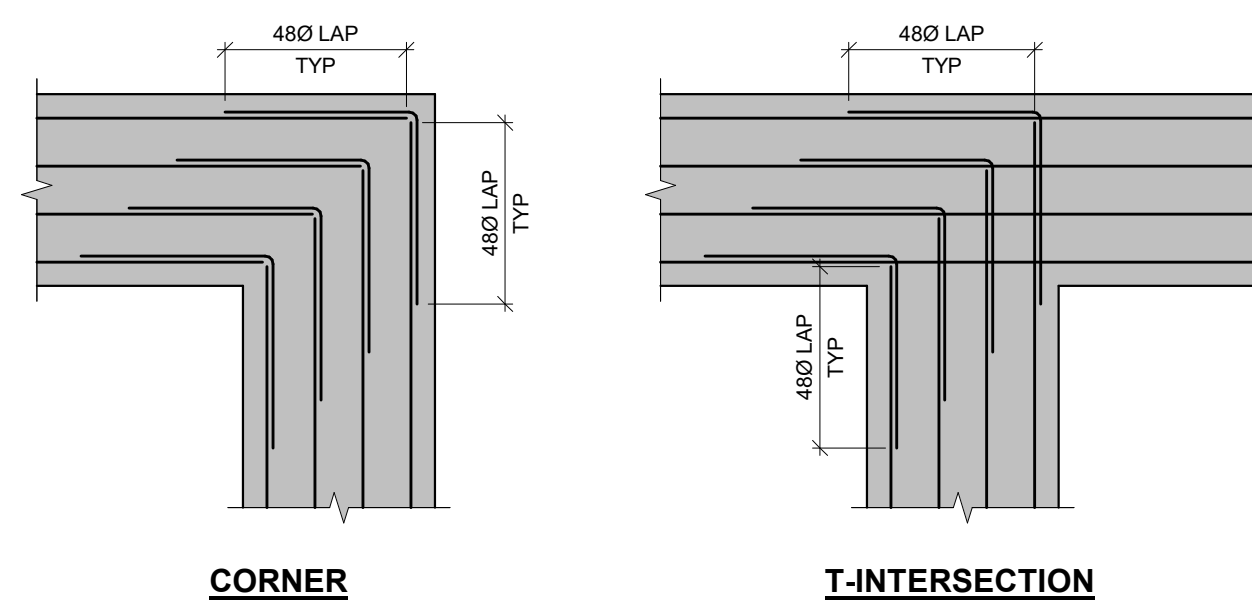


NOTE: EXACT LOCATION AND EXTENT OF CONSTRUCTION JOINT TO BE CONFIRMED ON SITE BY THE CONTRACTOR LOCATION TO BE APPROVED BY ENGINEER AND ARCHITECT.

5 TYPICAL SLAB ON GRADE CONSTRUCTION JOINT
NTS

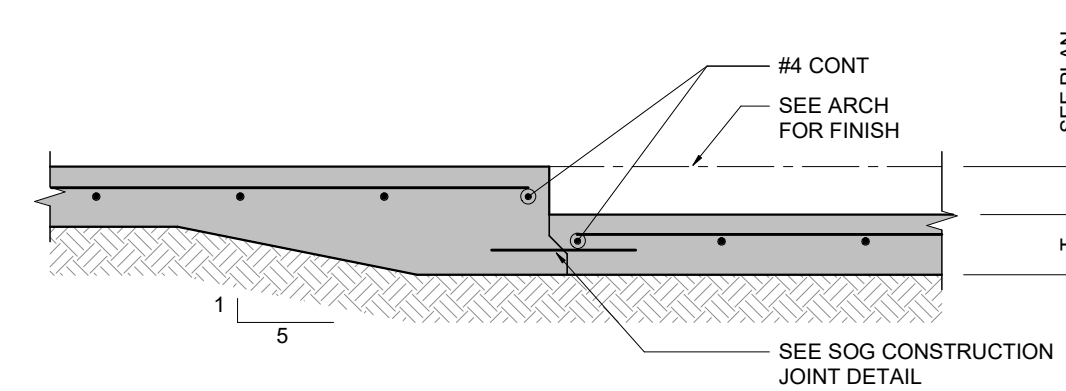


4 TYPICAL ADJACENT FOOTING
NTS

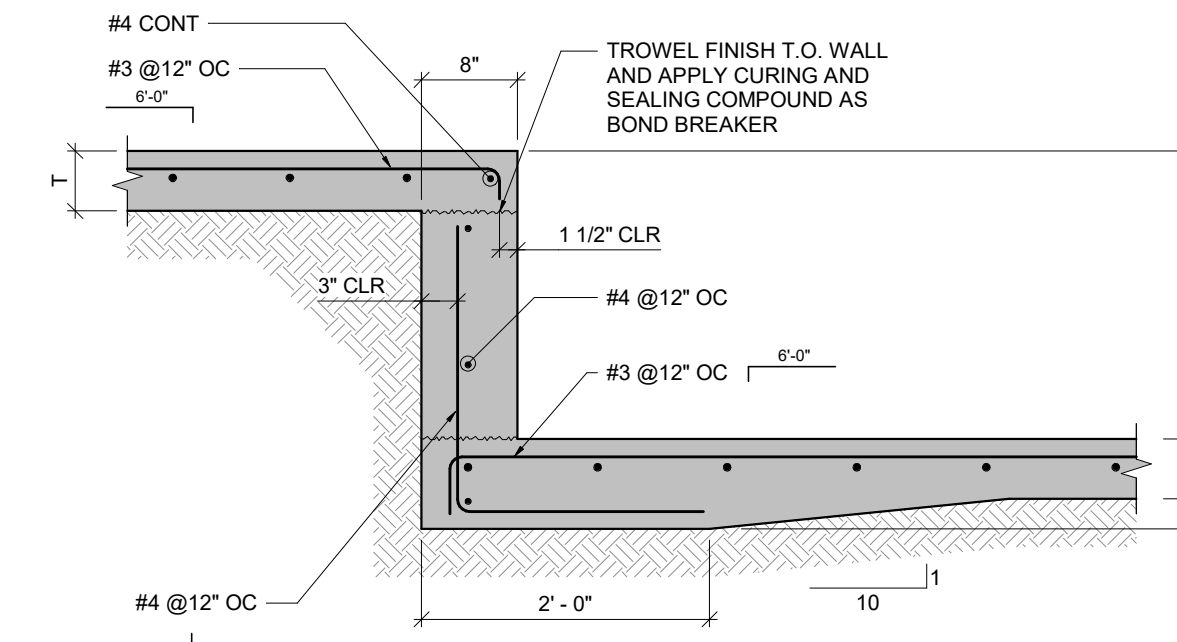


NOTES:
1. TRANSVERSE FOOTING STEEL NOT SHOWN FOR CLARITY.
2. BENT CORNER REINFORCEMENT SHALL MATCH SIZE AND SPACING OF CONTINUOUS LONGITUDINAL REINFORCEMENT.
3. SEE PLAN FOR SIZE AND NUMBER OF REINFORCEMENT BARS.
4. TOP BARS, IF REQUIRED, SHALL FOLLOW THE SAME LAP PATTERN.
5. SEE PLAN FOR FOOTING SIZE.

3 TYPICAL FOOTING INTERSECTION DETAIL
NTS



2 TYPICAL SLAB ON GRADE DEPRESSION
NTS



1 TYPICAL STEP IN SLAB ON GRADE
NTS

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700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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FOUNDATION DETAILS

2178 FLIGHTLINE AVE

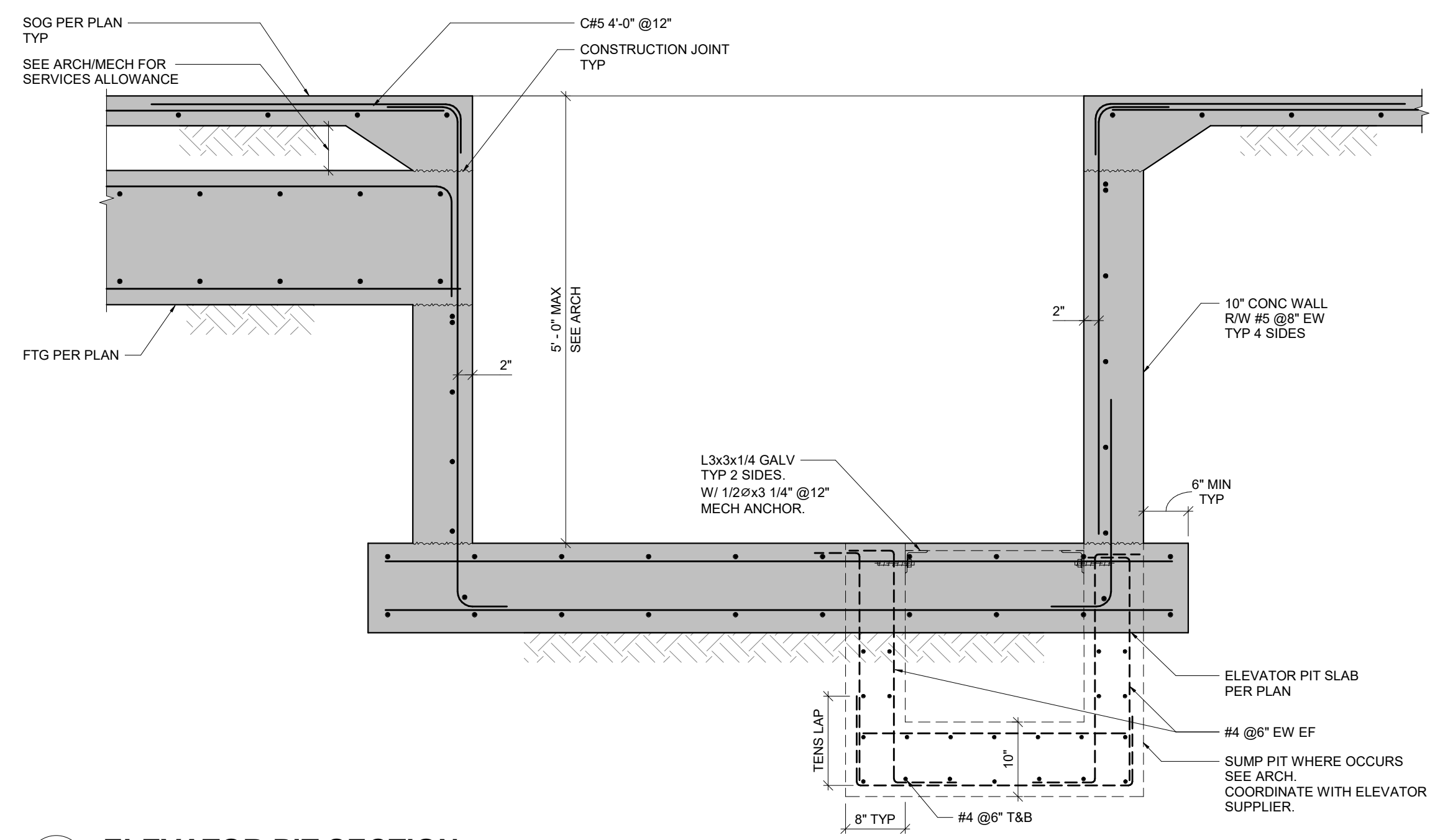
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON STATE: GEORGIA
COUNTY: BIBB PROJECT NO.:

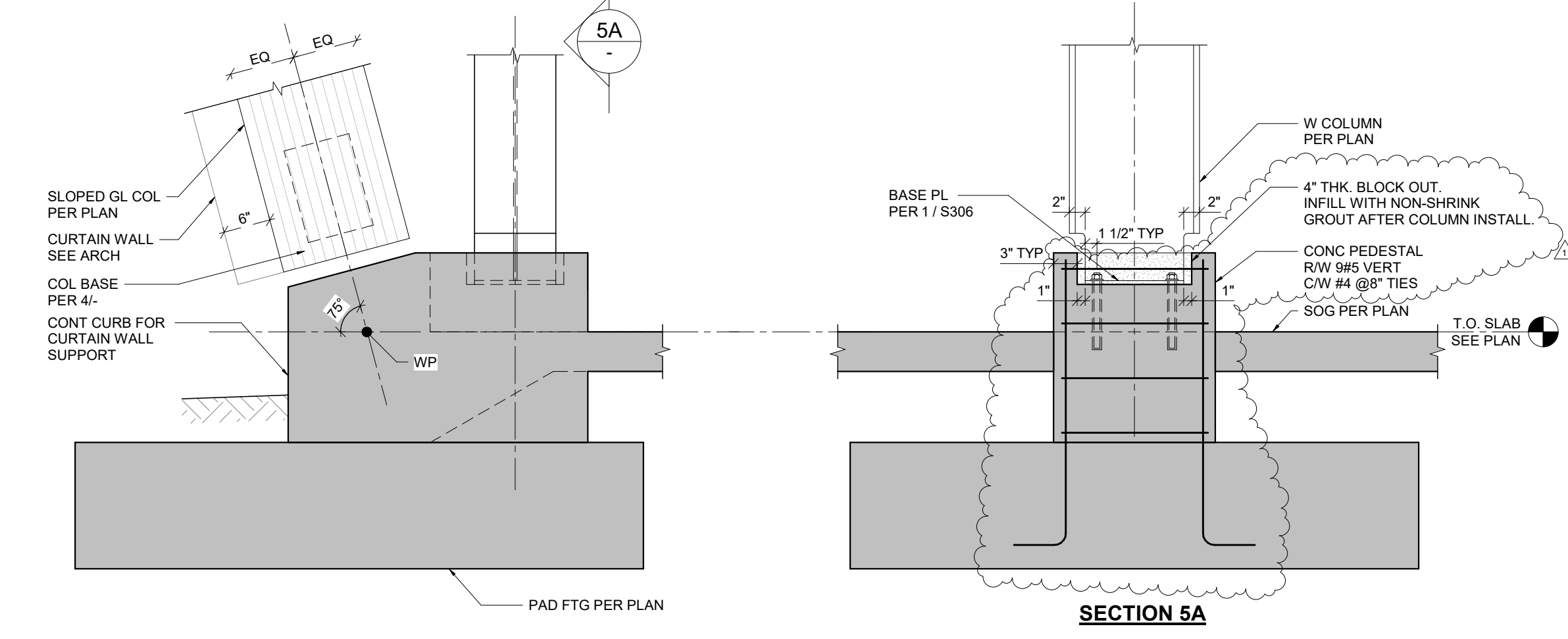
23121

DRAWING NO.: **S302**

DATE: **NOVEMBER 18, 2024**

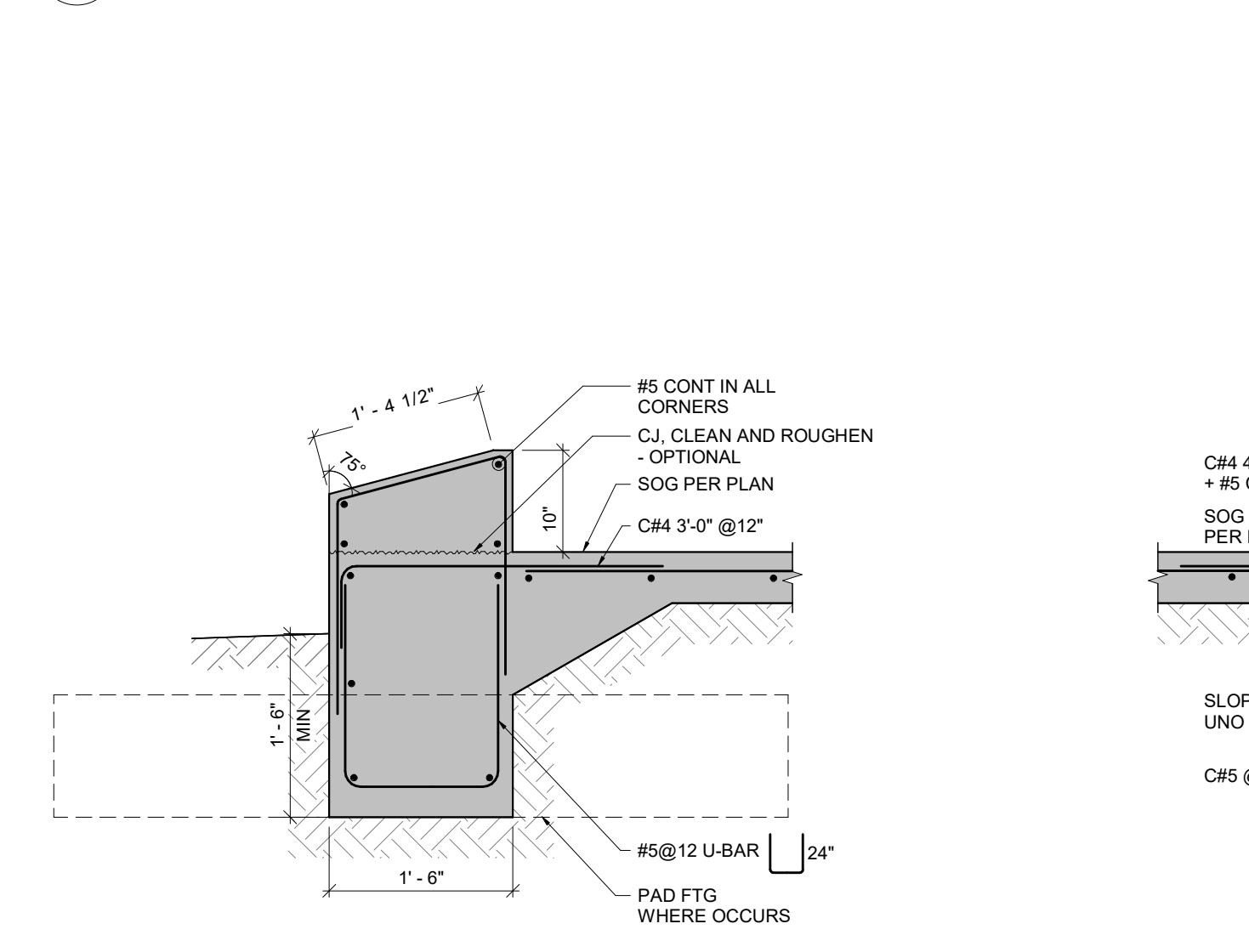


8 ELEVATOR PIT SECTION
S101 3/4" = 1'-0"



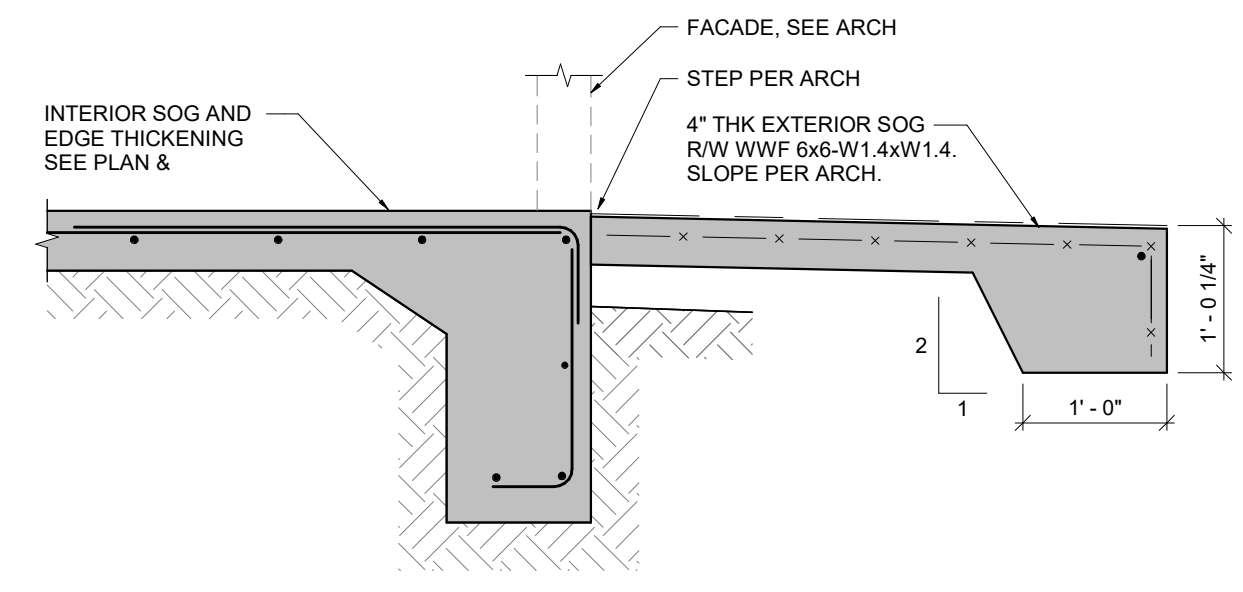
5 SLANTED GLULAM COLUMN AT MOMENT FRAME BASE
S101 3/4" = 1'-0"

NOTE:
FOR BALANCE OF INFORMATION REFER TO DETAIL 2 / S302.

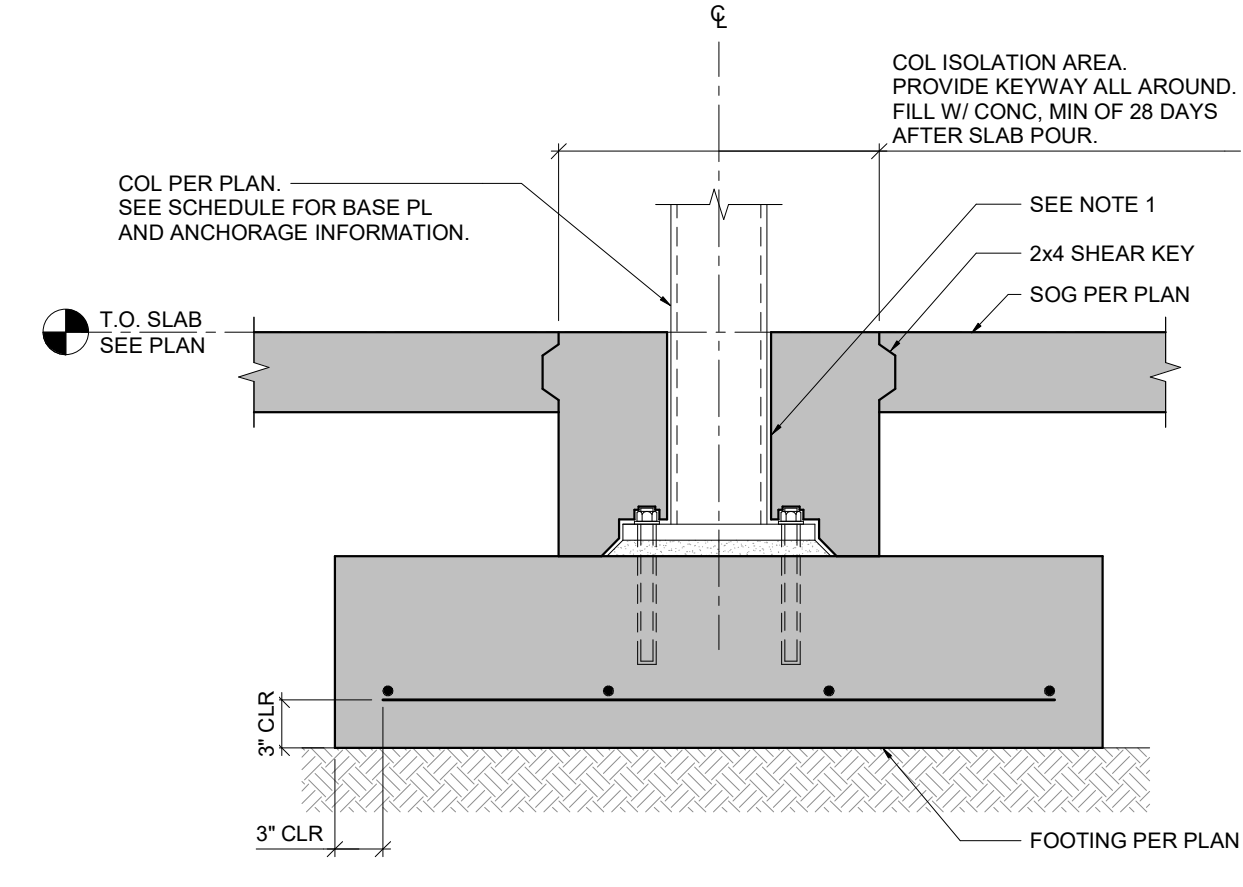


2 SLAB ON GRADE EDGE AT ANGLED CURTAINWALL
S101 3/4" = 1'-0"

1 TYPICAL SOG EDGE THICKENING
S101 3/4" = 1'-0"

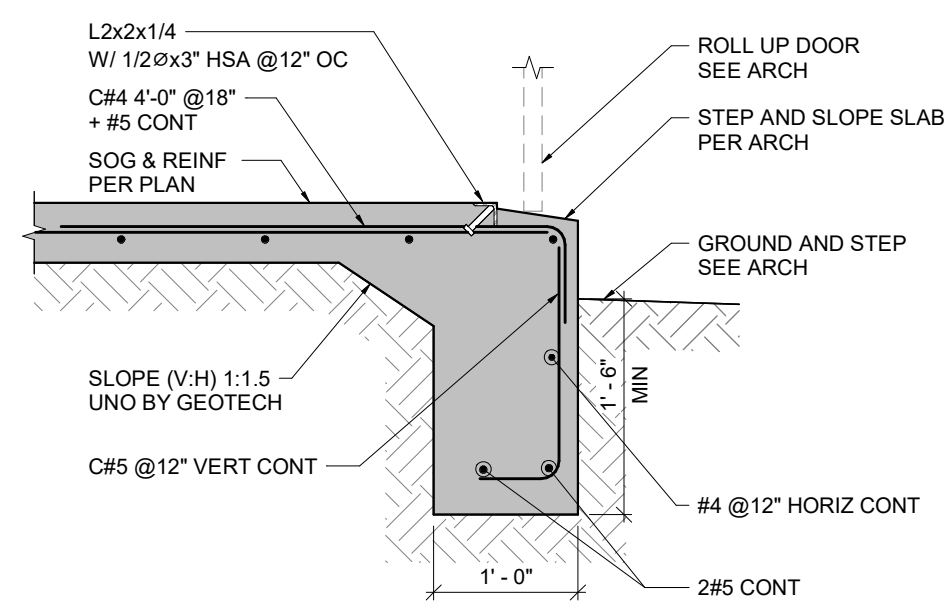


6 SLAB ON GRADE AT SOUTH ENTRANCE
S101 3/4" = 1'-0"

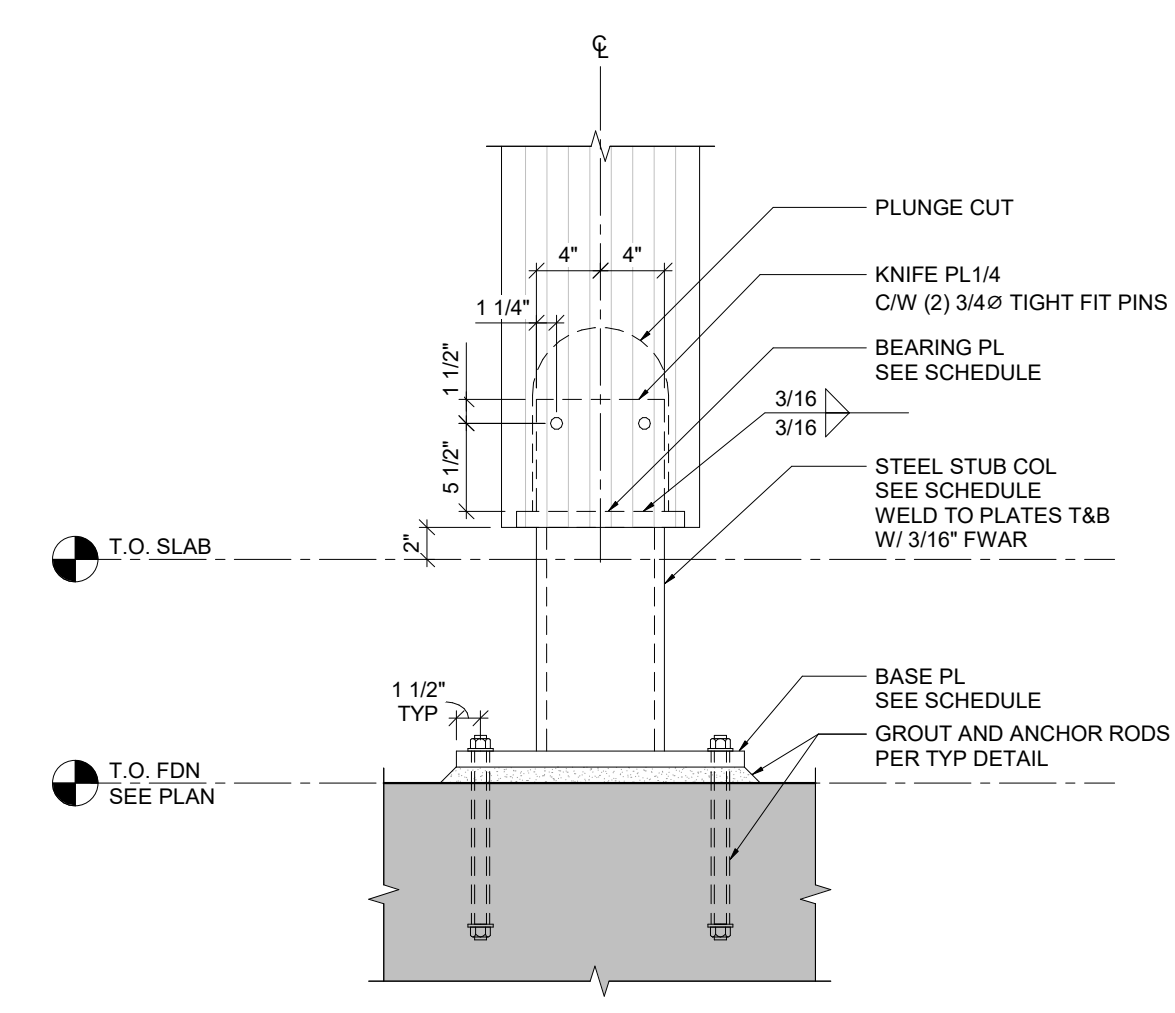


NOTE:
1. AT EXTERIOR COLUMNS, COAT BELOW GRADE PORTION OF COLUMN & BASE PLATE WITH BITUMINOUS MASTIC AND PROVIDE 1/2" PREFORMED JOINT FILLER AROUND COLUMNS. AT INTERIOR COLUMNS, PROVIDE 30# ROOFING FELT.

3 TYPICAL STEEL COLUMN AND FOOTING DETAIL
S101 1" = 1'-0"



7 SOG EDGE AT ROLL-UP DOOR
S101 3/4" = 1'-0"



4 TYPICAL PAD FOUNDATION / GLULAM COLUMN BASE
S101 1" = 1'-0"

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ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KMECK, ASSOC., AIA

NO.	DATE	BY	DESCRIPTION
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TYPICAL MASONRY DETAILS

2178 FLIGHTLINE AVE

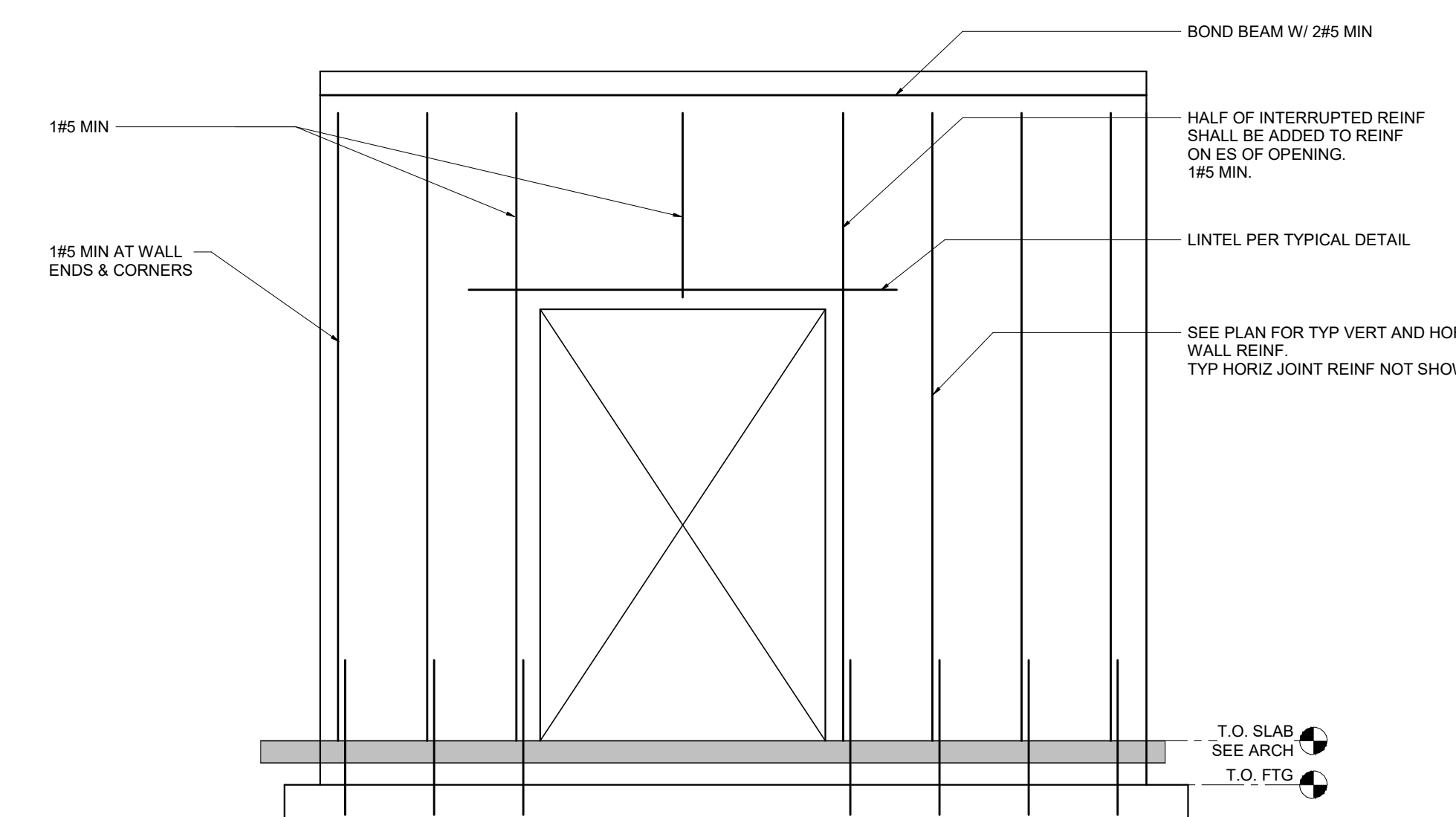
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

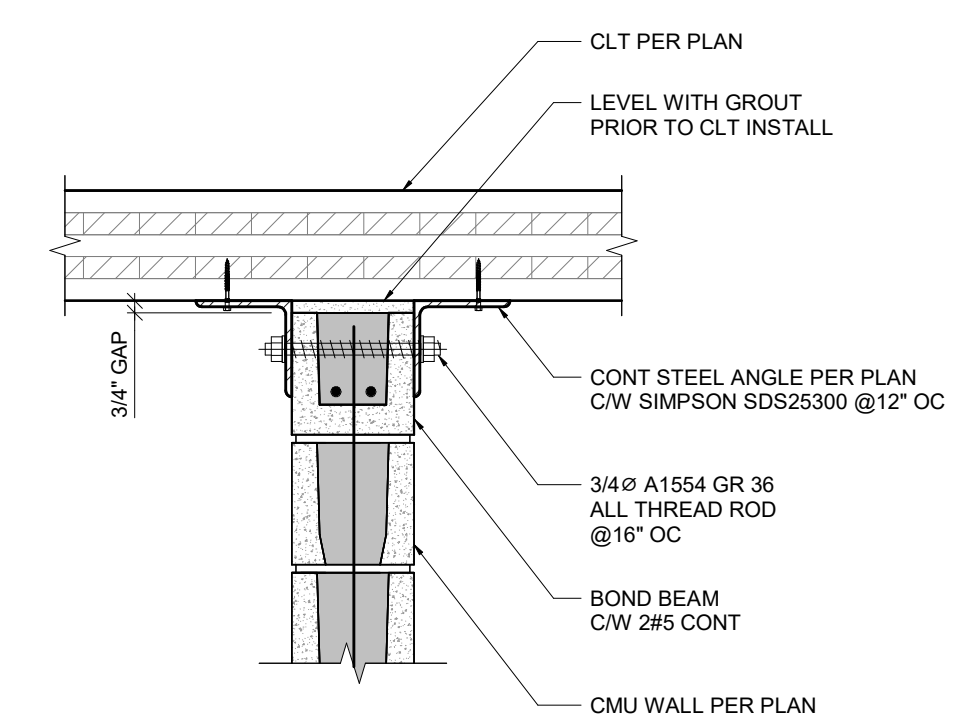
23121

DRAWING NO.:
S303

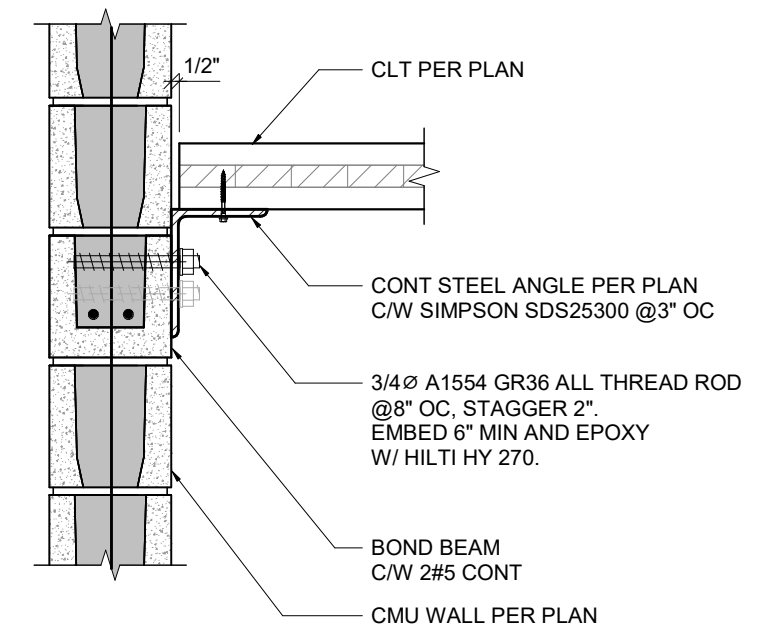
DATE:
NOVEMBER 18, 2024



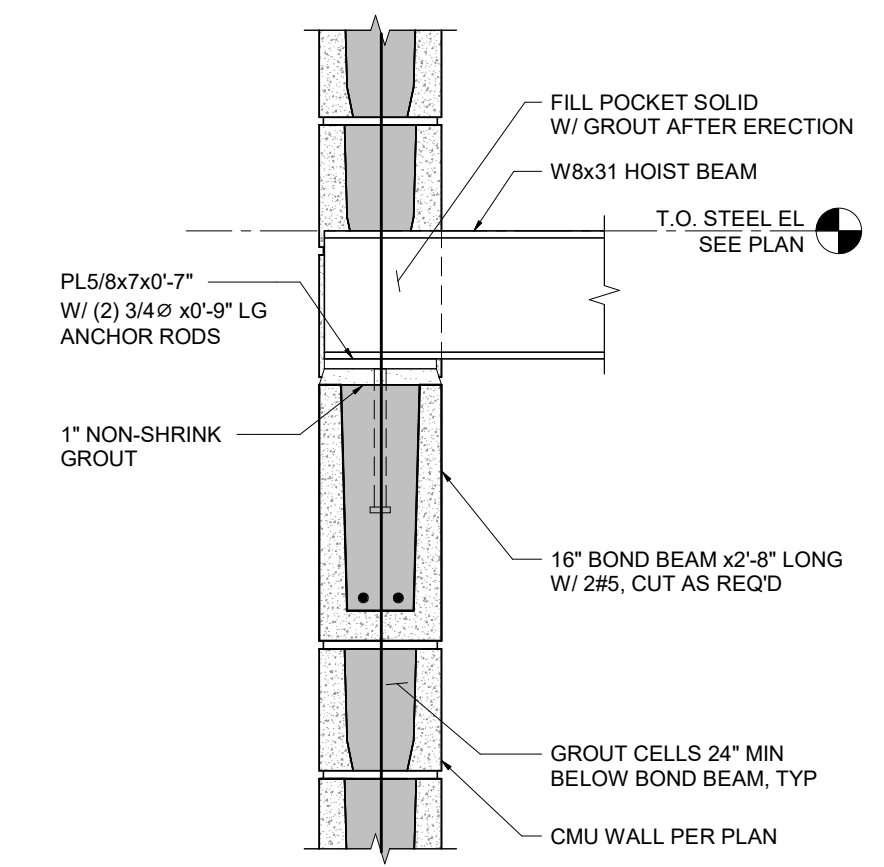
5 TYPICAL CMU WALL REINFORCING
NTS



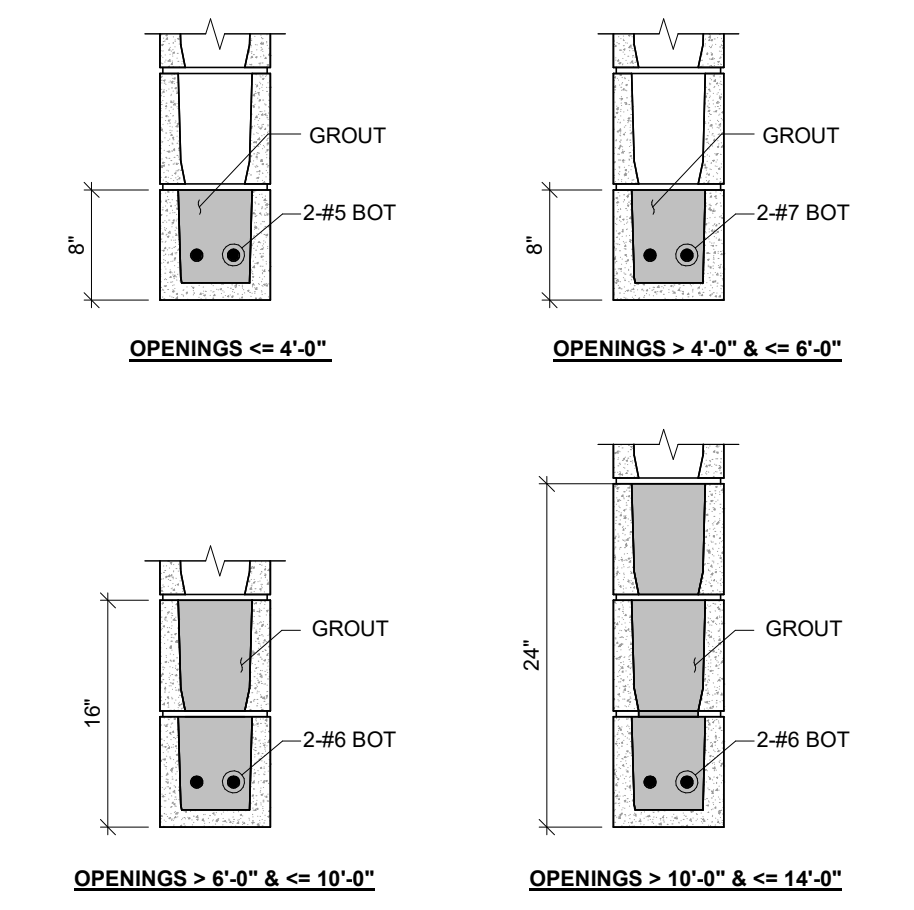
6 TOP OF CMU TO CLT CONNECTION
NTS



7 CLT TO SIDE OF CMU WALL CONNECTION
NTS

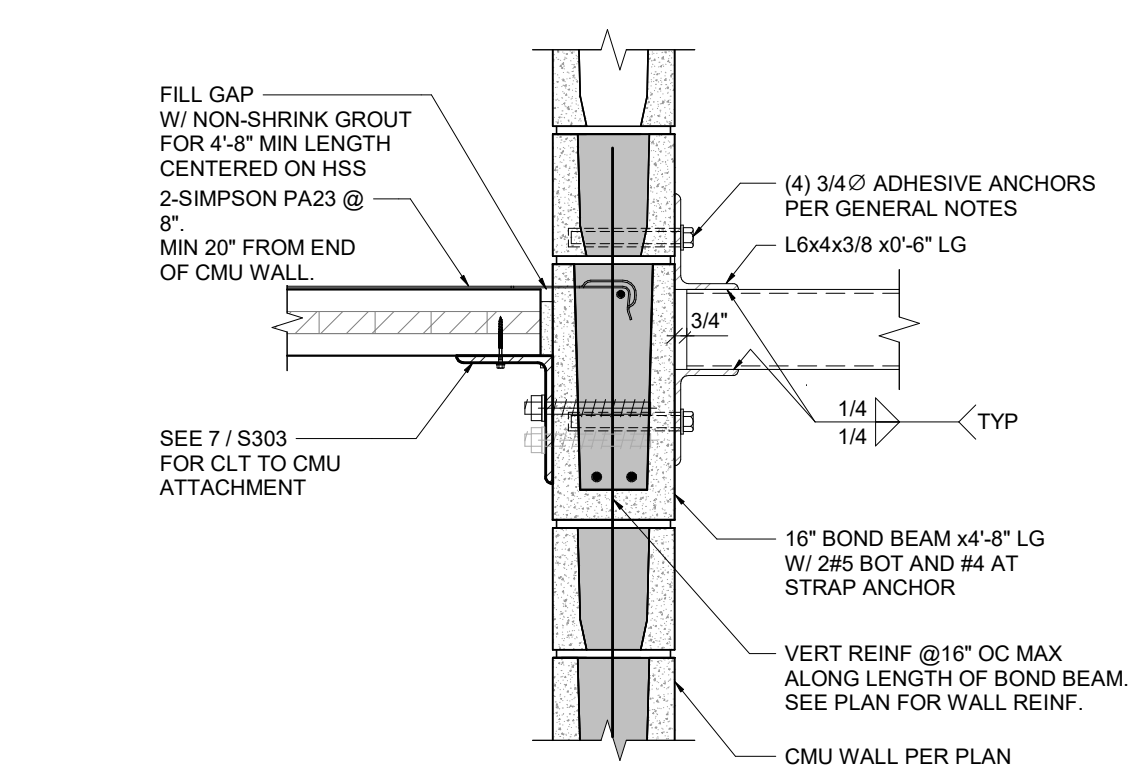


8 HOIST BEAM AT CMU WALL
NTS

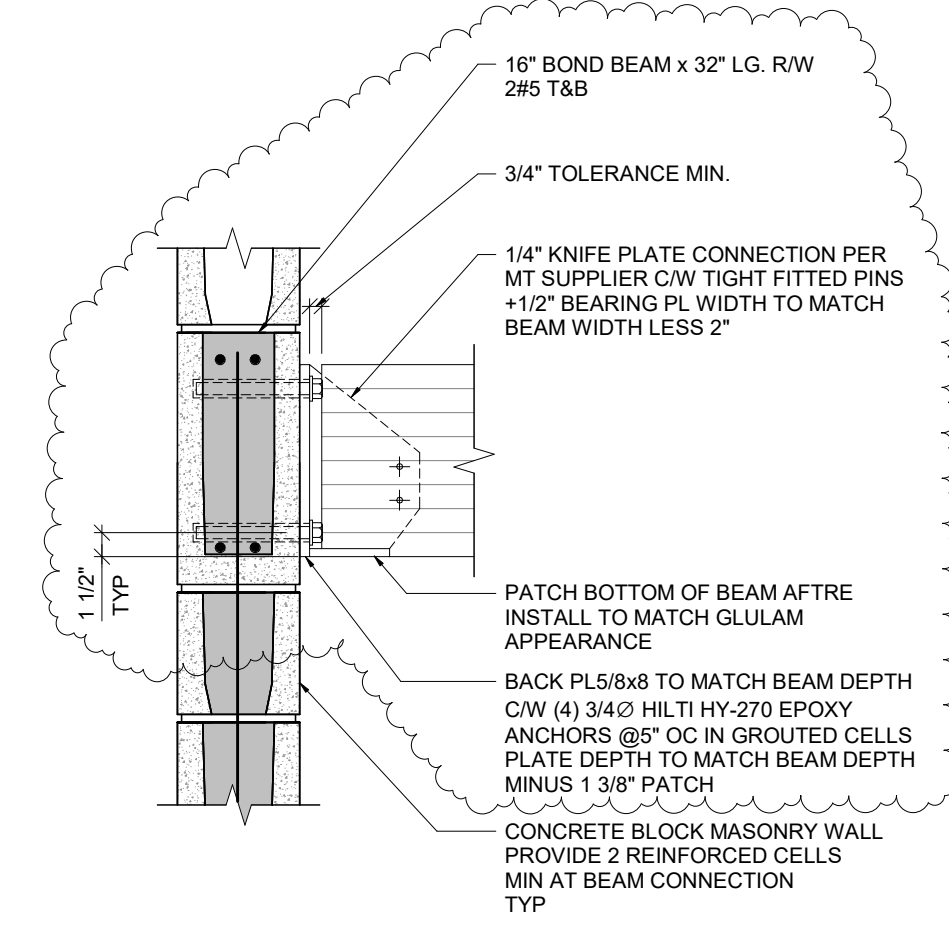


NOTES:
1. PROVIDE 8\"/>

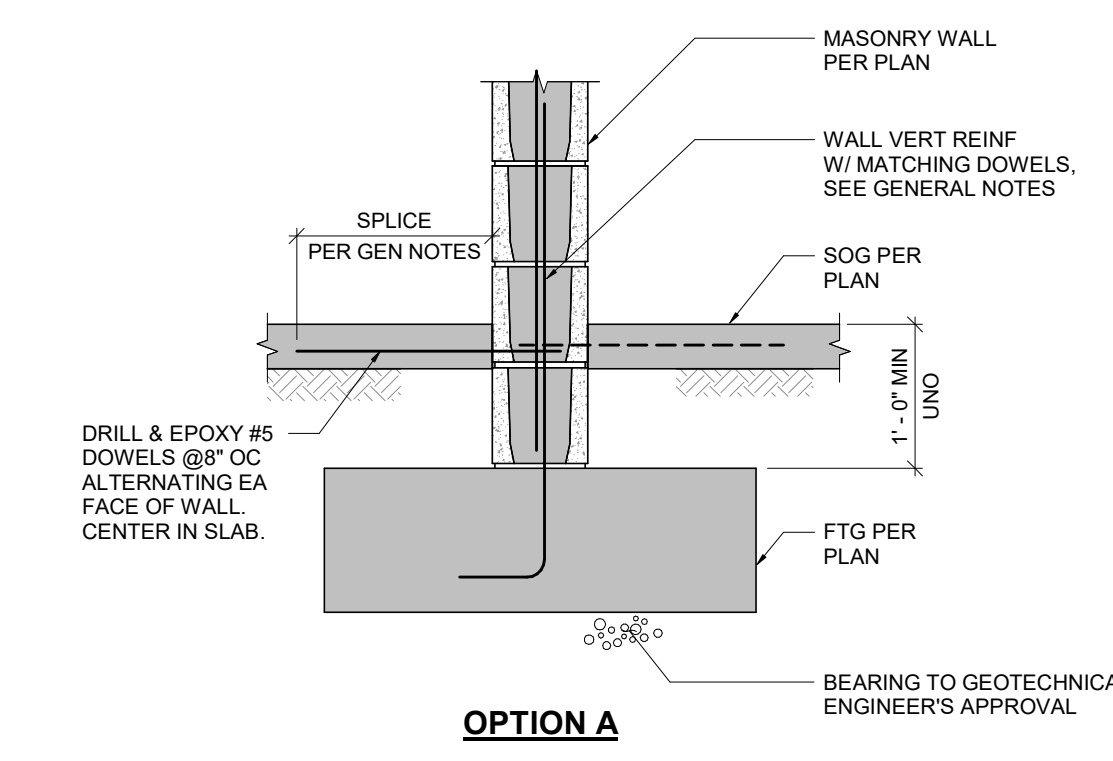
3 MASONRY LINTELS TYPICAL UNO
NTS



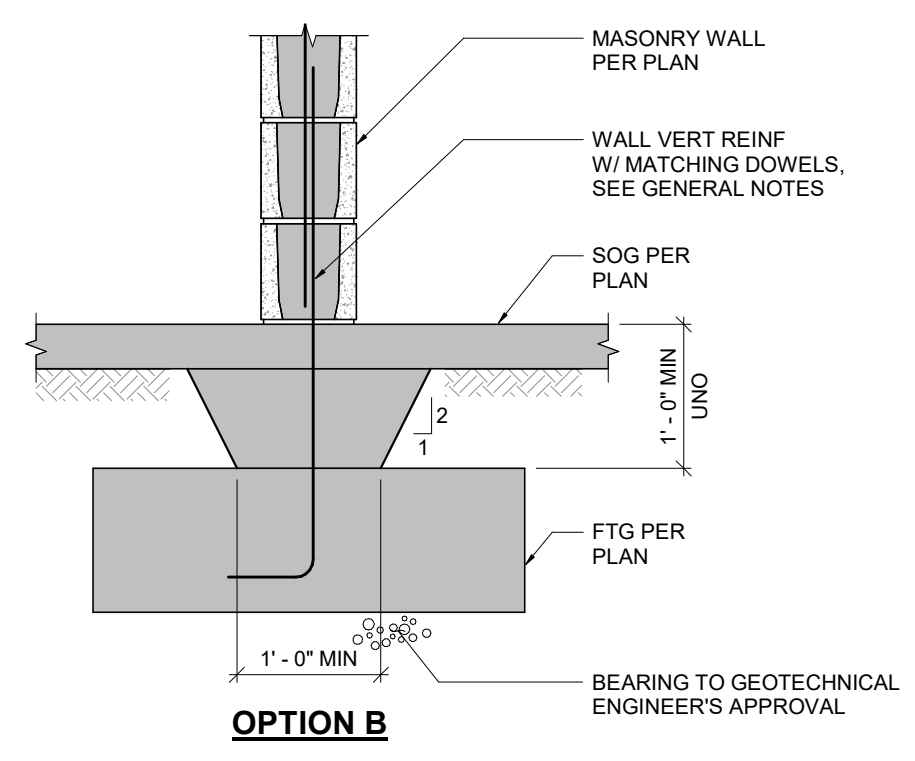
2 HSS CHORDS AT CMU
NTS



1 TYPICAL GLULAM TO CMU WALL CONNECTION
NTS



4 TYPICAL INTERIOR CMU FOOTING
NTS



CONTRACTOR MAY USE EITHER OPTION

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MACON, GA 31201



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4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE SWEENEY, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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TYPICAL MASS TIMBER DETAILS

2178 FLIGHTLINE AVE

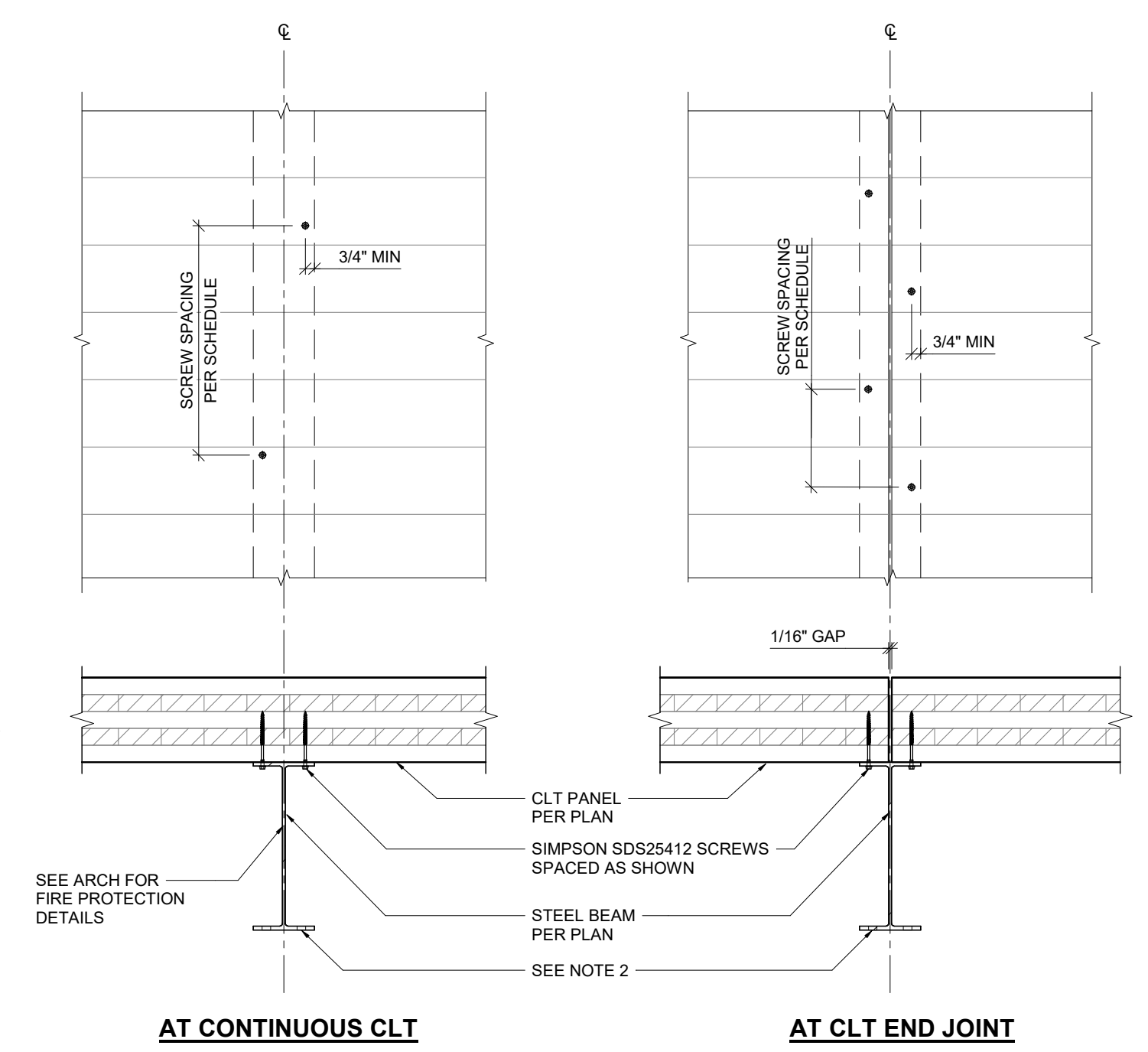
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

PROJECT NO.: 23121

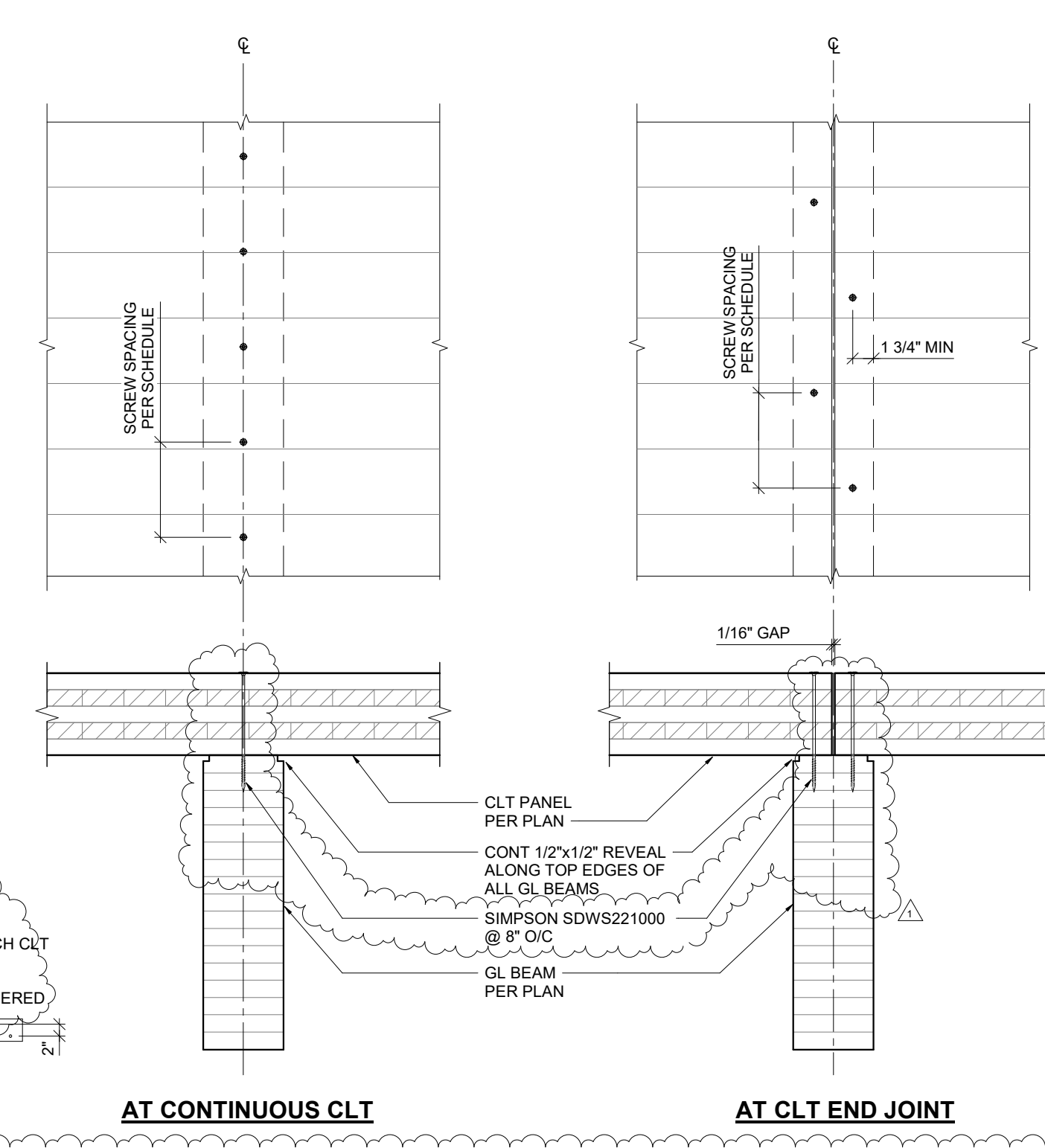
DRAWING NO.: S304

DATE: NOVEMBER 18, 2024

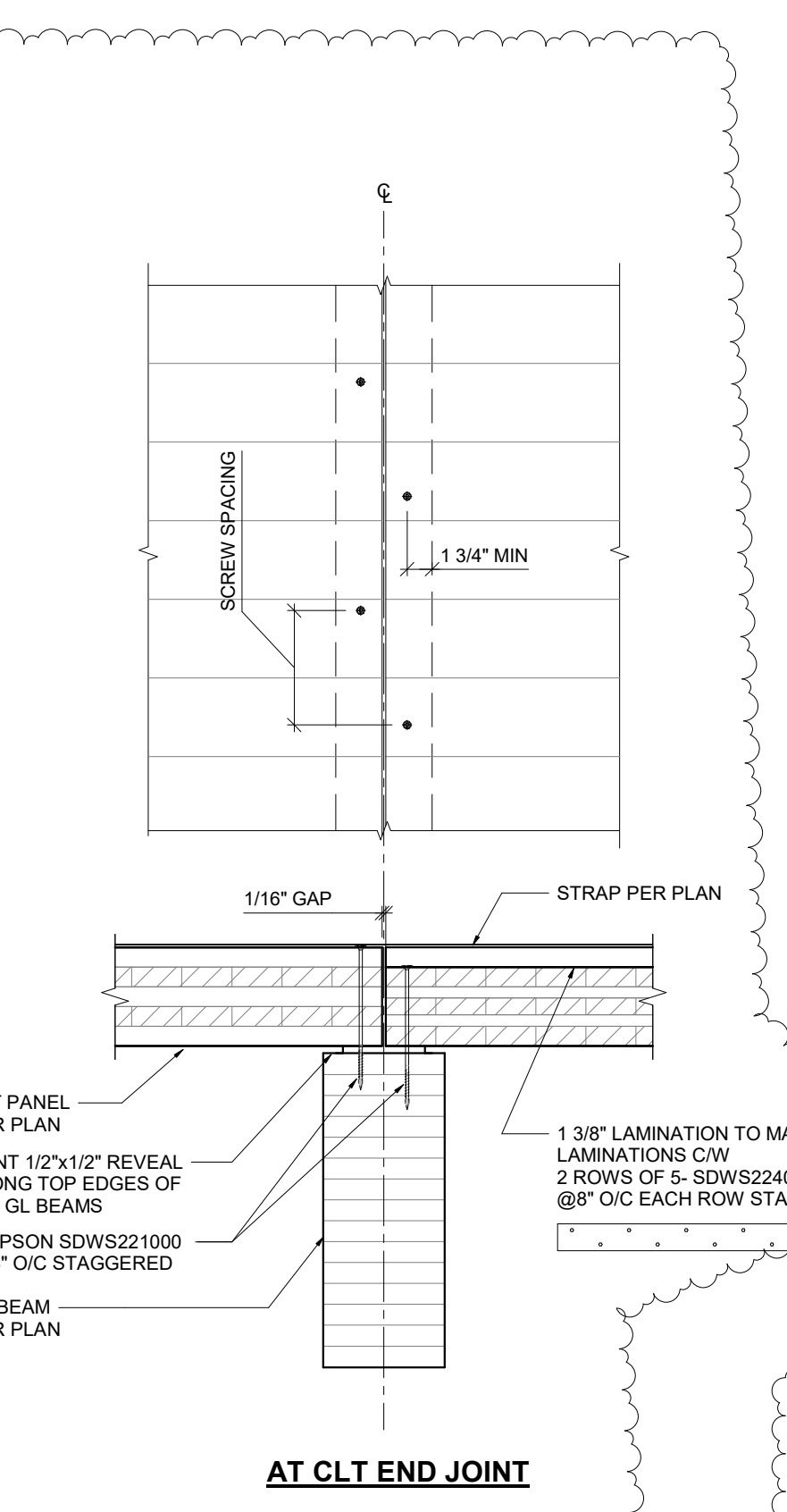


CLT FLOOR / ROOF TO STEEL FASTENING SCHEDULE			
LEVEL	SCREW TYPE	SCREW SPACING AT CONTINUOUS CLT	SCREW SPACING AT CLT END JOINT
ROOF	SDS25412	12"	6"
L2	SDS25412	6"	3"

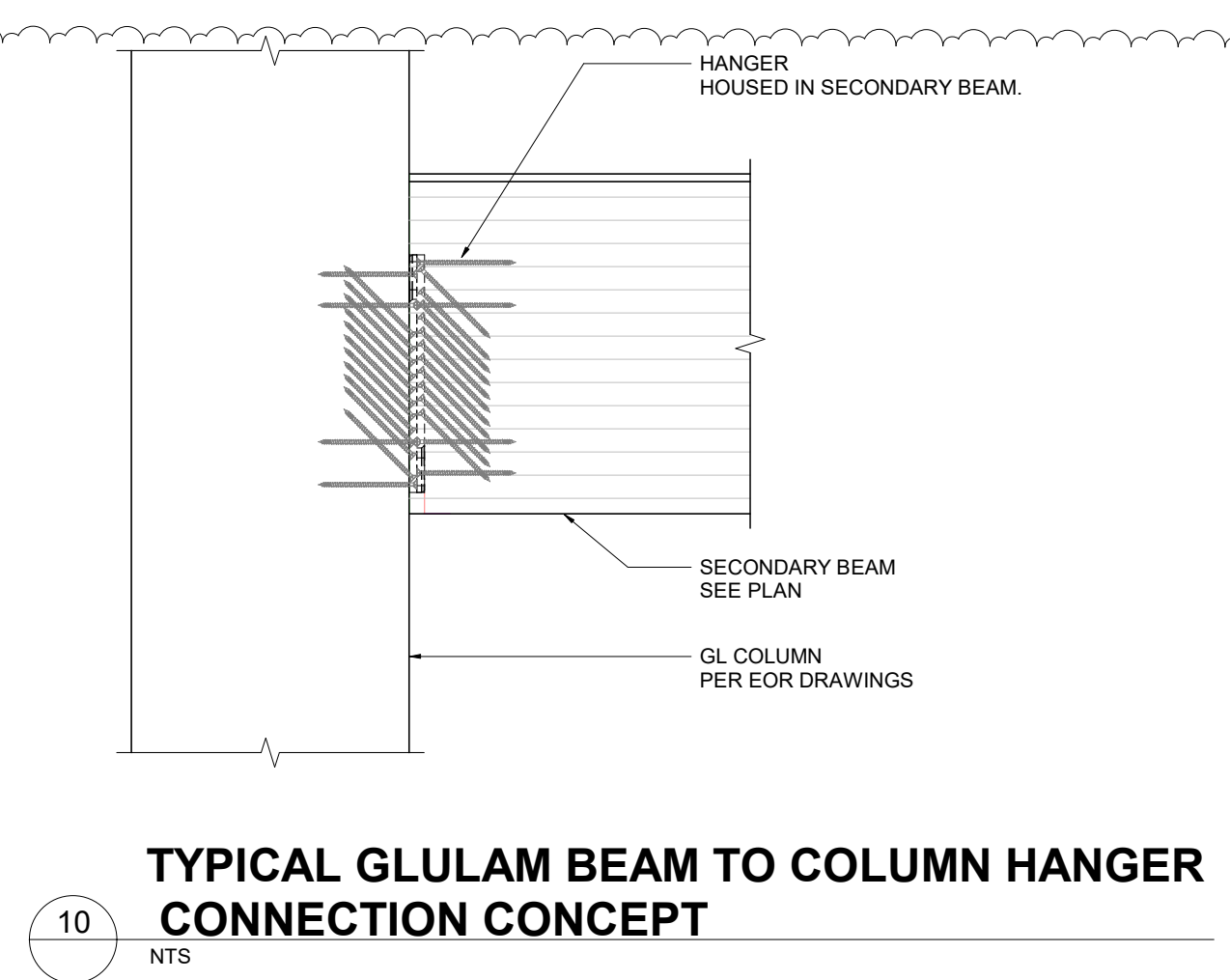
- NOTES:**
- COORDINATE HOLE SIZES IN STEEL WITH SELECTED SCREW SUPPLIER BASED ON THE EXACT SCREWS TO BE USED.
 - PROVIDE MATCHING HOLES IN BOTTOM FLANGE IF REQUIRED TO PROVIDE ACCESS FOR DRILLING OPERATION.



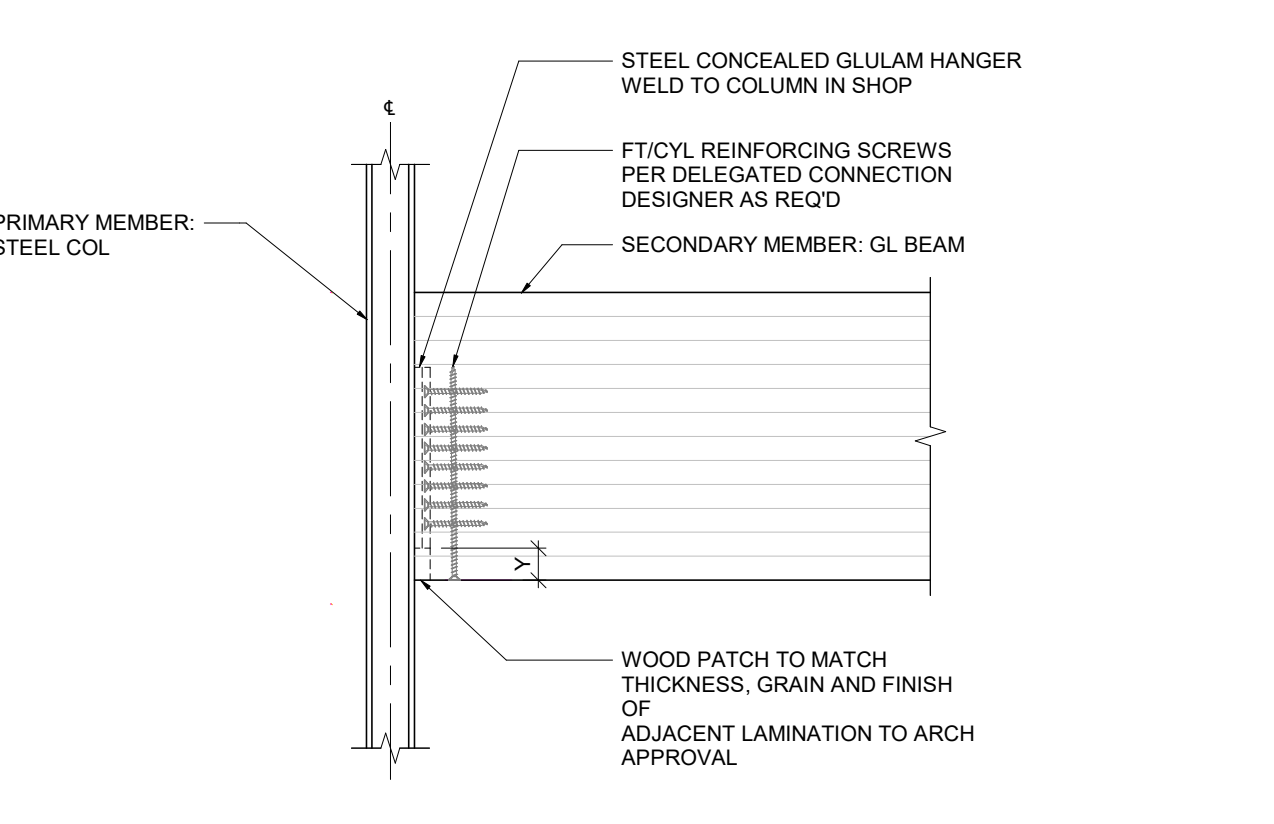
TYPICAL CLT PANEL OVER GLULAM BEAM



8
S102A
NTS

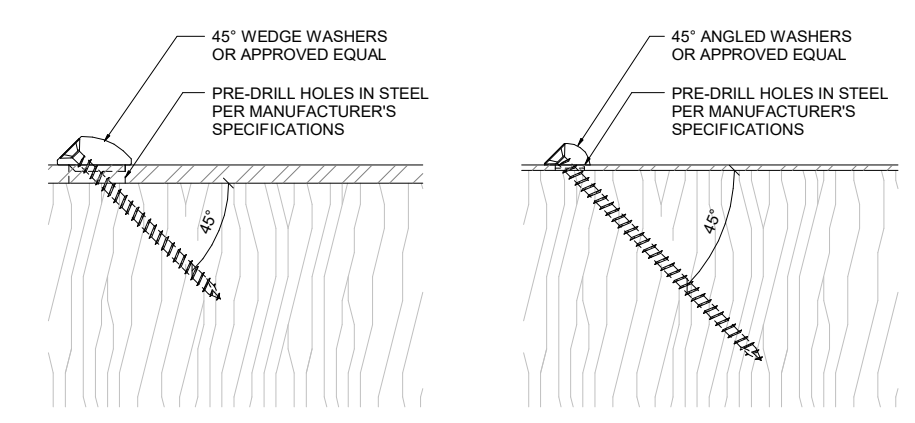


10
NTS



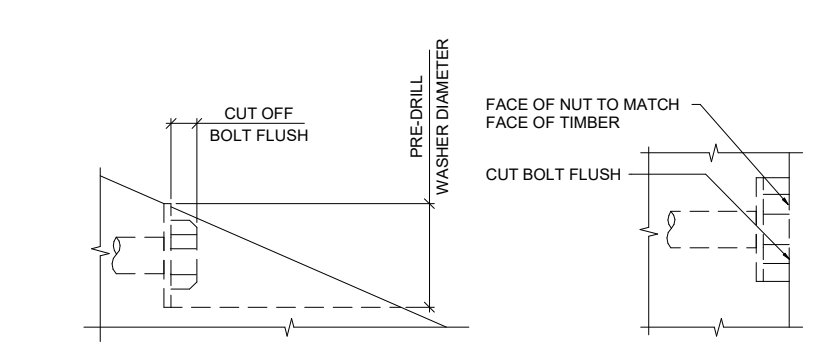
- NOTES:**
- Y DIMENSION PER DELEGATED CONNECTION DESIGNER. ENSURE CONFORMANCE WITH FIRE RESISTANCE RATING REQUIREMENTS.
 - REFER TO GENERAL NOTES FOR ACCEPTABLE CONNECTOR PRODUCTS.

9
NTS

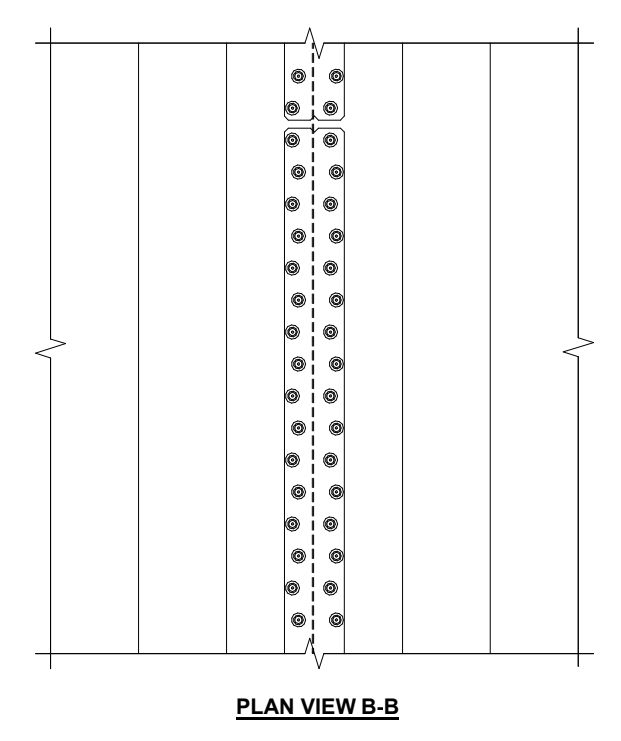
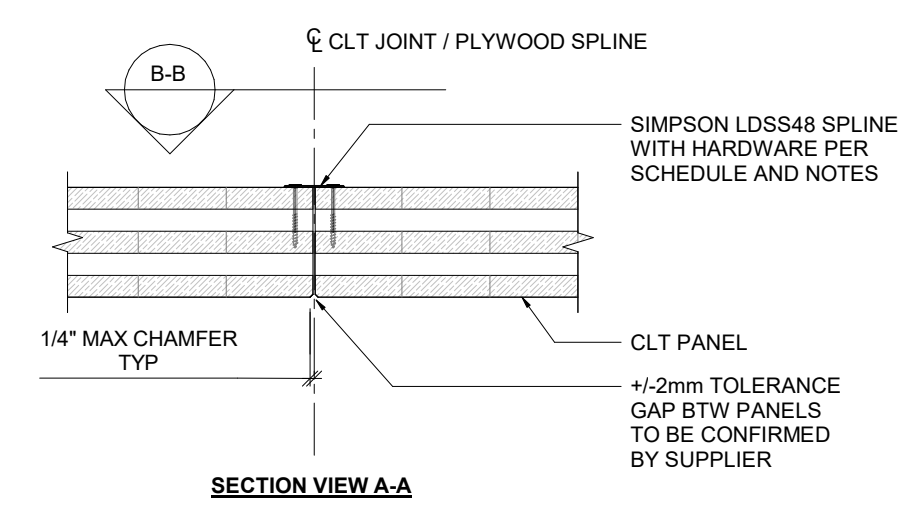


5
NTS

TYPICAL WASHER DETAILS



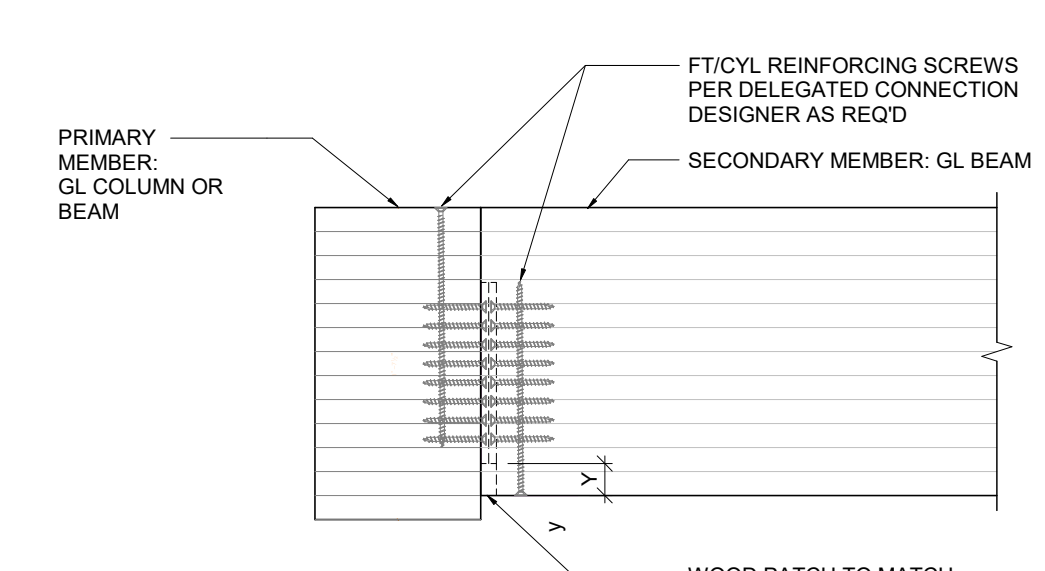
4
NTS



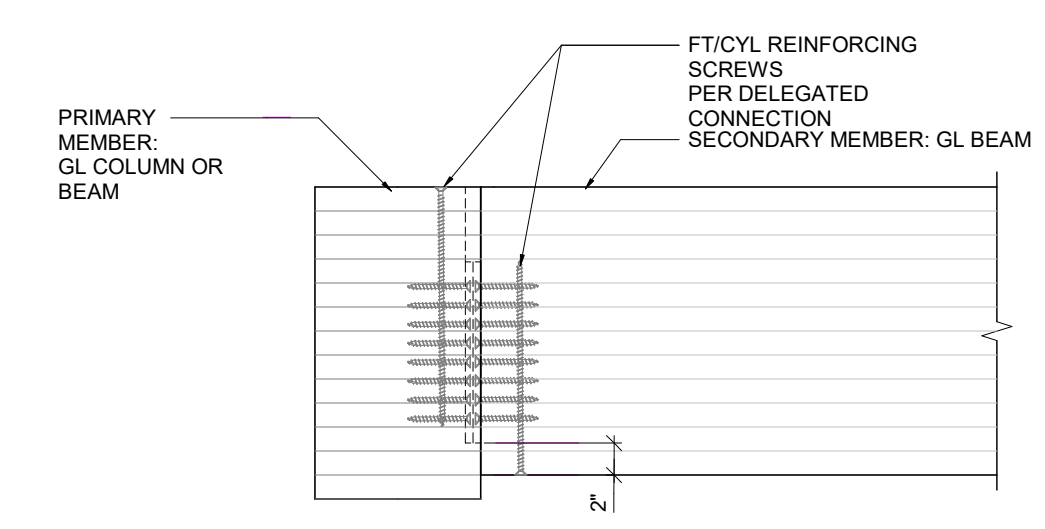
LDSS SPLINE FASTENING SCHEDULE

ZONE	FASTENER TYPE	FASTENER SPACING
A	NAILS	4"
B	NAILS	2"
C	SCREWS	4"
D	SCREWS	2"

3
NTS



OPTION B: CONNECTOR HOUSED IN SECONDARY MEMBER

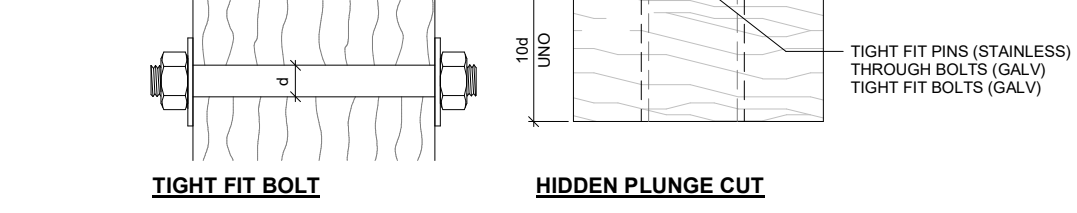
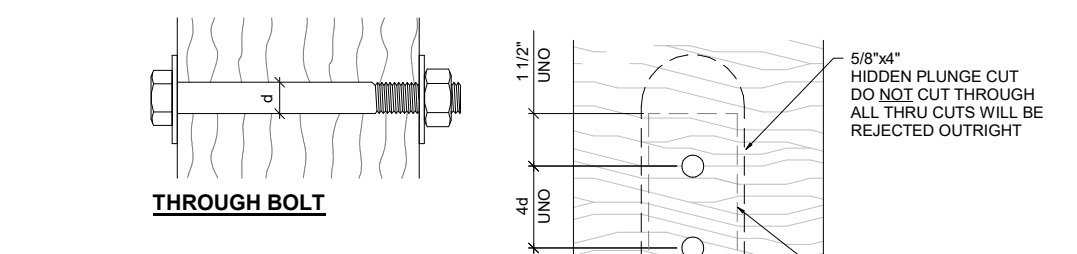
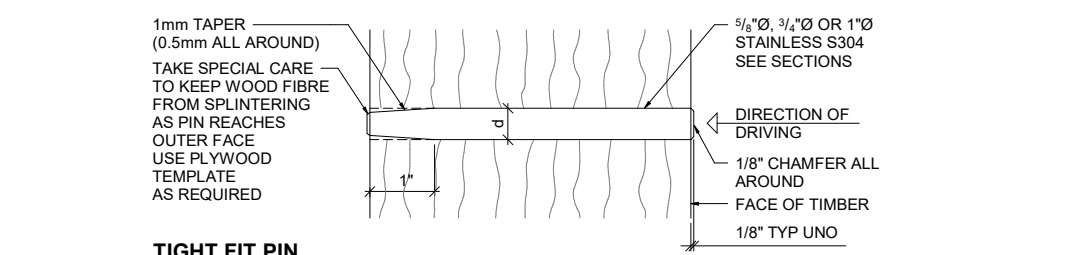


OPTION A: CONNECTOR HOUSED IN PRIMARY MEMBER

- NOTES:**
- Y DIMENSION PER DELEGATED CONNECTION DESIGNER. ENSURE CONFORMANCE WITH FIRE RESISTANCE RATING REQUIREMENTS.
 - OPTION 'A' SHALL BE USED WHERE PRACTICAL FOR INSTALLATION.
 - REFER TO GENERAL NOTES FOR ACCEPTABLE CONNECTOR PRODUCTS.

2
NTS

- NOTES - GENERAL:**
- TIGHT FIT PINS TO BE STAINLESS STEEL S304.
 - THROUGH BOLTS TO BE A307, GALVANIZED.
 - DIAMETER 'D' OF PINS/BOLTS AS PER PLAN/SECTION:
12"x3" 5/8"x3" 3/4"x3" 1"x3"



- NOTES - FABRICATION:**
- GENERAL:**
- FABRICATOR TO SUBMIT SAMPLES TO ENGINEER & ARCHITECT FOR APPROVAL PRIOR TO MASS PRODUCTION.
 - ALL CHAMFERS TO BE ACCURATELY MACHINED, ANY IRREGULARITY WILL BE REJECTED.
- TIGHT FIT PIN/BOLT:**
- HOLE DIAMETER IN TIMBER TO BE 0.01mm TO 1.01mm SMALLER THAN PIN DIAMETER.
 - HOLE IN STEEL TO BE MAX 1.01mm LARGER THAN PIN DIAMETER UNDO. FOR MULTIPLE PIN CONNECTIONS, HOLES IN TIMBER TO BE DRILLED USING EQUIPMENT CAPABLE OF ACHIEVING REQUIRED TOLERANCES OR USING ACTUAL STEEL PLATE AS A DRILLING TEMPLATE.
 - HOLES ARE TO BE SQUARE AND ALIGNED.
 - USE PLYWOOD TEMPLATE WHEN INSTALLING PINS/BOLT TO AVOID SPLINTERING OF WOOD OPPOSITE TO DRIVING DIRECTION.
- THROUGH BOLT:**
- HOLE DIAMETER IN TIMBER TO BE MAX 2mm (CSA-688) BIGGER THAN BOLT DIAMETER.
 - IN ACCORDANCE WITH THE WOOD DESIGN MANUAL, THREADED RODS MAY BE USED IN LIEU OF BOLTS, PROVIDED THE ROD IS THREADED AT THE ENDS ONLY.

1
NTS

STEEL PARTS FOR WOOD CONSTRUCTION

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
DESIGNER: CHRISTOPHER NARDONE, AIA
KATIE KEMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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FRAMING DETAILS

2178 FLIGHTLINE AVE

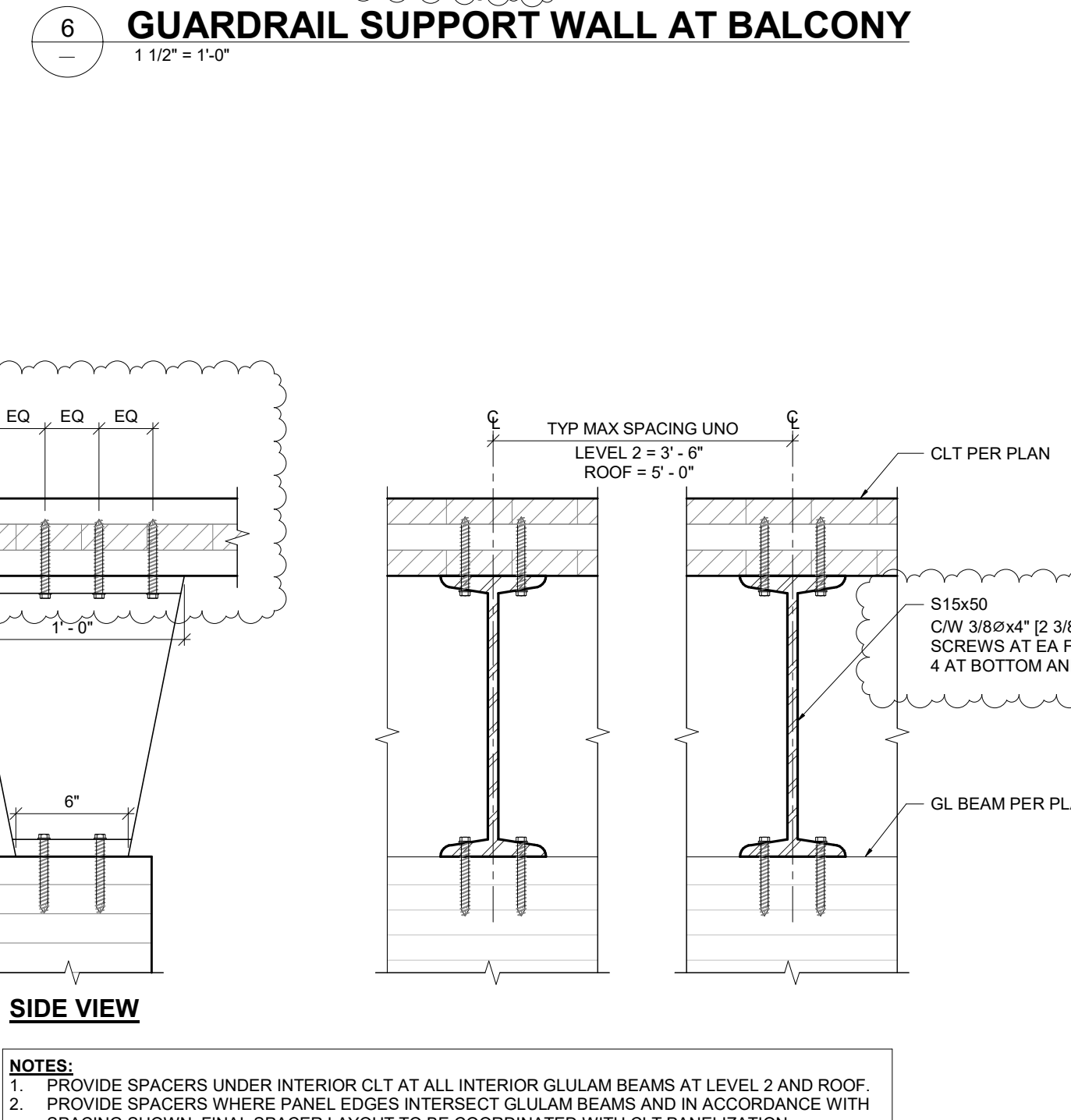
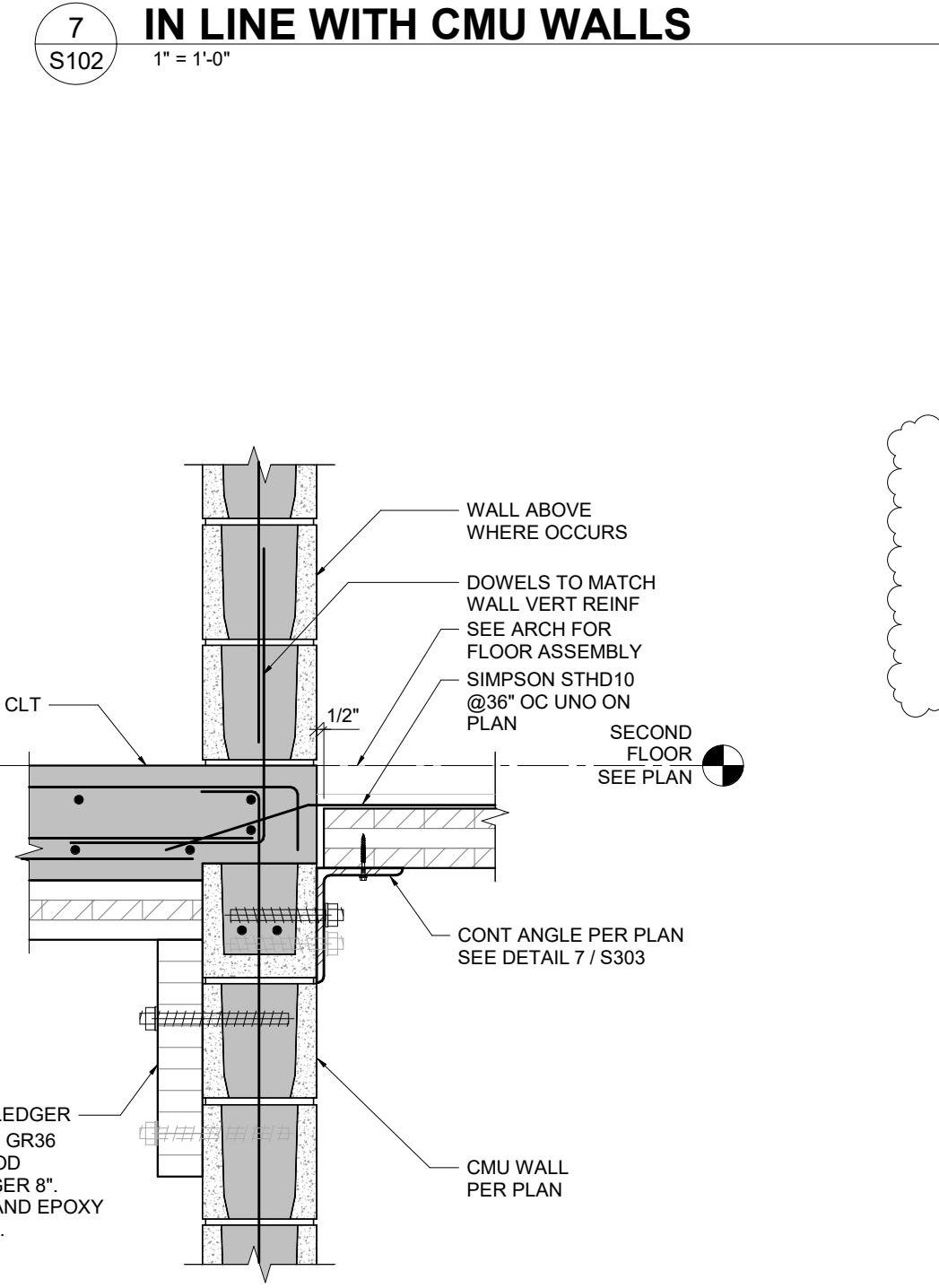
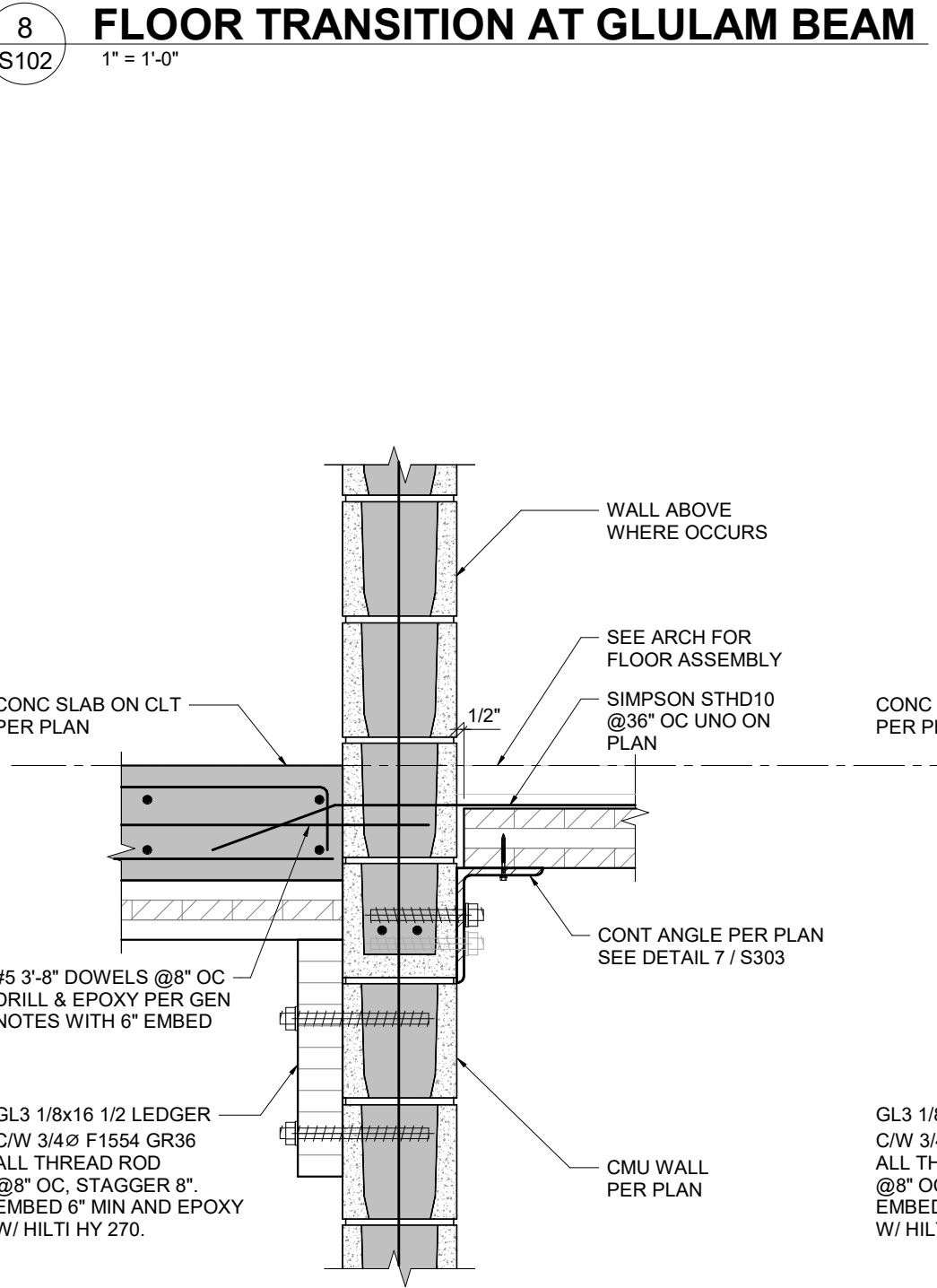
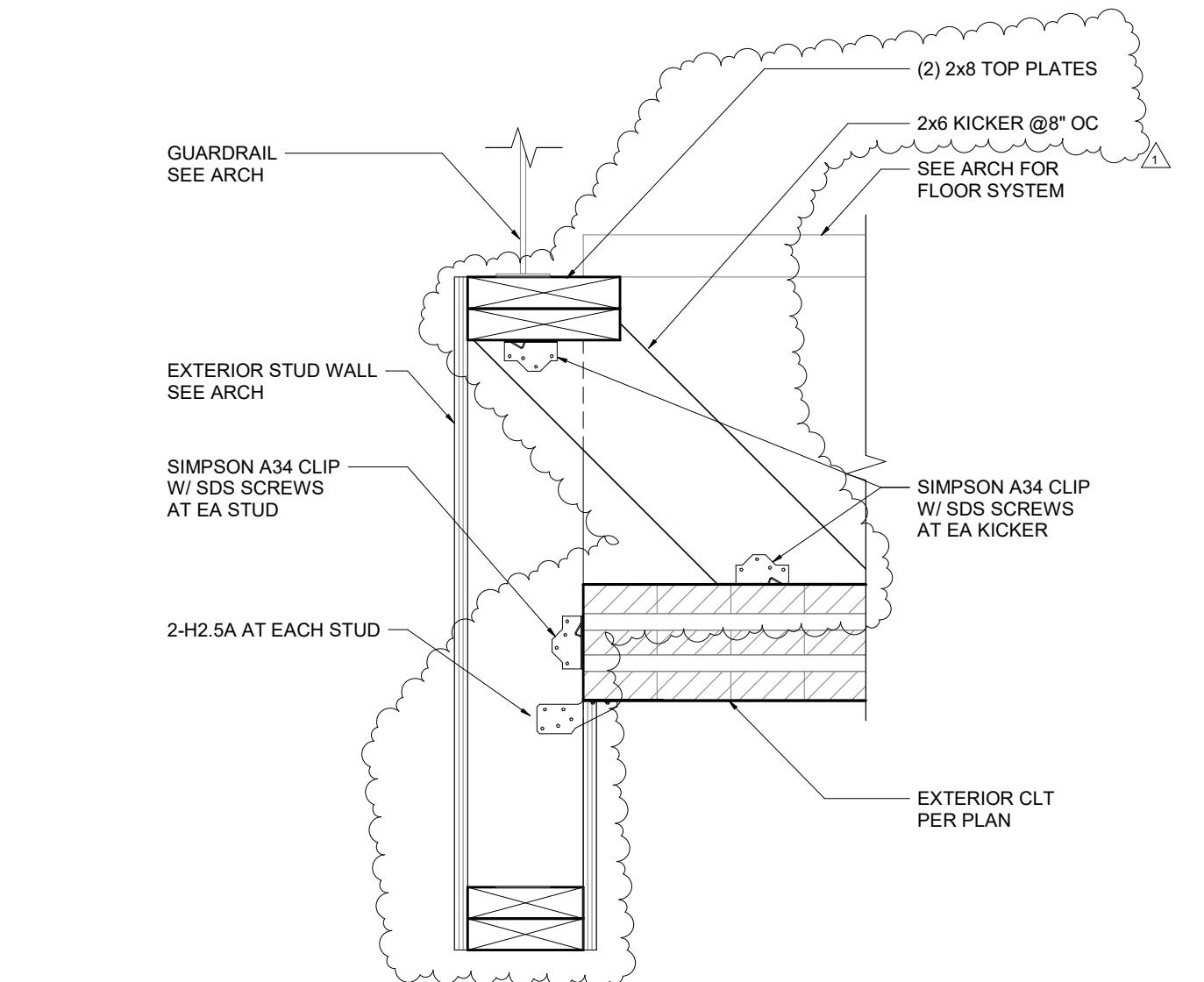
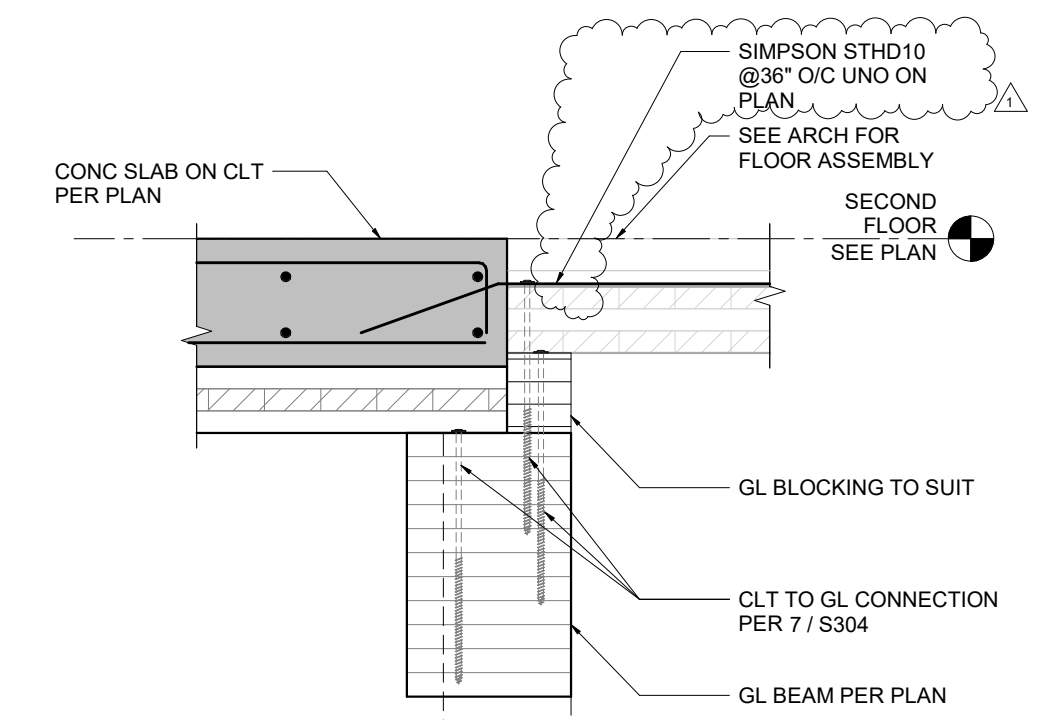
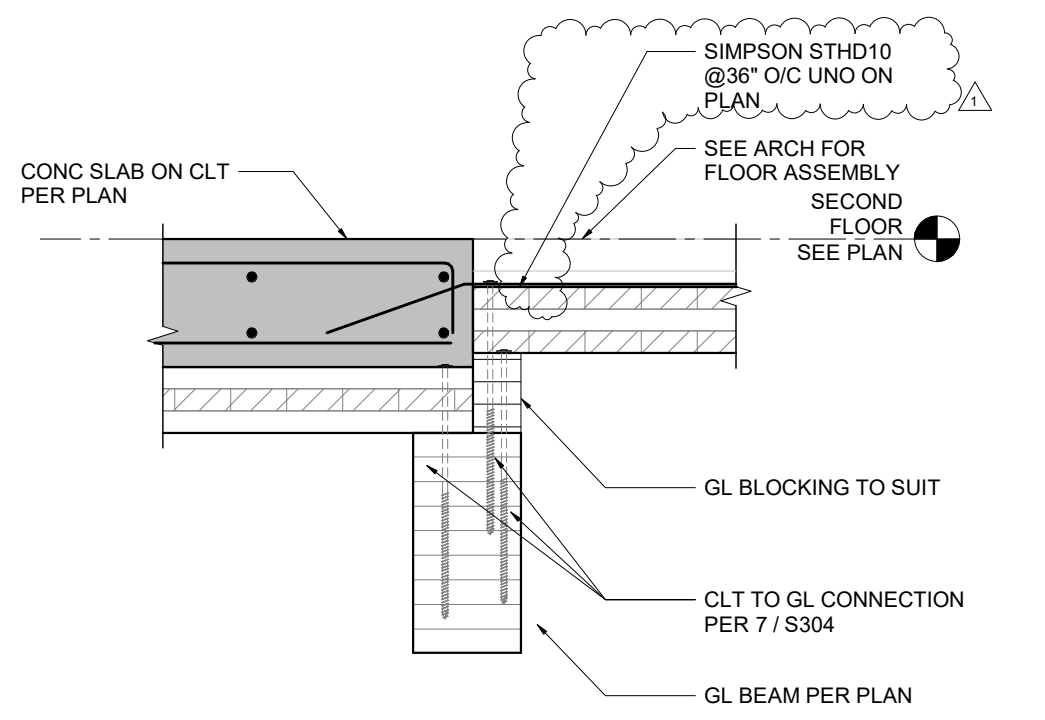
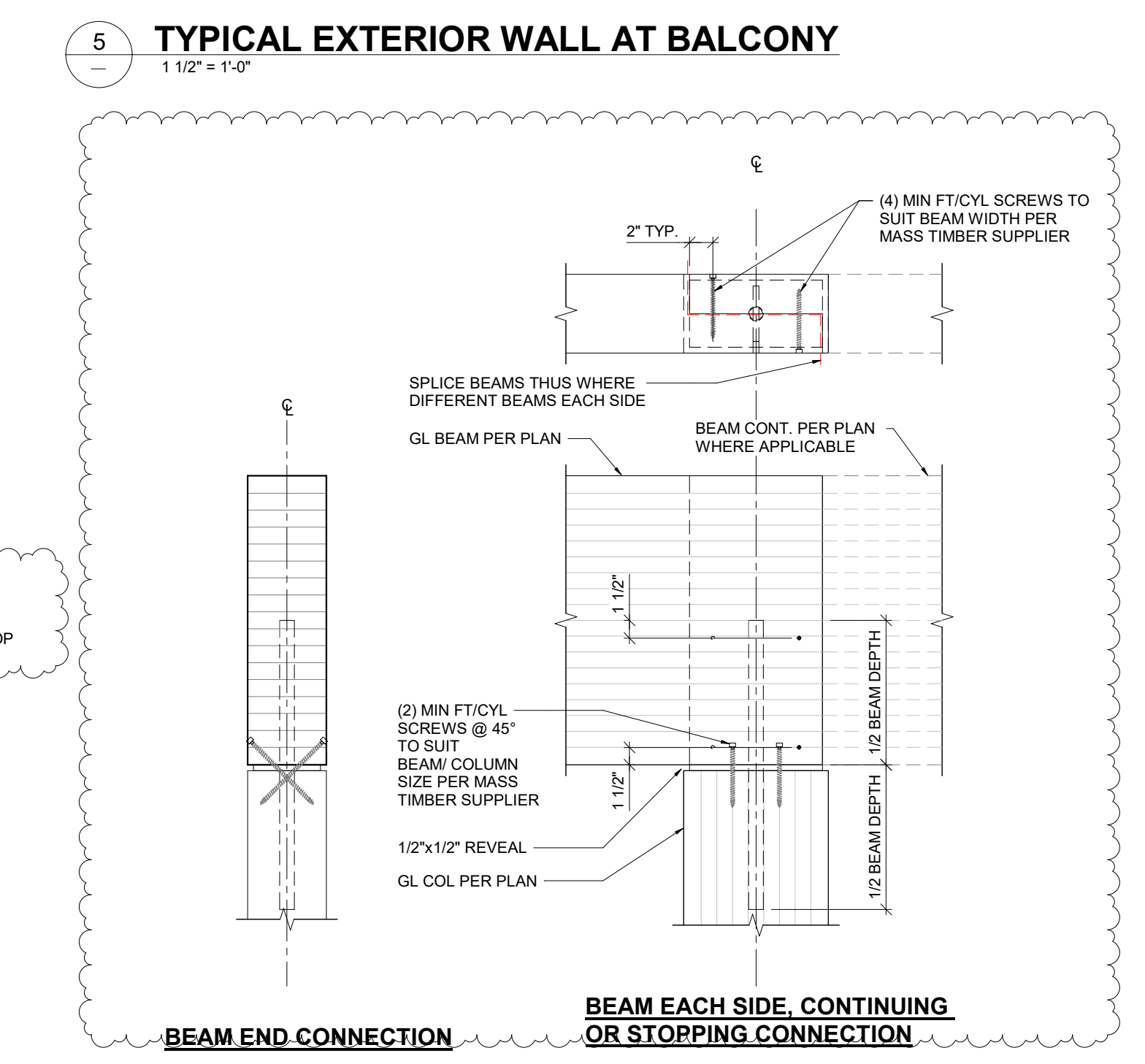
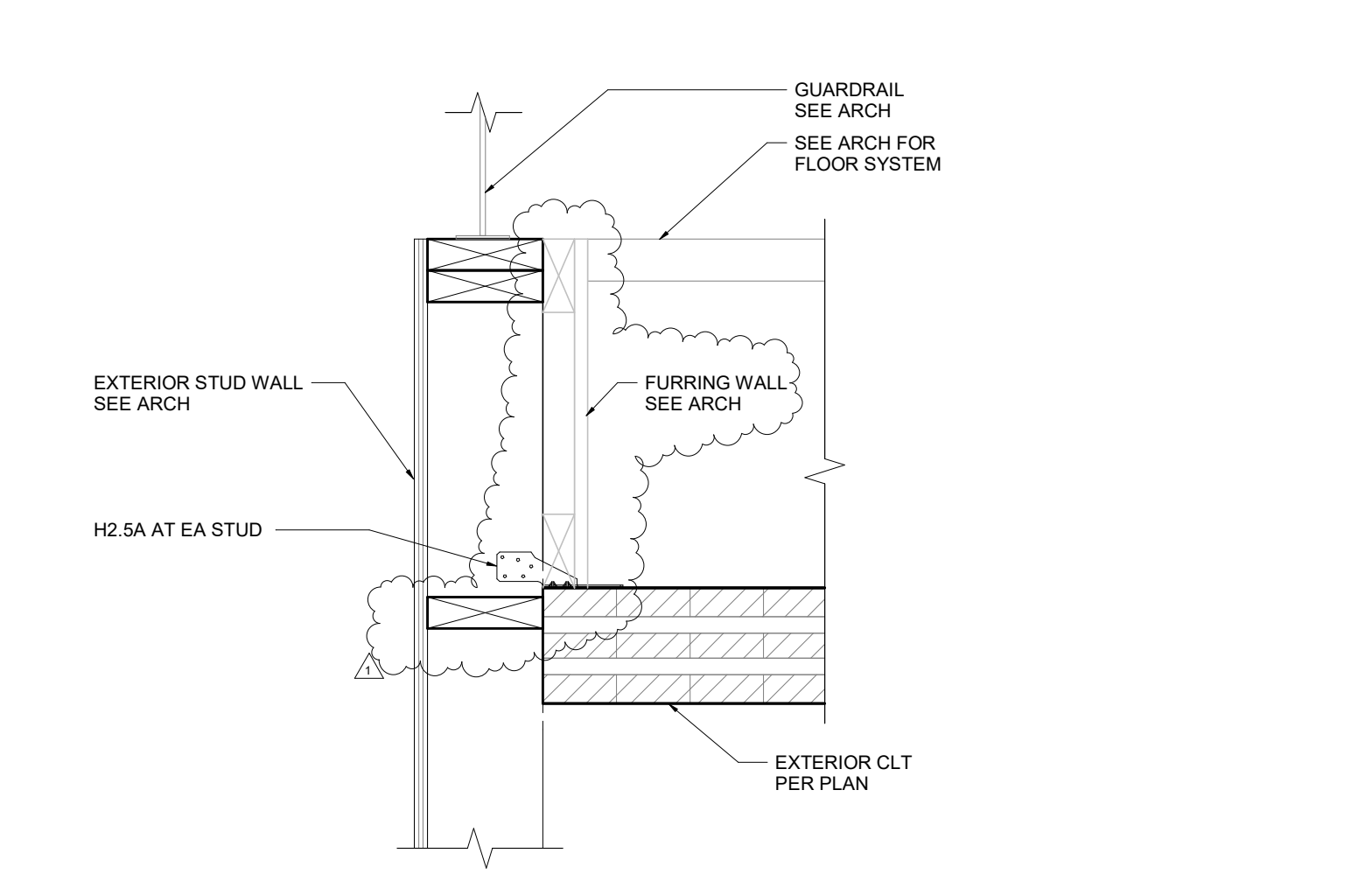
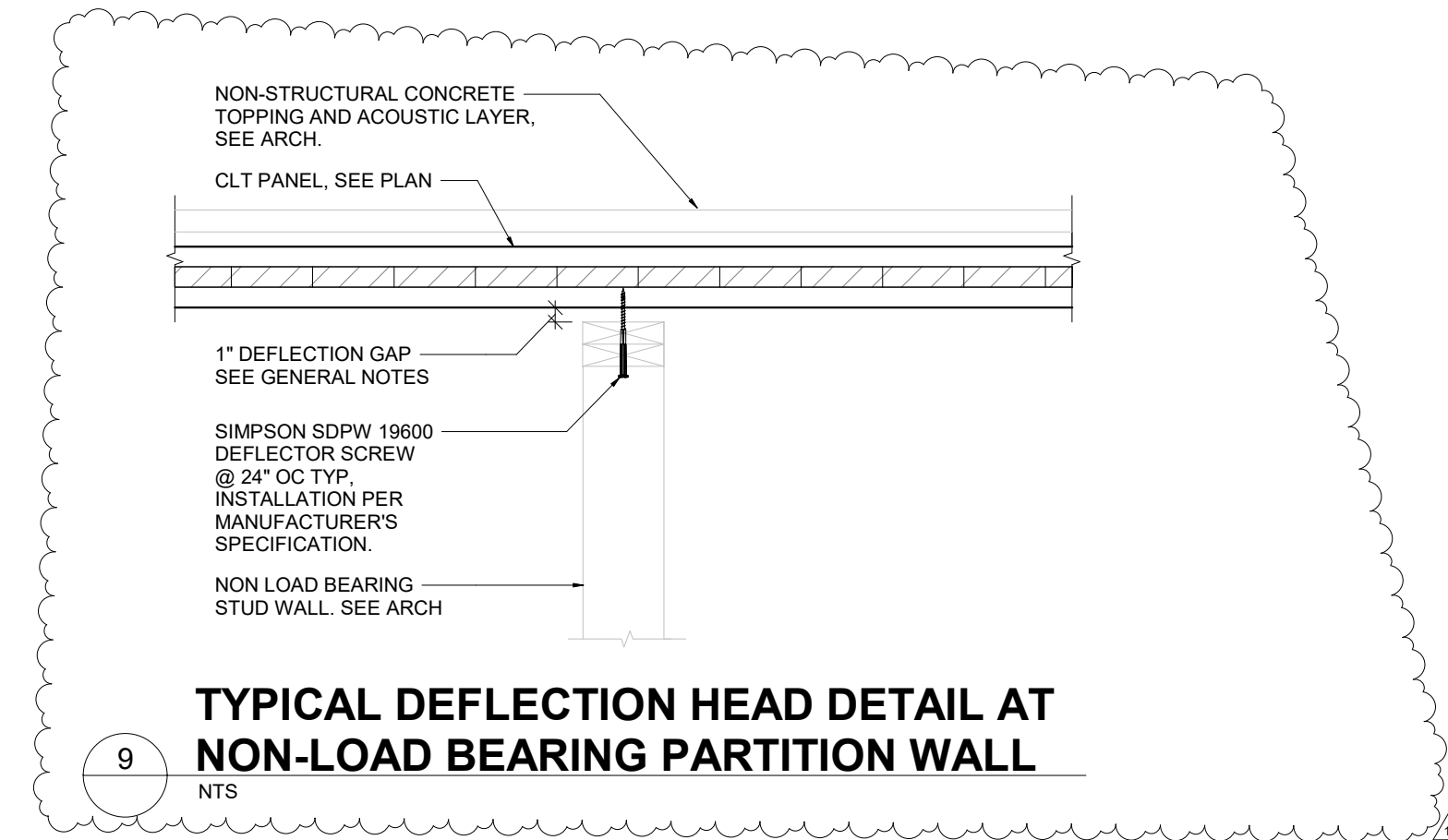
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

23121

DRAWING NO.: **S305**

DATE: NOVEMBER 18, 2024



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BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER STAN PRICE, PE
PROJECT ARCHITECT CHRISTOPHER NARDONE, AIA
DESIGNER KATIE KEMERIK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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FRAMING DETAILS

2178 FLIGHTLINE AVE

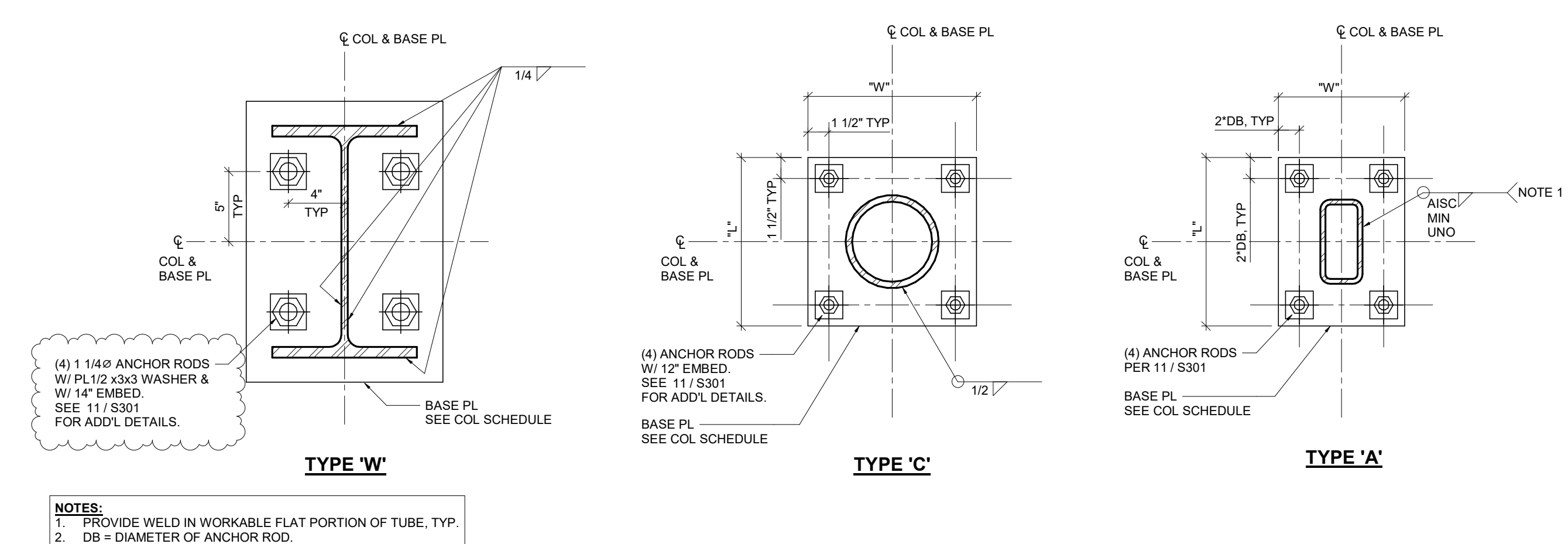
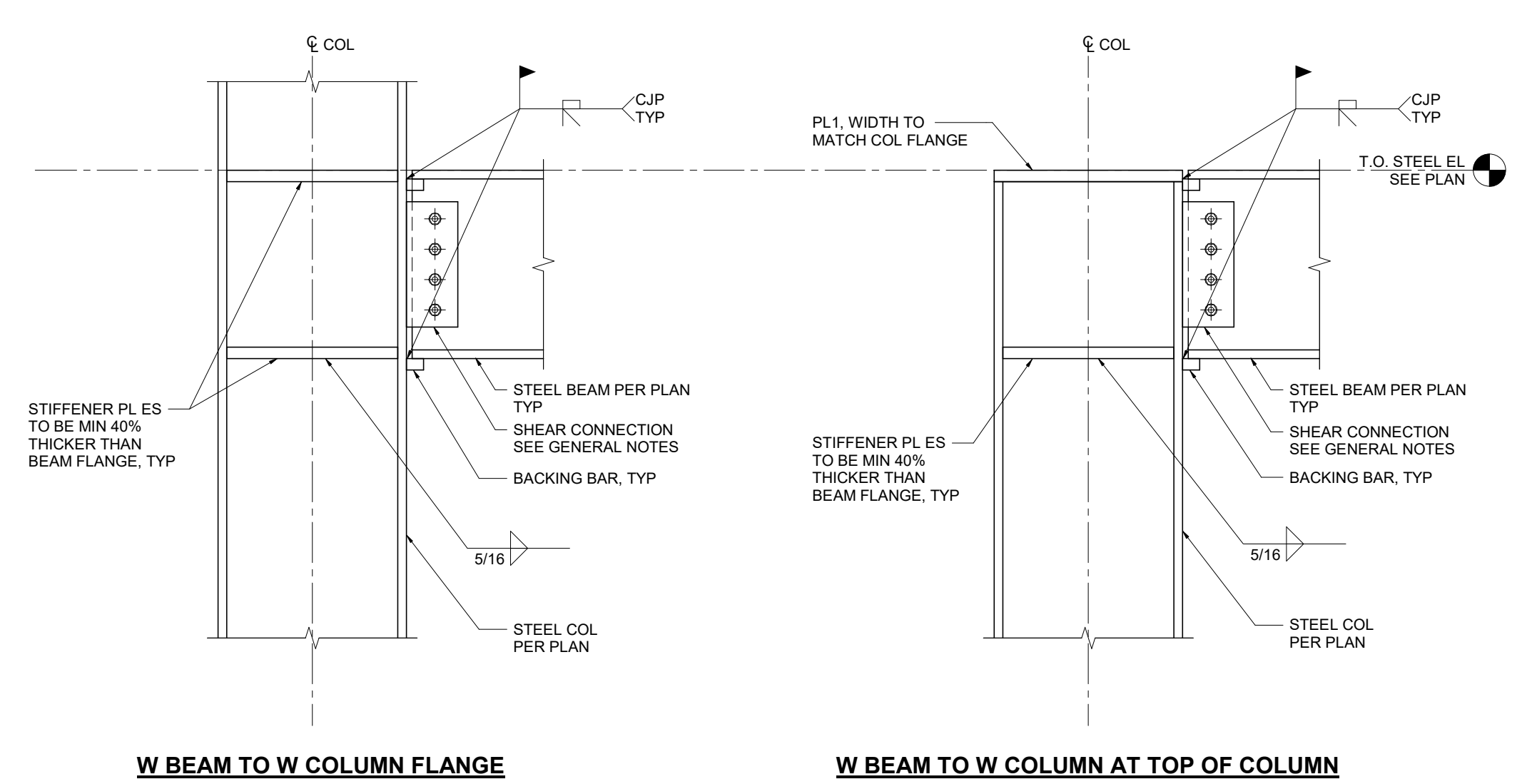
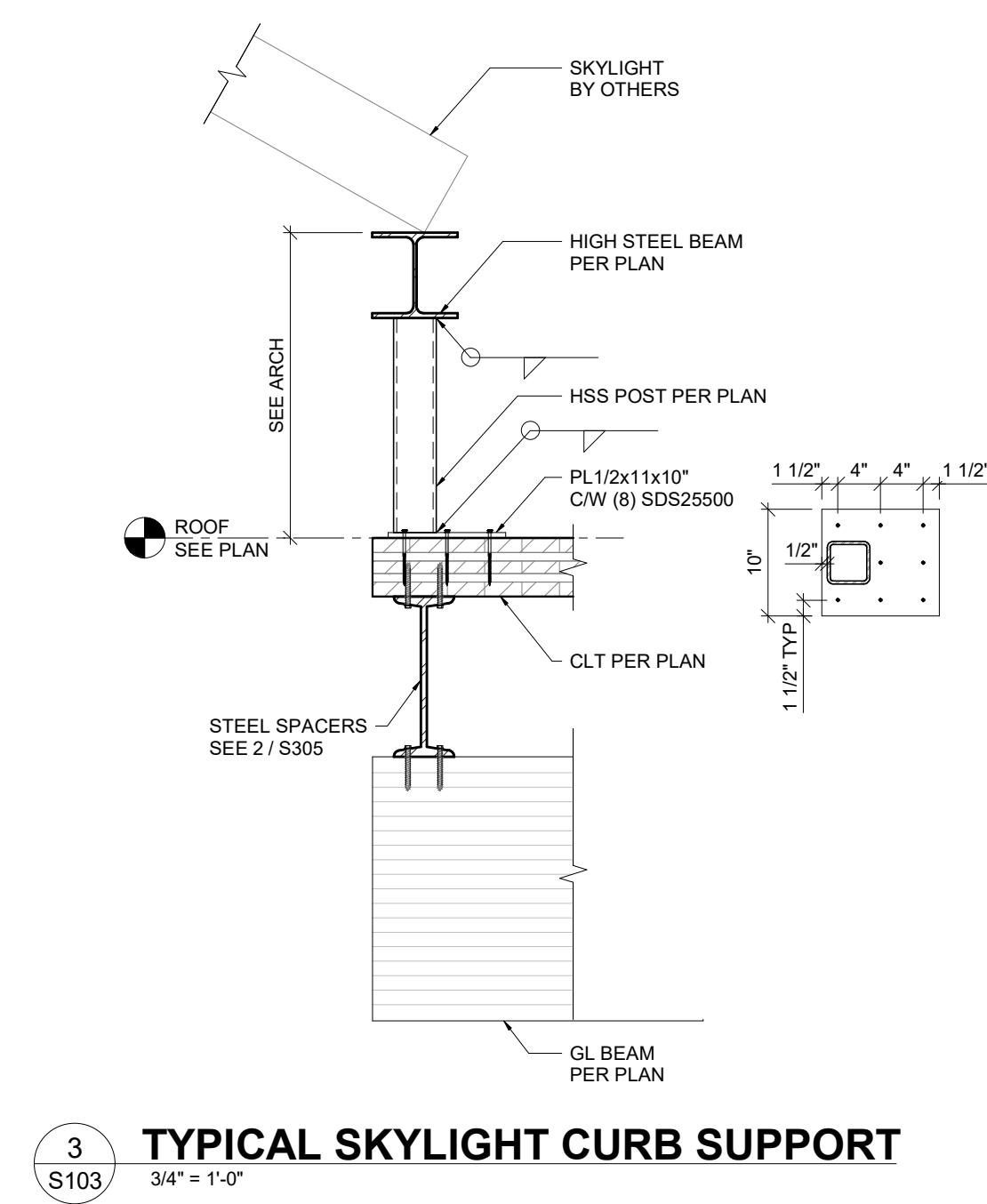
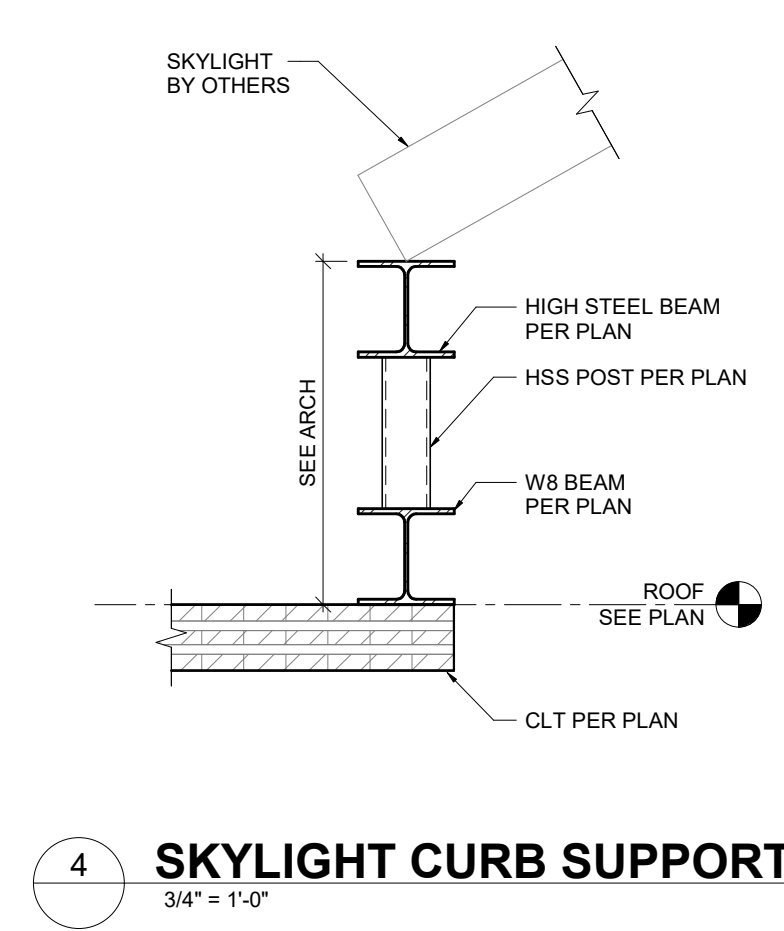
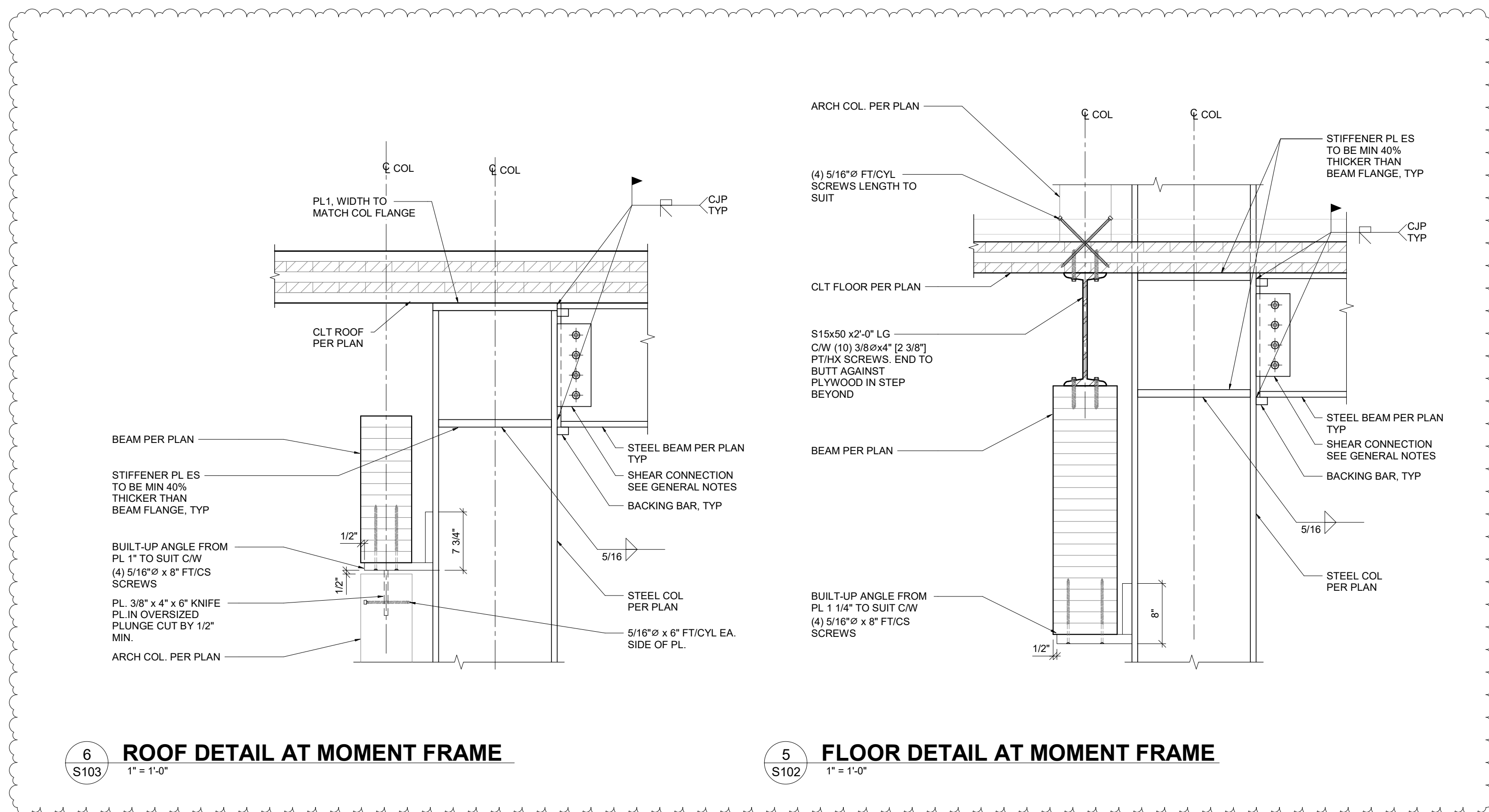
CORPORATE FBO TERMINAL
BUILDING AND PARKING LOT
REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

23121

DRAWING NO.:
S306

DATE:
NOVEMBER 18, 2024



BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE SIMECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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ENLARGED STAIR PLANS AND DETAILS

2178 FLIGHTLINE AVE

CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

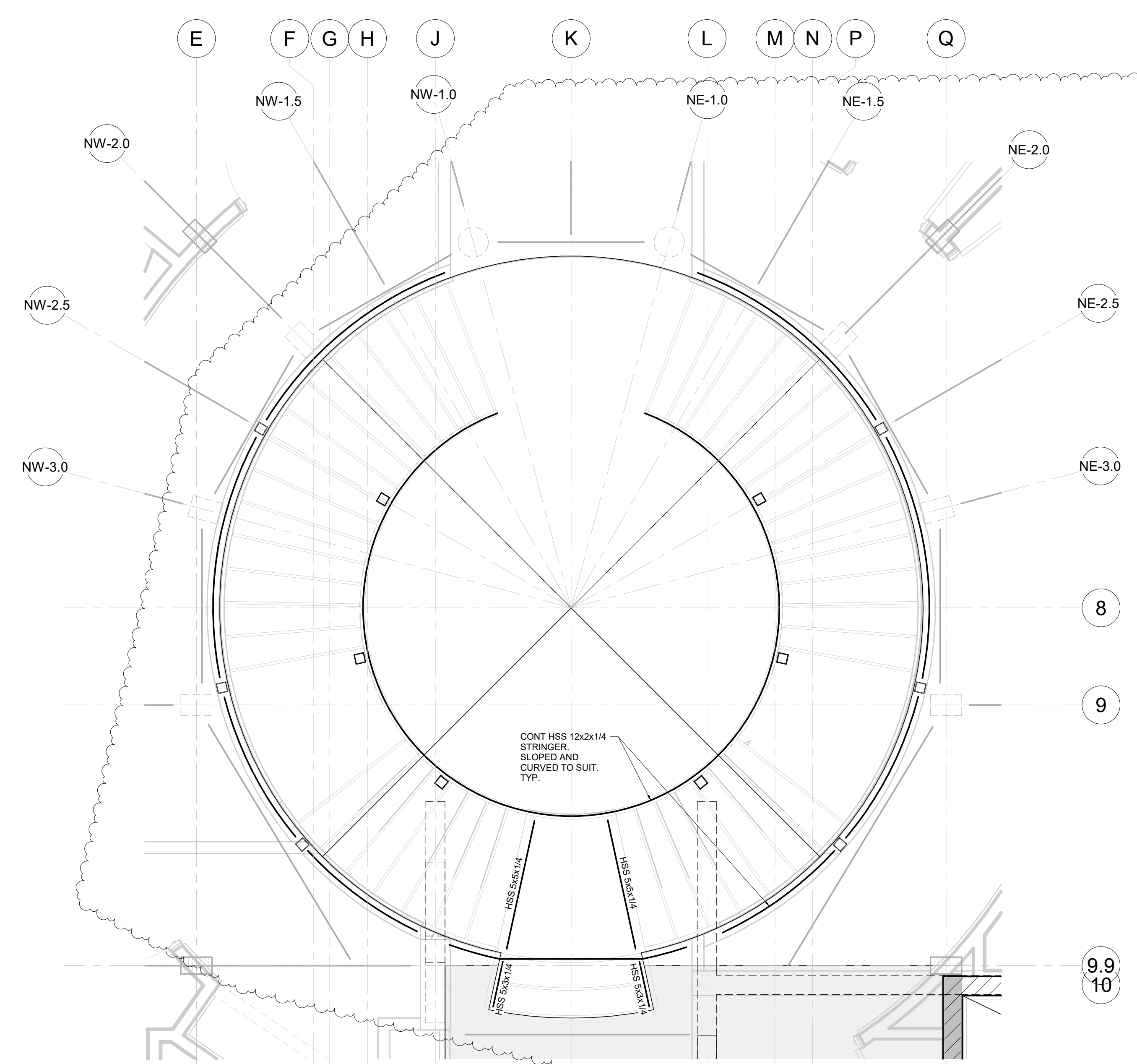
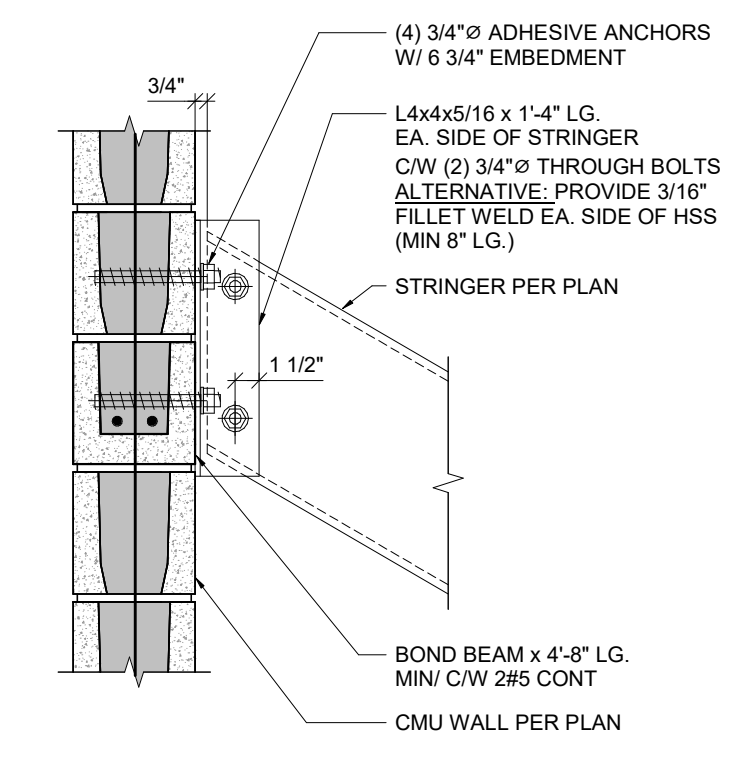
TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA

23121

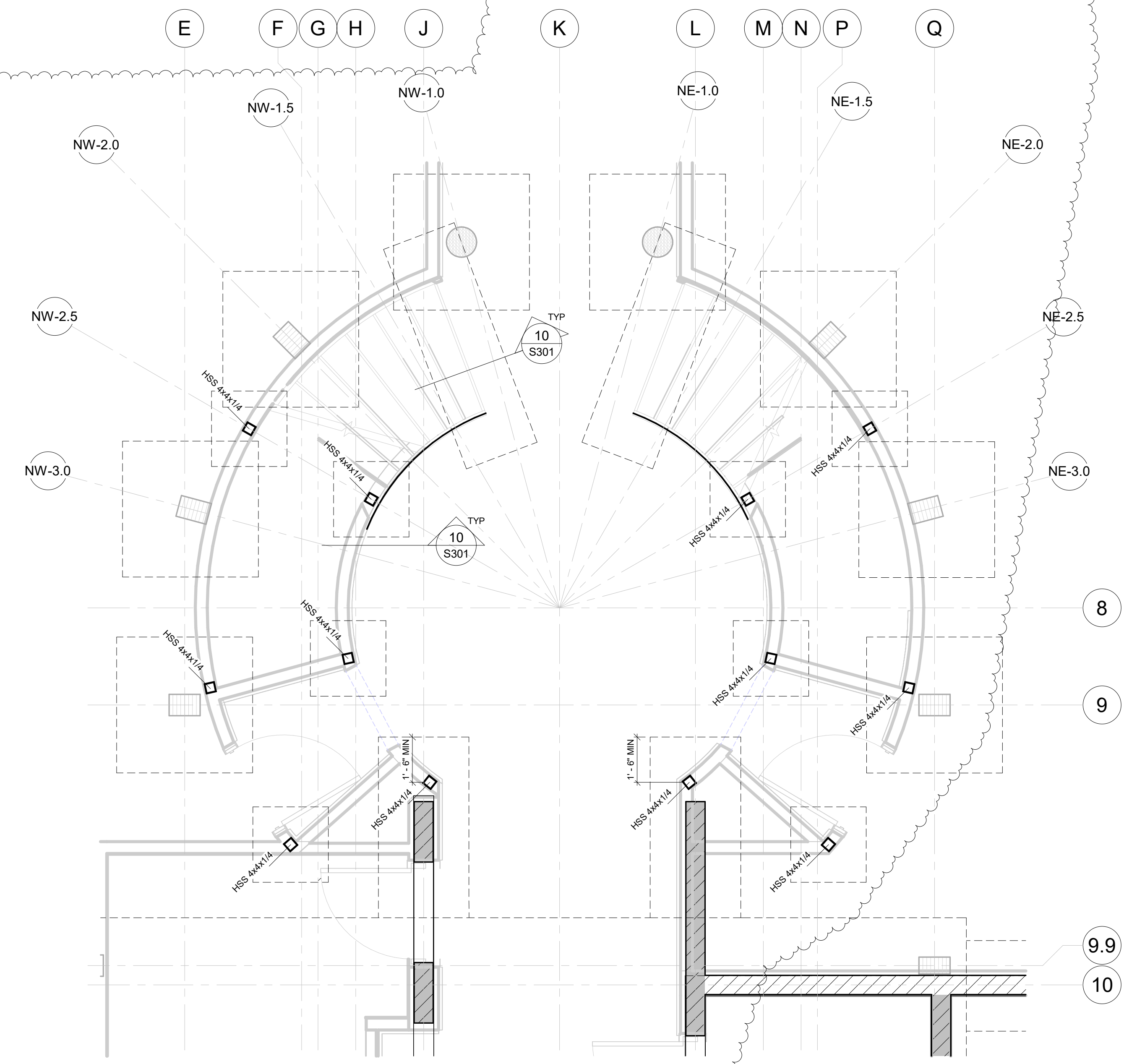
DRAWING NO.:
S310

DATE:
NOVEMBER 18, 2024

3 STEEL STRINGER TO CMU WALL CONNECTION
1" = 1'-0"



2 SECOND FLOOR PARTIAL STAIR PLAN
3/8" = 1'-0"



1 FOUNDATION / MAIN FLOOR PARTIAL STAIR PLAN
3/8" = 1'-0"

NOTE:
FINAL STAIR DESIGN BY SPECIALTY ENGINEER. FRAMING LAYOUT AND SIZES SHOWN ARE PRELIMINARY FOR PRICING PURPOSES ONLY.

BID SET

STAMP:

CLIENT:
MACON-BIBB COUNTY
700 POPLAR ST.
MACON, GA 31201



Passero Associates

4730 CASA COLA WAY, SUITE 200 (904) 757-6106
ST. AUGUSTINE, FL 32095
PROJECT MANAGER: STAN PRICE, PE
PROJECT ARCHITECT: CHRISTOPHER NARDONE, AIA
DESIGNER: KATIE KIMBECK, ASSOC. AIA

NO.	DATE	BY	DESCRIPTION
1	2024/11/18		ADDENDUM 01

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STEEL OVERFRAMING PLAN AND DETAILS

2178 FLIGHTLINE AVE

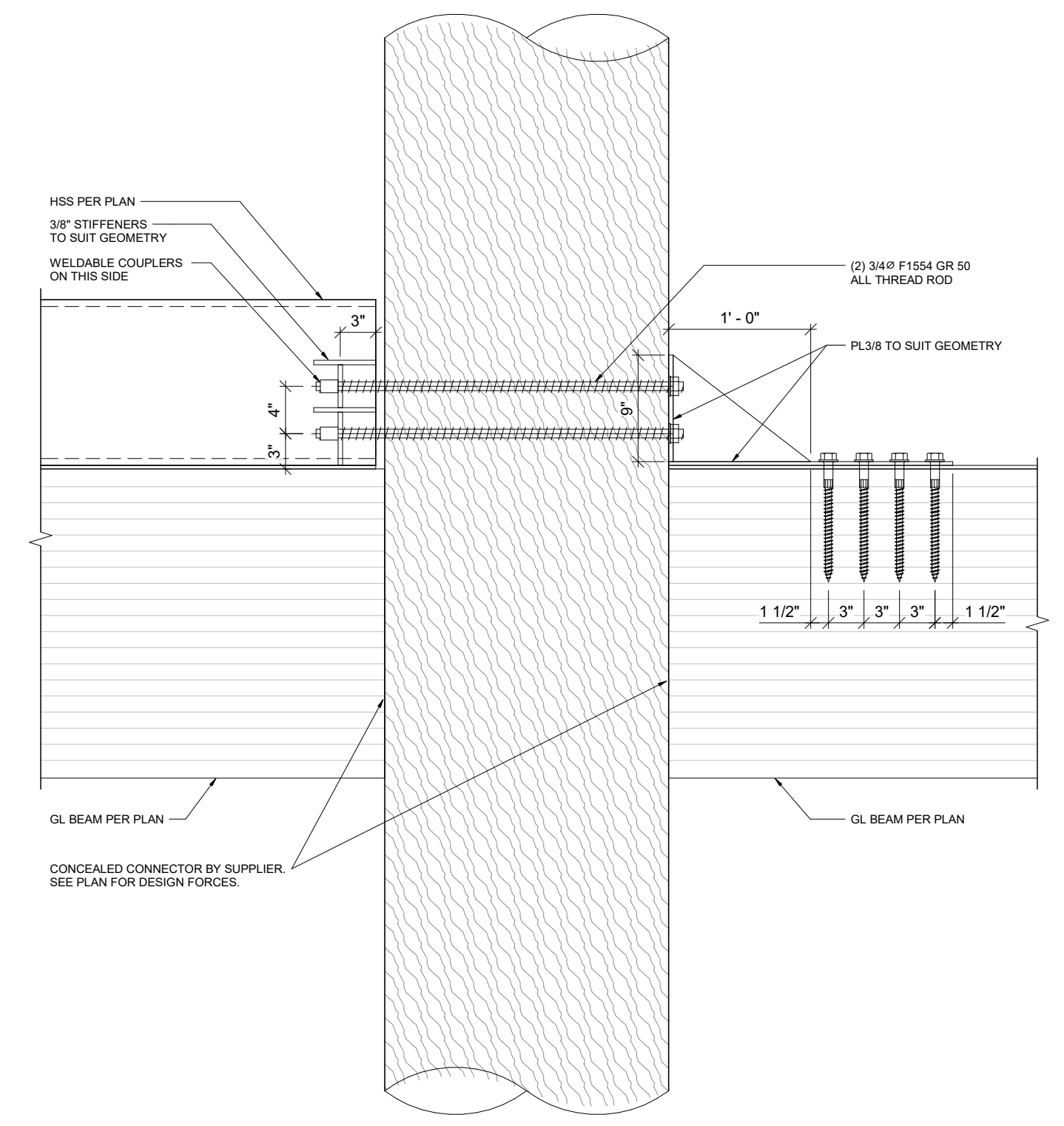
CORPORATE FBO TERMINAL BUILDING AND PARKING LOT REHABILITATION

TOWN/CITY: MACON
COUNTY: BIBB STATE: GEORGIA
PROJECT NO.:

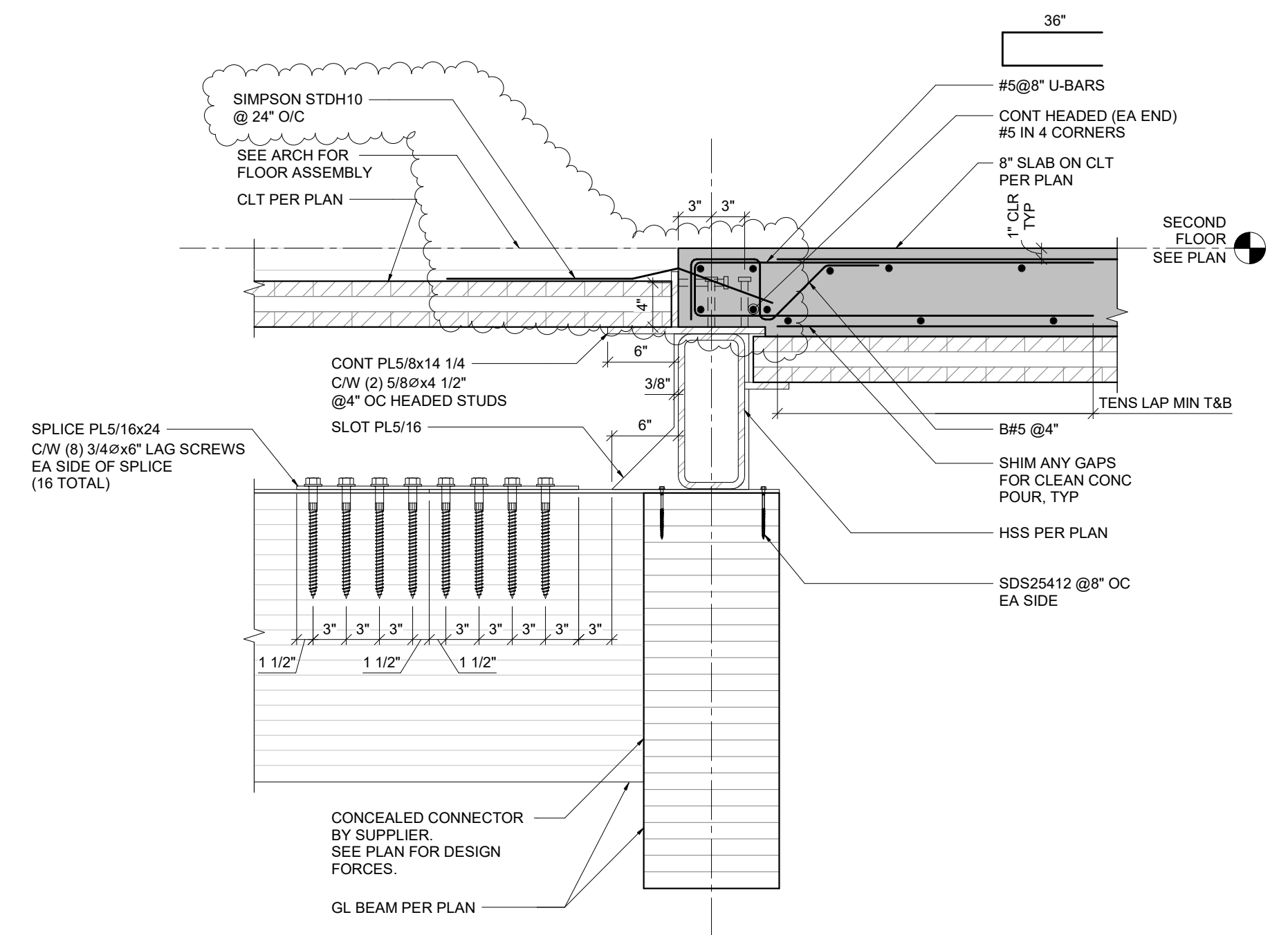
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DRAWING NO.: **S320**

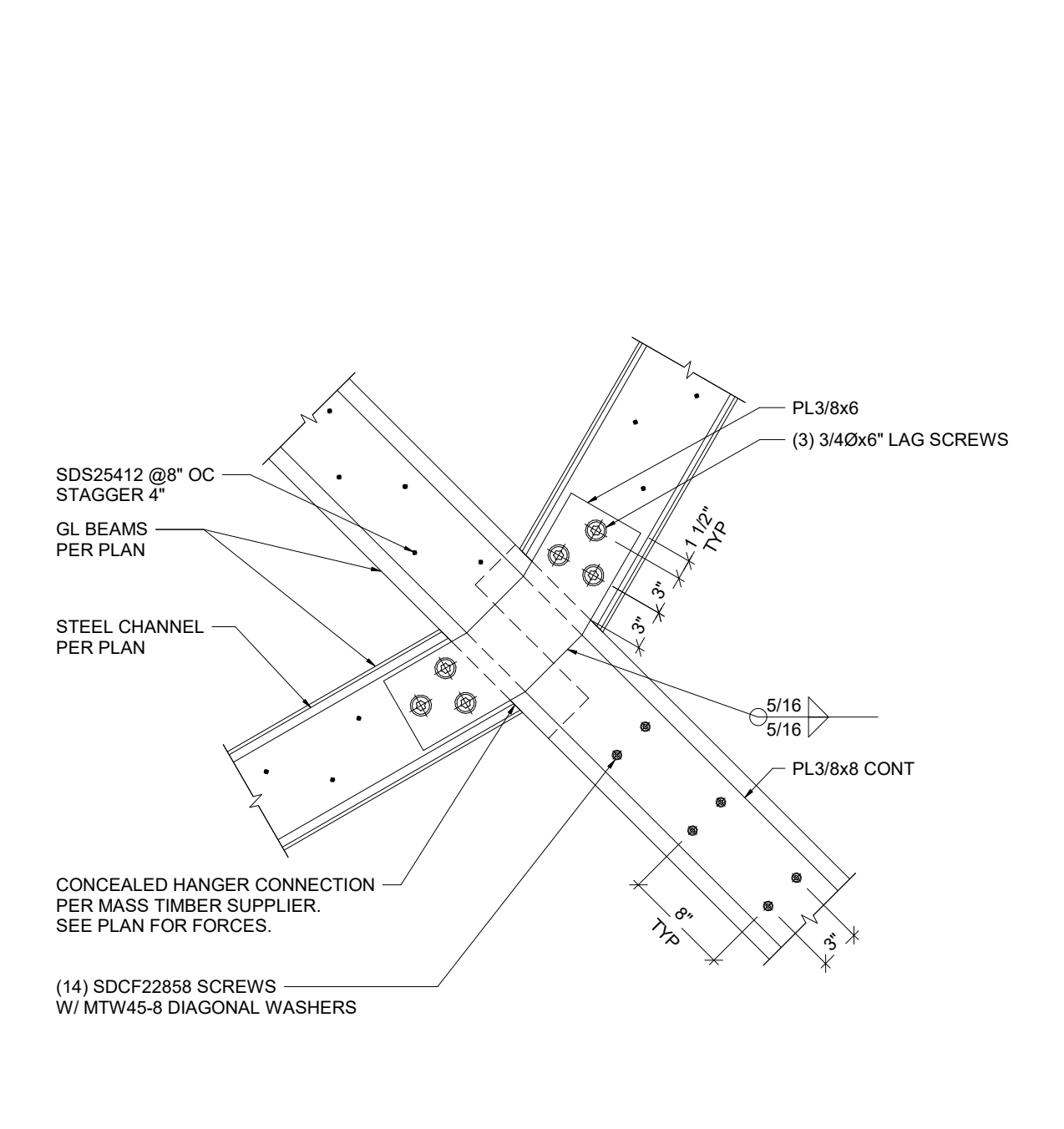
DATE: **NOVEMBER 18, 2024**



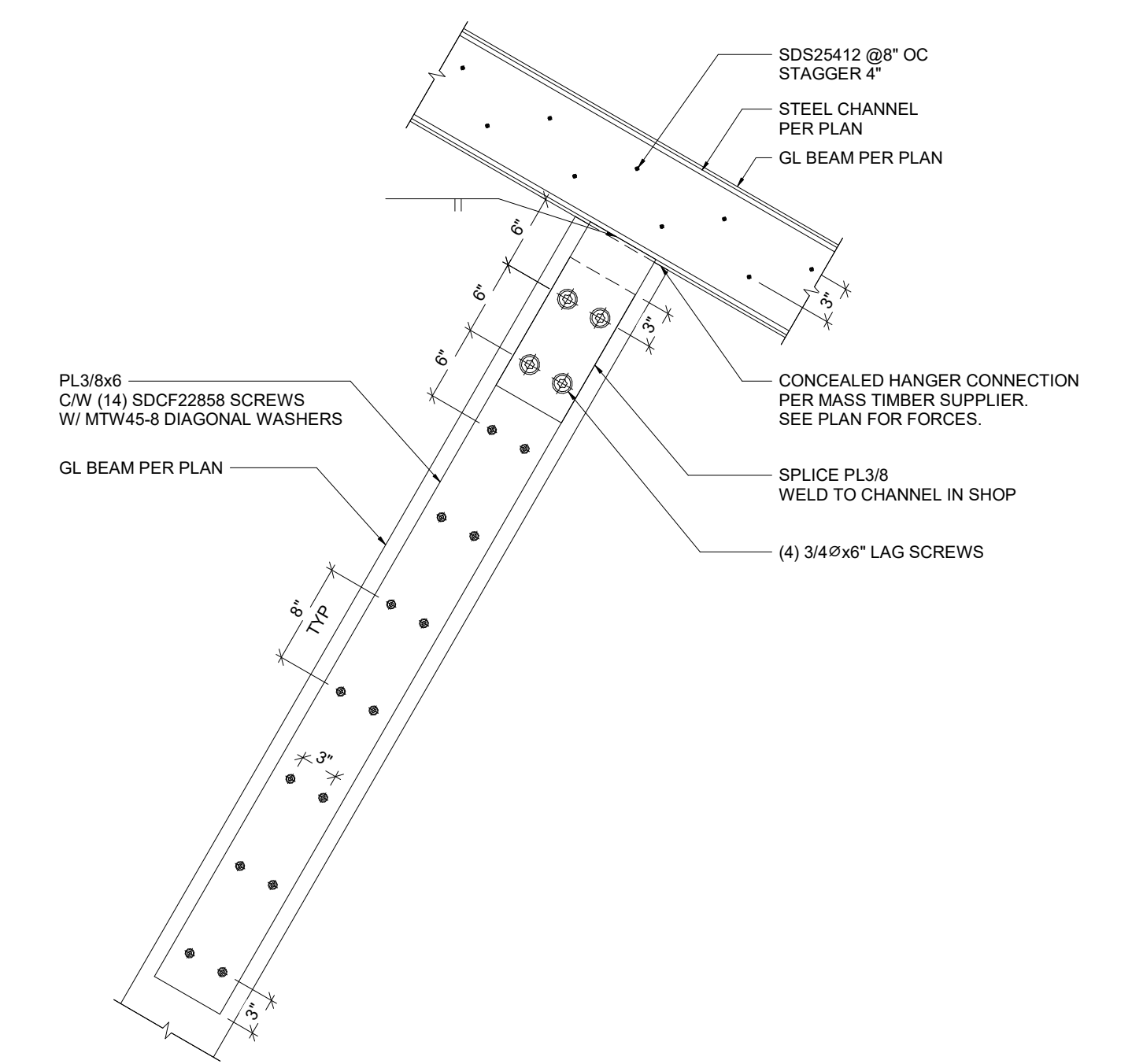
5 CONNECTION THROUGH COLUMN
S320 1" = 1'-0"



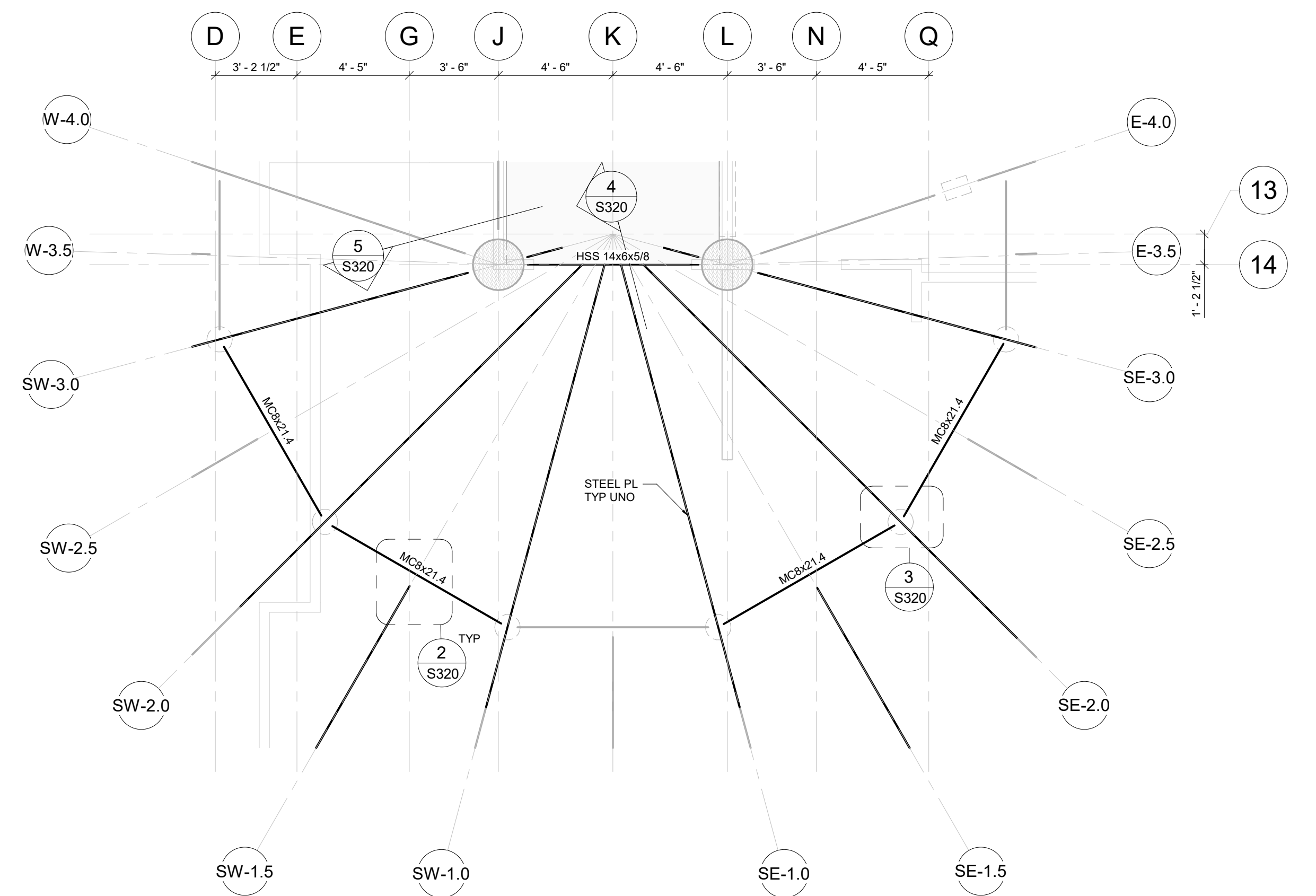
4 CONNECTION AT DRAG PLATE TO HSS
S320 1" = 1'-0"



3 END BEAM OVERFRAMING CONNECTION DETAIL
S320 1" = 1'-0"



2 END BEAM OVERFRAMING CONNECTION DETAIL
S320 1" = 1'-0"



1 STEEL OVERFRAMING AT BEAM CONVERGENCE
S103 1/4" = 1'-0"

SECTION 10 DEFINITION OF TERMS

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	Award	The Owner's notice to the successful bidder of the acceptance of the submitted bid.

Paragraph Number	Term	Definition
10-10	Bidder	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	Building Area	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	Calendar Day	Every day shown on the calendar.
10-13	Certificate of Analysis (COA)	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	Certificate of Compliance (COC)	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	Change Order	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	Contract	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	Contract Item (Pay Item)	A specific unit of work for which a price is provided in the contract.
10-18	Contract Time	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.

Paragraph Number	Term	Definition
10-19	Contractor	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	Contractors Quality Control (QC) Facilities	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	Contractor Quality Control Program (CQCP)	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	Control Strip	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	Construction Safety and Phasing Plan (CSPP)	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	Drainage System	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	Engineer	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	Equipment	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	Extra Work	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.

Paragraph Number	Term	Definition
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	Force Account	<p>a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p>b. Owner Force Account - Work performed for the project by the Owner's employees.</p>
10-31	Intention of Terms	<p>Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner.</p> <p>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</p>
10-32	Lighting	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	Major and Minor Contract Items	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	Materials	Any substance specified for use in the construction of the contract work.

Paragraph Number	Term	Definition
10-35	Modification of Standards (MOS)	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	Notice to Proceed (NTP)	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	Owner	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only.
10-38	Passenger Facility Charge (PFC)	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	Pavement Structure	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	Payment bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	Performance bond	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	Plans	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	Project	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	Proposal	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

Paragraph Number	Term	Definition
10-45	Proposal guaranty	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	Quality Assurance (QA)	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	Quality Control (QC)	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	Quality Assurance (QA) Inspector	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	Quality Assurance (QA) Laboratory	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	Resident Project Representative (RPR)	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	Runway	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	Safety Plan Compliance Document (SPCD)	Details how the Contractor will comply with the CSPP.
10-54	Specifications	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.

Paragraph Number	Term	Definition
10-55	Sponsor	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	Structures	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	Subgrade	The soil that forms the pavement foundation.
10-58	Superintendent	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	Supplemental Agreement	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	Surety	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	Taxilane	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	Taxiway	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	Taxiway/Taxilane Safety Area (TSA)	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.

Paragraph Number	Term	Definition
10-64	Work	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	Working day	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

END OF SECTION 10

SECTION 20 PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 Advertisement (Notice to Bidders). [___] See Advertisement

20-02 Qualification of bidders. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-03 Contents of proposal forms. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

20-04 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.
- c. Documented record of Contractor default under previous contracts with the Owner.
- d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 Interpretation of estimated proposal quantities. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception

because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

20-06 Examination of plans, specifications, and site. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

20-07 Preparation of proposal. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 Responsive and responsible bidder. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-09 Irregular proposals. Proposals shall be considered irregular for the following reasons:

- a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.
- b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.
- d. If the proposal contains unit prices that are obviously unbalanced.
- e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.
- f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 Bid guarantee. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

20-11 Delivery of proposal. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-12 Withdrawal or revision of proposals. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 Public opening of proposals. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 Disqualification of bidders. A bidder shall be considered disqualified for any of the following reasons:

a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, *Issuance of Proposal Forms*, of this section.

20-15 Discrepancies and Omissions. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than as stated for the last days for questions on page AFB-2.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

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SECTION 30 AWARD AND EXECUTION OF CONTRACT

30-01 Consideration of proposals. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 Award of contract. The award of a contract, if it is to be awarded, shall be made within 90 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

30-03 Cancellation of award. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

30-04 Return of proposal guaranty. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds*.

30-05 Requirements of contract bonds. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 Execution of contract. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 15 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-07 Approval of contract. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 Failure to execute contract. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *Execution of Contract*, of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

END OF SECTION 30

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SECTION 40 SCOPE OF WORK

40-01 Intent of contract. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

40-03 Omitted items. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

40-04 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work

covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 Maintenance of traffic. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

40-06 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

- a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the RPR; or
- c. Use such material for the Contractor's own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40

SECTION 50 CONTROL OF WORK

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If

any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 List of Special Provisions. (See table of contents)

50-05 Cooperation of Contractor. The Contractor shall be supplied with two hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-07 Construction layout and stakes. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): **Electronic and Hard copy.**)

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

50-08 Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 Load restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

50-12 Maintenance during construction. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 Partial acceptance. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such

inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

SECTION 60 CONTROL OF MATERIALS

60-01 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program and Addendum*, that is in effect on the date of advertisement.

60-02 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

60-03 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by “brand name or equal” and the Contractor elects to furnish the specified “or equal,” the Contractor shall be required to furnish the manufacturer’s certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed “or equal” is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 Plant inspection. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

- a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-05 Engineer/ Resident Project Representative (RPR) field office. An Engineer/RPR field office is not required.

60-06 Storage of materials. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor’s plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner’s permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-08 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

SECTION 70 LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-01 Laws to be observed. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 Federal Participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 Public convenience and safety. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction.

70-09 Use of explosives. The use of explosives is not permitted on this project.

70-10 Protection and restoration of property and landscape. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

70-11 Responsibility for damage claims. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the

Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 Third party beneficiary clause. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 Opening sections of the work to traffic. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such “phasing” of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor’s responsibility for work. Until the RPR’s final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 Contractor’s responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any

public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-16 Furnishing rights-of-way. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 Personal liability of public officials. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 No waiver of legal rights. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 Environmental protection. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. See Instructions to Bidders.

END OF SECTION 70

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SECTION 80 EXECUTION AND PROGRESS

80-01 Subletting of contract. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least **25** percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within **5** days of the NTP date. The Contractor shall notify the RPR at least **24 hours** in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least **10 days** prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least **24 hours** in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 Limitation of operations. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the

effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 Determination and extension of contract time. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.1 Contract time based on calendar days. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

80-08 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract.

Refer to Advertisement for Bidders AFB-1 for maximum construction time allowed. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

80-09 Default and termination of contract. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

SECTION 90 MEASUREMENT AND PAYMENT

90-01 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement .

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term “lump sum” when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term “ton” will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.

Term	Description
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the

Term	Description
	<p>scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.</p> <p>In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.</p> <p>In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.</p> <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p> <p>All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.</p>
Rental Equipment	<p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p>
Pay Quantities	<p>When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.</p>

90-02 Scope of payment. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are

concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items*, the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 Payment for extra work. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

From the total of the amount determined to be payable on a partial payment, 10 percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 Payment for materials on hand. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall

be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

- a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.
- b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.
- c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.
- d. Complete all punch list items identified during the Final Inspection.
- e. Provide complete release of all claims for labor and material arising out of the Contract.
- f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.
- g. When applicable per state requirements, return copies of sales tax completion forms.
- h. Manufacturer's certifications for all items incorporated in the work.
- i. All required record drawings, as-built drawings or as-constructed drawings.
- j. Project Operation and Maintenance (O&M) Manual(s).
- k. Security for Construction Warranty.
- l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

Item C-001 Special Provision: GDOT Standard Specifications

001-1 General. All work related to the project, unless otherwise included in a detailed specification in the project documents, shall be performed by the Contractor such that the work meets the requirements as detailed in the Georgia Department of Transportation (GDOT) *Standard Specifications Construction of Transportation Systems 2021*. This includes, but is not limited to, adhering to the requirements of Section 400 – Hot Mix Asphaltic Concrete Construction. All GDOT Supplemental Provisions for the applicable specifications shall also apply. It is the responsibility of the Contractor to become familiar with and strictly adhere to the applicable specifications. The Contractor shall account for all applicable specifications, special provisions, and incidental items when preparing their bid proposal. Any reference to “GDOT” or “the Department” with regard to shop drawing review, material submittals, and construction materials testing/acceptance shall mean the Engineer or RPR.

METHOD OF MEASUREMENT

001-2 Basis of measurement and payment. Pay items that are governed by the GDOT *Standard Specifications Construction of Transportation Systems 2021* shall be measured for payment as detailed on the plans. Any items that are required per the GDOT *Standard Specifications Construction of Transportation Systems 2021* or as shown on the plans, and not specifically included as a separate pay item, shall be considered incidental to the project; and no separate measurement shall be made for those items.

BASIS OF PAYMENT

001-3 Payment. Payment shall be made at the contract unit price for that item; and shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

ITEM C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

DESCRIPTION

102-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

~~**102-2.1 Grass.** Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.~~

102-2.2 Mulches. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

~~**102-2.3 Fertilizer.** Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.~~

102-2.4 Slope drains. Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

102-2.5 Silt fence. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, maintenance and removal of silt fence. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more

than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. Temporary construction entrance will be measured by the unit.
- b. Installation and removal of silt fence will be measured by the linear foot (meter).
- c. Temporary silt barrier (filter sock) will be measured by the linear foot (meter).
- d. Temporary inlet protection will be measured by the unit.
- e. Temporary mulching will be measured by the square feet (square meter).

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-5.1a	Temporary construction entrance - per the unit (each)Temporary seeding and mulching - per square yard (square meter)
Item C-102-5.1b	Installation and removal of silt fence - per linear foot (meter)
Item C-102-5.1c	Temporary silt barrier (filter sock) - per linear foot (meter)
Item C-102-5.1d	Temporary inlet protection - per the unit (each)
Item C-102-5.1e	Temporary mulching - per square foot (square meter)

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2 *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

ITEM C-103: PROJECT SURVEY, STAKEOUT, AND RECORD DRAWINGS

DESCRIPTION

103-1.1 Under this item, the Contractor shall do all necessary surveying required to construct all elements of the Project as shown on the Plans and specified in the Proposal and Specifications. This shall include but not be limited to stakeout, layout and elevations for pavements, structures, forms and appurtenances as shown and required, consistent with the current practices and shall be performed by competently qualified personnel acceptable to the Engineer. The stakeout survey shall proceed immediately following the award of the Contract and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. All survey work shall be provided under the direction of a licensed land surveyor.

MATERIALS

103-2.1 All instruments, equipment, stakes, and any other material necessary to perform the work satisfactorily shall be provided by the Contractor.

All stakes used shall be of a type approved by the Engineer. It shall always be the Contractor's responsibility to maintain these stakes in their proper location and position.

Record drawing deliverables shall meet the requirements of the Sections 100-4.1 and 100-4.2 as applicable to the project.

CONSTRUCTION DETAILS

103-3.1 The Contractor shall trim trees, brush, and other interfering objects, not consistent with the Plans, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stakeout survey crews and cross-section and topographic survey crews.

The exact position of all work shall be established from control points, baseline transit points or other points of similar nature which are shown on the Plans and/or modified by the Engineer. Any error, apparent discrepancy, or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation.

Permanent survey marker locations shall be established and referenced by the Contractor.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc., throughout the life of the Contract. Damaged or destroyed points, benchmarks or stakes, or any reference points made inaccessible by the progress of the construction, shall be replaced or transferred by the Contractor. Any of the above points which may be destroyed or damaged shall be transferred by the Contractor before construction begins. All control points shall be referenced by ties to acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the Engineer immediately. All computations necessary to establish the

exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be neatly made. Such computations, survey notes and other records shall be made available to the Engineer upon request and delivered to the Engineer not later than the date of acceptance of the Contract, to become the property of the Owner.

The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor. Any necessary correction to the work shall be made immediately by the Contractor. Such checking by the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.

Prior to the final cross-section and topo survey of the Project by the Contractor, the Contractor shall re-establish centerline or baseline points and stationing as required by the Engineer.

During the progress of the construction work, the Contractor will be required to furnish all of the surveying and stakeout incidental to the proper location by line and grade for each phase of the work. For paving and any other operation requiring extreme accuracy, the Contractor will restake with pins or other acceptable hubs located directly adjacent to the work at a spacing directed by the Engineer.

Any existing stakes, iron pins, survey monuments or other markers defining property lines which may be disturbed during construction shall be properly tied into fixed reference points before construction begins and accurately reset in their proper position upon completion of the work.

The Contractor shall set nails or pins flush with finished grade on the centerline of the runway pavement at each runway threshold. The set points shall be located, elevated and referenced to the project coordinate system. The as-built runway threshold elevation and coordinates shall be given to the Engineer.

Just prior to completion of the Contract, the Contractor shall reestablish if necessary, and retie all control points as permanently as possible, to the satisfaction of the Engineer.

AS-BUILT DRAWINGS

103-4.1. REDLINE DRAWINGS. The Contractor shall be provided one (1) set of full-size construction drawings by the Engineer for the sole purpose of recording as-built conditions. The Contractor shall mark each sheet of the non-reproducible drawings in red pencil and record thereon in a legible manner, (heretofore known as redline drawings) any and all field changes and conditions as they occur. A complete file of approved field sketches, diagrams, and other approved changes/modifications shall be maintained and attached to the redline drawings.

A Redline set of As-Built drawings shall be kept current during the progress of the work. All deviations from the proposed drawings shall be noted. Special attention shall be given to note any shift in the location of underground items (utilities, pipes, etc) to facilitate accurately locating underground items on the final As-Built drawings.

Redline drawings shall be reviewed by the Engineer for accuracy as often as deemed necessary by

the Engineer. Errors or omissions that are identified shall be promptly corrected. The Engineer may withhold the monthly progress payment request until such time as the redline drawings have been updated by the Contractor. At the completion of the work, each sheet of the redline drawings, plus all approved field sketches and diagrams shall be certified by the Contractor as reflecting the as-built conditions of the work. The Contractor shall thereafter submit to the Engineer the original redline drawings, referenced above, for approval prior to release of any retainage and establishing the value of the work.

103-4.2. FINAL AS-BUILT AND ELECTRONIC DRAWINGS. Horizontal datum shall be State Plane Coordinates derived from North American Datum of 1983 (NAD 83). Vertical Datum shall be North American Vertical Datum of 1988 (NAVD 1988). The location and elevation all benchmarks used shall be shown on the As-Built drawings.

The As-Built drawings shall accurately reflect and shall encompass all alterations that occurred during the progress of the work. The term As-Built Condition, referenced in this specification, shall be defined as the result of construction alterations. All proposed lines and proposed features on the design drawings that do not accurately reflect the As-Built condition shall not be shown on the As-Built drawings. Such proposed lines and features shall be erased and redrawn or otherwise modified on the As-Built drawings to accurately reflect the As-Built Condition. All proposed notes on the design drawings that do not reflect the As-Built Condition shall not be shown on the As-Built drawings. Such notes shall be erased and replaced, struck-through and corrected, or otherwise modified to accurately reflect the As-Built Condition. Design elevations that deviate from As-Built elevations shall be struck-through, and the As-Built elevation shall be noted adjacent to the struck-through design elevation.

The Contractor shall provide original and finished grade, As-Built topographic survey of all areas altered during construction. Unless otherwise noted, As-Built elevations shall be measured at 50 foot intervals (50 feet grid), at changes in surface slope, and at limits of construction alteration (grading, clearing or otherwise). This spacing requirement applies to paved and unpaved surfaces that do not have specific topographic measurement spacing requirements defined elsewhere. A topographic digital terrain model (DTM) that can be utilized in .dwg, CAD format, version 2004 or later shall be provided for all areas altered during construction. DTM shall mean the AutoCAD surface generated from surface data points (location and elevation) connected by TIN (triangulated irregular network) lines.

Ditches: As-Built elevations shall be measured along the centerline, at toes of slopes, and at tops of bank. These measurements shall be taken at 50 foot intervals and at the beginning and end points of the ditch alteration.

Storm Drains, Structures, and Retention/Detention Ponds: All piping, wyes, tees, manholes, inlets, cleanouts and points of connection to the existing system shall be located and shown on the As-Built Drawings. Runs of storm sewers shall be identified (i.e. 300' of 15" RCP at S=.004). Elevations shall be given for top of rim/grate of all manhole covers and inlets. Elevations shall be given for all manhole, inlet, and catch basin inverts. Elevations shall be given for underdrain inverts at the location of cleanouts. Elevations shall be given for control structure weirs, orifices, and outfall elevations. Elevations shall be given for inverts of all outfall pipes. Elevations shall be given for the bottom of

pond and top of bank for Retention/Detention ponds. Elevations may be required for any other pertinent design data not listed here.

A review-set of Final As-Built drawings shall be submitted to the Engineer (electronic PDF or CAD files is acceptable) and if requested modifications shall be made. When modifications are required, the Contractor shall make the requested modifications and submit a revised review-set. Written approval from the Engineer shall be given prior to submitting the Final As-Built drawings described in the below paragraph.

The Final As-Built drawings shall be prepared, signed, and sealed by a licensed Professional Surveyor. These drawings shall describe all alterations that occurred during the construction project. The Contractor shall provide one (1) set of Redline As-Built drawings, five (5) sets of signed and sealed Final As-Built drawings, and one (1) electronic copy of the As-Built drawings in CAD (version 2018 or later) including a DTM of all topographic information. Final payment for this project will not be made until the As-Built drawings have been reviewed and accepted by the engineer. Cost of producing the As-built drawings shall be considered incidental to the contract unless a specific pay item is provided.

METHOD OF MEASUREMENT

103-7.1 This is a Lump Sum Item and thus there is no measurement for payment. The Item shall be completed per the requirements of this specification.

BASIS OF PAYMENT

103-8.1 The lump sum price bid shall include the cost of furnishing all labor, equipment, instruments, and all other material necessary to satisfactorily complete all requirements of this specification. Partial payments may be made at the discretion of the Engineer as the work progresses.

Payment will be made under:

Item C-103-8.1 - Project Survey, Stakeout, and Record Drawings – per lump sum

END ITEM C-103

ITEM C-105 MOBILIZATION

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 10 percent of the total project cost.

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105-6.1 Mobilization – per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster
United States Department of Labor, Wage and Hour Division (WHD)
WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

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ITEM C-107 MAINTENANCE OF TRAFFIC AND AIRFIELD SAFETY

DESCRIPTION

107-1.1 GENERAL. This work shall consist of maintaining airport traffic and protecting the public from damage to person and property within the limits of and for the duration of the Contract and securing the airport perimeter at all times.

The following additional items are specifically included without limiting the generality implied by these Specifications and the Plans:

- Restoration of all surfaces disturbed as a result of the Contractor's operations.
- Maintenance and repair of existing access roads.
- Cleaning and maintenance of all paved areas, including affected portion of main highways, and any dust control measures that may be necessary.
- Supplying of roadway crossing guards, observers, and radios as necessary.
- Restoration of staging areas, borrow pits, and haul roads outside of any grading limits.

METHOD OF MEASUREMENT

107-2.1 Payment for maintenance and protection of traffic will be made on a lump sum basis. The lump sum shall include all items required to satisfy this Specification and the requirements of the Plans as they relate to Maintenance & Protection of Traffic.

BASIS OF PAYMENT

107-3.1 The lump sum price bid for maintenance and protection of traffic shall include all equipment, materials and labor necessary to adequately and safely maintain and protect the airport and vehicular traffic.

In the event the contract completion date is extended, no additional payment will be made for maintenance and protection of traffic.

Progress payments will be made for this item in proportion to the total amount of contract work completed, less any deductions for unsatisfactory maintenance and protection of traffic.

No payment will be made under maintenance and protection of traffic for each calendar day during which there are substantial deficiencies in compliance with the Specification requirements of any subsection of this Item as determined by the Engineer.

The amount of such calendar day non-payment will be determined by dividing the lump sum amount bid for maintenance and protection of traffic by the number of calendar days between the

date the Contractor commences work and the date of completion as designated in this proposal, without regard to any extension of contract time.

If the Contractor fails to maintain and protect traffic adequately and safely for a period of 24 hours, the Owner shall correct the adverse conditions by any means it deems appropriate and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the liquidated damages and non-payment for maintenance and protection of traffic listed above.

However, where major nonconformance with the requirements of this Specification is noted by the Engineer and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the Engineer regardless of whether corrections are made by the Owner as stated in the paragraph above.

Payment will be made under:

Item C-107-3.1 - Maintenance of Traffic and Airfield Safety – per lump sum

END ITEM C-107

ITEM D-751: MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 Mortar. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast concrete pipe manhole rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

~~**751-2.5 Corrugated metal.** Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.~~

751-2.6 Frames, covers, and grates. The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 Precast inlet structures. Manufactured in accordance with and conforming to ASTM C913.

CONSTRUCTION METHODS

751-3.1 Unclassified excavation.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

751-3.2 Brick structures.

a. Foundations. A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.

b. Laying brick. All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall

be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

c. Joints. All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.

d. Pointing. Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.

e. Cleaning. Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.

f. Curing and cold weather protection. The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

751-3.3 Concrete structures. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed

structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

~~**751-3.5 Corrugated metal structures.** Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.~~

751-3.6 Inlet and outlet pipes. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 Placement and treatment of castings, frames, and fittings. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

751-3.8 Installation of steps. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 Backfilling.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item D-751-5.1 Manhole Cover - per each unit

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
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END OF ITEM D-751

ITEM F-162 CHAIN-LINK FENCE

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications, the details shown on the plans, and in conformity with the lines and grades shown on the plans or established by the RPR.

MATERIALS

162-2.1 Fabric. The fabric shall be woven with a 9-gauge galvanized steel wire in a 2-inch (50 mm) mesh and shall meet the requirements of ASTM A392, Class 2.

162-2.2 Barbed wire. Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A121, Class 3, Chain Link Fence Grade.

162-2.3 Posts, rails, and braces. Line posts, rails, and braces shall conform to the requirements of ASTM F1043 or ASTM F1083 as follows:

Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.

The following are acceptable minimum dimensions (in accordance with Federal Specification RR-F-191/3D Table I through VI) for posts, rails and braces:

<u>Description:</u>	<u>Steel Pipe Dimension</u>
Top Rails and Braces	1 5/8" O.D.
Line Posts	2 1/2" O.D.
Terminal, Corner and Intermediate Posts	3" O.D.
Gate Posts (Gates with a span of < 15')	8" O.D.
Bollards	6" O.D.

~~**162-2.4 Gates.** Gate frames shall consist of galvanized steel pipe and shall conform to the specifications for the same material under Paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.~~

162-2.5 Wire ties and tension wires. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824.

All material shall conform to Federal Specification RR-F-191/4.

162-2.6 Miscellaneous fittings and hardware. Miscellaneous steel fittings and hardware for use with galvanized steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A153. Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm. Truss Rods shall be galvanized 3/8" and stretcher bars shall be galvanized 1/4" x 3/4".

162-2.7 Concrete. Concrete shall have a minimum 28-day compressive strength of 3000 psi (2670 kPa). High Early Strength concrete of a commercial grade structural concrete with a minimum 28 day compressive strength of 5000 psi may also be used.

162-2.8 Marking. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

162-2.9 Signs and Sign Posts. Signs shall be of the dimensions and with the text as shown on the Plans. Signs shall be aluminum, Type A, retro-reflective, in conformance with Section 828 of the Mass Highway Standard Specifications for Highways and Bridges. Signs shall be .080" thick and shall have reflective sheeting in compliance with AASHTO-M268.

Fasteners for all signs shall be stainless steel. All signs shall be mounted to fence fabric.

~~**162-2.9 Swing Gate.** Gate shall be furnished and installed complete with all required latches, stops, keepers and hinges. When gate is in the closed position, it shall be impossible for the gate to be opened except by mechanical operations provided. Tension bars shall be galvanized steel in accordance with ASTM F 626. Tie wires shall be nine (9) gauge aluminized or galvanized steel. The entire frame and gate assembly shall be hot dip galvanized after welding. Gate hinges shall have a thrust capacity of 600 lbs per pair. The gate shall be constructed to receive a mechanical latch and lock. The gate shall be the width indicated on the Plans, shall be the same height as the highest adjacent fence or gate section, and shall use the same fabric type as the adjacent fence, or gate section, unless otherwise indicated on the Plans.~~

162-2.10 Padlocks And Chains. One (1) keyed padlock and chain shall be provided for each swing gate. Locks shall be for outdoor commercial application and protected against the weather with a plastic cover. Locks shall have dual locking steel shackles. The lock width and the shackle vertical clearance shall be not less than two inches (2"). Each lock shall have a thirty-six inch (36") long flat-link, zinc-plated chain, trade size 4/0, to secure the lock to the gate when it is unlocked to prevent loss of the lock. The locks shall be high security with a removable cylinder.

All padlocks furnished as part of this project shall be keyed alike.

162-2.11 Shop Drawings and Certifications. The Contractor shall submit manufacturer's Shop Drawings and Certification of Compliance on the following: all fence components, fabric, posts, rails, wire ties, gates, signs, and padlocks. A Certification of Compliance shall be submitted on the concrete.

CONSTRUCTION METHODS

162-3.1 General. The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the RPR. The Contractor shall layout the fence line based on the plans and coordinate with the RPR prior to the start of fence installation. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences as shown on the plans. The Contractor shall stake down the woven wire fence at several points between posts as shown on the plans.

The Contractor shall arrange the work so that construction of the new fence will immediately follow the removal of existing fences. The length of unfenced section at any time shall not exceed 300 feet (90 m). The work shall progress in this manner and at the close of the working day the newly constructed fence shall be tied to the existing fence.

162-3.2 Clearing fence line. Clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the RPR, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.3 Installing posts. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within seven (7) days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

162-3.4 Installing top rails. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.5 Installing braces. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.6 Installing fabric. The wire fabric shall be firmly attached to the posts and braced as shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than one inch (25 mm) or more than 3 inches (75 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches (150 mm) or less.

162-3.7 Electrical grounds. Electrical grounds shall be constructed at 500 feet (150 m) intervals. The ground shall be accomplished with a copper clad rod 8 feet (2.4 m) long and a minimum of 5/8 inches (16 mm) in diameter driven vertically until the top is 6 inches (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction. The Contractor shall comply with FAA-STD-019, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, Paragraph 4.2.3.8, Lightning Protection for Fences and Gates, when fencing is adjacent to FAA facilities.

162-3.7 Electrical Grounds. Electrical grounds shall be constructed at five hundred foot (500') intervals. The ground shall be accomplished with a copper clad rod eight feet (8') long and a minimum of

5/8 inch in diameter driven vertically until the top is six inches (6') below the ground surface. A no. six (6) solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction.

~~**162-3.8 Installing Gates.** Gates shall be installed to swing or slide in the direction indicated on the Plans or as directed by the Engineer. All hardware shall be thoroughly secured, properly adjusted and left in perfect working order. Hinges and diagonal bracing in gates shall be adjusted so that the gates will hang level. The Contractor shall install gate supports to support both sides of the gates in their open position. Fabric shall be attached to the gate frame with stretcher bar bands and stretcher bars on all sides and to the mid point braces by tie wires. The locking device shall be as shown on the Plans and as herein specified. The locking device shall be installed as recommended by the manufacturer and to the satisfaction of the Engineer.~~

162-3.9 Installing Signs. "No Trespassing" signs on fence sections shall be attached securely to the fence fabric using tamper-resistant bolts or metallic clips at a height of five feet (5') to the center of the sign. One (1) sign shall be attached to exterior of each new gate or as directed on the Plans. A sign shall be attached five feet (5') from the beginning and five feet (5') from the end of each continuous run of fence. Additional signs shall be attached to each continuous run of fence such that the signs are no more than 500 feet apart measured along the fence line.

Gate Number Signs shall be furnished and installed on all new gates. The gate numbering system shall be as directed by the Engineer. The signs shall be attached securely to the gate fabric using tamper-resistant bolts or metallic clips at a height of five feet (5') to the center of the sign. One (1) sign shall be attached to the Aviation side of each gate and one (1) shall be attached to the non-aviation side. On gates with multiple leaves, the signs shall be placed on the left leaf as seen from the non-aviation side of the fence.

162-3.10 Cleaning up. The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per T-901.

METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item F-162-5.1	Chain-Link Fence - per linear foot
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A491	Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A824	Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence
ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM F668	Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and other Organic Polymer Coated Steel Chain-Link Fence Fabric
ASTM F1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM F1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F1183	Standard Specification for Aluminum Alloy Chain Link Fence Fabric
ASTM F1345	Standard Specification for Zinc 5% Aluminum-Mischmetal Alloy Coated Steel Chain-Link Fence Fabric
ASTM G152	Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G153	Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM G155	Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

Federal Specifications (FED SPEC)

FED SPEC RR-F-191/3 Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)

FED SPEC RR-F-191/4 Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

FAA Standard

FAA-STD-019 Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment

FAA Orders

5300.38 AIP Handbook

END OF ITEM F-162

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Item L-110 Airport Underground Electrical Duct Banks and Conduits

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing, trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.3 Plastic conduit. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II—Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions

toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade. The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 Markers. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include sodding shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Ownership of removed cable. Middle Regional Airport (MCN) & Macon-Bibb County

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1 Concrete Encased Electrical Duct Bank - per linear foot (meter)

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30 Design and Installation Details for Airport Visual Aids

AC 150/5345-53 Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70 National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6 Electrical Rigid Metal Conduit - Steel

UL Standard 514B Conduit, Tubing, and Cable Fittings

UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

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Item L-115 Electrical Manholes and Junction Structures

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR .

EQUIPMENT AND MATERIALS

115-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format . The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 Concrete structures. Concrete shall be proportioned, placed, and cured per [Item P-610, Concrete for Miscellaneous Structures]. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand **H-20 Highway** loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.5 Mortar. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

115-2.7 Frames and covers. The frames shall conform to one of the following requirements:

- a. ASTM A48 Gray iron castings
- b. ASTM A47 Malleable iron castings
- c. ASTM A27 Steel castings
- d. ASTM A283, Grade D Structural steel for grates and frames
- e. ASTM A536 Ductile iron castings
- f. ASTM A897 Austempered ductile iron castings

All castings specified shall withstand H-20 Highway loading.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 Ladders. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 Reinforcing steel. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 Bedding/special backfill. Bedding or special backfill shall be as shown on the plans.

CONSTRUCTION METHODS

115-3.1 Unclassified excavation. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 Concrete structures. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 Precast unit installations. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 Placement and treatment of castings, frames and fittings. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or

bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 Installation of ladders. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 Removal of sheeting and bracing. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 Backfilling. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 Connection of duct banks. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.10 Cleanup and repair. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 Restoration. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 Inspection. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 Manhole elevation adjustments. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 Duct extension to existing ducts. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115-5.1	Existing Electrical Manhole/Junction Structure Elevation Adjustment – Per Each
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
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AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
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AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
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AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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AC 150/5345-53	Airport Lighting Equipment Certification Program
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Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
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ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
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ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
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ASTM A48	Standard Specification for Gray Iron Castings
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ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
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ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
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ASTM A536	Standard Specification for Ductile Iron Castings
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ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
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ASTM A897	Standard Specification for Austempered Ductile Iron Castings
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ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime
FAA Engineering Brief (EB)	
EB #83	In Pavement Light Fixture Bolts
Mil Spec	
MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
National Fire Protection Association (NFPA)	
NFPA-70	National Electrical Code (NEC)

END OF ITEM L-115

ITEM MWA-101: MACON WATER AUTHORITY SPECIFICATIONS FOR WATER AND SEWER

DESCRIPTION

MWA-101-1.1 This item shall consist of the construction of potable water and sanitary sewer pipes and appurtenances in accordance with the Macon Water Authority specifications included in this section and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

MWA-101-2.1 Materials shall meet the requirements shown on the plans and specified below.

CONSTRUCTION METHODS

MWA-101-3.1 Construction methods shall meet the requirements shown on the plans and in the Macon Water Authority specifications included in this section.

METHOD OF MEASUREMENT

Work required under this specification section will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

MWA-101-4.1 The quantity of removal of existing 8" Clay Sanitary Sewer shall be measured by the number of linear feet installed in place, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe.

MWA-101-4.2 The quantity of 8" PVC SDR 26 Sanitary Sewer shall be measured by the number of linear feet installed in place, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable.

MWA-101-4.3 The quantity of Sanitary Sewer Doghouse Manholes shall be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR.

MWA-101-4.4 The quantity of 6" PVC Sanitary Sewer Service Line shall be measured by the number of linear feet installed in place, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable.

MWA-101-4.5 The quantity of 4" PVC Sanitary Sewer Service Line shall be measured by the number of linear feet installed in place, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable.

MWA-101-4.6 The quantity of the Relocate Existing Fire Hydrant Top and disposal of Assembly Including Valve, Hardware, and Fittings shall be measured by the number of units, and as accepted by the RPR.

MWA-101-4.7 The quantity of Fire Hydrant Assembly Relocated Includes New Gate Valve and Valve Box, Spool Pieces Concrete Collar, Crushed Stone, and Anchor Couplings, Installed, Complete shall be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR.

MWA-101-4.8 The quantity of 6" DIP Waterline shall be measured by the number of linear feet installed in place, including all required fittings, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe.

MWA-101-4.9 The quantity of 6" C900 PVC Waterline shall be measured by the number of linear feet installed in place, including all required fittings, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe.

MWA-101-4.10 The quantity of 2" PVC Waterline shall be measured by the number of linear feet installed in place, including all required fittings, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe.

MWA-101-4.11 The quantity of 1/2" PVC Waterline shall be measured by the number of linear feet installed in place, including all required fittings, ready for operation, and accepted by the RPR. It shall be measured along the centerline of the pipe.

BASIS OF PAYMENT

Accepted quantities of Macon Water Authority work ordered by the RPR and measured as provided in the Method of Measurement section of this specifications will be paid for under:

Payment will be made under:

Item MWA-101-5.1	Removal of 8" Clay Sanitary Sewer – per linear foot
Item MWA-101-5.2	8" PVC SDR 26 Sanitary Sewer – per linear foot
Item MWA-101-5.3	Sanitary Sewer Doghouse Manholes – per each
Item MWA-101-5.4	6" PVC Sanitary Sewer Service line – per linear foot
Item MWA-101-5.5	4" PVC Sanitary Sewer Service line – per linear foot
Item MWA-101-5.6	Relocate Existing Fire Hydrant Top and disposal of Assembly Including Valve, Hardware, and Fittings – per each
Item MWA-101-5.7	Fire Hydrant Assembly Relocate Includes New Gate Valve and Valve Box, Spool Pieces Concrete Collar, Crushed Stone, and Anchor Couplings, Installed, Complete – per each
Item MWA-101-5.8	6" DIP Waterline – per linear foot
Item MWA-101-5.9	6" C900 PVC Waterline – per linear foot
Item MWA-101-5.10	2" PVC Waterline – per linear foot
Item MWA-101-5.11	1/2" PVC Waterline – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Macon Water Authority	Standards for Design and Construction Specifications (Included as Appendix A of this specification)
	Section I - Water Distribution
	Section II - Wastewater Collection

END ITEM MWA-101

APPENDIX A

Macon Water Authority Standards for Design and Construction Specifications

APPROVED

STATE OF GEORGIA
ENVIRONMENTAL PROTECTION DIVISION

MAR 25 2022

DRINKING WATER PROGRAM
ENGINEER SIG.
VALID ONLY FOR DRINKING WATER PORTION OF PROJECT



Macon Water Authority
790 Second Street
Macon, Georgia 31202
(478) 464-5620 * FAX (478) 741-1239

STANDARDS FOR DESIGN

AND

CONSTRUCTION SPECIFICATIONS

I WATER DISTRIBUTION

II WASTEWATER COLLECTION

Original 1984
Revised April 2004
Revised May 2004

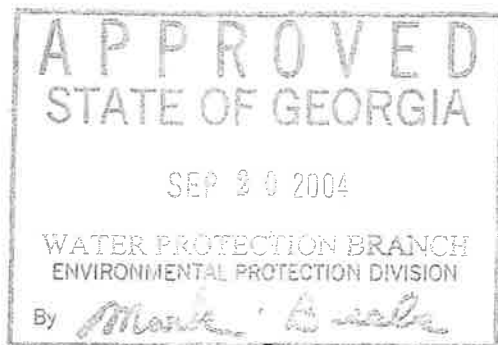


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ARTICLE I
STANDARDS FOR DESIGN
AND
CONSTRUCTION SPECIFICATIONS
FOR
WATER DISTRIBUTION

PREFACE: This Guideline and Standards Book contains information to assist planners and engineers with the design and construction of water facilities. The Macon Water Authority's intent is to ensure uniformity of design concepts, formats, methodologies, procedures, construction materials, types of equipment and quality of work products. These standards have been produced and adopted to encourage exceptional quality while using current technology for all Macon Water Authority facilities.

These Guidelines and Standards are not a substitute for good Engineering. Sound judgment must be exercised in all applications to create quality and cost efficient facilities.

Macon Water Authority management encourages the creation of relationships between project stakeholders that promotes engineering excellence and timely completion of projects. Macon Water Authority staff and consultants are encouraged to take the time at the beginning of all projects to identify common goals, common interests, lines of communication, and a commitment to cooperative problem solving.

SECTION 1.01 - PURPOSE:

This section of the Specifications describes products to be incorporated into the water lines and requirements for the installation and use of these items. The Contractor/Developer shall furnish all products and perform all labor necessary to fulfill the requirements of these Specifications. The word "Authority" used herein shall mean the Macon Water Authority.

SECTION 1.02 - GENERAL:

A Applicable Standards:

Supply all products and perform all work in accordance with applicable American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), National Sanitation Foundation, American National Standards Institution (ANSI), Macon Water Authority (MWA) Cross Connection Control and Backflow Prevention Policy, or other recognized standards. Latest revisions of all standards are applicable. If requested by the Authority, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.

B. Substitutions:

Whenever a product is identified in the Specifications by reference to manufacturer's or vendor's names, catalog numbers, etc., the Contractor/Developer may freely choose from these referenced products which ones he wishes to provide.

Any item or product other than those so designated shall be considered a substitution. The Contractor/Developer shall obtain prior approval for an approved equal from the Authority for all substitutions.

C. Warranty:

Water distribution systems installed by Contractors/Developers which are accepted by the Authority for ownership, operation and maintenance shall be warranted and guaranteed for a period of one year from the date of final acceptance that the completed system is free from all defects due to faulty products or workmanship, and that the Contractor/Developer shall make such corrections as may be necessary by reason of such defects upon notice by the Authority.

D. Easements and Rights of Way:

Water distribution systems installed by a Contractor/Developer which are accepted by the Authority for ownership, operation and maintenance shall be installed in either dedicated streets or easements. Easements shall be properly executed and recorded. The easements shall be cleared of all structures, trees, shrubs, brush, logs, upturned stumps and roots of downed trees and similar items.

No permanent structure shall be built on the easement. Temporary structures such as fence, driveway, etc. can be installed on the permanent easements; but it shall be the responsibility of the owner to remove, if necessary, or repair such structures if they are disturbed when the Authority works on the water and sewer mains within the easement. The Owner shall obtain a written permission of the Authority before the installation of such temporary structures.

The minimum easement width shall be (20) feet for main up to 15 ft deep.

The minimum easement width shall be (30) feet for main up to 20 ft deep.

SECTION 1.03 - CONSTRUCTION DRAWINGS:

The term construction drawings shall mean drawings, prints, descriptive literature, test reports, samples, calculations, schedules, material lists and information and items of similar meaning.

A. Submittals Required:

The Contractor/Developer shall furnish to the Authority for review, in accordance with the procedure outlined below, drawings and descriptive literature for all manufactured or fabricated products. Additional information, such as special drawings, schedules, calculations and curves, shall be provided as specifically requested by the Authority.

B. Contractor/Developer's Review:

The Contractor/Developer shall review and check drawings and submittals. He shall indicate his approval by initials and date. The Contractor/Developer shall furnish the Authority with a minimum of four copies of all submittals. A transmittal form shall accompany each submittal or group of submittals.

C. Authority's Review:

All submittals will be reviewed, stamped, and dated by the Authority before they are returned to the Contractor/Developer.

Acceptable submittals will be approved in writing with two copies returned to the Contractor/Developer and the remaining copies retained by the Authority.

Submittals requiring minor corrections before being acceptable will be so noted. Drawings must be resubmitted for review and approval prior to installation or use.

D. Drawings For Construction:

Drawings or other submittals not bearing the Authority's approval notation shall not be issued to subcontractors or utilized for construction purposes. The Contractor/Developer shall maintain at the job site a complete set of construction drawings bearing the

Authority's approval. The drawings shall be submitted on a 24 inch x 36 inch paper and drawn to a one inch to a (50) ft horizontal and (10) ft vertical scale.

E. “As-Built” Drawings:

The Contractor / Developer shall submit two copies of “as-built” plans and one digital copy in AutoCAD format after the completion of construction but before the project is accepted for operation and maintenance by the Macon Water Authority. The “as-built” plans shall be prepared and stamped by a registered Land Surveyor or Professional Engineer. The plans shall include the following information for the water portion of a project: location of water mains, fire hydrants, valves, bends, width of easements, and any pertinent information.

All water mains (type, size) including gate valves, hydrants, blow offs, water meters, curb stops, shall be located and tied to Georgia State Plane Coordinates.

All other relative information, such as rights-of-way, property corners, stake plans along easements, etc. shall be located and tied to Bibb County State Plane Coordinates.

SECTION 1.04 - MATERIALS:

All materials used which come into contact with drinking water during its distribution shall not adversely affect drinking water quality and public health and must be certified for conformance with American National Standards Institute/National Sanitation Foundation Standard 61 (ANSI/NSF Standard 61). Any pipe, solder, or flux which is used in the installation or repair of the water distribution system shall be lead free with not more than 8.0% lead in pipes and fittings and not more than 0.2% lead in solders and flux.

All materials, unless otherwise specified or approved equal, shall be in accordance with the Buy America requirements of Federal regulations 23 U.S.C. 313 and 23 CFR 635.410. Acceptance will be on the basis of the Authority's inspection and receipt of the manufacturer's written certification that the material was manufactured and tested in accordance with the applicable standards. All pipe, fittings, valves, tapping sleeves, hydrants and all other materials required for completion of the work must comply with the following:

NOTE: Water mains less than 4 inches in diameter will not be allowed within the Macon Water Authority's Water Distribution System.

A. Ductile Iron Pipe (DIP):

Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51 and shall be a minimum of Pressure Class 350 up to a diameter of 12 inches and Pressure Class 350 above 12" diameter. Sizes will be as shown on the Drawings. Pipe and fittings shall be cement lined in accordance with ANSI/AWWA - C104/A21.4. Fittings shall conform to ANSI/AWWA C110/A21.0 or ANSI/AWWA C153/A21.53 with rated working pressure of 350 psi. Pipe and fittings shall be furnished with a bituminous outside coating.

Joints shall be push-on type for pipe and standard mechanical or flanged joints for fittings. Push-on and mechanical joints shall conform to ANSI/AWWA C111/A21.11. Restrained joint pipe (RJP) shall be either the bolted joint type, or modified push-on type with joint restrained using ductile iron components. Restrained joint pipe on piers shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet. Restrained joint pipe where required shall be American, U.S. Pipe, Clow, or approved equal.

Gaskets for mechanical or flange joints shall be made of 1/8- inch thick cloth reinforced rubber; gaskets may be ring type or full face type.

Bolts for flange connections shall be steel with American Regular unfinished square or hexagon heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B 17.2. All bolts and all nuts shall be threaded in accordance with ANSI B 1.1, Coarse Thread Series, Class 2A and 2B fit.

All pipe shall be furnished in lengths of 18 or 20 feet.

Acceptance will be on the basis of the Authority's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

Ductile iron pipe shall be used on all water systems, including systems behind master meters. The systems behind master meters shall be pressure tested, disinfected and the results shall be available for Macon Water Authority's review.

B. Gate Valves (GV):

- (1) Valves (4" through 12") shall be mechanical joint end (Flange x mechanical joint), resilient seated, iron body gate valves with non-rising stem flanged mechanical joint o-ring stem seals and open left. The valve shall be designed for a water working pressure of 250 psi and a test pressure of 500 psi, and shall be designed for installing in a vertical position. This valve shall conform to the lateral Revision of AWWA C-509, for "Ordinary Water Works Service", and shall be Mueller A-2370-20 or an approved equal.
- (2) Valves (14" and larger) shall be mechanical joint, resilient seated, D.I. body, bronze mounted, non-rising stem with O-ring stem seals and open left. The valve shall be designed for water working pressure of 250 psi and a test pressure of 500 psi. The valve shall be designed for horizontal installation and equipped with bevel gearing, gear case, tracks, rollers, scrapers and by-pass valves. The valve shall conform to AWWA standard specification C-500, latest revision for "Ordinary Water Works Service" and shall be Mueller No. A-2380-20 or an approved equal. American Flow Control resilient wedge gate valve series 2500 rated for 250 PSI working pressure can be used in lieu of double disc, iron body gate valve.

(3) Valve Boxes (VB):

All valves shall be equipped with valve boxes. Valve boxes shall be heavy roadway type. The valve boxes shall be heavy roadway type. The valve boxes shall be adjustable to 6" up or down from the nominal required cover over the pipe. Provide a 4 inch thick, 18 inch square or round concrete pad around the valve box. This must be placed at grade. Note: Gate valves Larger than 16" shall be placed in a MH and stack out to grade – See Manholes specs in wastewater section.

(4) Tapping Sleeves and Valves (TS &V)

(a) Tapping sleeves shall be the split sleeve, mechanical joint type. Valves shall be gate valves furnished in accordance with the above specifications. The valves shall have flange x mechanical joint ends. Tapping sleeves shall be Mueller No. 615 or approved equal. Tapping crosses shall be Mueller No. 716 or approved equal. Tapping valves shall be Mueller No. 687 or approved equal. (Mechanical Sleeve required for mains above 16")

(b) As an alternative to the conventional tapping sleeve and valve, a stainless steel tapping sleeve with mechanical joint outlet and a standard MJ gate valve could be installed. The MJ tapping sleeve shall meet or exceed the following material specifications for use with a standard mechanical Joint x mechanical joint, resilient wedge gate valves per ANSI (AWWA C509-94). The mechanical joint outlet shall be a one piece casting with a plain end and MJ gland. The tapping sleeve shall have a MJ outlet gasket. The armor plate, lugs, nuts, bolts shall be 203 (18-8) stainless steel, and gaskets shall be virgin nitrile, Buna-N or equal.

(5) "All stainless tapping sleeves" may be used in lieu of the above and shall conform to the following specifications: Body: 18-8 type 304 s.s. flange CF 8 cast stainless steel equivalent to 18-8 type 304 s.s. with ANSI 150 lb drilling; recessed for tapping valve per MSS-SP-60. Bolts: Type 304 s.s. Branch outlet: Heavy s.s. pipe. Gasket: Full circumferential gasket compounded for use with water, salt solutions, mild acids, bases and sewage.

(6) Tapping Saddles:

For 1-inch and below:

Use service clamps double strapped cc thread or direct tap.

For 1 1/2-inch to 2-inch:

Use service clamps double strapped cc thread.

Above 2-inch:

Tapping saddles shall be ductile iron body type with O-ring gasket and stainless steel straps. Connection shall be flanged or mechanical joint as required.

C. Backflow Preventers:

(1) General:

Backflow preventers shall be selected on the basis of impurities involved and the type of cross connection and shall be approved by the Macon Water Authority.

(2) Approval of Devices:

The backflow preventers shall be certified by the American Society of Sanitary Engineers, as having been tested by a nationally recognized laboratory in accordance with applicable ASSE Standards. Each device shall bear the ASSE seal of approval and shall be individually factory tested.

(3) Specifications and Installation of Devices:

(a) Dual check backflow preventer (3/4 inch and 1 inch) shall have bronze body with two compact checks, a union, and "o" ring seals shall be installed at the downstream side of residential water meters to prevent backflow of polluted water into potable water supply. The device shall not be buried but may be installed in a pit below grade. A positive shut-off valve and a union shall be installed on the inlet side of the device.

The device shall meet or exceed the requirements of ANSI/ASSE.

(b) Double check valve assembly backflow preventer (1 inch, 1 ½ inch and 2 inch) shall have brass body with replaceable seats, ball valve test cocks, and bronze strainers. The device shall be installed on the downstream side of all residential water meters to prevent backflow of polluted water into potable water supply. This device shall not be buried, but may be installed in a pit below grade, provided ball valve test cocks fitted with brass plugs are used, it should also include a positive shutoff valve and shall be equipped with three (3) leak proof test cocks. A fourth cock shall be provided on the upstream side of the inlet shutoff valve. A strainer with (20) mesh stainless steel screen shall be installed.

The device shall meet or exceed the requirements of ASSE, AWWA or USCFCC Manual for Cross Connection Control.

(c) Double check valve backflow preventer assembly (2 ½ inches, 3 inches, 4 inches, 6 inches, 8 inches and 10 inches)

Shall have bronze body (2 ½" and 3 inches) epoxy coated. Cast iron or ductile iron (4 to 10 inches) body bronze seats, and stainless steel internal parts. The device shall be installed on the downstream side of all residential water meters to prevent backflow or polluted water to potable water supply.

This device shall not be buried, but may be installed in a pit below grade provided ball valve test cocks fitted with brass plugs are used. The assembly shall be equipped with three (3) leak proof test cocks, a fourth test shall be provided on the upstream side of the inlet shut-off valve. Also a 20 mesh stainless steel screen shall be installed. The device shall meet or exceed the requirements of ASSE, AWWA or USCFCC Manual of cross connection control.

(d) Double Detector Check Valve Backflow Preventer Assembly (DDC):

A double detector check valve assembly shall be installed at the property line for a building sprinkler system or private fire hydrant system installed for fire protection only. The DDC prevents reverse flow of fire protection system substances (stagnant water) from being pumped or siphoned into the potable water line, also provides a detection point for unauthorized water use.

Shall have bronze body (3 inches) or epoxy coated cast iron body (4 to 10 inches) bronze seats, and stainless steel internal parts. This device shall not be buried, but may be installed in a pit below grade provided ball valve test cocks fitted with brass plugs are used. The unit shall be a complete assembly including US listed OS & Y shut off valves (resilient seated) and test cocks, an auxiliary line consisting of an approved water meter and a backflow preventer. The device shall meet the requirements of AWWA or USCFCC Manual for cross connection control.

(e) Reduced Pressure Zone Backflow Preventer (RPZ):

The RPZ backflow preventer shall be installed at the property line for a service which is considered as "hazardous" to prevent the backsiphonage and back pressure backflow of contaminated water into the potable water supply.

Shall have bronze body (3/4 inch through 2 inches) of epoxy coated cast iron body (2 inches and above), stainless steel springs. This device shall be installed in a vault, above ground with positive drainage. The device shall consist of a pressure differential valve located in a zone between two tightly closing shut off valve (resilient seated) before and after the device, test cocks, protective strainer upstream of No. 1 Gate Valve. The device shall meet or exceed the requirements of AWWA or ASSE.

(f) Reduced Pressure Zone Detector Double Check Valve Assembly:

A reduced pressure principle detector double check valve assembly shall be used to prevent the reverse flow of fire protection system substances (glycerin, wetting agents, water of non-potable quality) from being pumped or siphoned into the potable water line.

This device can detect leaks, and provides a detection point for unauthorized use.

The unit shall have fused epoxy coated cast iron body, removable bronze sheets, stainless steel internal parts, maximum flow at low pressure drop with a 5/8" x 3/4" record all by-pass meter.

The unit shall be a complete assembly, including UL listed OS & Y shut-off valves with FM approval, including an auxiliary line consisting of an approved backflow preventer and a water meter. The device shall meet the basic requirements of AWWA or USCFCC Manual for cross connection control.

D. Corporation Stops:

Corporation stops shall be ball type made of bronze conforming to ASTM B61 or B62; and shall be rated at 150 psi. Ends shall be suitable for solder-joint. Threaded ends for inlet and outlet of corporation stops shall conform to AWWA C800; coupling shall conform to ANSI B16.26.

E. Valve Boxes:

Valve boxes shall be cast iron and shall be adjustable to 6 inches up and down from the nominal required cover over the pipe. Valve stem extension is required for all valves that are over 3 feet in depth.

F. Fire Hydrants (FH):

All fire hydrants shall conform to the requirements of AWWA C502 for 250 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall not be less than 5 1/4 inches. All valves shall open left.

In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.

The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.

Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.

In general, fire hydrants are located at street intersections, but no more than 500 feet apart in single-family residential areas nor more than 300 feet (or as specified on plans) apart in multi-family residential, commercial, and industrial areas.

All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant. The operating nut shall match those on the existing hydrants. The operating threads shall be totally enclosed in an operating chamber separated from the hydrant barrel by a rubber o-ring stem seal and lubricated by a grease or oil reservoir. A stop nut shall be positioned in the top operating mechanism so that the valve cannot contact the bottom of the shoe when fully open.

Hydrant shall be a non-freezing design and provided with a simple, positive and automatic drain which shall be fully closed whenever the main valve is opened.

Hose and pump connections shall be breech-locked, pinned, or threaded and pinned, to seal them permanently into the hydrant barrel. Each hydrant shall have two 2 ½ inch hose connections using Macon Standard Threads conforming to:

Coupling on 2 ½" hose	Macon Standard Threads
Outside diameter of male end	Three inches
Threaded per inch	Eight
Angle or Pitch	60 degrees

and one 4 inch pumper connection with National Standard threads. Equip each connection with cap and chain.

Hydrants shall be furnished with a mechanical joint shoe connection to the spigot of the 6-inch hydrant lead. A fire hydrant tee shall be installed on the main. The fire hydrant valve shall be directly connected to the tee and to the hydrant lead. All joints shall be fastened with retainer glands and rod all fittings to fire hydrant using threaded rods. A minimum pipe size of 6" is required for the installation of all fire hydrants.

Minimum depth of bury shall be 4.0 feet. Provide extension section where necessary for vertical installation and in accordance with manufacturer's recommendations.

All outside surfaces of the barrel above grade shall be painted with Koppers Glamortex 501 enamel or approved equal, in Safety Yellow ASE #1663 or color as selected by the Owner.

Hydrants shall be Mueller Centurion, Model A-423 (5 1/4") Traffic Model, Dresser M & H 129-01 (5 1/4") Traffic Model, American Flow Control (5 1/4") B-84-B, Metropolitan #250, M-94.

G. Fire Hydrants Location:

All fire hydrants shall be located on the backside of the ditch area one foot within the Right-of-way. Fire hydrants are also required at the end of all water mains.

H. Valves at the end of the Main:

Where future water main extensions are anticipated, or are deemed possible, valves are placed so that no customers are out of service for the connection work. In all cases, this calls for a mechanical joint resilient gate valve with a plug valve at the end of the main.

I. Valves Placement:

Valves are to be placed at street intersections and on each smaller main as it leaves other larger mains. In commercial, residential and industrial locations, all tees and crosses are all valved on all sides.

Valves shall be placed at both ends of the crossing:

1. Under a road, creek and railroad tracks.
2. When crossing a bridge.

Maximum spacing of valves along a water main shall be no more than 1600 feet.

When a fire hydrant is relocated, the old valve shall be kept in service, and a new valve shall be placed within two to three feet of the new fire hydrant.

SECTION 1.05 - HANDLING MATERIALS:

A. Unloading:

Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification.

B. Handling:

Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front loader. Do not use material damaged in handling. Damaged material will not be accepted for installation, and shall be removed and replaced with acceptable materials at the contractors' expense.

C. Distribution:

Distribute and place pipe and materials without interference to traffic. Do not string pipe more than 1,000 feet beyond the area where pipe is being laid. Do not obstruct drainage ditches.

D. Storage:

Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

SECTION 1.06 - CONSTRUCTION ALONG HIGHWAY, STREETS AND ROADWAY:

Install pipe lines and accessories along highways, streets, roadways in accordance with the applicable regulations of the city of Macon, Bibb County and/or the Department of Transportation with reference to construction operations, safety, traffic control, road maintenance and repair.

A. Protection of Traffic:

Provide and maintain suitable signs, barricades and lights for protection of traffic. Replace all highway signs removed for construction as soon as possible. Do not close or block any highway, street, or roadway without first obtaining permission from the proper authorities.

B. Construction Operations:

Perform all work along highways, streets and roadways to least interfere with traffic.

(1) Stripping:

Where the pipe line is laid along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.

(2) Trenching, Laying and Backfilling:

Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

(3) Shaping:

Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

(4) Saw cut all driveway, paved parking areas, paved roadways and paved sidewalks.

C. Excavated Materials:

Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement.

D. Drainage Structures:

Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.

E. Maintaining Highways, Streets, Roadways and Driveways:

Maintain streets, highways and roadways in suitable condition for movement of traffic until completion and final acceptance of the work. Use steel running plate to maintain traffic until pavement replacement is completed.

Repair all driveways that are cut or damaged immediately. Maintain them in a suitable condition for use until completion and final acceptance of the work.

SECTION 1.07 - CLEARING:

Clearing of the construction easement is permitted with special care taken to adhere to the requirements of Section 1.19.

SECTION 1.08 - EXCAVATION:

Excavate all materials encountered, including rock, and dispose of excess excavated material not required for backfilling. Perform all excavation in accordance with applicable local, state, and federal regulations, including Occupational Safety and Health Act of 1970 (PL 91-596), as amended.

A. Depth of Trenches:

Excavate trenches to provide a minimum cover of four feet. Within the right-of-way of highways, streets, or roadways, excavate to place the top of the pipe a minimum of four feet below the nearest pavement edge.

B. Width of Trenches:

Excavate trenches wide enough to allow proper installation of pipe, fittings, and other materials, and not less than 6 inches or more than one foot from outside barrel of the pipe on any side at any point.

C. Bell holes:

At each joint, excavate bell holes of ample depth and width to permit the joint to be made properly and to relieve pipe bell of any load.

D. Earth Excavation:

Excavate and prepare the trench bottom to support the pipe uniformly throughout its length.

For ductile iron pipe, the trench shall meet all requirements of Standard Laying Condition Type 2 in accordance with AWWA C 151.

If the trench is excavated to excessive width or depth, provide crushed stone meeting the requirements of Georgia DOT Specification 800.01 for No. 57 stone to achieve Standard Laying Condition Type 4 in accordance with AWWA C151.

E. Rock Excavation:

(1) Definition of Rock:

Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 18,300 pounds (caterpillar Model 215 or equal), and occupying an original volume of at least one-half cubic yard.

(2) Excavation:

Where rock is encountered, excavate to the minimum depth and width which will provide 6 inches clearance beyond the outside diameter of the pipe bell.

(3) Blasting:

Blasting must be performed by a certified and bonded contractor. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all structures from the effects of the blast. Repair any resulting damage.

(4) Removal of Rock:

Do not use excavated rock as backfill material. Dispose of rock which is surplus or not suitable for use as rip rap.

SECTION 1.09 - EXISTING UNDERGROUND UTILITIES AND OBSTRUCTION:

It is the responsibility of the Contractor/Developer to locate all existing utilities along the path of his construction. His drawings shall indicate underground utilities or obstructions that are known to exist. Where these or unforeseen underground utilities are encountered, the location and alignment of the water main may be changed, upon written approval of the Authority, to avoid interference. It is the responsibility of the Contractor to contact the Utilities Protection Centers, Inc. ("Call Before You Dig" - 1-800-282-7411 or 811) prior to the start of any excavation or construction.

A horizontal separation of 10 feet shall be maintained between water mains and sanitary sewers. The distance shall be measured edge to edge. When a water main must cross a sewer, the water main and/or sewer shall be laid such that the top of the sewer is at least 18" below the bottom of the water main. When this requirement cannot be met both the water main and the sewer shall be constructed of ductile iron pipe with ductile iron pipe for a distance of 10 feet on each side of the point of crossing on both the water main and sewer.

SECTION 1.10 - LAYING AND JOINTING PIPE AND FITTINGS:

Lay all pipe fittings to accurately conform to the lines and grades approved by the Authority as follows:

A. Handling:

Use suitable tools and equipment to handle and lay pipe, preventing damage to the pipe and the cement lining. Examine all pipes carefully for cracks and other defects as it is laid. Do not lay pipe or other materials which are known to be defective. Lower pipe, fittings, valves and accessories into the trench by suitable means. Do not drop or dump pipe or accessories into the trench.

Clean pipe and fittings thoroughly before laying. Keep the pipe line clean until final acceptance.

If any pipe or other material is discovered to be defective or damaged after being laid, remove and replace it.

B. Alignment and Gradient:

Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than $\frac{2}{3}$ the maximum deflection recommended by the manufacturer.

Maintain a transit and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.

The minimum cover for water distribution mains shall be Forty- eight (48) inches.

C. Expediting of Work:

Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe, close the end with a mechanical joint plug.

D. Laying Pipe in Trenches:

Lay the pipe with solid bearing throughout its length.

(1) Earth Trenches:

Grade the bottom of the trench to a true line. Lay the pipe in clean bedding

material, free of rock, organics and other unsuitable materials.

(2) Rock Trenches:

Bed the pipe in at least six inches of granular bedding material. Backfill with the same material to at least six inches above the pipe.

(3) Wet Trenches:

Do not lay pipe in water. Provide dewatering equipment to maintain a ground water level below the bottom of the pipe while pipe is being laid.

(4) Pipe Joints:

Joints shall be made in accordance with the manufacturer's recommendations.

(5) Cutting:

Cut ductile iron pipe using an abrasive wheel saw. Remove all burrs and smooth the end before jointing.

SECTION 1.11 - CONNECTIONS TO EXISTING PIPE LINES:

Before laying pipe, the Contractor/Developer shall locate the points of connection to existing pipe lines and uncover as necessary for the Authority or an approved contractor to confirm the nature of the connection to be made. The Authority or Contractor shall furnish materials and make the connection to all existing pipe lines. The Contractor/Developer will be charged with a connection fee to cover the expenses of the Authority, only if Authority makes tap.

SECTION 1.12 - THRUST RESTRAINT:

Provide restraint at all points where hydraulic thrust may develop.

A. Retainer Glands:

Install retainer glands on fire hydrants and all associated fittings, valves and related piping. Retainer glands shall be ACIPCO A 90857 or an approved equal.

B. Zinc plated 3/4 inch all threaded rods with USS course thread shall be used where it is required to restrain joints.

C. Concrete Blocking:

Provide concrete blocking for all other bends, tees, valves, and other points where thrust may develop, or as directed by the Engineer. Retainer glands, including mega-lug

retainers, may be used in lieu of concrete blocking, only as approved by the Engineer.

D. Restrained Joints:

Restrained joints type pipe such as American Lock Ring, or Lok-Fast, or an approval equal may be used in accordance with manufacturer's recommendation.

Concrete for blocking shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. For job mixed concrete, submit the concrete mix design for approval by the Authority. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C94. Reinforcing steel shall conform to the requirements of ASTM A 615, grade 40.

Form and pour concrete blocking at fittings as shown on the Typical Blocking Detail in Appendix A and as directed by the Authority. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.

SECTION 1.13 - BACKFILLING:

Backfill and compact to prevent settlement and displacement of the pipe.

A. Material:

Backfill trenches with earth only. Do not use rock excavated from trenches in the backfill. If necessary, furnish suitable earth material to backfill the trench.

B. Backfill:

Place backfill material in the bottom of the trench and up to two feet above the pipe in 6-inch layers. Compact with two hand operated air hammers with tamping feet, one on each side of the pipe, operated simultaneously.

Backfill above, shall be compacted as follows:

- (1) In 6-inch layers, if using light power tamping equipment, such as a "jumping jack".
- (2) In two foot layers, if using heavy tamping equipment, such as hammer with tamping feet.

C. Backfill Under Roads:

Backfill under roads shall be compacted to 95% up to top 2' below grade and 98% for top of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D698).

D. Settlement:

If trenches settle, refill and grade the surface to conform to the adjacent surface.

E. Compaction:

The backfill in all the trenches shall be compacted as stated herein: shall be 100 percent of the maximum dry-density as determined by Standard Proctor Compaction Test (ASTM D698) for the base material under the pavement. The top (24) inches of backfill shall be compacted to a minimum of (98) percent of the maximum dry density. It shall be 95% outside the pavement but within the road right-of-way and 85% outside road right-of-way. The testing agency shall run as a minimum (1) Proctor for each type of soil encountered or could use "Family of Curves Method - GHD - 67" as approved and utilized by the Georgia Department of Transportation and the U. S. Army Corps of Engineers.

During the backfilling, loose lifts shall not exceed (8) inches in thickness. Field density determination (compaction tests) should be made a minimum of one (1) test per 200 linear feet per two (2) compacted vertical feet. This is a minimum requirement for all the areas. Additional tests may be required for special conditions such as in streets and other critical areas as desired by the Engineer. The range of moisture contents should be maintained within plus or minus three (3) percent of the optimum moisture content as determined in accordance with GHD - 67.

SECTION 1.14 - REMOVING AND REPLACING PAVEMENT:

A. Removing Pavement: Remove existing pavement as necessary for installing the pipeline and appurtenances.

(1) Marking:

Before removing any pavement, mark the pavement neatly paralleling pipe lines and exiting street lines. Space the marks the width of the trench.

(2) Breaking:

Break asphalt pavement along the marks using jack hammers or other suitable tools. Break concrete pavement along the marks by use of jack hammers or by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.

(3) Machine Pulling:

Do not pull pavement with machines until completely broken and separated from pavement to remain.

(4) Damage to Adjacent Pavement:

Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

(5) Sidewalk:

Remove and replace sidewalks for their full width.

(6) Curbs:

Remove and replace or tunnel under any curb encountered.

B. Replacing Pavement:

Upon completion of backfilling and consolidation of the backfill, arrange to have the compaction tested by an independent testing laboratory approved by the Authority. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks and curbs removed.

(1) Materials:

Place material for pavement replacement to dimensions shown on the Drawings. Typical replacement details are included in Appendix A.

(a) Graded Aggregate Sub-Base:

Furnish graded aggregate sub-base in two sizes of such gradation that when combined in approximately equal quantities, the resulting mixture is well graded from coarse to fine, meeting the gradation requirements of Section 816 of the State Highway Department of Georgia Standard Specifications.

(b) Black Base:

The base for all paved roadways shall conform to the requirements of the Georgia State Highway Department Specifications for the Black Base (Hot Mix). Use a Pug Mill Rotary Drum type mixer with minimum capacity of not less than 50 tons per hour for asphalt production. Apply and compact the base in two courses by asphalt spreader equipment of design and operation approved by the Authority. After compaction, the

black base shall be smooth and true to established profiles and Sections.

(c) Surface Course:

The surface course for all pavement, including Paint or tack coat when required by the Authority, shall conform to the requirements of the Georgia State Highway Department Specifications for Asphaltic Concrete, Section 400, Type "E" (Modified Top). Produce surface course in an asphalt plant of the same type as noted above for Black Base. Apply and compact the surface course in a manner approved by the Authority. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

(d) Concrete:

Provide concrete and reinforcing for concrete pavement in accordance with the requirements of Georgia State Highway Department Specifications for Portland Concrete Pavement, Section 430.

(2) Supervision and Approval:

Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final inspection. Obtain the Authority's approval for restoration of pavement such as private roads and drives.

Complete pavement restoration as soon as possible after backfilling.

(3) Replacement:

Prior to replacing pavement, make a final cut in concrete pavement nine inches back from the edge of damaged pavement. Make the cut using a rotary saw. Remove asphalt pavement nine inches back from the edge of damaged pavement using jack hammers or other suitable tools.

Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks, and curbs with the same material and to the same dimensions as existing.

(4) Failure of Pavement:

Should any pavement restoration or repairs fail or settle during the life of the contract, including the bonded and warranty period, promptly restore or repair defects.

SECTION 1.15 - BORING:

Furnish and install pipe casing and install the pipe line therein in accordance with the drawings and the following specifications:

A. General:

Where groundwater is encountered, operate well points or drainage systems in the vicinity of the casing to prevent the accumulation of ground water in the casing.

B. Pipe Casing:

Furnish all material and equipment and perform all labor required to install steel pipe casing at locations indicated on the Drawings and as specified.

(1) Boring:

The steel casing pipe shall be Schedule 30 steel pipe manufactured from steel plate having minimum yield strength of 35,000 PSI. The steel plate shall also meet the chemical requirements of ASTM A36. Size and thickness shall be as follows:

UNDER RAILROADS

Pipe Dia. In.	Casing Dia In.	Wall Thickness In.
6	14	0.250
8	18	0.250
10	20	0.281
12	22	0.312
14	24	0.344
16	30	0.406
18	30	0.406
20	32	0.469
24	36	0.469
30	42	0.500

UNDER HIGHWAYS

Pipe Dia In.	Casing Dia In.	Wall Thickness In.
6	12	0.250
8	16	0.250
10	16	0.250
12	18	0.250
14	22	0.250
16	24	0.250
18	30	0.312
20	30	0.312
24	36	0.375
30	42	0.375

C. Installation of Pipe:

(1) In Casing:

After installation of the casing is complete, install the pipe line by a method which has received prior approval of the Authority. The carrier pipe shall be supported at each joint or as recommended by the manufacturer. All stainless steel casing spacers as manufactured by Cascade or approved equivalent shall be used.

Close the ends of the casing with 4 inch brick walls, plastered with Portland Cement mortar and waterproofed with asphaltic roofing cement.

Leave a 4 inch x 8 inch opening at the bottom of the lowest closure for drainage.

SECTION 1.16 - STREAM AND DITCH CROSSING:

At all points where banks of streams or drainage ditches are disturbed by excavation or where natural vegetation is removed, carefully compact backfill and place rip rap or an approved erosion control fabric where applicable to prevent subsequent settlement and erosion.

This requirement applies equally to construction alongside a stream or drainage ditch as well as crossing stream or drainage ditch. Place rip rap a distance of not less than 10 feet upstream and 10 feet downstream from any disturbed area. Extend rip rap from 1 foot below streambed to top of bank. Place to conform with the natural slope of the stream bank. Use only one method, either (a) or (b), throughout the job.

A. Stone Rip Rap:

Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or higher.

Maximum weight of individual stones shall be 50 pounds. The maximum allowable dimension for an individual stone is 24 inches. The minimum allowable dimension for an individual stone is 6 inches. At least 50% of the stones shall have a minimum dimension of 12 inches. A geotextile fabric shall be placed over the entire ditch and extend outward on either side a minimum of 10 feet.

Rip rap shall be placed on a (6) inch layer of soil, crushed stone, or sand overlaying the fabric. Rip rap shall be placed with its top elevation conforming with the finished grade or the natural existing slope of the stream bank and stream bottom. The stone shall be dropped no more than three feet during construction.

Embed stone rip rap by hand so as to form a compact layer at least 12 inches thick. Place rip rap in such a way that the smaller stones are not segregated but evenly distributed. Place chinking stones in the crevices between the larger stones so that a dense, well graded mass is produced.

B. Sand-Cement Bag Rip Rap:

Use cement sacks or burlap bags having a capacity of from 1 to 2 cubic feet. Do not use bags previously used for sugar or chemicals. Fill bags with a mixture of one part Portland Cement to five parts sand.

Embed bags by hand to form a compact layer at least 12 inches thick. Place with overlapping joints. The finished surface shall not deviate from that specified by more than 3 inches at any point.

- C.** When the depth of cover on the pipe at the bottom of the creek is less than 24 inches, encase the pipe with concrete. The width and depth shall be a minimum of pipe OD+16" or as directed by the Engineer.

SECTION 1.17 - TESTING:

When a length of pipe approved by the Authority is ready for testing, fill the line with water, bleed out all air and make a leakage test.

A. Preparation:

Provide a test pump, an accurate water meter, and all other accessories required to make

the test. Provide a corporation stop at each high point on the pipe to bleed off air. Provide and remove all temporary bulkheads, plugs, and flanges required to perform the pressure test.

B. Test Pressure and Leakage: (According to AWWA C600)

Or test the pipeline at 150 psi measured at the highest point or 1.25 times the normal static pressure whichever is greater. The pressure can't drop more than 5 psi or leakage shall not exceed 0.12 gallons per hour per inch diameter per thousand feet. Test for a minimum of two hours.

The gate valve when tested at the rated working pressure or at a minimum of 250 psi shall show no leakage through the metal or at flange joints.

If leaks are detected, locate, repair and retest. If results are not totally satisfactory, the Authority may require additional testing.

C. Existing Valves:

Do not operate valves in the existing system without the specific authorization and direct supervision of the Authority.

D. Tapping Sleeve and Tapping Valve: All tapping sleeves and tapping valves shall be air or water tested to a pressure of 200 psi prior to making the tap into an existing main. Any leaks shall be detected by applying a soap solution to all sealing surfaces. The seal and the valve shall be adjusted and retested as necessary until no leaks are observed. After the sleeve and valve have been tested satisfactorily, the existing main can be tapped. All testing and tapping shall be done in the presence and at the discretion of a representative of Macon Water Authority.

SECTION 1.18 - DISINFECTION OF WATER MAINS:

- A.** All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspection, repair or other activities that might lead to contamination of water shall be disinfected before they are returned to service.
- B.** Disinfection of the new mains and the disposal of the heavily chlorinated water, following the disinfection, shall be accomplished in accordance with the latest edition of AWWA Standard C651. Field Dechlorination shall be in accordance with AWWA C655-09 or latest edition.

SECTION 1.19 - PROTECTION AND RESTORATION OF WORK AREA:

Protection and Restoration of Work Area shall be in accordance with Section 2.23.

ARTICLE II
STANDARDS FOR DESIGN
AND
CONSTRUCTION SPECIFICATIONS
FOR
WASTEWATER COLLECTION

PREFACE: This Sewer Design Guide is a guide for the Engineer when planning and designing wastewater facilities. This guide summarizes and outlines policy, applicable Codes and Engineering and operational practices and procedures that have been developed to establish a cost effective, reliable, and safe wastewater collection system. Also to be considered and used in conjunction with this design guide are all applicable current standard drawings, specifications, and industry requirements for the planning and design of wastewater infrastructure.

This guide is not a substitute for professional experience, nor is it meant to relieve the engineer from his/her responsibility to use good engineering judgment. The Engineer shall be responsible for providing a design that, within industry standards, can be safely repaired and maintained, will provide good service and life, and will not create a public nuisance or hazard. Under most conditions, this guide serves as a minimum standard.

SECTION 2.01 - PURPOSE:

This section of the Specifications describes products to be incorporated into the sewers and requirements for their installation and use. The Contractor/Developer shall furnish all products and perform all labor necessary to fulfill the requirements of these Specifications. The word "Authority" used herein shall mean the Macon Water Authority.

SECTION 2.02 - GENERAL:

A. Applicable Standards:

Supply all products and perform all work in accordance with applicable American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable. If requested by the Authority, submit evidence that manufacturer has consistently produced products of satisfactory quality and performance over a period of at least two years.

B. Substitutions:

Whenever a product is identified in the Specifications by reference to manufacturer's or vendor's names, trade names, catalog numbers, etc., the Contractor/Developer may freely choose from those referenced products which ones he wishes to provide.

Any item or product other than those so designated shall be considered a substitution. The Contractor/Developer shall obtain prior approval from the Authority for all substitutions.

C. Warranty:

Wastewater collection systems installed by a Contractor/Developer which are accepted by the Authority for ownership, operation and maintenance shall be warranted and guaranteed for a period of one year from the date of final acceptance that the completed system is free from all defects due to faulty products or workmanship and the Contractor/Developer shall make such corrections as may be necessary by reason of such defects upon notice by the Authority.

D. Easements and Rights-of-Way:

Wastewater collection systems installed by a Contractor/Developer which are accepted by the Authority for ownership, operation and maintenance shall be installed in either dedicated streets or easements. Easements shall be properly executed and recorded.

The minimum easement width shall be (20) feet. Additional width may be required depending on depth of the line, soil conditions and accessibility. The easements shall be cleared of all structures, trees, shrubs, brush, logs, upturned stumps and roots of downed trees and similar items.

No permanent structure shall be built on the easement. Temporary structures such as fence, driveway, etc. can be installed on the permanent easements; but it shall be the responsibility of the owner to remove, if necessary, or repair such structures if they are disturbed when the Authority works on the water and sewer mains within the easement. The owner shall obtain written permission of the Authority before the installation of such temporary structures.

SECTION 2.03 - DRAWINGS AND SUBMITTALS:

A. Contractor/Developer's Review:

The Contractor/Developer shall review and check drawings and submittals. He shall indicate his approval by initials and date. The Contractor/Developer shall furnish the Authority with a minimum of four copies of all submittals. A transmittal form shall accompany each submittal or group of submittals.

B. Authority's Review:

All submittals will be reviewed, stamped, and dated by the Authority before they are returned to the Contractor/Developer.

Acceptable submittals will be approved in writing with one copy returned to the Contractor/Developer and the remaining copies retained by the Authority. Submittals requiring minor corrections before being acceptable will be so noted. Drawings must be resubmitted for review and approval prior to installation or use of products.

C. Drawings for Construction:

Drawings or other submittals not bearing the Authority's approval notation shall not be issued to subcontractors or utilized for construction purposes. The Contractor/Developer shall maintain at the job site a complete set of construction drawings bearing the Authority's approval.

D. The Owner/Contractor shall submit two copies of "as-built" plans and one digital copy in AutoCAD format after the completion of construction but before the project is accepted for operation and maintenance by the Macon Water Authority. The "as-built" plans shall be prepared and stamped by a registered Land Surveyor or Professional Engineer. The plans shall include the following information for the sewer portion of a project: Location of sewer mains, manholes, including rim and invert elevations, distance and angles between manholes, distance of each sewer lateral from manholes and their length, width of easements and any pertinent information.

All sewer mains (type, size) and appurtenances such as manholes, laterals, cleanouts, pump stations, etc. shall be located and tied to Bibb County State Plane Coordinates. Also distance between manholes, rim and invert elevations and sewer profiles.

All other relative information, such as rights-of-way, property corners, stake plans along easements, etc. shall also be located and tied to Bibb County State Plane Coordinates.

SECTION 2.04 - PIPE AND ACCESSORIES:

All materials, unless otherwise specified or approved equal, shall be in accordance with the Buy America requirements of Federal regulations 23 U.S.C. 313 and 23 CFR 635.410. Acceptance will be on the basis of the Authority's inspection and receipt of the manufacturer's written certification that the material was manufactured and tested in accordance with the applicable standards. All pipe shall be subject to the inspection of the Authority at the pipe plant, job site, or other point of delivery for the purpose of rejecting pipe not conforming to these Specifications.

A. Ductile Iron Pipe:

Ductile iron pipe shall be utilized in force mains, stream crossings, railroad crossings, all piping inside (carrier pipe) steel casing, and other applications deemed necessary by the Authority. Ductile iron pipe shall be installed at locations where depth of cover is less than 3 feet and more than 20 feet. All pipe shall be furnished in lengths of at least 20 feet. All ductile iron pipe shall be lined with Protecto 401 Epoxy to include fittings for gravity pipe and force mains. **(In any and all applications, ductile iron pipe shall be used only at the direction of the Authority).**

(1) Pipe:

Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51 and shall be a minimum of Pressure Class 350 up to a diameter of (12) inches and Pressure Class 350 above (12)inches diameter. Pipe shall be furnished with a bituminous outside coating and lined with Protecto 401 Ceramic Epoxy coating on the inside.

(2) Joints:

Joints shall be push-on type for pipe and standard mechanical joints for fittings. Joints shall conform to ANSI/AWWA C111/A21.11. Retrained joint pipe (RJP) shall be either the bolted joint type, or modified push-on type with joint restraint using ductile iron components. Retrained joint pipe on piers shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet. Retrained joint pipe where required shall be American, U.S. Pipe, Clow, or equal.

When installed in a casing the pipe shall be supported at every joint, as recommended by the manufacturer. Casing spacers shall be stainless steel as manufactured by Cascade, or approved equal.

(3) Acceptance:

Acceptance will be on the basis of the Authority's inspection and receipt of the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. Polyvinyl Chloride Gravity Sewer Pipe:

PVC gravity sewer pipe shall be supplied in lengths not longer than 13 feet. The PVC pipe can be installed between a minimum depth of 3 feet to a maximum depth of 20 feet. Ductile iron pipe shall be installed in depths up to 3 ft and depths beyond 20 feet (**only at the direction of the Authority**).

(1) Pipe:

PVC gravity sewer pipe shall be manufactured with ASTM D3034, SDR 26 pipe.

Nominal Size	Outside Diameter Average Tolerance	Minimum Wall Thickness
8"	8.400 +/- 0.018	0.323
10"	10.500 +/- 0.020	0.404
12"	12.500 +/- 0.024	0.481

Minimum "pipe stiffness" (F/Y) at 5% deflection shall be 46 for all sizes when tested in accordance with ASTM Designation D-2412. External loading properties of plastic pipe shall be determined by Parallel Plate Loading Test.

Installation of PVC sewer pipe shall be in accordance with the provisions of ASTM-2321, "Underground Installation of Flexible Thermoplastic Sewer Pipe" with additional bedding as required in these specifications.

(2) Joints:

Joints for pipe and fittings shall be of the bell and spigot type with a confined elastomeric gasket having the capability of absorbing expansion and contraction without leakage. The joint system shall be subject to the approval of the Authority and shall be identical for pipe and fittings.

Fittings for pipe eight inches and less in diameter shall be of the bell and spigot type with a confined elastomeric gasket having the capability of absorbing expansion and contraction without leakage. The joint system shall be subject to the approval of the Authority and shall be identical for pipe and fittings.

Fittings for pipe eight inches and less in diameter shall be one piece with no solvent-welded joints. Fittings for pipe ten inches and larger may be fabricated using solvent welding. No field fabrication or fittings will be allowed. All such fabrication shall be performed at the factory and the fittings delivered ready for use.

(3) Detection Tape:

Detectable Mylar encased aluminum foil marking tape will be installed over all sewer pipe and sewer lateral. Tape will be "green" in color, at least 3-inches wide and shall bear the printed identification "Caution: Buried Sewer Line Below" (reverse printed), so as to be readable through the Mylar. Surface printing on the tape shall be equal to Lineguard Type II Detectable. Refer to (S-14).

(4) Acceptance:

Acceptance will be on the basis of the Authority's inspection and receipt of the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

C. Check Valves:

Check valves shall be hinged disc type with cast iron body and bronze or bronze-fitted disc. Valves shall be designed for the operating head indicated and shall not slam shut on pump shutdown. Valves shall be equipped with ½-inch stop cock at the high point of the valve for bleeding air from the line.

Valves of the outside weight and lever cushioned type shall have the cushion chamber attached to the side of the valve body externally and constructed with a piston operating in a chamber that will effectively prevent hammering action at the pump discharge heads specified. The cushioning shall be by air, and the cushion chamber shall be so arranged that the closing speed will be adjustable to meet the service requirements.

Weight and lever cushioned type valves shall be manufactured by G-A Industries, or equal.

Spring and lever type valves shall be manufactured by G-A Industries, Dresser M & H, Mueller.

D. Automatic Air and Vacuum Valves:

Valves shall be automatic air and vacuum valves designed to allow escape of air, close water-tight when liquid enters the valve and allow air to enter in the vent of a vacuum. The valve body shall be cast iron, designed to facilitate disassembly for cleaning and maintenance. The float shall be stainless steel; the valve seat and all working parts shall be of corrosion resistant materials. Valves shall be recommended by the manufacturer for wastewater service. Air and vacuum valves shall be equal to Apco Valve Corporation, or Val-Matic, or approved equal.

E. Adaptor Couplings:

Adaptors shall be elastomeric plastic sleeves designed to connect pipes of dis-similar materials. Adaptors shall provide a positive seal against infiltration and exfiltration, be root-proof and remain leak proof up to 10 psi. The adaptor manufacturer shall provide steel clamps, adaptor donuts and other required accessories.

Couplings for a DIP/PVC transition joint shall be ductile iron as manufactured by Ford Meter Box Co. or JCM Industries, Inc., or approved equal and shall be installed in accordance with the manufacturer's recommendations.

- F.** In lieu of Ford Transition Coupling, a transition coupling, Flex Seal ARC, manufactured by Mission Rubber Company could be used. The coupling shall be stainless steel shielded sewer coupling with a gasket meeting ASTM C-425-91. The stainless steel shear ring shall have a minimum thickness of 0.012 inches. Nuts, bolts, shearing, clamps shall be of 316 grade stainless steel meeting or exceeding all requirements of ASTM A-167.

G. Materials for Manholes:

Provide materials for construction of manholes in accordance with the following: (ASTM A615, ASTM D4101)

(1) Precast Concrete Sections:

Precast concrete sections shall meet the requirements of ASTM C 478. The minimum compressive strength of the concrete in precast sections shall be 4,000 psi. The minimum shell thickness shall be one twelfth of the inside diameter of the riser.

Seal joints between precast sections by means of rubber "o" ring gaskets or flexible butyl rubber sealant. Butyl rubber sealants shall meet the requirements of ASSHTO -198. Sealant shall be pre-formed type with a minimum nominal diameter of 1-inch. Butyl rubber sealant shall be equal to Kent Seal No. 2 or Kor-N-Seal 300.

(2) Brick and Mortar:

Brick shall be whole and hardburned, conforming to ASTM C32 Grade MS. Concrete bricks, when used, shall conform to the specification for concrete building brick ASTM C55, Grade A. Mortar shall be made of one part Portland Cement and two parts clean sharp sand. Cement shall be type 1 and shall conform to ASTM C150. Sand shall meet ASTM C53.

(3) Iron Castings:

Cast iron manhole frames and covers shall be gray iron, conforming to ASTM A 48 for Class 35B gray iron and applicable local standards. All castings shall be tough, close grained, smooth and free from blow holes, blisters, shrinkage, strains, cracks, cold shots and other imperfections. No casting will be accepted which weighs less than 95% of the design weight. Shop drawings must indicate the design weight and provide sufficient dimensions to permit checking.

Manhole frames and covers shall be equal to the following:

<u>Type</u>	<u>Design Weight</u>	<u>Standard</u>	<u>Clear Opening (In.)</u>	<u>Manufacturer's Reference</u>
Non-Traffic	325 lbs.	ASTM 48, Class 35B	22.375	USF 195E
Traffic	425 lbs.	ASTM 48, Class 35B	22	USF 604
Watertight	360 lbs.	ASTM 48, Class 35B	24	USF 576BH
Watertight Traffic	360 lbs.	ASTM 48, Class 35B	24	USF 576BH
Watertight	400 lbs.	ASTM 48, Class 35B	20.625	USF 420C
Watertight Traffic	400 lbs.	ASTM 48, Class 35B	20.625	USF 420C
Watertight Traffic	380 lbs.	ASTM 48, Class 35B	30	USF 692
Non-Traffic	308 lbs.	ASTM 48, Class 35B	20	Neenah R-1700-A
Traffic	309 lbs.	ASTM 48, Class 35B	21	Neenah R-1713
Traffic	335 lbs.	ASTM 48, Class 35B	22.25	Neenah-R-1726-A
Watertight	342 lbs.	ASTM 48, Class 35B	24	Neenah R-1916-F
Watertight Traffic	342 lbs.	ASTM 48, Class 35B	24	Neenah R-1916-F
Traffic	580 lbs.	ASTM 48, Class 35B	30	Neenah R-1916-H
Watertight (Bolted lid)	580 lbs.	ASTM 48, Class 35B	30	Neenah R-1916-H

All frames and covers shall have machined horizontal bearing surfaces.

Bolt-down covers shall be equipped with four ½ inch stainless steel bolts and a 1/8-inch neoprene o-ring gasket. Covers shall be rotatable and interchangeable. Bolt holes shall be bored through so that debris entering the bolt hole will fall into

the manhole.

Provide neoprene boot seal where sewer enters manhole. Openings for pipes entering or leaving the manholes shall be core drilled at the plant or site. All pipes entering and leaving the manhole shall be provided with neoprene boot seal.

(4) Manhole Steps:

The Authority does not allow manhole steps to be used within our sanitary sewer system. The Macon Water Authority policy mandates that all steps be deleted from the manhole before final inspection of the manhole is performed. Holes shall be grouted with hydraulic cement or approved equivalent.

SECTION 2.05 - LOCATION AND GRADE:

A. The Drawings shall show the alignment and grade of the sewer and the position of manholes and other appurtenances. The grade line shown on the profile and/or called for in the plan shall be the grade of the invert of the pipe. The grade shall be sufficient to maintain a minimum gravity flow velocity of two feet per second when the pipe is flowing half-full.

B. Slopes:

All sewers shall be designed and constructed to generate mean velocities when flowing half-full of not less than 2.0 feet per second based on Manning's formula using an "n" value of 0.013. The following are minimum slopes which should be provided, however, slopes greater than these are desirable.

Sewer Size In.	Minimum Slope Ft./100 Ft.
8	0.40
10	0.28
12	0.22
14	0.17
15	0.15
16	0.14
18	0.12
21	0.10
24 and larger	0.08

Slopes less than 0.08 for pipe sizes larger than 24-inches may be approved by the Authority on a case by case basis. Slopes resulting in mean velocities when flowing full of greater than 10 feet per second must be approved by the Authority before construction. Sewers shall be laid with uniform slope between manholes.

Sewers on slopes of 20 percent or greater shall be anchored securely with concrete anchors or equal. Anchor spacing shall be as follows:

Minimum Center to Center Spacing	Slope
36 feet	20% to 35%
24 feet	35% to 50%
16 feet	Greater than 50%

SECTION 2.06 - EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS:

It is the responsibility of the Contractor/Developer to locate all existing utilities along the path of his construction. The drawings of the Contractor/Developer shall indicate underground utilities or obstructions that are known to exist. Where unforeseen underground utilities or obstructions are encountered, the location and alignment of the sewer may be changed, upon written approval of the Authority, to avoid interference. It is the responsibility of the Contractor to contact the Utilities Protection Centers, Inc. ("Call Before You Dig" - 1-800-282-7411 or 811) prior to the start of any excavation or construction.

A horizontal separation of 10 feet shall be maintained between water mains and sanitary sewer. The distance shall be measured edge to edge. When a water main must cross a sewer, the water main and/or sewer shall be laid such that the top of the sewer is at least 18" below the bottom of the water main. When this requirement cannot be met both the water main and the sewer shall be constructed of ductile iron pipe with ductile iron pipe for a distance of 10 feet on each side of the point of the crossing on both the water main and sewer. **(At the discretion of the Authority, the sewer main shall be encased in concrete per MWA standard detail S-11. In any and all applications, ductile iron pipe shall be used only at the direction of the Authority).**

SECTION 2.07 - CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS:

Install pipe lines and accessories along highways, streets and roadways in accordance with the applicable regulations of the City of Macon, Bibb County and/or the Department of Transportation with reference to construction operations, safety, traffic control, road maintenance and repair.

A. Protection of Traffic:

Provide and maintain suitable signs, barricades and lights for protection of traffic. Replace all highway signs removed for construction as soon as possible. Do not close or block any highway, street, or roadway without first obtaining permission from the proper authorities.

Provide qualified/certified flagmen to direct and expedite the flow of traffic.

B. Construction Operations:

Perform all work along highways, streets and roadways to least interfere with traffic.

(1) Stripping:

Where the pipe line is laid along road shoulders, strip and stockpile all sod, topsoil and other material suitable for shoulder restoration.

(2) Trenching, Laying and Backfilling:

Do not open the trench any further ahead of pipelaying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

(3) Shaping:

Reshape damaged slopes, side ditches and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

C. Excavated Materials:

Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off the pavement.

D. Drainage Structures:

Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material and free to drain at all times.

E. Maintaining Highways, Streets, Roadways and Driveways:

Maintain streets, highways, and roadways in suitable condition for movement of the work. Use steel running plate to maintain traffic until pavement replacement is completed.

Repair all driveways that are cut or damaged immediately. Maintain them in a suitable condition for use until completion and final acceptance of the work. Saw cut all driveways, paved parking areas, paved roadways and paved sidewalks.

SECTION 2.08 - CLEARING:

Clear the permanent easement before excavating. Remove all trees, growth, debris, stumps and other objectionable matter. Clear the construction easement only if necessary and take special

care to adhere to the requirements of Paragraph 1.19.

SECTION 2.09 - EXCAVATION:

Excavate trenches by open cut. Perform all excavation in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), and any subsequent amendments to this Act.

A. Dimensions:

Excavate trenches to the depths shown on the drawings for each class of bedding and for manholes and other structures. Excavate the top portion of the trench to any width within the construction easement which will not cause unnecessary damage to adjoining structures, roadways, pavements, utilities, trees, or private property.

Excavate the lower portion of the trench to a width no greater than the outside diameter of the pipe plus 18 inches. Maintain this width up to two feet above the pipe.

If trenches are excavated to excessive dimensions or collapse because of inadequate or improperly placed bracing and sheeting, lay the pipe with the next better class of bedding. If excavation for manholes and other structures is made to excessive depth, backfill with compacted bedding material to the required grade.

B. Bracing and Sheeting:

When required by regulations or to prevent damage to adjoining structures, roadways, pavements, utilities, trees, or private property, which are specifically required to remain, provide bracing and sheeting.

(1) Timber:

Timber for shoring, sheeting or bracing shall be sound and free of large or loose knots and in good condition. Size and spacing shall be in accordance with OSHA regulations.

Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Authority it cannot be safely removed. Cut off sheeting left in place at least two feet below the surface.

(2) Steel Sheet Piling:

Continuous lockjoint steel sheet piling may be substituted for timber sheeting when approved by the Authority. Steel piling may be removed, without cutting, provided the rate of removal is kept in place with the tamping and backfilling operations to assure complete filling of the void created by the withdrawal of the piling. Complete withdrawal of the piling in advance of the tamping and

backfilling will not be permitted. Piling, where ordered to be left in place by the Authority for reasons of safety, will be cut off where directed.

C. Dewatering Trenches:

Dewater excavation continuously to maintain a water level below the bottom of the trench. Dewater running sand by well pointing. Where soil conditions do not permit use of well point, construct french drains of crushed stone or gravel to conduct water to the sumps.

D. Trench Stabilization:

Wherever the material at the bottom of the trench is unsuitable for the proper installation of the pipe, the Authority will direct the removal and replacement of the unsuitable material.

When so directed, undercut the trench and backfill with bedding material. Place and compact this material to bring the trench to the required grade.

E. Rock Excavation:

(1) Definition of Rock:

Any material which cannot be excavated with a backhoe, having a bucket curling force rated at not less than 18,300 pounds (Caterpillar Model 215 or equal), and occupying an original volume of at least one-half cubic yard.

(2) Excavation:

Where rock is encountered in trenches excavate to the minimum depth which will provide clearance below the pipe barrel of 8 inches for pipe 21 inches in diameter and smaller and 12 inches for larger pipe and manholes. Remove boulders and stones to provide a minimum of 6 inches clearance between the rock and any part of the pipe or manhole.

(3) Blasting:

Provide experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all structures from the effects of the blast. Repair any resulting damage.

If the Contractor persistently uses excessive blasting charges or blasts in any unsafe or improper manner, the Authority may direct that Contractor/Developer to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

(4) Removal of Rock:

Do not use excavated rock as backfill material. Dispose of rock which is surplus or not suitable for use as rip rap.

SECTION 2.10 - BEDDING OF SEWER:

Bed pipeline in accordance with the detail drawings included in Appendix A and the following specifications:

A. Bedding Materials:

(1) Ductile Iron Gravity Sewer:

All bedding materials shall be crushed stone unless shown or specified otherwise. Crushed stone bedding material shall meet the requirements of Georgia Department of Transportation Specification 800.01 for No. 57 stone.

(2) PVC:

Bedding materials shall be crushed stone per ASTM D 2774 unless shown or specified otherwise. Crushed stone bedding material shall meet the requirements of Georgia Department of Transportation Specification 800.01 for No. 78 stone.

(3) Manholes:

Bedding material shall be crushed stone unless shown or specified otherwise. Crushed stone bedding material shall meet the requirements of Georgia Department of Transportation Specification 800.01 for No. 57 stone.

(4) Ductile Iron Force Main:

Bedding material shall be coarse sands and gravels with a maximum particle size of 1 ½ inch, including variously graded sands and gravels containing small percentages of fines. These include Unified Soil Classification System (USCS) Soil Types SW, GP, SW, and SP.

B. General:

Compact stone bedding material by tamping or slicing with a flat-blade shovel. Prepare the trench bottom to support the pipe uniformly throughout its length. Provide bell holes to relieve pipe bells of all load. If the trench is excavated to excessive width or depth, provide the next better class of bedding. In rock trenches, bed pipe in at least six inches of suitable earth material.

C. Bedding Classifications:

Bedding shall be prepared in accordance with the following:

(1) Ductile Iron Pipe:

Excavate the trench to a depth of one-fourth the nominal diameter of the pipe or six inches whichever is greater. Place and compact the bedding material to proper grade. Place the pipe over bedding material. Bedding material shall then be placed and hand compacted to provide full support under the pipe and up to one third (1/3) Outside Diameter of the pipe. See detail (OT-2)

(2) PVC Pipe:

Excavate the bottom of the trench flat at a minimum depth shown on the Drawings below the bottom of the pipe barrel. Place and compact bedding material to the proper grade. Bedding shall then be carefully placed by hand and compacted to provide full support under the pipe and to a minimum depth of six inches above the crown of the pipe. See detail (OT-2)

(3) Flexible Pipe:

Embedment materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D2487, Standard Method for Classification of Soils for Engineering Purposes. (See Table 2.10-1 for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application.

- (a) Class I** – Angular, ¼ to 1 ½ inches (6 to 40 mm) graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed shells, and crushed stone.

NOTE – The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of fine grained natural material from the trench walls and bottom of migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than ¼ inch (6 mm) and the gradation properly designed to limit the size of the voids.

- (b) Class II** – coarse sands and gravels with maximum particle size of 1 ½ in (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types SW, GP, SW and SP and included in this class.

NOTE – Sands and gravels which are clean, or borderline between clean and with fines, should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material includes its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment, if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and bottom.

(c) **Class III** – Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM and SC are included in this class.

(d) **Class IV** – Silt, silty clays, and clays, including inorganic clays and silts of low to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class.

NOTE – Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching, and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall, and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CH-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.

(e) **Class V** – This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 1 ½ in. (40 mm) in diameter, and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

Table 2.10-1 Soil Classification

DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS

SOIL CLASS	SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION
CLASS I SOILS *	—	Manufactured angular, granular material, ¼ to 1½ inches (6 to 40 mm) size, including materials having regional significance such as crushed stone or rock, broken coral, crushed slag, cinders, or crushed shells.
CLASS II SOILS**	GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SP	Poorly graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
CLASS III SOILS***	GM	Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	SM	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
	SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
CLASS IV SOILS	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
CLASS V SOILS	OL	Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	OH	Organic clays of medium to high plasticity. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	PT	Peat, muck and other highly organic soils.

* Soils defined as Class I materials are not defined in ASTM D2487.

** In accordance with ASTM D2487, less than 5% pass No. 200 sieve.

*** In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g., GP-GC.

PVC pipe requires No. 78 crushed stone.

DIP pipe requires No. 57 crushed stone.

Rigid Pipe:

Bedding requirements for rigid pipe materials shall be in accordance to ASTM D 2774. The Macon Water Authority permits the usage of Class “CS” bedding for all rigid pipe materials.

Class “CS” Bedding procedures: The pipe shall be bedded in granular material *carefully placed and* compacted on a firm trench bottom with a minimum thickness beneath the pipe of 4 inches sliced into the haunches of the pipe with a shovel or other suitable tool to the two inches above the crown of the pipe.

Class “D” bedding is NOT allowed for any pipe bedding.

(4) Suitable and Unsuitable Soil Materials:

The major properties of a soil proposed for use as a bedding material that are of concern to the design or construction engineer are its strength, permeability, and consolidation and compaction characteristics. Other features may be investigated for a specific problem, but in general, some or all of the properties mentioned are of primary importance. It is common practice to evaluate the properties of the soils in question by means of laboratory or field tests and to use the results of such tests as a basis for design and construction. The factors that influence strength, consolidation, and other characteristics are numerous, and some of them are not completely understood; consequently it is impractical to evaluate these features by means of a general soils classification. However, the soil groups in a given classification do have reasonably similar behavior characteristics. While such information is not sufficient for design purposes, it will give the engineer an indication of the behavior of a soil when used as a component in construction. This is especially true in the preliminary examination for a project when neither time nor money for a detailed soils-testing program is available.

(See Table 2.10-2)

Major Divisions (1)	(2)	Letter (3)	Symbols		Name (5)	Value As Subgrade When not Subject to Frost Action (7)	Value As Subbase When not Subject to Frost Action (8)	Value As Base When not Subject to Frost Action (9)	Potential Frost Action (10)	Compressibility and Expansion (11)	Drainage Characteristics (12)	Compaction Equipment (13)	Dry Unit Weight (pcf) (14)	Typical Design Values		
			Hatching (4)	Color (5)												
Coarse-Grained Soils	Gravel and Gravelly Soils	GW		Red	Well-graded gravels or gravel-sand mixtures, little or no fines	Excellent	Excellent	Good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	125-140	40-80	300-500	
		GP		Red	Poorly graded gravels or gravel-sand mixtures, little or no fines	Good to excellent	Good	Fair to Good	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	110-140	31-61	300-500	
		GM _d		Yellow	Silty gravels, gravel-sand-silt mixtures	Good to excellent	Good	Fair to Good	Slight to medium	Very slight	Fair to poor	Poor to practically impervious	Rubber-tired roller, sheepfoot roller, close control of moisture	125-145	41-61	300-500
		GM _u		Yellow	Clayey gravels, gravel-sand-clay mixtures	Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepfoot roller	115-135	31-61	200-500	
		GC		Yellow	Clayey gravels, gravel-sand-clay mixtures	Good	Fair	Poor to not suitable	Slight to medium	Slight	Poor to practically impervious	Rubber-tired roller, sheepfoot roller	130-145	21-40	200-500	
		SW		Red	Well-graded sands or gravelly sands, little or no fines	Good	Fair to good	Poor	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	110-130	21-40	200-400	
	Sand and Sandy Soils	SP		Red	Poorly graded sands or gravelly sands, little or no fines	Fair to good	Fair	Poor to not suitable	None to very slight	Almost none	Excellent	Crawler-type tractor, rubber-tired roller, steel-wheeled roller	105-135	10-40	150-400	
		SM _d		Yellow	Silty sands, sand-silt mixtures	Fair to good	Fair to good	Poor	Slight to high	Very slight	Fair to poor	Rubber-tired roller, sheepfoot roller, close control of moisture	120-135	15-40	150-400	
		SM _u		Yellow	Silty sands, sand-silt mixtures	Fair	Poor to fair	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepfoot roller	100-130	10-20	100-300	
		SC		Yellow	Clayey sands, sand-silt mixtures	Poor to fair	Poor	Not suitable	Slight to high	Slight to medium	Poor to practically impervious	Rubber-tired roller, sheepfoot roller	100-135	5-20	100-300	
		ML		Green	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Poor to fair	Not suitable	Not suitable	Medium to very high	Slight to medium	Fair to poor	Rubber-tired roller, sheepfoot roller, close control of moisture	90-130	15 or less	100-200	
		CL		Green	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Poor to fair	Not suitable	Not suitable	Medium to high	Medium	Practically impervious	Rubber-tired roller, sheepfoot roller	90-130	15 or less	50-150	
Fine-Grained Soils	OL		Green	Organic silts and organic silt-clays of low plasticity	Poor	Not suitable	Not suitable	Medium to high	Medium to high	Poor	Rubber-tired roller, sheepfoot roller	90-105	5 or less	50-100		
	MH		Blue	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Poor	Not suitable	Not suitable	Medium to very high	High	Fair to poor	Rubber-tired roller, sheepfoot roller	80-105	10 or less	50-100		
	CH		Blue	Inorganic clays of high plasticity, fat clays	Poor to fair	Not suitable	Not suitable	Medium	High	Practically impervious	Rubber-tired roller, sheepfoot roller	90-115	15 or less	50-150		
	OH		Blue	Organic clays of medium to high plasticity, organic silts	Poor to very poor	Not suitable	Not suitable	Medium	High	Practically impervious	Rubber-tired roller, sheepfoot roller	80-110	5 or less	25-100		
	Pt		Orange	Peat and other highly-organic soils	Not suitable	Not suitable	Not suitable	Slight	Very high	Fair to poor	Compaction not practical	-	-	-		
	Highly Organic Soils															

NOTES: 1. Divisions of the GM and SM groups (column 3) into subdivisions of d and u are applicable to roads and airfields only. Subdivision is based on the LL and Pt; suffix d (for example, GMd) will be used when the LL is 25 or less and the Pt is 5 or less; the suffix u will be used otherwise.

D. Manholes:

Excavate to a minimum of 12 inches below the planned elevation of the base of the manhole. Place and compact stone bedding material to the required grade before constructing the manhole.

E. Force Mains:

Force mains shall be bedded in accordance with the detail in Appendix A and the following:

(1) Earth Trenches:

Grade the bottom of the trench to a true line. Lay the pipe in the bedding material.

(2) Rock Trenches:

Bed the pipe in at least six inches of bedding material. Backfill with the same material to at least six inches above the pipe.

(3) Wet Trenches:

Do not lay pipe in water. Provide dewatering equipment to maintain a ground water level below the bottom of the pipe while pipe is being laid.

(4) At end of each workday all open end pipe shall be capped with a plug.

F. Compaction:

Bedding under pipe and manholes shall be compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor Compaction Test, ASTM D698. The Backfill in all trenches shall be compacted in accordance with section 1.13-C.

SECTION 2.11 - BACKFILL MATERIAL

- A.** The requirements of this Article shall apply to all backfill materials unless otherwise specified.
- B.** All material shall be suitable and free from roots, wood, scrap material, and other vegetable matter and refuse.
- C.** Acceptable material shall generally be a natural or artificial mixture of soil types normally found in natural deposits in the project vicinity or material obtained from the Contractor's excavations.

- D. All material shall be sufficiently dry for compaction and shall not contain excessive amounts of soft or highly plastic clays.
- E. Maximum size of stone shall not exceed four (4) inches.

SECTION 2.12 - SEWER ON PILING:

If unusually poor soil conditions are encountered and adequate dewatering fails to establish a soil condition suitable for laying pipe, the Authority may direct the Contractor/Developer to provide piling supports for pipe and manholes. Dewatering will not be considered adequate unless the water table is lowered to an elevation at least two feet below the trench bottom.

A. Drawings:

Submit to the Authority for review and approval construction drawings for the layout of piling, details of support slabs, saddles and beams, reinforcing and tie straps when required.

B. Piling:

Piles shall meet the requirements of ASTM D25 friction type. Piles shall be pressure tested with creosote to retain 12 pounds of oil per cubic foot. Pressure treatment shall meet the requirements of the American Wood Preserver's Association Standard C 3. Piles shall be 30 feet in length and shall have a minimum tip diameter of 8 inches.

C. Driving:

Drive piles by a mechanical hammer having a rated energy of 15,000 - 20,000 foot pounds. A drop hammer is not acceptable. Submit technical literature on the hammer proposed for use for review by the Authority and determination of specific refusal criteria.

D. Saddles and Manhole Support Slabs:

After driving, cut the pile at the required elevation and pour a concrete saddle or manhole support slab in accordance with the approved construction drawings.

E. Installation of Pipe:

After concrete work is completed, install pipe and manholes in accordance with the details shown on the approved construction drawings. After pipe is secured in position, proceed with backfilling as specified elsewhere.

SECTION 2.13 - MANHOLES:

A. General Design Considerations:

All manholes shall be constructed in accordance with the Macon Water Authority Standards. Typical manhole details are included in appendix A-MWA S2.

B. Required Location:

Manholes shall be required at all of the following locations:

- 1) Change of grade
- 2) Changes in pipe size
- 3) At the intersection of mains
- 4) At the terminus of dead-end sewers
- 5) Change of flow direction

C. Prohibited Locations:

- 1) Inaccessible areas
- 2) Gutters and other depressions or areas subject to inundation
- 3) In freeway ramp
- 4) Between railroad tracks or within the right-of-way of railroad tracks.

D. Distance Between Manholes:

The distance between manholes shall not be greater than those shown in Table A.

TABLE A

Sewer Size (Inches)	Maximum Distance Between Manholes in Feet
8 - 12	400
15 and over	450

E. Precast Concrete:

Handle sections carefully to prevent cracking or chipping. Provide uniform bedding of the bottom section to prevent uneven loading. If preformed openings must be enlarged or altered, or if new openings must be made in the field, minimize the amount of material removed to provide closely matched surfaces for grouting. Install gaskets in accordance with manufacturer's recommendations to produce a watertight structure. Manhole gaskets shall be installed as an integral part of the base section for a proper seal between pipe and the manhole.

F. Brick:

Bed the bottom and sides of every brick in mortar. Apply a smooth coat of mortar, $\frac{3}{4}$ inches thick, on the inside and outside.

G. Inverts:

Form channels as shown on the drawings, rounded and troweled smooth. Maintain consistent grade through the invert. Seal the connection of pipes to the manhole with brick and mortar on the inside and outside.

H. Future Laterals:

Where future laterals have been identified, provide the first length of pipe for future lateral sewers, properly laid to alignment and grade and plugged using a plug specifically designed for the size and material of the pipe. Plug the end of the pipe at the manhole. Extend the lateral up to the road right-of-way or property line and install a cleanout at the property line as shown in Appendix A.

I. Top Elevations:

Build manholes outside of paved area to 18 inches above ground unless otherwise shown on the plans or directed by the Authority. Build manholes in paved areas to existing grades.

J. Drop Connections:

Manholes requiring drop connections shall be shown on the drawings. Construct drop connection of the same materials as the upstream sewer and in accordance with the details shown in Appendix A.

K. PVC Connections:

Make all manhole connections to PVC pipe with the connector specified. Couplings shall be grouted into the manhole opening after jointing with the PVC pipe.

SECTION 2.14 - PUMPING STATIONS:

Pumping stations will be constructed only in locations approved by the Authority. Plans, design criteria and detailed description of the proposed installation and the equipment to be incorporated shall be submitted and written approval of the Authority obtained before any related construction is begun. Installations must meet the following minimum requirements:

A. Site Improvements:

The site shall be fenced with minimum 6-foot high chain link fencing with 16-foot double gate. Access to the site and the size of the fenced area shall permit access by maintenance vehicles. The area within the fence shall have a minimum 6-inch layer of crushed stone placed over a 10 mil sheet of polyethylene. All piping within the fenced area shall be DIP or copper.

B. The Contractor shall furnish and install one factory-built automatic pumping station. The station shall be complete with all needed equipment, factory installed in a fiberglass enclosure.

The principal items of equipment shall include two vertical close-coupled, motor-driven, vacuum primed, "Non-Clog" sewage pumps, valves, internal piping, central control panel with circuit breakers, motor starters and automatic pumping level controls, priming pumps and appurtenances, ventilator heater and all internal wiring.

The unit shall be as manufactured by Smith & Loveless of Lenexa, Kansas, or the Gorman-Rupp Company, Mansfield, Ohio, or approved equal.

C. Operating Conditions:

The pumping station shall be a duplex station designed for the following conditions:

<u>No. of Pumps</u>	<u>Capacity</u>	<u>Total Head</u>	<u>RPM</u>	<u>Min. HP</u>	<u>Voltage</u>
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(Fill in the design conditions for the station)

All openings and passages shall be large enough to permit the passage of a sphere 3" in diameter and any trash or stringy material which can pass through a 4" house-collection system.

D. Pump Chamber:

The station shall be constructed in one complete factory-built assembly. It shall be sized to reason on the top of a standard 6' diameter manhole. The pump chamber shall have a low profile, as shown on the drawings and shall be of fiberglass construction. The floor plate shall be a minimum 3/8" thickness steel plate. The plate chamber shall have a suitable drip lip around the edge and shall have provisions for a weatherproof pin tumbler lock.

The cover shall have a latch mechanism to keep the cover open under any normal load. A cover plate, exterior to the pump chamber, complete with hasp and staple shall be provided integral with station base to provide access to the wet well. Adjustable ventilating louvers shall be provided on each end of the fiberglass cover which are capable of being closed during cold weather operation.

A stanchion with lifting arm shall be provided to lift each pump. The lifting arm shall have a hook over the center of the motor to support a hoist to facilitate easy removal of the motors, impellers and pumps from the station.

E. Welding:

All steel structural members shall be joined by electrical arc welding with welds of adequate section for the joint involved.

F. Protection Against Corrosion:

After welding, all inside and outside surfaces of the structure shall be blasted with steel grit to remove rust, mill scale and weld slag. All weld spatter and surface roughness shall be removed by grinding. Immediately following the cleaning, a single heavy inert coating shall be factory-applied to all inside and outside surfaces prior to shipment. This coating shall be of epoxy resin for abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic agents.

A touch-up kit shall be provided for repair of any marks or scratches occurring during installation. The touch-up coating shall contain a minimum of 85% epoxy resin, which is compatible with the original coating.

G. Pumps:

The pumps shall be vertical, non-clog sewage pumps of heavy cast iron construction, especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by lineal movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that end play is limited to the clearance within the bearing. To minimize seal wear resulting from shaft deflection caused by the radial thrust of the pump, the shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 1 7/8" for motor frame sizes 213 through 286; 2 1/8" for motor frame sizes 324 and 326; and 3" for frame 364 and larger. The dimension from the lowest bearing to the top of the impeller shall not exceed 6".

The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move linearly with the thermal expansion of the shaft and shall carry only radial loads.

The shaft shall be solid stainless steel through motor, pump and bottom bearing to eliminate corrosion within the pump or the mechanical seal. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified minimum diameter.

The pump impellers shall be of the enclosed type made of cross-grained cast iron and

shall be balanced. The impeller shall be keyed with a stainless steel key and secured to the motor shaft by a stainless steel cap screw equipped with a Nylock or other suitable self-locking device. The impeller shall not be screwed or pinned to the motor pump shaft and shall be readily removable without the use of special tools. To prevent the buildup of stringy materials, grit and other foreign particles around the pump shaft, all impellers less than full diameter shall be trimmed inside the impeller shroud. The shroud shall remain full diameter so that close minimum clearance from shroud to volute is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy removal of the impeller from the shaft.

The pump shall be so constructed so as to permit priming from the low pressure area behind the impeller. Priming from high pressure connections, tending to cause solids to enter and clog the priming system, will not be acceptable. The priming bowl shall be transparent to enable the operator to monitor the priming level.

The pump shall be arranged so that the rotating element can easily be removed from the volute without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal, so that any foreign may be removed from the pump or suction line.

The pump shaft shall be sealed against leakage by a single mechanical seal constructed so as to be automatically drained and primed each time the pump is drained and primed. Water which lubricates the mechanical seal shall be automatically drained from around the seal if the pump loses prime, in order to allow both the pump and the seal to be drained, thereby preventing freezing and breakage of the seal during power outages in sub-freezing temperatures.

The seal shall be of carbon and ceramic materials with the mating surfaces lapped to a flatness tolerance of one light band. The rotating ceramic shall be held in mating position with the stationary carbon by a stainless steel spring.

The pump volute shall be furnished with mounting lugs and be bolted to the station floor plate, forming a gas-tight seal.

H. Motors:

The pump motors shall be vertical, solid shaft, NEMA P-base, squirrel-cage induction type, suitable for 3 phase, 60 cycle, 480-volt electric current. They shall have Class F insulation, suitable for temperatures up to 105 deg C. Insulation temperature shall, however, be maintained below 80 deg C. The motors shall have normal starting torque and low-starting current, as specified by NEMA Design B characteristics. They shall be open drip-proof design with forced air circulation by integral fan. Openings for ventilation shall be uniformly spaced around the motor frame. Leads shall be terminated in a cast connection box and shall be clearly identified.

The motors shall have 1.15 service factor. The service factor shall be reserved for the

Owner's protection. The motors shall not be overloaded beyond their nameplate rating, at the design condition, nor at any head in the operating range as specified under Operating Conditions.

The motor-pump shaft shall be centered, in relation to the motor base, within .005". The shaft runout shall not exceed .003".

The motor shaft shall equal or exceed the diameter specified under sewage pumps, at all points from immediately below the top bearing to the top of the impeller hub.

A bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fitting for lubrication as well as purging old lubricant.

The motor shall be fitted with heavy lifting eyes, each capable of supporting the entire weight of the pump and motor.

I. Controls:

The control equipment shall be mounted in a NEMA Type 1 steel enclosure with a removable access cover. The circuit breakers, starter reset buttons, and control switches shall be operable without removing the access cover, for deadfront operation.

A grounding type convenience outlet shall be provided on the side of the cabinet for operation of 115 volt AC devices. This outlet shall be for the Owner's exclusive use. No manufacturer items shall be plugged into this outlet.

Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.

Magnetic across-the-line starters with under-voltage release and overload coils for each phase shall be provided for each pump motor to give protection against single phasing. Each single phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.

To control the operation of the pumps with variations of sewage level in the wet well, a minimum of four (4) mercury, displacement switches shall be provided, as a backup level control system. A minimum of 30' of cord shall be provided with each switch to eliminate the hazards created by splicing. The cord shall have a corrosion resistant vinyl jacket and be multi-stranded in order to prevent fatigue. The displacement switches will work as a backup system to the main liquid level control system.

The primary level control of liquid levels in pump station shall be by air bubbler system. To control the operation of the pumps with variations of liquid level in the wet well, an air bubbler system shall be provided, complete with two air compressors, flow indicator, bubbler line, a sensitive pressure switch for each pump, and a storage tank.

The two air compressors shall be of the close-coupled, oil-less type. Each compressor shall have a minimum capacity of 0.2 cubic feet of air per minute at 10 PSI. It shall

incorporate a single phase, 60 cycle, 115 volt, drip-proof brushless type, electric motor. A motor driven timer shall be provided to automatically alternate the compressors every five minutes. Wiring and piping of the air compressors shall be so arranged that one compressor may be removed without removing the other compressor from service.

The pressure switches shall be of the mercury-tube type, with sensitive pressure elements and independent high and low adjustments for each pump capable of a minimum differential of 18" of water.

A push-button operated air switch shall be provided for high pressure purge of wet well bubbler line. Full storage tank pressure shall be diverted from the system to the purge line when purge button is depressed to dislodge any residue build-up in the submerged bubbler line. The bubbler line within the wet well shall be stainless steel with provisions for a cleanout plug and a tee.

The eccentric plug throttling valve shall be provided with an adjustable mechanical stop so that the minimum flow rate can be set at the minimum pumping condition specified under operating conditions.

The entire automatic flow regulating system shall be designed and installed in such a manner as to permit the pump station to operate as a standard on-off pump station if any component in the automatic flow regulating system should become inoperative for any reason.

A separate and independent priming system shall be furnished for each sewage pump, providing complete standby operation. Each priming system shall include a separate vacuum pump. Vacuum pumps shall have corrosion resistant internal components. They shall each be capable of priming the sewage pump and suction piping in not greater than 60 seconds, underrated static suction lift conditions of 20' at mean sea level.

Each priming system shall be complete with vacuum pump, vacuum control solenoid valve, prime level sensing probe, and a float operated check valve installed in the system ahead of the vacuum pump to prevent liquid from entering the vacuum pump. The float-operated check valve shall have a transparent body for visual inspection of the liquid level and shall be automatically drained when the vacuum pump shuts off.

The priming system shall automatically provide positive lubrication of the mechanical seal each time the sewage pump is primed. To prevent excess stoppage due to grease accumulation, no passageway in the priming system through which sewage must pass shall be smaller than the equivalent of a 3" opening.

An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps every eight hours. The manual switch shall allow for either pump to be selected as base pump or for automatic alternation. Alternating the pumps at less than 8-hour intervals will not be acceptable.

Provisions shall also be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level for the low level pump.

A separate and independent priming system shall be furnished for each sewage pump, providing complete standby operation. Each priming system shall include a separate vacuum pump. Vacuum pumps shall have corrosion resistant internal components. They shall each be capable of priming the sewage pump and suction pumping in not greater than 60 seconds, under rated static suction lift conditions of 20' at mean sea level.

Each priming system shall be complete with vacuum pump, vacuum control solenoid valve, prime level sensing probe, and a float operated check valve installed in the system ahead of the vacuum pump to prevent liquid from entering the vacuum pump. The float-operated check valve shall have a transparent body for visual inspection of the liquid level and shall be automatically drained when the vacuum pump shuts off.

The priming system shall automatically provide positive lubrication of the mechanical seal each time the sewage pump is primed. To prevent excess stoppage due to grease accumulation, no passageway in the priming system through which sewage must pass, shall be smaller than the equivalent of a 3" opening.

J. Environmental Equipment:

A ventilating blower shall be provided, capable of delivering 250 cfm at 0.1" static water pressure, in order to remove the heat generated by continuous motor operation. The ventilating blower shall be turned on and off automatically by a pre-set thermostat. The ventilating blower shall be rigidly mounted from the station floor. The discharge outlet shall have a thick resilient gasket which will match with a louvered opening in the fiberglass cover to seal the discharge to the cover when the cover is closed. An electric heater controlled by a pre-set thermostat shall be furnished. The heater shall be rigidly mounted in the station to prevent removal.

K. Sewage Piping:

The pump suction shall be drilled and tapped for a 125 pound American Standard flange for ready connection of the suction riser. The discharge line for each pump shall be fitted with a clapper-type check valve and eccentric plug valve. Size, location, and quantity of check valves and plug valves shall be as shown on the construction drawing.

The check valve shall be of the spring-loaded type with external lever arm and a replaceable resilient seat for added assurance against vacuum leaks. An operating wrench shall be provided for the plug valves. Protrusions through the floor plate shall be gas-tight where necessary to effect sealing between the equipment chamber and the wet well. Bolted and sealed joints shall be provided at the volutes or suction pipes in order to prevent corrosive, noxious fumes from entering the station. The lift station manufacturer shall extend the suction and discharge connections below the floor plate at the factory, so that field connections can be made without disturbing the gas-tight seals.

The manufacturer of the lift station shall provide a compression-type sleeve coupling for installation in the common discharge pipe.

L. Wiring:

The pump station shall be completely wired at the factory except for the power feeder lines. All wiring in the pump station shall be color coded as indicated on the wiring diagram. Wiring diagrams matching the unit wiring shall be provided. Lag-pump lock-outs to prevent simultaneous starting of both pumps under emergency generator operation shall be installed in the control panel. The emergency generator will not be required unless specified for this project.

M. Factory Tests:

All components of the pump station shall be given an operational test of all equipment at the factory to check for excessive vibration, for leaks in all piping or seals, for correct operation of the vacuum priming and control systems and all auxiliary equipment. Pumps shall take suction from a deep well, simulating actual service conditions.

N. Spare Parts:

The contractor shall furnish the following spare parts:

One (1) complete rotating assembly including motor, backhead, priming assembly and one (1) each clockwise and counter clockwise impeller trimmed to design conditions, and spare parts not to exceed \$2,000.00.

It will be the responsibility of the contractor at the time of construction to contact the Macon Water Authority through the Engineer to determine exactly what the Contractor will be required to supply at that time.

O. Non-Standard Equipment:

The lift station shall also be equipped with a High Water Alarm Sensor; three (3) Lapse Time Meters - One (1) non-resettable for each pump and one (1) meter wired for parallel pump operations; one intruder alarm sensor; one auxiliary blower for venting wetwell designed for continuous operation. Provide on/off switch inside station enclosure.

P. Installation and Operating Instructions: Instructions of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

Five (5) sets of Operation and Maintenance Manuals shall be furnished which will include A parts list of components and complete service procedures and trouble shooting guide.

All odor control tanks and fuel tanks shall be protected by an additional catch basin in case of a spill.

Q. Experience and Workmanship:

The pump station shall be the product of a manufacturer with a minimum of five (5) years of experience in the design and building of such automatic, vacuum primed, factory-built sewage pumping stations and all workmanship and materials throughout shall be of the highest quality.

R. Guarantee:

The manufacturer of the lift station shall have a minimum of five (5) years experience in the design and manufacture of vacuum-priming type factory-built automatic pumping stations and shall guarantee the structure and all equipment to be free from defects in materials and workmanship for a period of up to one year from date of start-up.

(1) General:

The contractor is responsible for making all arrangements with the lift station manufacturer for the installation of required contracts for the telemetry system specified in this document as required by the Macon Water Authority. The existing telemetry system shall be transferred to the new pumping station by the Macon Water Authority.

(2) Alarm System:

The lift station manufacturer shall provide pressure switch, relay and contacts for the high water level alarm and intrusion alarm. The pressure switch assembly shall be mounted in the control panel and wired to a coded terminal strip.

S. Remote Terminal Unit (RTU)

(1) Remote Terminal Unit:

The Remote Terminal Unit (RTU) shall serve as an interface between control messages received from the Central Terminal Unit (CTU) and specific control points in the field. The RTU shall translate digital messages into contact closures for control of various devices and shall encode contact closures for transmission of device status to the CTU to confirm any control action taken.

The RTU shall initiate a control action only in response to a CTU oriented command. In addition, a confirming transmission shall be made to the CTU following each command response. RTU reset shall be automatic. An integral radio transmitter designed and manufactured by the RTU supplier shall be supplied. All connections except an antenna RF connector shall be integrated into the RTU wiring and the radio shall be of modular design. The RTU shall provide command, status, analog and accumulative data capability.

(2) **System:**

- (a) **Master Location** - Town Creek WTP with repeaters at 790 Second Street, and sub-masters at Breezy Hill Pump Station, Forsyth Road Pump Station, Heath Road Elevated Tank, Airport North Tank, Bowden Elevated Tank and Poplar Street WWTP.
- (b) Radio Path Survey is system manufacturer's responsibility.
- (c) Manufacturer shall ensure that the instrumentation and control (I/C) system is an integral system and should be responsible for the correct operation of the entire system.
- (d) The system manufacturer should be engaged in regular telemetry system work and shall be in business for a minimum of five (5) years at the time of supplying the system.

(e) **Following are the acceptable manufacturers:**

M/R Systems, Norcross, Georgia
Industrial Control Systems, Sandston, Virginia
Transdyn Controls, Norcross, Georgia
GE Automation Services, Pineville, North Carolina

System shall carry one year warranty from the date of acceptance by Macon Water Authority on material and workmanship.

- (f) Equipment furnished and installed shall be from established manufacturers, with proven history of service and support.
- (g) Electrical isolation shall be provided between the input systems and processor units. All wiring shall be protected against lightning and other surges.
- (h) System manufacturer shall provide training courses on site. Length of training shall be for a day for about 10 students.
- (i) Control panels enclosure can be wall mounted, free standing or walk-in as scheduled and shall be NEMA 12 for panels located indoors and NEMA 4X for outdoor locations.
- (j) **Remote Terminal Unit (RTU) Panels:** Small size RTU panels designated as Type 3 enclosures shall accommodate a minimum of two analog and two discharge modicon momentum models. Shall be a minimum 24 inches high, 24 inches wide and 12 inches deep, NEMA (12) for indoor

applications and NEMA 4X for outdoor applications.

- (k) **Programmable Logic Controllers (PLC) for RTU's:** The PLC will receive discrete and analog inputs and through the use of internal ladder logic program. Control output relay operation and perform data handling and telemetry functions. Each controller shall have 50 percent spare memory capacity and 10 percent instrumentation operation (I/O) capacity.

The PLC's shall be as manufactured by Modicon Momentum or approved equal.

The components of PLC's shall be from manufacturers who are manufacturing this type of equipment for a minimum of 5 years.

The PLC's shall be of a modular design with a plug-in processing unit, input/output assemblies, and plug-in peripherals. All parts shall have manufacturer's ID number.

The components of PLC shall be capable of continuous operation at temperatures 0 - 60 degrees centigrade and humidity levels 5 to 95 percent.

Electrical supply voltage to individual controllers shall be 115 vac + 10 percent, 48-63 HZ with adequate overload protection. A failure of one controller shall not disrupt operation of other controllers in the system. Reduced process adapters, communication adapters, input/output devices, program development software and program development PC shall be furnished along with the equipment.

- (l) **Radios:**

Radios shall be by Microwave Data Systems Model 9810 or approved equal. Provide all spread spectrum radios with in-line diagnostics.

Refer to Addendum A for Instrumentation and Control, Surge protection, Control Devices, Loop Descriptions, Control Panels and Scada Hardware.

SECTION 2.15 - LAYING PIPE:

Lay the pipe to conform accurately to the alignment and grade approved by the Authority.

A. Handling:

Use suitable tools and equipment to handle and lay pipe. Prevent damage to the pipe. Examine all pipe for cracks and other defects as it is laid. Do not lay pipe or other

materials which are known to be defective.

If any pipe or other material is discovered to be defective or damaged after being laid, remove and replace it.

B. Sequence:

Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. The exposed end of installed pipe at the close of work each day and at all other times when work is not in progress must be capped with a sealed cap. If it is necessary to backfill over the end of an uncompleted pipe, close the end with a plug.

C. Placing and Jointing:

Clean pipe and fittings thoroughly before laying. Before making the joint, clean the sealing surfaces of dust, dirt, gravel and other foreign substances. Apply joint lubricant recommended by the pipe manufacturer.

Center the spigot end in the bell of the preceding pipe and shove home. Apply moderate force to ensure proper seating. Complete jointing no later than five minutes after application of the lubricant.

Immediately after jointing bring the pipe to final alignment and grade.

D. Pressure Piping:

Comply with the regulations for excavation, in addition to the following requirements:

- (1) Make all push-on and mechanical joints in accordance with the manufacturer's recommendations.
- (2) Take special precautions to prevent damage to the cement lining of ductile iron pipe.
- (3) Ensure that force mains are laid flat or to a positive grade. Pipe laid incorrectly at negative grade shall be removed and re-laid.
- (4) Minimum depth of cover for force mains shall be four feet unless shown otherwise on the Drawings and approved by the Authority. Within DOT right-of-way, install force mains at a depth four feet below the nearest pavement edge.

E. Buried Valves:

Resilient sealed gate valves are to be used for force mains and in lift stations. Valves are

to be equipped with appropriate end connections, glands, gaskets, bolts, valve box cover, valve operator extensions and all applicable hardware. Valves shall be furnished with a valve box. If cover exceeds two feet, provide an extension stem to within six inches of the surface.

Outside of structural concrete install all floor stands on an 18 inch square by 9 inch deep concrete pad to terminate the valve box and mount the floor stand.

F. House Connections:

Install wyes or tees in locations designated by the Authority for future connection of service line with proper grade and alignment to the property line. Service lines shall be plugged until put into service using plugs specifically designed for the size and type of pipe. The service lines shall include provisions for cleaning out the line in case of an obstruction. Detailed drawings are included in Appendix A (S - 4).

The location of stubout shall be clearly shown on the as-built drawings. A cleanout embedded in concrete shall be installed at the property line and shall be marked on the curb where a curb is installed.

SECTION 2.16 - CONCRETE COLLARS AND BLOCKING:

A. Concrete:

Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. For job mixed concrete, submit the concrete mix design for approval by the Authority. Mix and transport ready-mixed concrete in accordance with ASTM A 615, grade 40.

B. Blocking:

Block bends, tees, valves, and other points where hydraulic thrust may develop. Form and pour concrete blocking as shown on the Drawings and as directed by the Authority. Pour blocking against undisturbed earth. Increase dimensions when required by over-excavation. Retrained joints in lieu of blocking is acceptable.

C. Collars:

Provide concrete collars at all joints between dissimilar pipe materials, and for anti-flotation as required. Construct as shown on the detail drawings in Appendix A.

SECTION 2.17 - BACKFILLING:

Backfill carefully to restore the ground surface to its original condition. Dispose of surplus material.

A. Backfill:

Place initial backfill material carefully over the bedding material covering PVC in uniform 6 inch layers to a depth of at least 24 inches above the pipe bell. Compact each layer thoroughly with suitable hand tools. Do not disturb or damage the pipe. Backfill on both sides of the pipe simultaneously to prevent side pressures. Initial backfill material is earth material excavated from the trench which is clean and free of rock, organics, and other unsuitable material. If materials excavated from the trench are not suitable for use as initial backfill material obtain suitable materials elsewhere.

Backfill above, shall be compacted as follows:

- (1) In 6-inch layers, if using light power tamping equipment, such as a "Jumping jack",
- (2) Where required, detection tape shall be buried 4 to 10 inches beneath the ground surface directly over the top of the pipe. Should detection tape need to be installed deeper, the Contractor shall provide 3 inch wide tap. In no case shall detection tape be buried greater than 20 inches from the finished grade surface.

B. Settlement:

If trenches settle, re-fill and grade the surface to conform to the adjacent surfaces.

C. Backfill Under Roads:

Compact backfill underlying pavement and backfill under dirt and gravel roads to 98% of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D 698).

- D.** For sewer laterals laid under the pavement area, compact backfill underlying pavement and backfill on dirt and gravel roads to 98% of the maximum dry density as determined by Standard Proctor Compaction Test (ASTM D 698).

E. Additional Materials:

Where final grades above the pre-existing grades are required to maintain minimum cover, additional fill material will be shown on the Drawings. Utilize excess material excavated from the trench if the material is suitable.

If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide suitable additional fill material.

SECTION 2.18 - REMOVING AND REPLACING PAVEMENT:

A. Removing Pavement:

Remove existing pavement as necessary for installing the pipe line and appurtenances.

(1) Marking:

Before removing any pavement, mark the pavement neatly paralleling pipe lines and existing street lines. Space the marks the width of the trench.

(2) Breaking:

Break asphalt pavement along the marks using jack hammers or other suitable tools. Break concrete pavement along the marks by use of jack hammers or by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.

(3) Machine Pulling:

Do not pull pavement with machines until completely broken and separated from pavement to remain.

(4) Damage to Adjacent Pavement: Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

(5) Sidewalk:

Remove and replace sidewalks for their full width.

(6) Curbs:

Remove and replace any curb encountered.

B. Upon completion of backfilling and consolidation of the backfill, arrange to have the compaction tested by an independent testing laboratory approved by the Authority. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks and curbs removed.

(1) Materials:

Place materials for pavement replacement to dimensions shown on the Drawings. Typical pavement replacement details are included in Appendix A.

(a) Graded Aggregate Sub-Base:

Furnish graded aggregate sub-base in two sizes of such gradation that when combined in approximately equal quantities, the resulting mixture is well graded from coarse to fine, meeting the gradation requirements of Section 816 of the State Highway Department of Georgia Standard Specifications.

(b) Black Base:

The base for all paved roadways shall conform to the requirements of the Georgia State Highway Department Specifications for the Black Base (Hot Mix). Use a Pug Mill Rotary Drum type mixer with minimum capacity of not less than 50 tons per hour for asphalt production. Apply and compact the base in two courses by asphalt spreader equipment of design and operation approved by the Authority. After compaction, the Black Base shall be smooth and true to established profiles and sections.

(c) Surface Course:

The surface course for all pavement, including paint or tack coat when required by the Authority, shall conform to the requirements of the Georgia State Highway Department Specifications for Asphaltic Concrete, Section 400, Type "E" (Modified Top). Produce surface course in an asphalt plant of the same type as noted above for Black Base. Apply and compact the surface course in a manner approved by the Authority. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

(d) Concrete:

Provide concrete and reinforcing for concrete pavement In accordance with the requirements of Georgia State Highway Department Specifications for Portland Concrete Pavement, Section 430.

(2) Supervision and Approval:

Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.

Obtain the Authority's approval of restoration of pavement not the responsibility of regulatory agency, such as private roads and drives.

Complete pavement restoration as soon as possible after backfilling.

(3) Replacement:

Prior to replacing pavement, make a final cut in concrete pavement 12 inches back from the edge of damaged pavement. Make the cut using a rotary saw. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks, and curbs with the same material and to the same dimensions as existing.

(4) Failure of Pavement:

Should any pavement restoration or repairs fail or settle during construction and warranty periods, promptly restore or repair defects.

SECTION 2.19 - BORING:

Furnish and install pipe casing and install the pipe line therein in accordance with the following specifications:

A. General:

Operate well points or drainage systems in the vicinity of casing construction to prevent the accumulation of flood water in the casing and to maintain the ground water table below the casing in invert. Directional bores will not be allowed, pipe and steel casing shall be jack and bored.

B. Boring:

Furnish all material and equipment and perform all labor required to install steel pipe casing at locations indicated on the drawings and as specified.

(1) Materials:

The steel casing pipe shall be Schedule 30 steel pipe manufactured from steel conforming to ASTM A 139, Grade B. Size and thickness shall be as follows:

UNDER RAILROADS

Pipe Dia. In.	Casing Dia. In.	Wall Thick In.
6	14	0.250
8	18	0.250
10	20	0.281
12	22	0.312
14	24	0.344
16	30	0.406
18	30	0.406
20	32	0.469
24	36	0.469
30	42	0.500

UNDER HIGHWAYS

Pipe Dia. In.	Casing Dia. In.	Wall Thick In.
6	12	0.250
8	16	0.250
10	16	0.250
12	18	0.250
14	22	0.250
16	24	0.250
18	30	0.312
20	30	0.312
24	36	0.375
30	42	0.375

- (2) **Installation of Casing:** Install the steel pipe casing by the dry boring method. Bore the hole and install the casing through the soil simultaneously by a cutting head on a continuous auger mounted inside the casing pipe. Fully weld lengths of casing pipe to the preceding section in accordance with the AWS recommended procedures. After the boring and installation of the casing is complete, install a cleaning plug on the rig and clean the casing. All piping inside (carrier pipe) steel casing shall be ductile iron pipe. The carrier pipe shall be supported at each joint and as recommended by manufacturer. Spacers as manufactured by Cascade or approved equivalent shall be used. **(In any and all applications, ductile iron pipe shall be used only at the direction of the Authority).**

In the event that rock is encountered during the installation of the pipe casing which, in the opinion of the Authority, cannot be removed through the casing then the Authority shall direct the Contractor/ Developer to complete the crossing by

installing a tunnel.

C. Installation of Pipe:

(1) Boring:

After installation of the casing is complete, install the pipe line by a method which has received prior approval of the Engineer.

Close the ends of the casing with 4 inch brick walls, plastered with Portland Cement mortar and waterproofed with asphaltic roofing cement.

D. Safety:

(1) Boring: Provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic at all times during the work.

Perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it. If in the opinion of the Engineer the installation is being conducted in an unsafe manner, the Contractor will be required to stop work and bulkhead the heading until suitable agreements are reached between the Contractor and the Engineer. The Owner will not be responsible and shall be saved harmless in the event of delays to the Contractor's work resulting from any cause whatsoever.

SECTION 2.20 - STREAM AND DITCH CROSSING:

At all points where banks of streams or drainage ditches are disturbed by excavation or where natural vegetation is removed, carefully compact backfill and place rip rap to prevent subsequent settlement and erosion.

This requirement applies equally to construction alongside a stream or drainage ditch as well as crossing stream or drainage ditch. Place rip rap a distance of not less than 10 feet upstream and 10 feet downstream from any disturbed area. Extend rip rap from 1 foot below streambed to top of bank. Place to conform with the natural slope of the stream bank. The pipe material for stream and ditch crossings shall be ductile iron pipe. A geotextile fabric shall be placed over the entire ditch and extend outward on either side a minimum of (10) ft. **(In any and all applications, ductile iron pipe shall be used only at the direction of the Authority).**

Use only one method, either (a) or (b), throughout the job.

A. Stone Rip Rap:

Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or higher.

Minimum weight of individual stones shall be 50 pounds. The maximum allowable dimension for an individual stone is 24 inches. The minimum allowable dimension for

an individual stone is 6 inches. At least 50% of the stones shall have a minimum dimension of 12 inches.

Embed stone rip rap by hand so as to form a compact layer at least 12 inches thick. Place rip rap in such a way that the smaller stones are not segregated but evenly distributed. Place chinking stones in the crevices between the larger stones so that a dense, well graded mass is produced.

B. Sand-Cement Bag Rip Rap:

Use cement sacks or burlap bags having a capacity of from 1 to 2 cubic feet. Do not use bags previously used for sugar or chemicals. Fill bags with a mixture of one part Portland Cement to five parts sand.

Embed bags by hand to form a compact layer at least 12 inches thick. Place with overlapping joints. The finished surface shall not deviate from that specified by more than 3 inches at any point.

SECTION 2.21 - CONCRETE PIERS:

Construct piers as shown on the Drawings and in accordance with the following requirements:

A. Material:

Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. For job mixed concrete, submit the concrete mix design for approval by the Engineer. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, grade 40.

B. Bearing:

(1) Earth:

Where excavation reveals undisturbed earth subsurface, construct piers with spread footing foundations as shown in the Appendix.

(2) Rock:

Where excavation reveals level or benched rock having a minimum safe bearing value of 20,000 psf, construct piers with a foundation bearing directly on rock. Drill a minimum of four holes into the rock under each pier and grout dowels into place to anchor the pier to the rock. Hole and dowel sizes shall be in accordance with the requirements of the table at the end of this section.

Grout holes from the bottom up using a group pump. Take extreme care to ensure that the entire hole is filled with grout prior to inserting the dowel.

C. Installation:

Employ experienced form work carpenters to construct forms.

Build formwork sufficiently strong to resist movement and distortion during pouring and to protect the pier from caving in or lateral movement.

Before placing concrete, dewater the bottom of the hole and clean out all mud, loose earth, and extraneous matter.

Pour concrete as soon as possible after the forms have been approved. Do not leave the excavation open for prolonged periods of time. Protect the excavation from surface water. Do not allow water to accumulate in the excavation or in surrounding areas.

Take all necessary precautions to protect the work and personnel on the site. Cover open holes when work is not in progress. Examine all surrounding excavations and embankments for possible hazards.

ANCHORAGE REQUIREMENTS FOR PIERS ON ROCK

Carrier Pipe Size	Grout Hole Diameter, Inches	Grout Hole Depth, Feet	Reinforcing Bar Dowel Size
8-24	2.5	8	5
27-36	4	8	6
42-48	4	8	6
54	4	8	6

D. Inspection Select and, with the approval of the Engineer, employ a consulting soil and foundation Engineer to perform the following:

- (1) Inspect the bearing material and evaluate its suitability.
- (2) Inspect pneumatically drilled grout holes where applicable.
- (3) Check dimensions and plumbness of forms to ensure conformity with Drawings and Specifications.
- (4) Evaluate material penetrated by excavation with regard to lateral stability and uplift resistance.
- (5) Recommend remedial measures should insufficient lateral stability or uplift resistance exist.

SECTION 2.22 - INSPECTION AND TESTING:

The Authority will televise and will inspect all projects to ensure compliance with these specifications. Unless other provisions have been specifically approved by the Authority, sewer lines and related facilities will be inspected and tested by the Authority before acceptance or tie-in to the Authority's system is permitted. All lines must be clean and all obstruction removed prior to requesting inspection and testing. When requested by the Authority, flush out lines and manholes before testing and inspection. The Authority will televise for construction or material defects, and will inspect all PVC sewers for excessive deflection. A fee for testing and any retesting will be charged by the Authority in accordance with the Sewer Inspection Policy. This fee can be established by contacting the Authority.

Procedure for Final Inspection:

- * During installation the Authority will visually inspect all sewers for construction or material defects
- * After installation and before acceptance, all sewer segments will be televised by closed circuit camera for construction or material defects and acceptable alignment.
- * All sewer segments will undergo low pressure air testing as per Section (b). All segments containing PVC pipe will be tested for excessive deflection.
- * Any re-testing will be charged by the Authority in accordance with the Sewer Inspection Policy. This fee can be established by contacting the Authority.
- * The Contractor shall perform all tests in the presence of a Macon Water Authority Inspector. Copy of such records will be given to the Engineer or the Owner.

A. Gravity Sewers:

Pipe lines shall be straight and show a uniform grade between manholes. Correct any discrepancies discovered during inspection.

- (1) Pipe joints for sewers 30 inches in diameter and larger shall be air tested individually. The joint tester assembly shall be placed over the joint and shall pressurize the joint area to 4 psi. The pressure shall not drop more than 2 psi in 10 seconds. The joint tester assembly shall be equal to Cherne Industries, Inc. and shall be provided by the Contractor.

(a) Lamping

Pipelines shall be straight and show a uniform grade between manholes. Evidence of straight and uniform grade will be determined by placing a closed circuit TV camera in the invert of the first manhole and in the second manhole a light source sufficient to illuminate the manhole. Acceptable alignment is indicated by a full circle (full moon) of light visible and centered in view from manhole one. Televising will be performed by the Authority for a fee according to current Authority policy.

(b) Low Pressure Air

All sewers less than (30) inch diameter shall be subject to low pressure air test as stated herein.

- (i)** Prior to air testing, the section of sewer between manholes shall be thoroughly cleaned and wetted. Immediately after cleaning or while the pipe is water soaked, the sewer shall be tested with low-pressure air. At the Contractor's option, sewers may be tested in lengths between manholes or in short sections (25 feet or less) using Air-Lock balls pulled through the Line from manhole to manhole. Air shall be slowly supplied to the plugged sewer section until internal air pressure reaches approximately 4.0 psi. After this pressure is reached, and the pressure allowed to stabilize (approximately two to five minutes), the pressure may be reduced to 3.5 psi before starting the test. If a 1.0 psi drop does not occur within the test time, then the line has passed the test. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test, and the Contractor will be required to locate the failure, make necessary repairs, and retest the line. Minimum test time for various pipe sizes, in accordance with ASTM F 1417 is as follows:

Nominal Pipe Size (Inches)	T(time) Min/100 (Feet)	Nominal Pipe Size (Inches)	T(time) Min/100 Fee
8	1.2	27	4.2
10	1.5	30	4.8
12	1.8	33	5.4
15	2.1	36	6.0
18	2.4	39	6.6
21	3.0	42	7.3
24	3.6	48	8.6
		54	9.8

- (ii)** Required test equipment, including Air-Lock balls, braces, air hose, air source, timer, rotometer as applicable, cut-off valves, pressure reducing valve, 0-15 psi pressure gauge with gradations in 0.1 psi and accuracy of plus or minus 2 percent, shall be provided by the Contractor.
- (iii)** The Contractor shall perform all tests in presence of Macon Water Authority personnel. Copy of such records will be given to the Engineer or the Owner. Such records shall show date, line number and stations, operator, and such other pertinent information as required by the Engineer.

- (iv) The Contractor is cautioned to observe proper safety precautions in performance of the air testing. It is imperative that plugs be properly secured and that care be exercised in their removal. Every precaution shall be taken to avoid the possibility of over-pressurizing the sewer line.

B. PVC Deflection Test (Mandrel Test):

Test PVC gravity sewer for excessive deflection by passing a mandrel "pig" through the line with a diameter equal to 95 percent of the normal inside diameter of the pipe. Excavate and install properly any section of pipe not passing this test. Re-test until results are satisfactory. This test shall be performed within the first 10 days of installation and during final inspection, at the completion of this contract. (Refer to ASTM 2122)

- (1) Procedure for Conducting a Mandrel Test: Installed pipe shall be tested ensure that vertical deflections for plastic pipe do not exceed the maximum allowable deflection. Maximum allowable deflections shall be governed by the mandrel requirements stated herein and shall nominally be:
 - (a) 3 percent of the maximum average ID for PVC Composite Pipe.
 - (b) For all plastic pipe PVC Composite Pipe, the percentage listed of maximum average ID shall be as follows:

TABLE 2.21-1

Nominal Pipe Size		Percentage Deflection Allowed
Millimeters	Inches	
Up to and including 300 mm	Up to and including 12 in.	5.0
Over 300 –to and including 750 mm	Over 12 –to and including 30 in.	4.0
Over 750 –to and including 1500 mm	Over 30 –to and including 60 in.	3.0
Over 1500 –to and including 2250 mm	Over 60 –to and including 90 in.	2.5
Over 2250 –to and including 3000 mm	Over 90 –to and including 120 in.	2.0
Over 3000 mm	Over 120 in.	1.5

The maximum average ID shall be equal to the average OD per applicable ASTM Standard minus two minimum wall thicknesses per applicable ASTM Standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

Deflection tests shall be performed not sooner than 30 days after completion of Placement and densification of backfill. The pipe shall be cleaned and inspected for Offsets and obstructions prior to testing.

For all pipes 600 mm (24 inch) ID or smaller, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified by the Engineer or by another entity approved by the Engineer. Use of an uncertified mandrel or a mandrel altered or modified after certification will invalidate the test. If the mandrel fails to pass, the pipe will be deemed to be overdeflected.

Unless otherwise permitted by the Engineer, any overdeflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed from the Work site. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be uncovered removed from the Work site, and replaced with new pipe.

The mandrel shall:

- (1) Be a rigid, non-adjustable, odd-numbered leg (9 legs minimum) mandrel having an effective length not less than its nominal diameter
- (2) Have a minimum diameter at any point along the full length as follows:
- (3) Be fabricated of steel, be fitted with pulling rings at each end, be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size, and mandrel OD (e.g., PVC D3034-200mm-187.10mm; PVC D3034-8"-7.366"; and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.

Table 2.21-2

Pipe Material	Nominal Size		Minimum Mandrel Diameter
	MM	Inches	Inches
PVC-ASTM D 3034 (SDR 26)	150	6	5.33
	200	8	7.11
	250	10	8.87
	300	12	10.55
	375	15	12.90

C. Force Main Pressure and Leakage Test:

- (1) All sections of pipeline subject to internal pressure shall be pressure tested in accordance with AWWA C 600. A section of line will be considered ready for testing after completion of all thrust restraint and backfilling. Each segment of pipeline between line valves shall be tested individually.
- (2) **Test Preparation:**
 - (a) Flush pipeline section thoroughly at flow velocities adequate to remove

debris from pipe and valve seats. Partially operate valves and hydrants to clean out seats. Provide correctly sized temporary outlets in number adequate to achieve flushing velocities.

- (b) Provide temporary blocking, bulkheads, flanges and plugs as necessary to assure all new pipe, valves and appurtenances will be pressure tested.
- (c) Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. Unless permanent air vents are in place, insert temporary corporation stops at highpoints to expel air as line is filled with water.
- (d) Fill pipeline slowly with water. Provide a suitable pump with an accurate water meter to pump the line to the specified pressure. Differential pressure at valves and hydrants shall equal the maximum possible, but shall not exceed manufacturer's pressure rating.

(3) Test Pressure:

Test the pipeline at 150 psi. The test pressure shall not vary by more than 5 psi for the test duration(2 hours). Should the pressure drop more than 5 psi at any time during the test period, the pressure shall be restored to the specified test pressure. Provide an accurate pressure gauge with gradation not less than 5 psi.

(4) Leakage:

- (a) Leakage shall be defined as the quantity of water that must be pumped into the test section equal to the sum of the water, to maintain pressure with 5 psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test. Leakage shall be the total cumulative amount measured on a water meter.
- (b) The Owner assumes no responsibility for leakage occurring through existing valves.

(5) Test Results:

No test section shall be accepted if the leakage exceeds the limits determined under Section 4 of AWWA C600. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results.

(6) Completion:

After a pipeline section has been accepted, relieve test pressure. Record type, size and location of all outlets on record drawings.

D. Manholes:

Prior to testing manholes for a water-tightness all liftholes shall be plugged with a non-shrink grout, all joints between precast sections shall be properly sealed and all pipe openings shall be temporarily plugged and properly braced. Each manhole shall pass one of the following tests. The tests shall be performed after all the backfill and the road bed is in place.

(1) Vacuum Tests:

The manhole, after proper preparation as noted above. The test head shall be placed at the inside of the top of the cone section and the compression head inflated to 40 psi to effect a seal between the vacuum base and the manhole structure. Connect the vacuum pump to the outlet port with the valve open. A vacuum of 10 inches of mercury shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 48 inch diameter manholes. If the manhole fails the initial test, necessary repairs shall be made and the manhole re-tested. Re-testing shall proceed until a satisfactory test is obtained. All the tests shall be witnessed by Macon Water Authority inspectors. The Macon Water Authority will not allow the usage of concrete sewer pipe. (Reference ASTM C1244 Standards - Test Method for concrete Sewer Vacuum Testing of Manholes).

(2) Exfiltration Tests:

This test applies to the pump station wet wells only. The manhole, after proper preparation as noted above, shall be filled with water. The maximum allowable leakage shall not exceed 8 gallons per foot of depth per 24 hours for 48-inch diameter manholes. Tests shall last a minimum of eight hours. The manholes may be backfilled prior to testing.

(3) Infiltration Tests:

Measurement shall be performed by the Macon Water Authority on any lines with a visible flow of water. In no case will an infiltration rate greater than 25 gallons per inch diameter of pipe per mile of sewer pipe per day be allowed. All visible or audible leaks must be dug up and repaired unless it is found to be in a joint and can be repaired by chemical grouting. All test procedures shall be in accordance with ASTM C-1091 (Infiltration testing) or ASTM C969.

SECTION 2.23 - PROTECTION AND RESTORATION OF WORK AREA:
(Section applies to water and wastewater design projects)

A. General:

Return all items and all areas disturbed, directly or indirectly, by work under these Specifications, to their original condition or better, as quickly as possible after work is started. Any bypassing of raw wastewater on to the ground or into a receiving stream is prohibited.

B. Man-Made Improvements:

Protect or remove and replace with the Authority's approval, all fences, piers, docks, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables and other improvements that may be encountered in the work.

C. Cultivated Growth:

Do not disturb cultivated trees or shrubbery outside the easement unless approved by the property owner. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

D. Cutting of Trees:

Do not cut trees for the performance of the work outside the easement except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stores over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3 inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed by the Contractor. No stumps, wood piles or trash piles will be permitted on the work site or within the easement area unless specifically approved by the Authority.

E. Grassing:

Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Outside of residential areas, plant the entire area disturbed by the work in rye, fescue, bermuda, clover or other suitable ground cover on completion of work in any area. In all areas, promptly establish successful strands of grass. Grass areas will be considered acceptable when a viable stand of grass covers at least 98% of the total area with no bare spots exceeding one square foot and the ground surface is fully stabilized against erosion. (Georgia D.O.T. Section 700,890 Manual for Erosion and Sedimentation Control in Georgia).

(1) Description:

This section consists of the furnishing and sowing of grass seed and furnishing and applying mulch, water and fertilizer. Hydroseeding shall be employed where shown on the plans.

(2) Soil Analysis and Report:

The Contractor shall obtain from the Agricultural Extension Service a soil analysis and report. Analysis of fertilizer and application rates shall be as recommended by the County Extension Service Report and in accordance with this schedule:

FERTILIZER REQUIREMENTS				
TYPE OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N-P-K	RATE	N TOP DRESSING RATE
1. Cool season grasses	First	6-12-12	1,500 lbs/ac	50-100 lbs/ac ^{1,2}
2. Cool season grasses and legumes	First	6-12-12	1,500 lbs/ac	0-50 lbs/ac ¹
3. Ground covers	First	10-10-10	1,300 lbs/ac ³	-
4. Temporary cover crops seeded alone	First	10-10-10	500 lbs/ac	30 lbs/ac ⁴
5. Warm season grasses	First	6-12-12	1,500 lbs/ac	50-100 lbs/ac ^{2,5}

- 1 Apply in spring following seeding.
- 2 Apply in split applications when high rates are used
- 3 Apply in three (3) split applications
- 4 Apply to grass species only
- 5 Apply when plants grow to a height of 2 to 4 inches

(3) Areas to be Grassed:

The areas to be grassed shall be all disturbed areas not occupied by a structure, including but not limited to, the storage areas, easements highway right-of-ways, and designed areas. All disturbed areas will be stabilized as quickly as possible and in no case will ungrassed and unmulched areas be permitted more than 1,000 feet behind the pipe laying operation.

(4) Materials:

(1) Site Operations and Materials: The following materials and rates of application are suggested. The Contractor is solely responsible for the success of grassing.

(a) Commercial Fertilizer:

Shall be a slow release, complete fertilizer. The nitrogen content of which shall be derived from either organic or inorganic sources and meet the following minimum requirements of plant food by weight. Should the soil analysis and report indicate a need for a different fertilizer mixture, the recommended mixture shall be furnished and applied at the Contractor's expense. All State and Federal laws relating to fertilizer must be complied with.

(b) Ammonium Nitrate:

Shall be commercial product in dry powder form of recent manufacture and shall be delivered in the original unopened containers each bearing the manufacturer's guaranteed statement of analysis. It shall contain not less than 33.5% Nitrogen.

(c) Ground Limestone:

Shall be ground dolomitic limestone containing not less than 85 percent of total carbonates and shall be ground to a fineness such that more than 50 percent will pass through a 100-mesh sieve and 90 percent will pass through a 20-mesh sieve. Coarser material will be acceptable, provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve.

(d) Seed:

Seed shall be delivered to the site in the original sacks, and each sack shall be tagged in accordance with the agricultural seed laws of the United States and the State of Georgia. Each sack shall be tagged showing the dealer's guarantee as to the year grown, percentage of purity, percentage of germination and the date of the test by which the percentages of purity and germination were determined. All seed sown shall have a date of test within six months of the date of sowing.

Any seed delivered prior to use, shall be stored in such a manner that it will be protected from damage by heat, moisture, rodents, or other cause.

Permanent seeding shall be in accordance with the following schedule:

SEEDS	LBS/ ACRE	DEPTH OF COVER	DATE OF PLANTING
BERMUDA GRASS-HULLED	10	¼" - ½"	3/15 - 5/31
BERMUDA GRASS-UNHULLED	10	¼" - ½"	10/1 - 2/28
BAHIA, PENSACOLA	60	¼" - ½"	3/1 - 6/15

(5) Execution:

(a) Hydroseeding:

Hydroseeding may be used on any area to be grassed. Under this method of seeding, the seed and fertilizer, at the specified rates, with Wood Fiber Mulch shall be distributed over the area to be seeded in the form of a slurry. Seeds of all sizes may be mixed together.

- (i)** Wood Fiber Mulch is required to be used as a metering agent and seedbed when hydroseeding is used. The application rate for Wood Fiber Mulch shall be approximately 500 pound per acre and is required regardless of which mulching method is chosen.
- (ii)** Ground preparations for hydroseeding shall be the same for conventional seeding.
- (iii)** Equipment for mixing and applying the slurry shall be especially designed for this purpose. It shall be capable of applying a uniform mixture over the entire area to be seeded. The slurry mixture shall be agitated during application to keep the ingredients thoroughly mixed. All materials shall be discharged within one hour after being combined in the hydroseeder. Hydroseeding shall not be performed when winds prevent an even, thorough application. The equipment manufacturer's discretions shall be closely observed unless modifications ion methods of application are ordered by the Engineer.
- (iv)** The entire hydroseeded area shall be mulched as specified below.

(b) Fertilizing and Liming:

Approximately two (2) days prior to start of grassing operations, apply ground limestone at a rate of ½ ton per acre. Either in conjunction with the above operation or immediately afterwards, apply the specified commercial fertilizer over all areas. The fertilizer shall consist of a minimum of 85 pounds of nitrogen per acre, 60 pounds of phosphorus per acre, and 80 pounds of potassium per acre or as recommended by the soil analysis. Spread fertilizer and work into the top 4" - 6" of ground using disc harrow.

(c) Water:

The Contractor shall be responsible for providing water to the newly planted grass. On site sources such as stream and groundwater may be available. Permission from governing jurisdictions must be obtained before withdrawing water. The Contractor shall be responsible for providing temporary above-ground irrigation equipment.

(d) Soil Preparation:

Before sowing grass, the existing soil shall be loosened to a minimum 12" depth by using "Knife Point Type Sub-Soiler Attachment" (maximum spacing of tines 8" on centers). Prepare the bed by thoroughly cultivating discing and hand raking, as necessary to produce a smooth even grade free of hollows or other inequalities. Areas sown must be smoothed to a point such that the usage of the Owner's maintenance equipment in the area does not cause abnormal wear or damage to the equipment and does not induce discomfort to the equipment operator. Smoothness shall be developed to the level acceptable to the Owner.

(e) Seeding:

Before any seed is sown, the area to be seeded shall be soil conditioned as required herein, and brought to a pleasing finished grade in conformance with the plans and as directed. In the event that prior conditioned soil has become compacted by rain, equipment or other sources, the entire area or compacted portions thereof shall be again conditioned as directed, in such a manner as to present a finely pulverized, smooth, even seed bed of not less than two inches (2") in depth at time of sowing.

After sowing the seed, the entire area shall be lightly raked or dragged, either by hand or mechanical equipment, to cover all seed in accordance with the table.

All areas within the seeding limits of this project, except paved, building and other areas designated, shall be seeded as herein

specified. Grass seed shall be sown evenly by hand or mechanical broad cast in two operations of equal amounts, and at right angles to each other.

No seeding shall be done when wind velocities exceed five miles per hour, or when poor results are being obtained due to adverse soil or weather conditions.

(f) Mulching:

All areas planted in grass seed shall be mulched within twenty-four (24) hours after seeding operations have been completed. Wheat straw mulch shall be uniform, loose (not matted) and a maximum depth of one (1) inch. Recommended application is two and a half (2 ½) tons per acre. Hay is not acceptable.

(g) Watering:

Soak soil bed to a minimum depth of 6" immediately after seeding. Do not wash away soil or seed. Keep all surfaces continuously moist thereafter until 30 calendar days after the area has been seeded.

(h) Maintenance and Protection:

(i) Maintenance of grass consist of watering, weeding, cutting, repair of any erosion and reseeded, as necessary to establish a uniform stand of the specified grass, and shall continue until acceptance.

(ii) All areas that do not show satisfactory growth within 15 days after sowing shall be re-sown and re-fertilized as directed until a satisfactory growth is established. Approximately 3 weeks after sowing the last seed, but not before the seed has taken hold and the grass is growing well, apply sulphate of ammonia or sodium nitrate at the rate of 300 pounds to the acre and immediately water in. A 12" by 12" grassed area shall be considered established when it is reasonably free from weeds, green in appearance and the specified grass is vigorous and growing well. It is not required that the area be as thick and heavy as an old established lawn, but the runners must be interlaced over the entire area. (At least 98% grass cover with no bare spots exceeding one square foot and the surface is fully stabilized against erosion).

(iii) Established coverage is required in 60 days.

(i) Protection:

All areas shall be protected until accepted. All eroded and damaged areas, regardless of cause, shall be immediately repaired and re-established.

(j) Final Review and Acceptance:

- (i)** As soon as the grassed areas have become established as required above, a final review of the areas will be made, provided a written request for such review is given to the Engineer or representative of the Owner. If the Work is found to be satisfactory and in accordance with all requirements of the contract documents, the Work will be accepted.
- (ii)** The Contractor may request review for acceptance 60 days after completing all seeding Work.
- (iii)** The Engineer may reject any areas of grassing in which any square foot of area is not covered by at least one runner of the type grass specified.

(k) Planting Times:

Planting is recommended between August 15 and October 15 or between May 1 and June 1, or during the season or seasons which are normal for such Work as determined by weather conditions and accepted practice in the locality.

A temporary vegetative cover shall be required if seasonal requirements for planting are not correct at the time grading operations are complete. Seeding shall be performed in the manner outlined in these specifications. Before permanent grassing is begun, the Contractor shall restore and prepare the ground surface as required by these specifications. Temporary grassing shall be at the Contractor's expense. Temporary seeding shall be as follows:

Temporary Seeding	LBS/Acre	Depth of Cover	Date of Planting
Annual Ryegrass	40	1/4" - 1/2"	8/15 - 3/31
Pearl Millet	50	1/4" - 1/2"	5/1 - 8/15

Grassing will be done as soon as practical after grading operation for utility installations and in no case will the grassing operation fall more than 1,000 feet behind the utility installation.

E. Sodding:

- (1) **Scope** - Sodding shall consist of establishing certain critical areas with sod as designed on the Drawings.
- (2) **Products:**
 - (a) **Sod:**
 - (i) Sod shall consist of a live, dense, well-rooted growth of turf grass species as noted on the Drawings. The sod shall be free from Johnson grass, nut grass and other obnoxious grasses and shall be of suitable character for the purpose intended and for the soil in which it is to be planted. It shall be un-injured at the time of planting.
 - (ii) Sod shall be uniform in thickness, having not over 2 inches or less than 1-inch of soil.
 - (iii) Sod strips shall have a consistent width of 12 or 18 inches.
 - (b) **Fertilizer:**
 - (i) Fertilizer (10-10-10) used in connection with sodding, shall contain 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash. The fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearly marked. The containers shall ensure proper protection in handling and transporting the fertilizer. All commercial fertilizer shall comply with local, state and federal fertilizer laws.
 - (ii) Ammonium nitrate shall be a standard commercial product, shall conform to the requirements for other commercial fertilizers as specified above, and shall have a minimum of 32 ½ percent nitrogen.
 - (iii) Lime - Agricultural limestone shall be dolomitic and contain not less than 85 percent of calcium carbonate and magnesium carbonate combined, and shall be crushed so that at least 85 percent will pass the No. 10 mesh sieve and 50 percent will pass a No 40 mesh screen.
- (3) **Weather Limitations** - Sod shall be planted only when the soil is moist and favorable to growth. No planting shall be done between October 1 and April 1 unless weather and soil conditions are considered favorable and permission is granted by the Engineer.

(4) Execution:

(a) Sodding:

- (i)** The area to be sodded shall be constructed to the lines and grades indicated on the Drawings or as directed by the Engineer, and the surfaces loosened to a depth of not less than 3 inches with a rake or other device. If necessary, it shall be sprinkled until saturated at least 1 inch in depth, and kept moist until the sod is placed thereon. Immediately before placing the sod, the fertilizer shall be uniformly applied at the rate of 12 pounds of Grade 10-10-10, or equivalent, per 1,000 square feet. Agricultural limestone shall be applied at the rate of 50 pounds per 1,000 square feet.
- (ii)** The entire area shall be thoroughly covered with sod. The sod shall be placed on the prepared surface with the edges in close contact and, as far as possible, with staggered joints.
- (iii)** The sod shall be maintained moist from time of removal until reset but shall be placed as soon as practicable after removal from place where growing. Immediately after placing it shall be rolled with a lightweight roller or hand tamped to the satisfaction of the Engineer.
- (iv)** Sod on slopes steeper than 3 to 1 shall be held in place by wooden pins about 1 inch square and 6 inches long, driven through the sod into the soil until they are flush with the top of the sod.

(b) Watering and Maintenance:

- (i)** The sod shall be watered as directed by the Engineer for a period of two weeks after which ammonium nitrate shall be applied at the rate of three pounds per 1,000 square feet and the sod given a final watering.
- (ii)** The Contractor shall not allow any equipment or material to be placed on any planted area and shall erect suitable barricades and guards to prevent Contractor's equipment, labor or the public from traveling on or over any area planted with sod.

- (iii) It shall be the obligation of the Contractor to secure a satisfactory growth of grass before final acceptance of the project.

Tables 2.22-1A ~ Some Permanent Plant Species, Seeding Rates, and Planting Dates

Species	Rates per Acre	Rates per 1,000 sq. ft.	Planting Dates by Region			Remarks
			M-L	P	C	
Bahia, Pensacola Alone or with temporary cover With other perennials	60 lbs. 30 lbs.	1.4 lbs. 0.1 lb.	---	4/1-5/31	3/1-5/31	Low growing; sad producing; will spread into Bermuda lawns.
Bahia, Wilmington Alone or with temporary cover With other perennials	60 lbs. 30 lbs.	1.4 lbs. 0.1 lb.	3/15-5/31	3/1-5/31	---	Same as above.
Bermuda, Common (Hulled seed) Alone With other perennials	10 lbs. 6 lbs.	0.2 lb. 0.1 lb.	---	4/1-5/31	3/15-5/31	Quick cover; low growing; sad forming; needs full sun.
Bermuda, Common (Unhulled seed) With temporary cover With other perennials	10 lbs. 6 lbs.	0.2 lb. 0.1 lb.	---	10/15-2/28	11/1-1/31	Plant with Winter annuals. Plant with Tall Fescue
Bermuda Sprigs Common lawn and Forage hybrids	40 cu. ft. Sad plugs 3'x3'	0.9 cu. ft.	4/15-6/15	4/1-6/15	4/1-5/31	1 cu. ft. = 650 sprigs; 1 bu. = 1.25 cu. ft. or 800 sprigs

Table 2.22-1B ~ Some Permanent Plant Species, Seeding Rates, and Planting Dates (Continued)

Species	Rates per Acre	Rates per 1,000 sq. ft.	Planting Dates by Region			Remarks
			M-L	P	C	
Crown Vetch With winter annuals or cool season grasses	15 lbs.	0.3 lb.	9/1-10/15	9/1-10/15	--	Mix with 30 lbs. Tall Fescue or 15 lbs. Rye; inoculate seed; plant only North of Atlanta.
Fescue, Tall Alone With other perennials	50 lbs. 30 lbs.	1.1 lbs. 0.7 lb.	3/1-4/1 or 8/15-9/30	8/15-10/15 or 2/15-4/15	--	Mix with perennial Lespedezas or Crown Vetch; not for droughty soils or heavy use areas.
Lespedeza, Sericea Scarified	 60 lbs.	 1.4 lbs.	 4/1-5/31	 3/15-5/31	 3/1-5/15	Widely adapted and low maintenance; takes 2-3 years to establish; inoculate seed with EL inoculant.; mix with Weeping Lovegrass, Common Bermuda, Bahia or Tall Fescue.

Table 2.22-1C ~ Some Permanent Plant Species, Seeding Rates, and Planting Dates (Continued)

Species	Rates per Acre	Rates per 1,000 sq. ft.	Planting Dates by Region			Remarks
			M-L	P	C	
Lespedeza, Sericea (cont.) Unscarified	 75 lbs.	 1.7 lbs.	 9/1-2/28	 9/1-2/28	 9/1-2/28	Mix with Tall Fescue or winter annuals.
Seed-bearing hay	3 tons	138 lbs.	10/1-2/1	10/1-2/28	9/15-1/15	Cut when seed is mature but before it shatters. Add Tall Fescue or winter annuals.
Lespedeza, Ambro Virgata or Appalaw Scarified	 60 lbs.	 1.4 lbs.	 4/1-5/31	 3/15-5/31	 3/1-5/15	Spreading growth with height of 18"-24"; good in urban areas; slow to develop good stands; mix with Weeping Lovegrass, Common Bermuda, Bahia Tall Fescue or winter annuals; do not mix with Sericea Lespedeza; inoculate seed with EL inoculant.
Unscarified	75 lbs.	1.7 lbs.	9/1-2/28	9/1-2/28	9/1-2/28	

Table 2.22-1D ~ Some Permanent Plant Species, Seeding Rates, and Planting Dates (Continued)

Species	Rates per Acre	Rates per 1,000 sq. ft.	Planting Dates by Region			Remarks
			M-L	P	C	
Lespedeza, Shrub (Lespedeza Bicolor or Lespedeza Thumbergii) Plants	3'x3' spacing		11/1-3/31	11/1-3/15	11/15-2/28	Plant in small clumps for wildlife food and cover.
Lovegrass, Weeping Alone With other perennials	4 lbs. 2 lbs.	0.10 lb. 0.05 lb.	4/1-5/31	3/15-5/31	3/1-5/31	Quick cover; drought tolerant; grows well with Sericea Lespedeza on road-banks and other steep slopes; short lived.
Maidencane sprigs	2'x3' spacing		2/1-3/31	2/1-3/31	2/1-3/31	For very wet sites such as riverbanks and shorelines. Dig sprigs locally.
Panicgrass, Atlantic Coastal	20 lbs.	0.5 lb.	---	3/1-4/30	3/1-4/30	Grows well on coastal sand dunes; mix with Sericea Lespedeza but not on sand dunes.
Reed Canary Grass Alone With other perennials	50 lbs. 30 lbs.	1.1 lbs. 0.7 lb.	8/15-10/15	9/1-10/15	---	Grows similar to Tall Fescue; for wet sites.

Table 2.22-1E ~ Some Permanent Plant Species, Seeding Rates, and Planting Dates (Continued)

Species	Rates per Acre	Rates per 1,000 sq. ft.	Planting Dates by Region			Remarks
			M-L	P	C	
Sunflower, Aztec Maximillian	10 lbs.	0.2 lb.	4/15-5/31	4/15-5/31	4/1-5/31	Mix with Weeping Lovegrass or other low growing grasses or legumes.
Switch grass	20 lbs.	0.4 lb.	4/1-5/31	4/1-5/31	4/1-5/31	For streambank plantings, drainage ditches, and wet areas.

1. Rates are for broad casted seed. If a seed drill is used, reduce the rates by one-half.

2. PLS is an abbreviation for Pure Live Seed.

Suggested Seedbed Depths

Slope	Seedbed Depth
3:1 or Flatter	Less than 4" Depth
2:1 to 3:1	1 " to 4" Depth
2: 1 or Steeper	Depressions every 6"-8" hand dug, if necessary

G. Erosion Control:

Plan excavation work to prevent erosion and the washing of soil into adjacent streams. Limit the amount of open excavation at any one time. Place spoil in the proper place and keep natural water routes open. Install appropriate erosion barriers or blankets as required to prevent sediment from leaving the immediate work site. All sewer line trenches will not be excavated more than 400 feet in advance of pipe laying.

(1) Submittals and Permits:

- (a)** The Contractor/Developer shall submit description, drawings and schedule for proposed temporary and permanent erosion and sedimentation controls to the MWA. The description and drawings shall meet the requirements of the Georgia Erosion and Sedimentation Act of 1975 as amended, and local soil and sedimentation control ordinances. The Contractor/Developer shall acquire Land Disturbance Permits from the appropriate authority and shall pay any fees for said permits. The Contractor/Developer shall be responsible for submitting to the appropriate authority sufficient documents such that the authority can acquire approval from the local Soil and Water Conservation District. All fines imposed for improper erosion and sedimentation control shall be paid by the Contractor/Developer. All erosion and sedimentation control measures and BMP' s must be in compliance with the Act of 1975.
- (b)** If applicable to project, the Contractor/Developer shall file a Notice of Intent (NOI) with the Environmental Protection Division to be covered under the General Permit for Stormwater Discharge Associated with Construction.
- (c)** Land disturbance activity shall not commence until the Land Disturbance Permit is issued. All erosion and sedimentation control measures will be installed in accordance with the Manual for Erosion and Sedimentation Control in Georgia, latest edition.
- (d)** All erosion and sedimentation controls must be installed prior to initiation of construction activity.

(2) Basic Principles:

- (a)** Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.
- (b)** Minimize the disturbed area and the duration of exposure to erosion elements.

- (c) Stabilize disturbed areas immediately.
 - (d) Safety convey run-off from the site to an outlet such that erosion will not be increased off site.
 - (e) Retain sediment on site that was generated on site.
 - (f) Minimize encroachment upon watercourses.
 - (g) Clean-up and grassing operations shall be maintained within 1000 feet of the pipe laying operation and shall occur within seven days after the pipe has been installed.
- (3) **Temporary Erosion and Sedimentation Control:** In general, temporary erosion and sedimentation control procedures shall be directed toward:
- (a) Preventing soil erosion at the source
 - (b) Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.
 - (c) Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.
- (4) **Permanent Erosion Control:**

Permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

NOTE: Macon Water Authority policy states that for all projects budgeted by the Macon Water Authority, a consultant shall be hired to monitor the maintenance of erosion control and sedimentation controls on a 24 hour, every day basis. For private projects, the Macon Water Authority requires the contactor/owner to hire an individual to monitor the erosion and sedimentation controls on a 24 hour, every day basis.

H. Disposal of Rubbish:

Dispose of all material cleaned and grubbed during the construction of the project in accordance with the applicable codes and rules of the appropriate regulatory agencies, county, state and federal.

I. Excavated Area:

Any excavated area left open overnight shall be properly protected with flashing lights and barricades.

J. Rip Rap:

(1) Stone Rip Rap:

Use sounds, tough, durable stones resistant to the action of air and water Slabby or shaley pieces will not be acceptable. Unless shown or specified otherwise, stone rip rap shall be Type 1.

(2) Type 1 Rip Rap: Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specification for Type 1 Stone Dumped Rip Rap.

(3) Type 3 Rip Rap:

Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specifications for Type 3 Stone Dumped Rip Rap.

K. Filter Fabric:

(1) Filter fabric shall conform to the Georgia Department of Transportation Standard Specifications, Section 881.06 for woven fabrics.

(2) Filter fabric shall be an approved product on the Georgia Department of Transportation Qualified Product List No 28, latest edition.

L. Silt Fences:

(1) Sediment Barriers:

A temporary structure constructed of silt fences, straw or hay bales, brush, logs, gravel or other filtering material. They are installed to prevent sediment from leaving the site or from entering natural drainage ways or storm drainage systems. They are not to be used on high-risk areas or where there will be a possibility of failure. A non-reinforced silt fence is installed for areas less than ¼ acre per 100 feet of fence. This applies only if the area is flat or has a slope of less than 2%. For specs greater than 2% refer to Table 1. Two heights of silt fences are available (36 in and 22 in). In order to determine which to use, the project duration, slope gradient, and slope length must be known. Approved silt fence fabrics are listed in the Georgia Department of Transportation List #36.

To install a silt fence properly, a 4 inch or 6 inch trench is due and 2 inches of the fence is folded vertically to the direction of the flow. All undercutting or erosion of the toe anchor trench must be repaired immediately with compacted backfill material. A silt fence is never to be placed in ditches, waterways, across streams, or other areas where concentrated flow is to be expected. In these areas, rock

checkdams, sediment traps or basins are to be used. Silt fencing is to be installed parallel to existing contours or constructed in level alignments. Ends of fencing must be extended 10 feet, traveling upslope at 45 degrees to the alignment of the main fencing section.

The fence is to be inspected after every rainfall and on a weekly basis. Any necessary repairs are to be made immediately. Any unaccumulated sediment is to be removed as required to keep the fence functional (removal of deposits where accumulation reaches 1/2 the above ground height of the fence for wire raked fence and 1/3 of the above ground height for standard fence). The contractor must maintain sediment barriers until the project is vegetated or accepted. Sediment barriers are to be replaced whenever damage has occurred or has deteriorated to such an extent that its effectiveness is greatly reduced.

SLOPE	MAXIMUM SLOPE LENGTH BEHIND FENCE IN FEET
<2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20	15

M. Dust Control:

The Contractor is required to use all means necessary to control dust and other airborne particles on and/or near the work and all off-site borrow areas. The contractor shall thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of work on the site.

ADDENDUM A

**PUMP STATION INSTRUMENTATION,
PANELS, SURGE CONTROL, LOOP
DESCRIPTIONS, CONTROL DEVICES,
LOGIC CONTROLLERS, GROUNDING**

TELEMETRY AND SCADA HARDWARE

PART I GENERAL

1.01 SCOPE

- A. Work provided under this Division includes final system design, furnishing all components, system configuration, system installation services, required support services and complete documentation for the Instrumentation and Control (I/C) system. This work shall include, but not be limited to, all materials, labor and tools required to fabricate, deliver, unload, handle, erect, adjust, calibrate, and test a complete and operable I/C system as indicated on the Drawings and Specifications. Install all panels and designated instrumentation devices and provide all electrical, mechanical and pneumatic interconnection between the various components and their local sources of supply.
- B. It is the intent of these Specification for the System Manufacturer to provide a complete and operational I/C system. Additional items of equipment, materials or labor not specifically called for by these Specifications, and which may reasonably be considered to make the system complete and operational, shall be supplied as part of this work.
- C. Conductors: Discrete signal conductors, twisted pair analog signal conductor terminations are provided under this Section. This shall include, but not be limited to, terminations for all control panels and field devices. Where it is necessary to extend existing wiring, provide any required junction boxes, wiring and conduit. Termination within junction boxes shall be made by using terminal blocks as specified in Section 17100.

1.02 SYSTEM DESCRIPTION

- A. The system consists of one remote site which shall be fitted with new telemetry hardware and polled from an existing master PLC located at the Macon Town Creek Water Plant. Existing operator interface graphics shall be updated at the Town Creek facility, Martin Luther King (MLK) Boulevard facility and Poplar Street WWTP facility.
- B. The existing telemetry system has the following master, repeater and submaster locations:
 - 1. Town Creek WTP (Master).
 - 2. 790 Second Street (Repeater).

3. Breezy Hill Pump Station (Submaster).
 4. Forsyth Road Pump Station (Submaster)
 5. Heath Road Elevated Tank (Submaster).
 6. Airport North Tank (Submaster).
 7. Bowden Elevated Tank (Submaster)
 8. Poplar Street WWTP Lime Silo (Submaster).
- C. The System Manufacturer shall verify and guarantee all radio paths as a part of this project. Path verification shall include field signal strength verification by the System Manufacturer. The System Manufacturer shall confirm which radio paths are viable and shall inform the Engineer of any sites which may be accessed via radio.
- D. Prior to the bid, a site tour will be set up so that each of the prospective bidders may see what work is required at each site.

1.03

QUALITY ASSURANCE

- A. The System Manufacturer shall ensure that the I/C system is an integrated system, and the System Manufacturer shall provide all of the equipment and appurtenances – regardless of manufacture – and be responsible for correct operation of the entire system.
- B. The System Manufacturer shall be responsible for the detailed design and the proper functioning of the I/C system, programming and/or configuration of all digital hardware, preparation of required submittal data, including operations and maintenance manuals, tests, start-up including operational demonstrations, providing for installation and connection to equipment, and training of the Owner’s operating personnel.
- C. The System Manufacturer shall be regularly engaged in the type of work called for under these Specifications and must have capital facilities, personnel, plant and service capabilities required to successfully prosecute the work. The System Manufacturer shall have employed competent personnel experienced in the design, manufacturer, and programming of equipment and systems required.
- D. Acceptable Manufacturers
1. U. S. Filter Control Systems, Ames, Iowa

1.04

SUBMITTALS

- A. Make submittals in accordance with the requirements of Macon Water Authority's Shop Drawings, Product Data and Samples. Divide submittal into separate sections as listed below. Refer to related work sections for additional requirements.
- B. Field Devices: This volume includes primary elements, transmitters, etc. List all dimensions, enclosure types, ranges, and signal form or value. Provide data on special cables between sensing elements and electronics units and any special equipment used for calibration of a particular device.
- C. Control Panels: This volume includes dimensions, terminal block designations, front panel arrangement, bank panel layout, and ladder logic diagrams for both discrete component type control panels and sensor sampling panels. Provide cut sheets for all panel components, including PLC equipment, indicator ranges and nameplate schedule. All connections for new instruments terminating in the System Manufacturer's panels shall be clearly shown. Any miscellaneous equipment not clearly falling into one of the above volumes should not be included in the control panel section.

1.05 **RECORD DRAWINGS**

- A. Provide all information listed in Article 1.05 above, corrected to reflect the system as-built. Include also any instruction books, operation manuals, and other information pertaining to service and maintenance.
- B. Bind record drawings in three ring, hardback notebooks complete with tabs and index. Include manufacturers name, address, and telephone numbers to contact for service. For all major components, provide a recommended spare parts list.

1.06 **ENVIRONMENT**

- A. Local Control Panels: Local control panels shall be capable of operating between 32 degrees and 140 degrees F and 5 to 95 percent relative humidity without condensation. A 120 VAC (+ 10 percent) single phase three wire grounded power source will be supplied.
- B. Field Devices: Unless otherwise noted, field devices shall be housed in NEMA 4XD enclosures made of stainless steel, fiberglass or as noted in individual Specifications. Ambient temperature rating shall be suitable for the Project locale. All enclosures located out-of-doors shall be provided with adequate sunscreens.

1.07 **WARRANTY AND EXTENDED MAINTENCE**

- A. System Acceptable: See Article 3.04.
- B. Warranty: One year from the date of acceptance of the system by the Owner. The date of system acceptance does not necessarily coincide with the date of substantial completion of the Project.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Quality Standards: It is not the intention of these specifications to detail every component, accessory, signal conditioning device, etc that is required to provide a complete system. The System Manufacturer shall select these items from established manufacturers with a proven history of service and support.
- B. Electronic Equipment: All solid state, printed circuit boards and components shall be suitable for the specified environment. Provide complete circuit diagrams for troubleshooting and repair. All parts shall be replaceable with standard commercial components without degrading the performance of the complete assembly.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The system, peripherals, and accessory equipment shall be installed in accordance with the manufacturer's instructions and located as discussed in the pre-bid conference unless otherwise approved by the the Engineer.
- B. All work shall be executed in full accordance with all applicable codes and local rulings. Should any work be performed contrary to said rulings, ordinances, or regulations, the System Manufacturer shall bear the full responsibility for such violations and assume all costs arising therefrom.

3.02 SYSTEM NOISE REJECTION

- A. Electrical isolation shall be provided between input systems and the processor units. Noise rejection for common mode shall be at least 1000 decibels (db), from 0 to 100 Hertz, and up to 175 volts. Normal voltage rejection shall be not less than 35 db at 60 Hertz.

- B. All instrument signal wiring, control wiring and AC power wiring shall be protected against lightning, spikes, and other transient surges at all field and control panel termination points. Lightning and surge protection shall protect the instrumentation and control system from induced surges in analog, discrete and control circuitry and power supply lines. The protective devices shall not interfere with the normal operation of the instrument and control system hardware and shall be designed not to have a maximum clamping voltage in excess of what the protected device is capable of withstanding. Grounding for all surge protection devices shall be per the vendor's recommendations. Protection devices for all analog and discrete control writing and digital data transmission lines which enter or exit buildings or which are located out-of-doors shall be at both ends of the wire and as close as possible to the item being protected. Protection devices for all instrumentation and control system power supplies shall be installed on individual 120 VAC supply wiring to control panels, cabinets and each field instrument. Field instruments and antennas shall be protected by individual surge suppressors.

3.03 **GROUNDING**

- A. Bond all instrument and control panel enclosures to the power system ground.
- B. Ground analog signal conductor shields at the control panel end only.

3.04 **TESTS AND ACCEPTANCE**

- A. The equipment and programs shall be factory tested prior to shipment for compliance with the conditions of this section, these specifications and for environmental conditions.
- B. After installation of the complete system, the System Manufacturer shall provide services of a qualified systems engineer to test the complete system under the observation of the Engineer to verify that all functions specified are performed without error malfunction. As a part of the tests procedure, Contractor's personnel, when requested of the System Manufacturer, shall cause each remote process to change state or value three times to verify all functions during the checkout period, as required. This shall be repeated until the system performs correctly to the satisfaction of the Owner.

3.05 **TRAINING**

- A. The System Manufacturer shall provide training courses for Owner's

personnel as follows. The courses shall be taught by professional, full-time instructors. All course materials as required to adequately support the material presented must be included. The Owner will bear the cost of student transportation and board.

1. Operator Familiarization

- a) Length: 1 day
- b) Number of Students: 10
- c) Location: Owner's plant site
- d) This course will be taught on-site to ensure the plant operating and maintenance personnel will be thoroughly familiar with the system as delivered.

END OF SECTION

PART I GENERAL

1.01 SCOPE

- A. In general, simple analog and discrete control logic and indication requirements are depicted on the Process and Instrumentation Diagrams (P & ID) supplied as part of this package. Where additional information is necessary, it is included in the descriptions that follow.
- B. The items described in Article 1.02 are loop descriptions for typical plant unit operations. It is intended that these descriptions, in conjunction with the P & I Diagrams, provide sufficient system configuration information for the majority of simple control systems. Where additional descriptions are necessary or where control logic deviates from these general descriptions, it is described in Article 1.04.

1.02 LOOP DESCRIPTIONS – GENERAL

- A. Equipment protection interlocks and safety interlocks (motor temperature and moisture switches emergency stops, low-low level shutdowns, etc.) shall be hardwired and shall not reside in the plant control system. Hardwired equipment protection interlocks and safety interlocks shall be functional at all times, regardless of operating mode (hand, auto, local, remote, etc.)
- B. All motor control logic in the plant control system shall include “command disagree” logic. The plant control system shall generate a “command disagree” alarm to alert the operator that a fault has occurred for any of the following conditions:
 - 1. If a motor is called to run by the control system and no run feedback is received by the plant control system within a preset, adjustable period of time. This shall only be applied to those motors that have run feedback to the plant control system.
 - 2. If a motor is running based on a manual command generated through the plant control system or based on an automated sequence in the plant control system, and run feedback is lost by the plant control system for a preset, adjustable period of time. This shall only be applied to those motors which have run feedback to the plant control system.

3. If a motor is called to run based on a manual command generated through the plant control system or based on an automatic sequence in the plant control system, and the feedback from the “Hand/Off/Auto” or similar field mounted switch indicates that the unit is not in the “Automatic” mode. This shall only be applied to those motors which have “Unit in Auto” feedback to the plant control system.
- C. All analog inputs shall be monitored by the plant control system to identify “out of range” signals (less than 4 mA or more than 20 A). If the control system detects an “out of range” signal which continues for more than five minutes, an alarm signal shall be generated by the plant control system. The alarm shall identify the particular analog signal that is out of range.
 - D. In general, all analog input scaling shall be performed in the operator interface software.

1.03

TYPICAL LOOP DESCRIPTIONS

- A. Typical Motor Status Monitoring – Constant Speed Motors
 1. Motor run (typically designated “XI” and annotated “Run”) and overload (typically designated “XA” and annotated “Over Load”) status will be indicated in the plant control system.
 2. Where conditions other than motor overload are sensed in the MCC (e.g., motor temperature or moisture switch activated), the fault condition is combined with motor overload and the resulting fault (typically designated “XA” and designed “Fault”) status will be indicated in the control system.
 3. Total unit run time (typically designated “KQI” and annotated (“Run Time”)) will be provided for the motor in the plant control system.
- B. Typical Motor Status Monitoring – Variable Speed Motors
 1. Motor run (typically designated “XI” and annotated “Run) and combination VFD fault and motor overload (typically designated “XA” and annotated “Fault”) status will be indicated in the plant control system.
 2. Where conditions other than VFD fault and motor overload are sensed in the MCC (e.g., motor temperature or moisture switch activated), the fault condition is combined with motor overload

and VFD fault and the resulting fault (typically designated “XA” and annotated “Fault”) status will be indicated in the control system.

3. Total unit run time (typically designated “KQI” and annotated “Run Time”) will be provided for the motor in the plant control system.

END OF SECTION

SECTION 17100
Control Panels

PART I GENERAL

1.01 **SCOPES**

Control panels

1.02 **SUBMITTALS**

A. The Contractor shall furnish the following items from the System Manufacturer for approval prior to fabrication:

1. Layout drawings of the front of the panel showing mounting dimensions for all instruments and associated hardware.
2. Assembly drawings shall include:
 - a) Details of panel fabrication including outline and locations of rear of panel mounted equipment
 - b) Wiring layout
 - c) Wiring and tubing interconnection diagrams
3. Electrical wiring and termination drawings
4. Complete bill of materials describing all panel components.

1.03 **RECORD DRAWINGS**

Submit shop drawings as listed under Article 1.02 above plus operation and maintenance information.

1.04 **DELIVERY, STORAGE AND HANDLING**

- A. Wrap the completed panel in polyethylene plastic and crate in a wooden shipping crate with sufficient packing to avoid damage in shipment.
- B. Support the base of the shipping crate with the cross members of sufficient strength and clearance to allow movement of the entire crated panel by fork lift trucks.

PART 2 PRODUCTS

ENCLOSURE

- A. Provide wall mounted, free standing, or walk-in enclosures as scheduled.
- B. Provide NEMA 12 enclosures for control panels located indoors and NEMA 4X for outdoor locations unless otherwise noted. All NEMA 4X panels shall be 316 stainless steel. All outdoor panels shall be provided with sunscreens.
- C. In all NEMA 4X outdoor enclosures, provide a thermostat controlled space heater and corrosion inhibitor blocks. Provide NEMA 4 X rated devices or mount devices on interior panel and provide door mounted tempered glass or polycarbonate viewing window.
- D. Free-standing enclosures are a minimum of 24-inches deep.
- E. Steel enclosures shall be fabricated from a minimum 14 gauge steel with all seams ground smooth, all corners rounded and all flat surfaces smooth with no ripples, dimples, or surface imperfections and no screws, bolts, or nuts visible from outside. Thoroughly clean and degrease the steel shell before painting. Apply one coat of a rust inhibiting primer and two coats of air dry enamel or acrylic with flattening agent to produce a smooth semigloss finish. Colors are to be chosen by the Engineer.
- F. Install a continuous hinged front access door. For free-standing enclosure, furnish a three point latch. A single point latch is acceptable for wall-mounted enclosures. Wire door mounted instruments and controls to stationary components with suitable flexible connections and protection where wiring crosses the hinge. Provide double or multiple doors as required for stability and smooth mechanical operation.
- G. Terminate all tubing and electrical connections at the bottom of the panel to bulkhead fittings and terminal boards, with all external connections properly identified for field connections.
- H. Provide a circuit breaker rated 20 amps, single pole, 22,000 AIC, mounted in the rear of the panel to disconnect power. Mount an engraved nameplate (white letters, red background) to read “WARNING – This panel energized by foreign control power sources. Equipment will be live with panel disconnect in either on or off position.”
- I. Internal panel sub-feeds of 120 VAC power shall be divided into

separate circuits protected by properly sized circuit breakers or fuses. As a minimum, the following separate circuit divisions shall be provided:

- 1) Panel light(s) and panel fans (where used) shall have a separate, suitably sized circuit breaker.
 - 2) Each receptacle shall be provided with a separate, suitably sized circuit breaker.
 - 3) Power to the panel UPS shall be provided with a separate, suitably sized circuit breaker.
 - 4) Where panels are provided with thermostatically controlled heaters, the heater power feed shall be provided with a separate, suitably sized circuit breaker.
 - 5) Each power supply, include 24 volt power supplies, power supplies for PLC's, power supplies for fiber optic transceivers, etc. shall be provided with separate, suitably sized fuses.
 - 6) Where panels provide 120 volt power to field mounted instruments, each instrument shall be provided with a separate suitably sized fuse.
- J. Provide a ¼ x 3 / 12 inch copper ground bus in the rear of the panel. Bond to the metal enclosure, power system ground, and control and signal circuit grounds.
- K. Provide a minimum 25 percent spare, continuous panel/subpanel mounting area to accommodate future panel expansion.
- L. The System Manufacturer shall investigate the spaces allocated for control panels at the telemetry sites and inform the Engineer of any potential problems.
- M. The System Manufacturer shall wire all furnished I/O to terminal blocks.

2.02

WIRING

- A. Install a minimum of #16 AWG copper stranded, 600 volt, extra flexible type for all control wiring 50 volts and above, and a minimum of #18 AWG twisted shielded pair for analog signal conductors. Color code wires as follows:
- 1) Ground: Green
 - 2) Neutral: White
 - 3) Line Conductor (150 volts or less to ground): Black
 - 4) Control (150 volts AC or less): Red
 - 5) Control (150 volts DC or less): Blue

- 6) Interlock control circuits supplied from external power source: Yellow or pink.
 - 7) Signal, Shielded and Special Cables: Identify with wire markers.
- B. Mark all wires with approved wire markers at all terminations. Clearly mark all terminal blocks with typewritten or ink markings. Label all devices mounted on the steel sub panel. Label all devices mounted on the panel front with engraved lamacoid nameplates, fastened with crews, of colors chosen by the Engineer.
- C. Neatly bundle and secure all wirings with plastic ties. Route back-panel wiring in slotted plastic wireways with snap-on covers.
- D. Terminal blocks shall be provided for all field wiring connections to the panel. This includes shield terminals for shielded cables. Terminal blocks may be mounted horizontally or vertically and shall be easily accessed from panel door(s). Terminal blocks shall be DIN rail mounted, screw clamp, feed through type with 600 volt minimum rating. A minimum of 20 percent extra terminals shall be provided on the terminal blocks. Each terminal shall be clearly and permanently marked. Provide fused terminal blocks for all 120 VAC discrete inputs and outputs. All terminal blocks shall be suitably sized for #12 AWG (minimum) stranded wire. All terminal blocks shall be grouped apart, depending upon type of signal per Paragraph E below.
- E. AC or DC power wiring shall not run in any raceway with any type of instrument wiring. Wiring is to be divided into categories and shall be carried in separate raceways. The minimum acceptable groupings are:
- 1) 120 VAC, 60 Hz AC power wiring and chart drive power wiring.
 - 2) DC power to electronic instruments (does not include loop powered instruments), contact closure input and output wiring.
 - 3) All wiring carrying pulsed information.
 - 4) Standard range analog DC signals, thermocouple and up to 200 mV DC signals.
- F. Provide separate dc power supplies for field transmitter power and for PLC module power.
- G. All PLC modules and associated devices shall be fused per manufacturer's recommendations. This shall include, but not be limited to, fusing for PLC power wiring and fusing for field I/O wiring.

- H. All control panels furnished under this Section shall carry a UL label which certifies the control panel meets the requirements of UL-508A (latest revision).

2.03

RTU PANELS

- A. Small sized RTU panels designated as Type 3 enclosures shall conform to the general requirements of IO.4 with the following comments/exceptions:
 - 1) The panel layout shall accommodate a minimum two analog and two discrete Modicon Momentum modules.
 - 2) Space does not need to be provided for a future bridge/mux unit.
 - 3) The minimum panel size shall be 24 inches high, 24 inches wide and 12 inches deep for NEMA 12 (indoor) applications. The minimum panel size shall be 24 inches high, 24 inches wide and 12 inches deep for NEMA 4X (outdoor) applications.

2.04

DRAWINGS

A. Panel Construction Drawings

- 1) Shop Drawings and Catalog Cuts: Provide detailed shop drawings and catalog cuts for all panels, instrument racks and enclosures. Drawings shall show the location of all front panel and internal sub-panel mounted devices to scale and shall include a panel legend and bill of material. Layout drawings shall show all major dimensions as well as elevations in inches from the base up, of all rows of components.
- 2) The panel legend shall list and identify all front of panel devices by their assigned tag numbers, all nameplate inscriptions, service legends, and annunciator inscriptions.
- 3) The bill of materials shall include all devices including those mounted within the panel that are not listed in the panel legend, and shall include the device tag number, description, manufacturer, and complete model number.

B. Panel Wiring Diagram

- 1) Wiring diagrams shall be similar to those diagrams shown on the Drawings, but with the addition of all auxiliary devices, such as additional relays, alarms, fuses, lights, surge protection, etc.
- 2) Provide complete terminal identification of all external primary elements, panels and junction boxes that interface directly to the panel wiring being shown. Polarity of analog signals shall be shown at each terminal.
- 3) All external wiring that the electrical contractor must provide and wire shall be shown as a dotted line. Special cables that are provided with the instrument shall be clearly identified.
- 4) Panel wiring diagrams shall identify wire numbers and types, terminal numbers, and tag numbers. Wiring diagrams shall show all circuits individually. No common diagrams will be allowed.
- 5) Provide panel power wiring diagrams for all panels. The diagrams shall include the grounding requirements.

C. Interconnecting Wiring Diagrams: Diagrams shall show all component and termination cabinet identification numbers and external wire, fiber and cable numbers. This diagram shall be coordinated with the electrical supplier and shall bear its mark that this has been done.

2.05 **PANEL SCHEDULE**

Panel No.	Mounting Type	Enclosure Rating	Light/Receptacle	Locations
RTU	Stand-Mounted	NEMA 4X	No/No	Pump Station SCADA

PART 3 EXECUTION

3.01 **TESTING AND CALIBRATION**

- A. Thoroughly shop test the complete panel. Confirm that all lamps burn. Remove, box and label all parts that may come loose or detached in shipment, so that after installation, they may be easily replaced.
- B. Perform preliminary calibrations in the fabricator's shop, and final calibrations at start-up by qualified personnel.

END OF SECTION

**SECTION 17120
Surge Protection**

PART 1 GENERAL

1.01 SCOPE

Comprehensive surge protection for all instrumentation devices supplied as part of these Specifications.

1.02 GENERAL

- A. It is the responsibility of the System Manufacturer to provide appropriate protection against transients and surge for all field instruments, field wiring, and devices interfacing with control panels. All instrument signal wiring, control wiring, telephone wiring and data transmission wiring which enters or exits buildings shall be protected against lightning spike, and other transient surges at all control panel termination points. All instrument signal wiring, control wiring, telephone wiring and data transmission which in outdoor control panels shall be protected against lightning spikes, and other transient surges at all control panel termination points. All AC control power wiring shall be protected against lightning spikes, and other transient surges at all control panel termination points. Lightning and surge devices shall protect the system from induced surges in analog, discrete and control circuitry and power supply lines. The protection devices shall not interfere with the normal operation of the panel hardware and shall be designed not to have a maximum clamping voltage in excess of what the protected device is capable of withstanding.
- B. All field instruments located indoors or out-of-doors provided by the System Manufacturer under this contract shall be supplied with surge protection for 120 VAC power to the instrument.
- C. Surge protectors shall include a combination of surge suppression technologies including metal oxide varistor, gas discharge tubes, diodes, and 3 AG size fuses for line-to-line and line-to-ground protection.

1.03 SUBMITTALS

Submit detailed product data.

PART 2 PRODUCTS

2.01 FIELD INSTRUMENTS – ANALOG SIGNALS

- A. Direct mounted surge protectors for analog signals shall screw directly into the unused conduit entry hub of the instrument. The surge protector housing shall be 304 stainless steel minimum. Surge protectors shall be specifically manufactured for protecting field instruments.
- B. Where direct mount is not possible, the surge protectors for analog signals shall be located as close to the field instrument as practical. The surge protector shall be rated NEMA 4X, or shall be mounted in a 304 stainless steel NEMA 4X enclosure.

2.02 **FIELD INSTRUMENTS – DISCRETE SIGNALS**

Surge protectors for discrete signals wiring shall be located as close to the field instrument as practical. The surge protector shall be NEMA 4X, or shall be mounted in a 304 stainless steel NEMA 4x enclosure.

2.03 **CONTROL PANELS**

- A. All instrument analog and discrete signal wiring, data transmission wiring and 120 VAC power supply wiring which enters or exits buildings or which terminates in outdoor control panels shall be individually protected against lightning spikes and other transient surges at all control panel termination points.
- B. Provide surge protectors for all power wiring to control panels whether located indoors or out-of-doors.
- C. Provide surge protection for all telephone connections.

2.04 **INSTRUMENT POWER WIRING**

Provide surge protectors for all power wiring to individual instrument devices whether located indoors or out-of-doors. For instrument devices, protection shall be located as close to the device as practical. The surge protector shall be NEMA 4X, or shall be mounted in a NEMA 4x enclosure. Outdoor enclosures shall be NEMA 4x, 316 stainless steel. Indoor enclosures shall be NEMA, 4X, fiberglass.

2.05 **ANTENNAS**

Provide RF surge protectors for all antennas.

2.06 **MISCELLANEOUS DIGITAL EQUIPMENT**

Provide surge protection for all computers, printers, uninterruptible

power supplies, digital equipment power supplies, PLC, fiber optic modems, telephone modems, digital signal converters and other miscellaneous digital hardware to include communications wiring and 120 VAC power supply wiring for each device.

2.07 ACCEPTABLE PRODUCTS

SURGE PROTECTOR ACCEPTABLE MODEL NUMBERS		
Field Instrument Analog Signals Directed Mounted	TP48	S-PT1-2PE-24VDC
Field Instrument Analog Signals Remote Mounted	SD Series	UFBK-M2-PE Series
Analog Signals Control Panel	SD Series	UFBK-MS-PE Series
120 VAC Power Control Panel	MA Series	UAK2-PE/S Series
Discrete Inputs/Outputs Control Panel	SD Series	UFBK-2/2 Series
RS-232	NP Series	MT Series, D-UFB Series
RS-485	NP Series	MT Series, D-UFB Series
Telephone Line	DP200 Series	TELETRAB-4X Series
Ethernet	NP Series	D-ETH Series
Antenna Cable	CA Series	COAXTRAB Series

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install all surge protection equipment in strict accordance with manufacturer’s guidelines.
- B. For surge protectors located out-of-doors and for antenna surge protectors, surge protector grounding shall use individual ground rods located as close to the surge protector as possible. The grounding conductor shall be sized in accordance with manufacturer’s recommendations and be routed via the shortest path possible. Bends in the grounding conductor shall be avoided. If bends in the grounding conductor are unavoidable then the number of bends shall be kept to an absolute minimum.
- C. Provide installation for all field mounted surge protection equipment. Provide for all wiring terminations for surge protection equipment.

- D. If a particular piece of equipment is protected by two surge protectors in series, ensure that the resulting equipment protection is not diminished.

END OF SECTION

**SECTION 17200
CONTROL DEVICES**

PART I GENERAL

1.01 SCOPE

General purpose control components

1.02 SUBMITTALS

Submit product data.

PART 2 PRODUCTS

2.01 GENERAL PURPOSE CONTROL COMPONENTS

- A. Manual Operators: 30.5 mm heavy duty, oil tight; industrial grade pushbuttons and selector switches with octagonal ring; contacts rated 10 amps continuous, 6 amps break at 120 VAC. Provide flush head for “start” pushbuttons, extended head for “stop” pushbuttons and spring return for “jog” selector switches.
- B. Pilot Lights: 30.5 mm, heavy duty, oil tight; industrial grade transformer type pilot light with octagonal ring; 6 volt LED lamp.
- C. Elapsed Time Indicators: Six-digit, hour, non-reset, 3 ½ inch square case; equal to Yokogawa Type 240.
- E. Acceptable Manufacturers (Manual Operators and Pilot Lights): Allen-Bradley, Cutler-Hammer, General Electric, or Square D.

2.02 RELAYS

- A. Relays which interface with motor controls shall be heavy duty industrial grade; 600 volt; contacts rated 10 amps continuous, 6 amps break (5 and 3 amps respectively for time delay forms); 120 VAC; convertible contacts; coils suitable for continuous duty. Relays shall be manufactured by Allen Bradley, General Electric, or Square D.
- B. Interposing relays for non-motor control applications shall be double pole (minimum) relay contacts, rated 10 amps (minimum) at 120 VAC. Coil duty shall be continuous, with coil voltage suitable for application. Open contact breakdown voltage shall be 500 volts rms (minimum) Provide with polycarbonate dust cover, DIN rail mount

socket and holddown spring. The unit shall have a minimum expected life of 100,000 operations at rated loads. Relays shall be equal to Potter & Brumfield, Type KAP or KUP.

2.03 LOOP INSTALLATION

- A. Type: Current-to-current loop isolator
- B. Input: 4-20 mADC.
- C. Output: 4-20 mADC.
- D. Accuracy: +0.1 percent span
- E. Schedule: As Required
- F. Acceptable Manufacturers: Action Instruments, Newport, Moore Industries

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 17250
Programmable Logic Controllers

PART I GENERAL

1.01 SCOPE

Programmable logic controllers (PLC) for the remote terminal units

1.02 SYSTEM DESCRIPTION

- A. This Sections covers the technical requirements for programmable logic controllers (PLC) which will receive discrete and analog inputs, and through the use of an internal ladder logic program, control output relay operations and perform data handling and telemetry functions.
- B. The capabilities of the individual PLCs shall be as required to perform the control functions associated with the particular control panel or system.
- C. The System Manufacturer shall determine the actual amount of memory and I/O requirements necessary for each control panel to function as specified or shown on the Drawings. Each controller shall have 50 percent spare memory capacity (not less than 1K) and 10 percent spare I/O capacity (not less than four discrete inputs and four discrete outputs, and not less than two analog inputs and two analog outputs).

1.03 SUBMITTALS

- A. For each individual equipment item using PLCs, the following shall be furnished in addition to documentation requirements in other Sections.
 - 1. Complete software documentation, including ladder logic diagram printout. Printout shall include, or shall have added to it, a complete set of comments identifying relays, function of logic blocks, I/O points, etc.
 - 2. Narrative description of the sequence of operation. Description shall reference, as applicable, the ladder diagram.
 - 3. Wiring diagrams showing terminal block designations and interconnections to remote devices.
- B. For the PLC system, documentation shall consist of descriptive literature and installation operation and instruction manuals.

- C. The above items shall be included in prints for approval and prints for record. In addition, record drawings shall include PLC manufacturer's recommended list of spare parts with prices, and availability/cost of maintenance contracts and similar support services available.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

PLC to be Modicon Momentum.

2.02 GENERAL REQUIREMENTS

- A. All components in the PLC system shall be the product of a company who regularly manufactures and services this type of equipment. Wherever possible, all assemblies and sub-assemblies performing similar functions in separate controllers purchased under this Section shall be interchangeable.
- B. Components: In compliance with normally recognized industry standards and regularly sold to heavy industry installations. All connecting cables shall be constructed so as to withstand, without damage, all normal use and handling.
- C. The PLC system shall be of a modular design with a plug-in processing unit, input/output frames or assemblies, and plug-in peripherals. All necessary cables shall be included.
- D. Mark all major assemblies, sub-assemblies, circuit cards, and devices with the manufacturer's part or identification number.
- E. All components of the PLC system shall be capable of continuous operation at temperatures of 0-60 degrees C, and humidity levels of 5-95 percent.
- F. Electrical supply voltage to the individual controllers shall be 115 VAC + 10 percent, 48 – 63 Hz. Controller system power supplies shall have circuit breakers or fuses for overload protection.
- G. Each controller, including output devices, shall orderly shut down and alarm in the event of a disruption of program execution or scan, a loss of logic power, loss of communication between controller essential devices, or a memory error. A failure of one controller shall not disrupt operation of other controllers in the system.

2.03 **PROCESSOR ADAPTER (PLC)**

- A. The Processor Adapter shall be a full-fledged PLC containing a CPU, RAM, and Flash Memory.
- B. The Processor Adapter shall contain a minimum of 256K of RAM, one RS-232 port and one I/O bus port.
- C. One Option Adapter is required for each Processor Adapter. The Option Adapter shall contain a Modbus (RS232/485) Option Adapter, TOD Clock and battery backup.
- D. The status of latch relays and one-shorts, and all data from timers, counters, and math functions shall be retained during any power outage as specified above.

2.04 **COMMUNICATION ADAPTERS**

- A. Where communications to additional I/O Module Buses is required, it shall be via Interbus (I/O bus) protocol. An Interbus Communication Adapter shall be used with the I/O Module Base.
- B. Where communications to radios, modems, programming PC's, etc. is required, it shall be via Modbus protocol.

2.05 **INPUT/OUTPUT (I/O) DEVICES**

- A. Discrete Inputs/Outputs
 - 1) Discrete inputs shall be available in 24 and 115 Vac/dc. Discrete outputs shall be available in 24 Vdc, and 115 Vac. Discrete inputs and outputs shall be 115 Vac unless otherwise noted.
 - 2) Discrete inputs shall be guaranteed if at least 78 percent of nominal voltage is present. Discrete inputs shall be guaranteed off if 20 percent or less of the nominal voltage is present.
 - 3) Each discrete output shall have an individual interposing relay. See Specification 17200 for interposing relays.
- B. Analog Inputs/Outputs
 - 1) Analog inputs shall be available in 16 channel single-ended input module. Analog outputs shall be available in 4 channel output 4-20 mA modules.

2) All analog input and output modules shall be isolated. Where isolated input modules are not available, provide individual loop isolators for each input.

- C. All PLC terminal blocks shall be 300 V minimum NEM rated, and accommodate no fewer than #15 gauge wires.
- D. Marker strips shall be attached adjacent to the field wiring and the status indicating lights to allow easy identification of inputs and outputs by the user. These markers shall not change when devices are replaced during repair or maintenance. Color code marker strips according to voltage.
- E. Field wiring shall not have to be disconnected from the terminal in order to replace an I/O device during repair or maintenance.

2.06 **PROGRAM DEVELOPMENT SOFTWARE**

- A. Provide a Windows based programming software which will run on an IBM compatible PC.
- B. The programming software shall be: Modicon (Concept).

2.07 **PROGRAM DEVELOPMENT PC**

A program development PC is not included in this project. An electronic copy of the program development software and the updated (as-built) software program shall be provided to the Owner within 10 days after the I & C System Acceptance Test is complete.

PART 3 EXECUTION

3.01 **INSTALLTION**

See Remote Terminal Unit Drawing for typical RTU panel layout.

END OF SECTION

SECTION 17300
Instrumentation Devices

PART 1 GENERAL

1.01 **SCOPE**

- A. Primary elements
- B. Transmitters
- C. Receivers

1.02 **SYSTEM DESCRIPTION**

- A. System consists of all field and panel mounted instrumentation devices as noted, complete with all necessary signal converters, isolators, amplifiers, power supplies, and other appurtenances necessary for interfacing with other components.
- B. Except as noted, scale all indicators in engineering units.

1.02 **SUBMITTALS**

Submit product data.

PART 2 ALARM HORN

- A. Type: Electro-mechanical diaphragm.
- B. Mounting: As required by schedule, provide cast aluminum neoprene-gasketed weatherproof housing for outside mounted units and gasketed panel mounting kit for panel-mounted units.
- C. Diaphragm Material: Stainless steel
- D. Grille Material: Die-cast aluminum
- E. Power: 120 VAC
- F. Sound Intensity: 100 Db at 10 feet

G. Schedule

Tag
XA-1024

Mounting
Panel

H. Acceptable Manufacturer: Federal Signal Corporation Model 27XST Series C

2.02 **ALARM LIGHT (STROBE TYPE)**

- A. Type: High-intensity strobe warning light
- B. Enclosure: Corrosion-resistant NEMA 4X, suitable for outdoor service. Unit shall be suitable for mounting in Class 1, Group D, Division 2 rated areas.
- C. Power: 120 VAC
- D. Dome Color: Red, blue, or amber, as required by schedule.
- E. Schedule:

Tag	Color
XL-1024	Yellow
AAH-1023A	Red

F. Acceptable Manufacturer: Federal Signal Corporation

PART 3 EXECUTION

3.01 **INSTRUMENT TAGGING**

Provide stainless steel identification tags attached with stainless steel wire or screws for all field instruments.

3.02 **TESTS AND CALIBRATION**

- A. Perform continuity and insulation resistance tests on instrumentation conductors in accordance with Section 17120.
- B. Field calibrate each instrument to its published accuracy. Submit calibration sheets, including the instrument tag number or name, the date, name of individual performing calibration, procedures and equipment used, and results obtained.

END OF SECTION

SECTION !7400
Telemetry and SCADA System Hardware

Part 1 GENERAL

1.01 **SCOPE**

Telemetry and SCADA hardware.

1.02 **SYSTEM DESCRIPTION**

- A. The telemetry system hardware consists of radio and telephone telemetry equipment, coaxial cabling, antennas, panels, surge suppression devices, wiring and conduit for housing telemetry equipment and other telemetry equipment required to make a complete and workable system.
- B. All computer hardware shall comply with the latest amendment to Part 15 of the FCC Rules and Regulations, Dockets No. 20780 and 80-284 relating to restricted radiation devices and low power communication devices.

1.03 **SUBMITTALS**

Submit product data.

PART 2 PRODUCTS

2.01 **GENERAL REQUIREMENTS**

- A. All digital hardware shall be modular construction to provide for future hardware expansion.
- B. All remote telemetry unit PLCs shall continuously perform on-line diagnostics and provide failure reporting to the master operator interface units. Software shall be provided which keeps track of communications statistics for all radio sites, including, but not limited to, communication tries and fails.

2.02 **REDUNDANCY/FAIL-OVER REQUIREMENTS**

- A. Where redundant equipment is specified, the failure of either device in a redundant pair shall not alter the performance of the plant

control system. The fail-over shall be fully automatic and shall require no action on the part of the operator to effect the transfer from one device to its back-up.

- B. Where a failed device contains real-time control system data, the swap-over to the redundant device shall be such that no more than 3 seconds of data shall be lost.
- C. Where the failed device contains control system intelligence such as graphics or programs, the redundant device shall have this intelligence internally resident and shall not require the downloading of graphics or programming to resume system control.
- D. No degradation in control system performance shall occur when a redundant device is operating in a fail-over mode. No degradation of performance shall occur while redundant equipment is undergoing preventive or corrective maintenance.

2.03 **REMOTE TERMINAL UNITS AND I/O SUBSTRUCTURE**

Remote terminal unit PLCs and I/O substructure shall be per Section 17250.

2.04 **TELEMETRY COMMUNICATIONS**

All telemetry communications shall be Modbus for both radio and telephone telemetry equipment communicating with the master polling PLC.

2.05 **UNINTERRUPTIBLE POWER SUPPLIES**

- A. Provide uninterruptible power supply for each RTU panel containing control system processors, I/O racks or modems. Operator interface units shall have a minimum of one UPS unit for each master operator interface unit and one UPS for the 'slave' station. Each UPS unit shall be sized to provide nominal power requirements for a minimum of 15 minutes. The following devices, as a minimum, shall be provided with UPS based power:
 - 1) Modems for all forms of telemetry and digital LAN communications
 - 2) Loop powered analog devices
 - 3) Power supplies for control system processors and I/O hardware
- B. Acceptable Manufacturer: Best Power Systems

2.06

RADIOS

Radios shall be by Microwave Data Systems, Model 9810. Provide all spread spectrum radios with on-line diagnostics.

2.07

OPERATOR INTERFACE TERMINALS – TYPE 1 RTU PANELS

- A. The System Manufacturer shall provide one Operator Interface Terminal (OIT) in each Type 1 control panel. The OIT shall communicate directly with the associated PLC located in the control panel and shall be used by the operator to make adjustments to PLC software settings and to acknowledge the intrusion alarm.
- B. The OIT shall contain a fully configurable graphics touch screen display. The touch screen shall be configured with a security system login page requiring a correct operator login to proceed. The operator shall log in by selecting his/her name and entering a 4-digit personal identification number. The login page shall be configured for up to 15 operators. A correct login shall automatically acknowledge the intrusion alarm and bring up the system overview page. In addition, the central SCADA terminal at the Town Creek facility shall indicate the individual who has logged on at the remote station.
- C. Operator adjustments shall consist of changing the setpoints for analog switches. This page shall consist of appropriate graphic showing current analog signal status and current analog switch setpoints.
- D. A logout option shall be provided for operator use. The operator shall be able to logout at any time. Logging out shall return the OIT display to the security system login page. The OIT shall also be configured to automatically logout after 10 minutes of idle time. The system shall also be configured to allow the logging out of an operator from the central SCADA terminal at the Town Creek facility.
- E. The OIT shall communicate to the PLC using the PLC manufacturer's standard PLC communications protocol (Mobile Plus, Data Highway Plus, GE Genius, etc.).
- F. The OIT shall be provided with Windows compatible programming software, downloading cable, and 24 VDC power supply.
- G. The OIT shall be mounted on the door of the control panel approximately 5 feet above the floor.

H. The OIT shall be a 5” LCD monochrome type, 240 x 320 pixel resolution, black and white, NEMA 4/13. The manufacturer shall be Total Control Products (5” Quick Panel Jr).

2.08 **INTRUSION ALARM (TYPE 2 AND TYPE 3 RUT PANELS)**

Provide a small, momentary switch on the exterior of all Type 2 and Type 3 control panels. This switch shall be located in a nondescript location on the bottom of the panel, and shall be wired into the panel PLC. Once an intrusion is detected, if this switch is not activated in a preset, adjustable length of time (initial setting – 2 minutes), an intrusion alarm shall be activated at the central SCADA terminal at the Town Creek facility.

2.09 **MISCELLANEOUS TELEMETRY COMPONENTS**

Provide antennas, coaxial cabling and other miscellaneous components per the Specifications/cut-sheets provided in Section F of the attached Bristol Babcock report.

2.10 **RTU SECURITY**

All outdoor RTU’s shall be lockable using padlocks provided by the Owner.

2.11 **ANTENNA GROUNDING**

- A. Provide grounding kits for each site which requires an antenna. Provide grounding kit for each site equal to Andrew Model 204989-2.
- B. Provide grounding for each antenna and antenna surge arrestor at each site which requires an antenna.
- C. Provide ground rods at each site per the following specifications:
 - a. Bare Conductors: ASTM B-8; stranded; hard drawn copper. Size unless otherwise noted is #4/0 AWG.
 - b. Ground Rods: UL 425H; 5/8 inch x 8 feet; high strength steel core with metallically bonded copper jacket.
- D. Observe the following installation requirements:
 - a. Use insulated ground conductors only where installed in a raceway. Use bare conductors for the ground rod

connections. Where a conductor is installed in a raceway use only non-metallic raceways. Provide UL approved connections to ground rods.

- b. Drive ground rods so the top is 3 to 6 inches below finished grade. If rock is encountered then rods may be driven at an angle or grounding plates, as approved by the Engineer, may be used.
- c. Provide at least one driven ground rod per site. The System Manufacturer shall test each site and provide a list of sites to the engineer which have resistance to ground measurements of more than 10 ohms. Make resistance to ground measurements in normal, dry weather conditions not less than 24 hours after rainfall. Make measurements using the fall of potential method per IEEE Standard No. 142.
- d. It shall be the contractor's responsibility to provide as part of SCADA system hardware, the appropriate tower (height, type) for the SCADA antenna.

END OF SECTION

SECTION 17500
Grounding

PART I GENERAL

1.01 **SCOPE**

- A. Power system grounding.
- B. Electrical equipment and raceway grounding and bonding.

1.02 **SYSTEM DESCRIPTION**

- A. The system consists of ground clusters for supplemental electrodes, and connections thereto of structures, equipment and electrical systems.
- B. Within this Section the following definitions apply:
 - 1) Ground Cluster: An assembly of three or more driven ground rods; spaced not closer than eight feet apart; each rod connected to the others in a closed delta configuration; and providing a resistance to ground of not more than 10 ohms.
 - 2) Connect or Bond: For underground or otherwise inaccessible locations – a permanent connection made by exothermic welding, brazing, or similar process. For exposed and accessible locations – a connection made with clamps, bolts or similar fittings approved for the purpose.

1.03 **SUBMITTALS**

Submit product data.

PART 2 PRODUCTS

2.01 **MATERIALS**

- A. Bare Conductors: ASTM B-8; stranded; hard drawn copper. Size unless otherwise noted is #4/0 AWG.
- B. Ground Rods: UL 425H; 5/8 inch x 8 feet; high strength steel core with metallurgically bonded copper jacket.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Except as noted, use insulated ground conductors only where installed in a raceway. Use bare conductors for ground rod connections, and bonding of structures etc. Where a bare conductor is installed in a raceway use only non-metallic raceway; do not install bare conductors in metallic raceway.
- B. Drive ground rods so the top is 3 to 6-inches below finished grade. If rock is encountered then rods may be driven at an angle or grounding plates, as approved by the Engineer, may be used.
- C. Construct ground clusters as follows: Start with three driven ground rods and measure the resistance to ground of each rod. If the parallel combination exceeds 10 ohms then add sections and drive the rods deeper, or drive additional rods until the specified value is obtained. Connect each rod to every other rod in the cluster. Exception: not more than three additional rods of sections (six total) are required for any one cluster.
- D. Where bare conductors emerge from concrete encasement, provide a 4-inch length of Schedule 40 PVC conduit set in the concrete to protect the conductor.

3.02 SERVICE ENTRANCE EQUIPMENT

- A. Bond service entrance equipment ground bus to a ground cluster with a I/O conductor, unless otherwise noted.
- B. Provide one ground cluster at the closest practical location to the service entrance equipment and bond to ground bus with a I/O conductor, unless otherwise noted.
- C. Prior to energizing the system, remove the neutral link and meggar the system neutral. Repair any grounds then replace the neutral link.

3.03 SEPARATELY DERIVED SYSTEMS

- A. Ground enclosures where solidly grounded systems are indicated, the secondary neutral to a ground cluster.

3.04

FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors for tightness and proper installation.
- B. Compile and submit a list of ground resistance measurements for each ground rod in ground clusters. Measure and submit resistance to ground of service equipment ground bus.
- C. Make resistance to ground measurements in normal, dry weather conditions not less than 24 hours after rainfall. Make measurements using the fall of potential method per IEEE Standard No. 142.

END OF SECTION

APPROVED
STATE OF GEORGIA
ENVIRONMENTAL PROTECTION DIVISION
MAR 25 2022
DRINKING WATER PROGRAM
ENGINEER SIG. *[Signature]*
VALID ONLY FOR DRINKING WATER PORTION OF PROJECT

Standards for Design and Construction Specifications For Water and Wastewater

ACRONYMS

<u>Abbreviation</u>	<u>Meaning</u>
ACIPCO	American Cast Iron Pipe Company And Transportation Officials
ANSI	American National Standards Institute
ASSE	American Society of Sanitary Engineers
ASSHTO	American Association of State Highway
ASTM	American Society for Testing & Materials
AWS	American Welding Society
AWWA	American Water Works Association
CF	Cubic Feet
CFM	Cubic Feet Per Minute
CTU	Central Terminal Unit
DDC	Double Detector Check Valve
DIA	Diameter
DIP	Ductile Iron Pipe
DOT	Department of Transportation
FH	Fire Hydrant
FM	Force Main
GV	Gate Valve
HP	Horse Power
HZ	Hertz
I/C	Integrated Circuit
I/O	Instrumentation Operation
IN	Inch
MG/L	Milligrams Per Liter
MJ	Mechanical Joint
MWA	Macon Water Authority
NEMA	National Electrical Manufacturers Assn.
OHSA	Occupational Safety and Health Administration
PLC	Programmable Logic Controller
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
RJP	Restrained Joint Pipe

RPM	Rotation per Minute
RPZ	Reduced Pressure Zone
RTU	Remote Terminal Unit
SDR	Standard Thermoplastic Pipe Dimension Ratio
TS & V	Tapping Sleeve and Valve
UL	Underwriters Laboratory
USCFCC	University of Southern California
USCS	Unified Soil Classification System
USF	U S Foundry
USS	U S Steel
VAC	Vacuum
VB	Valve Box
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Item P-101 Preparation/Removal of Existing Pavements

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

101-3.3 Removal of Foreign Substances/contaminates prior to overlay or slurry seal, and remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water, cold milling, rotary grinding, or sandblasting may be used. Removal methods used shall not cause major damage to the pavement, or to any structure or

utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with router by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by routing. Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 Removal of Pipe and other Buried Structures.

a. **Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D698.

B. REMOVAL OF INLETS/MANHOLES. WHERE INDICATED ON THE PLANS OR AS DIRECTED BY THE RPR, INLETS AND/OR MANHOLES SHALL BE REMOVED AND LEGALLY DISPOSED OF OFF-SITE IN A TIMELY FASHION AFTER REMOVAL. EXCAVATIONS AFTER REMOVAL SHALL BE BACKFILLED WITH MATERIAL EQUAL OR BETTER IN QUALITY THAN ADJACENT EMBANKMENT. WHEN UNDER PAVED AREAS MUST BE COMPACTED TO 95% OF ASTM D698, WHEN OUTSIDE OF PAVED AREAS MUST BE COMPACTED TO 95% OF ASTM D698. METHOD OF MEASUREMENT

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the number of square yards (square meters) removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

101-4.2 Removal of Foreign Substances/contaminates. The unit of measurement for foreign Substances/contaminates removal shall be the square foot (meter).

101-4.3 Removal of Pipe and other Buried Structures. The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

- Item P 101-5.1 Pavement Removal - per square yard (square meter)

- Item P 101-5.2 Removal of Foreign Substances/contaminates - per square foot (square meter)

- Item P-101-5.3 Removal of Pipe and other Buried Structures - per each or per linear foot (refer to plans)

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

- AC 150/5380-6 Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690

Standard Specification for Joint and Crack Sealants, Hot Applied, for
Concrete and Asphalt Pavements

END OF ITEM P-101

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ITEM P-151 CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

~~**a. Clearing** shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.~~

b. Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

~~**c. Tree Removal.** Tree Removal shall consist of the cutting and removal of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.~~

CONSTRUCTION METHODS

151-2.1 General. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 Disposal. All materials removed by clearing or by clearing and grubbing shall be disposed of the Airport's limits at the Contractor's responsibility, except when otherwise directed by the RPR. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 Blasting. Blasting shall not be allowed.

151-2.2 Clearing. ~~The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.~~

~~Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.~~

151-2.3 Clearing and grubbing. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed, except where embankments exceeding 3-1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

METHOD OF MEASUREMENT

151-3.1 The quantities of clearing and grubbing as shown by the limits on the plans shall be the number of cubic yards of land specifically cleared and grubbed.

BASIS OF PAYMENT

151-4.1 Payment shall be made at the contract unit price per cubic yards for clearing and grubbing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-151-4.1 Topsoil (On Site Stripping) – per cubic yard

END OF ITEM P-151

Item P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the Engineer and/or RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the Engineer and/or RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of

the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot of the stated elevations for ground surfaces, or within 0.04 foot for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two (2) weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans, or as directed to by the Engineer. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will

constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor, or as indicated on the plans. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas are not required.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods

for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within $\pm 2\%$ of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 5,000 SF of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. Under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 98% percent of the maximum density as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches, which shall be prepared in accordance with Item T-904.

The in-place field density shall be determined in accordance with ASTM D1556. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compact and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches in their greatest dimensions will not be allowed in the top 12 inches of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet below the finished subgrade.

Payment for compacted embankment will be made under embankment in-place and no payment will be made for excavation, borrow, or other items.

152-2.9 Proof rolling. Not Used.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within $\pm 2\%$ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D1557. Tests for moisture content and compaction will be taken at a minimum of one (1) test per 5,000 SF of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the RPR, and density test results shall be furnished upon completion to the RPR for acceptance determination.

The in-place field density shall be determined in accordance with ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other

methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compact, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compact to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard shall be computed by the comparison of digital terrain model (DTM) surfaces.

152-3.1 The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.2 The quantity of embankment in place shall be the number of cubic yards measured in its final position.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For embankment in place, payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152-4.1	Unclassified Excavation - per cubic yard
Item P-152-4.2	Embankment in place - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
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ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software
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Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item P-605 Joint Sealants for Pavements

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D6690.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be $25\% \pm 5\%$ larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint. When used with Item P-606, such as light can installation, Item P-605 shall not be applied until the P-606 has fully cured.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 30 days prior to use on the project.

a. Tractor-mounted routing tool. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. Concrete saw. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. Sandblasting equipment. Sandblasting equipment is not allowed.

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided

adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to ¼ inch ±1/16 inch (2 mm) below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material shall be considered incidental no separate payment shall be made..

BASIS OF PAYMENT

605-5.1 No separate payment shall be made.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt]

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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END ITEM P-605

Item P-610 Concrete for Miscellaneous Structures

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 General. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
3/4 inch (19 mm)	67
1/2 inch (12.5 mm)	7

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking. Not used.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 Cement. Cement shall conform to the requirements of ASTM C595 - Type II,.

610-2.5 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-

accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751 or ASTM D1752 as applicable to Contract requirements, as shown in the Plans, or as requested by the Engineer.

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Not applicable.

610-2.11 Materials for curing concrete. Curing materials shall conform to the following specifications:

Materials for Curing

Waterproof paper	ASTM C171
Clear or white Polyethylene Sheeting	ASTM C171
White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309

CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape,

quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85°F (30 °C), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Concrete shall be liner feet (meters) of concrete complete in place and accepted.

BASIS OF PAYMENT

610-6.1 Payment shall be made at the contract price liner feet (meters). This price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-610-6.1	Concrete, per liner feet (meters)
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars

ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

<u>ASTM C1365</u>	<u>Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis</u>
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

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Item P-629 Thermoplastic Coal Tar Emulsion Surface Treatments

DESCRIPTION

629-1.1 This item shall consist of an application of a thermoplastic coal tar emulsion Sand Slurry Seal applied to an existing, previously prepared asphalt surface, including airport pavements serving small airplanes 30,000 lbs (13,600 kg) or less, roads, and other general applications. Thermoplastic resin coal tar emulsion products provide a fuel-resistant surface where pavements are subjected to fuel spills. Thermoplastic resin coal tar emulsion products assist in pavement preservation through reducing the rate of pavement oxidation. The application of the surface treatment shall be in accordance with these specifications and shall conform to the dimensions shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

629-2.1 Thermoplastic coal tar emulsion. The emulsion material shall be a thermoplastic coal tar emulsion made up of plastic resin and emulsified coal tar pitch. The thermoplastic coal tar emulsion shall be manufactured as a complete product and tested at the manufacturing plant for material certification. The cured thermoplastic coal tar emulsion sample must pass the fuel-resistance test in accordance with ASTM D5727.

629-2.2 Manufacturer's certifications. The Contractor shall furnish the manufacturer's certification of Analysis (COA) that all thermoplastic coal tar emulsion shipped to the project meets the following testing requirements:

Thermoplastic Coal Tar Emulsion Properties

Property	Standard	Requirement
Water content	ASTM D5727, Section 6.1.6	≤58%
Ash of Residue	ASTM D5727, Section 6.1.9	≤ 15%
Flexibility	ASTM D5727, Section 6.1.14	1 rating
Resistance to Kerosene	ASTM D5727, Section 6.1.12	Pass with no loss of adhesion and no softening of film
Softening Point	ASTM D36	>212°F (100°C)

629-2.3 Manufacturer sampling. A sample of undiluted thermoplastic coal tar emulsion shall be obtained at the production facility from each consignment shipped to the job. Manufacturer shall store the samples in containers that are sealed against contamination and retained for a period of six months. Samples shall be stored at room temperature and not be subjected to freezing temperatures.

629-2.4 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. The temperature of the water added during mixing shall be at least 50°F (10°C).

629-2.5 Handling and storage. All emulsion stored on-site shall be agitated at least once per day for a minimum of 15 minutes. The distributor or applicator, pumps and all tools shall be maintained in

satisfactory working condition. Spray bar nozzles, pumps, or other equipment can be cleaned mechanically or with clean water.

629-2.6 Health, safety, and environment. The Contractor must provide a complete Safety Data Sheet (SDS) in accordance with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Regulations (Standards – 29 CFR), 1910.1200 which establishes the requirement and minimum information for the SDS for hazardous materials. The SDS, Section II, shall include the Chemical Abstracts Service (CAS) registry numbers for all applicable hazardous ingredients in the coal tar emulsion product. The Contractor must provide the manufacturer’s certification that the product complies with the Code of Federal Regulation (CFR) Title 40 – Protection of Environment. The manufacturer’s certification shall address compliance for Air Programs, Part 59, National Volatile Organic Compound Emission Standards for Consumer and Commercial Products (for the airport location) and Water Programs, Part 116, Designation of Hazardous Substances.

COMPOSITION AND APPLICATION

629-3.0 Thermoplastic coal tar emulsion sand slurry seal.

629-3.1 Quantities of materials per square yard. Based on the data in this specification, the Contractor shall submit the proportions of thermoplastic coal tar emulsion and aggregate proposed for use to the RPR for approval prior to the start of operations. A copy of the mix design and test data required by this specification shall be submitted to the RPR for approval along with the above information. No thermoplastic coal tar emulsion sand slurry seal shall be produced for payment until a job mix formula has been approved in writing by the RPR.

Application Rate

Composition ⁱ lbs/gal (kg/l)	Application Rate ⁱⁱ lb/yd ² (kg/m ²)
17-19 (2.04-2.28)	4 (2.17)

1. Aggregate (lbs) shall be mixed homogeneously with the thermoplastic coal tar emulsion (gals).
2. Minimum application rate of uncured thermoplastic coal tar emulsion sand slurry seal.

629-3.2 Aggregate. The aggregate shall consist of sound, durable crushed igneous type stone (crushed basalt, granite, trap rock, etc.), clean washed masonry sand, or clean washed manufactured silica sand, be free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from coatings of clay, organic matter, and other deleterious materials. Aggregate shall have a minimum Mohs hardness of 6. The aggregate shall meet the gradation in the table below when tested in accordance with ASTM C136.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project.

Aggregate Material Gradation Requirements

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	99.5-100
No. 16 (1.18 mm)	85-100
No. 30 (600 μm)	50-90
No. 50 (300 μm)	15-55
No. 100 (150 μm)	0-20
No. 200 (75 μm)	0-20

629-3.3 Application.

a. Application of prime coat. After preparation of the pavement and acceptance by the RPR, the prime coat shall be applied to the pavement surface only where thermoplastic coal tar emulsion sand slurry seal will be applied. Apply a prime coat of thermoplastic coal tar emulsion diluted with 50% water at the rate of 0.10 gallons of mix per square yard (0.45 l/m²).

b. Application of sand slurry seal. The surface shall be pre-wet by fogging ahead of the spreader box. Water used in pre-wetting the surface shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the spreader box. The mixture shall be of the desired consistency when deposited on the surface, and no additional elements shall be added. A sufficient amount of mixture shall be carried in the spreader box at all times so that even distribution is obtained. No clumped or unmixed aggregate shall be permitted. No segregation of the thermoplastic coal tar emulsion and aggregate fines from the coarse aggregate will be permitted.

Upon completion of the work, the thermoplastic coal tar emulsion sand slurry seal shall have no bare spots or cracks through which liquids or foreign matter could penetrate to the underlying pavement. The finished surface shall present a uniform texture.

In areas where the spreader box cannot be used, the thermoplastic coal tar emulsion sand slurry seal shall be applied by a means of a hand squeegee.

629-3.4 Equipment and tools.

a. Mobile mixing machine. The mobile mixing machine shall be a truck-mounted mobile mixing plant with a towed-type spreader box. It shall have a water tank and water pump capable of delivering a constant volume of water.

The mobile mixing machine shall have an agitated storage tank for the thermoplastic coal tar emulsion and a non-shearing peristaltic pump with variable rate of flow for the delivery of this material. The mobile mixing machine shall have a hopper for holding aggregate, supplying this material to the mixing chamber by a conveyor belt. The rate of aggregate delivery shall be mechanically dependent upon the speed of the peristaltic pump.

The mobile mixing machine shall be a continuous-flow mixing unit capable of delivering predetermined quantities of thermoplastic coal tar emulsion, aggregate, and if necessary water, to the mixing chamber and discharging the thoroughly mixed material on a continuous basis. The mobile mixing machine shall deliver the materials to the mixing chamber in a constant proportion in a manner not dependent on power plant or vehicle speed. The machine shall be equipped with a water spray bar capable of fogging the pavement surface to aid in the application process.

Attached to the mixing machine shall be a mechanical-type squeegee distributor, equipped with flexible material in contact with the surface to prevent loss of material from the distributor. It shall be maintained to prevent loss of micro-surfacing on varying grades and adjusted to assure uniform spread. The spreader box may have an adjustable width.

b. Prime coat distributor. The prime coat distributor shall be either a truck-mounted 300 to 3,000-gallon (1136 to 11356 liter) tank or a trailer-mounted unit with a 300 to 1000-gallon tank (1136 to 3785 liters) containing suitably driven mixing blades to combine predetermined quantities of thermoplastic emulsion and water into a homogeneous mixture. It shall be equipped with a diaphragm style pump capable of delivering a constant volume of material to a spray wand or spray bar. The device shall have a bottom ball valve capable of delivering material to a squeegee spreader or a drag box.

c. Auxiliary equipment. Other tools or equipment such as power brooms, power blowers, air compressors, hand brooms, hand squeegees, etc., shall be provided as required.

d. Calibration. The Contractor shall furnish all equipment, materials and labor necessary to calibrate the equipment. It shall be calibrated to assure that it will produce and apply a mix that conforms to the job mix formula. Commercial equipment should be provided with a method of calibration by the manufacturer. All calibrations shall be made with the approved job materials prior to applying the slurry seal to the pavement. A copy of the calibration test results shall be furnished to the RPR.

629-3.5 Control strip. A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips. The area to be tested will be designated by the RPR and will be located on the existing pavement.

The control strip shall determine the quality of the mixture in place as well as the performance of the equipment. The same equipment and method of operations shall be used on the control strip as will be used on the remainder of the work. If the control strip should prove to be unsatisfactory, the necessary adjustments to the mix composition, application rate, placement operations and equipment shall be made. Additional control strips shall be placed and evaluated if required.

629-3.6 Friction characteristics. Friction testing is not required for sand slurry installations.

CONSTRUCTION METHODS

629-4.1 Worker safety. The Contractor shall obtain a SDS for both the thermoplastic coal tar emulsion product and aggregate and require workmen to follow the manufacturer's recommended safety precautions.

629-4.2 Weather limitations. The material shall not be applied when the humidity or impending weather conditions will not allow proper drying or when the atmospheric or pavement temperature is below 50°F (10°C), unless otherwise directed by the RPR.

During application of thermoplastic coal tar emulsion surface treatment, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should thermoplastic coal tar emulsion surface treatment get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

629-4.3 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease by scrubbing with a detergent, then wash thoroughly with clean water. Any additional surface preparation, such as crack repair, shall be in accordance with P101-3.6.

629-4.4 Application. Application shall be in accordance with paragraph 629-3.3.

629-4.5 Curing. The mixture shall be permitted to dry for a minimum of 24 hours after the application, before opening to traffic or painting, and shall be sufficiently cured to drive over without damage to the installation. Any damage to the uncured mixture caused by the Contractor will be the responsibility of the Contractor to repair.

QUALITY CONTROL (QC)

629-5.1 Field emulsion sampling. All emulsion sampling methods shall be in accordance with ASTM D140. Samples must be taken from the center of an agitated bulk storage tank after a minimum of 15 minutes of continual agitation.

629-5.2 Field composite mix sampling. Composite mix of thermoplastic coal emulsion and aggregate shall be taken directly from the pug mill of the mobile mixing machine for micro-surface and sand slurry installations into a sealed 1-gallon container to be weighed. The minimum weight of composite mix shall be the following:

- a. Type A Micro-Surface Composite Mix – Minimum 14 pounds per gallon
- b. Type B Micro-Surface Composite Mix – Minimum 13.5 pounds per gallon
- c. Sand Slurry Composite Mix – Minimum 13 pounds per gallon

629-5.3 Manufacturer's representation. The manufacturer's representative shall have knowledge of the material, procedures, and equipment described in the specification and shall be responsible for verifying the job mix formula submitted to the RPR and shall oversee the preparation and application of the thermoplastic coal tar emulsion surface treatment. Documentation of the manufacturer representative's experience and knowledge for applying the thermoplastic coal tar emulsion surface treatment shall be furnished to the RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the bid price.

629-5.4 Contractor qualifications. The Contractor shall provide the RPR Contractor qualifications for applicators, personnel and equipment. The Contractor shall also provide, from the thermoplastic coal tar emulsion Manufacturer, documentation that the Contractor is certified to apply the thermoplastic coal tar emulsion surface treatment. Contractor shall provide documentation for at least three (3) applications similar to this project completed in the past two (2) years.

MATERIAL ACCEPTANCE

629-6.1 Friction tests. Sand slurry version does not require friction testing.

METHOD OF MEASUREMENT

629-7.1 Measurement. The Thermoplastic Coal Tar Emulsion Sand Slurry Seal shall be measured by the square yard (sq m) of the area indicated on the contract drawings or designated by the RPR.

BASIS OF PAYMENT

629-8.1 Payment. Payment shall be made at the contract unit price per square yard (square meter) for the Thermoplastic Coal Tar Emulsion Sand Slurry Seal. This price shall fully compensate the Contractor for furnishing all materials and for all labor, equipment tools and incidentals necessary to complete the

thermoplastic coal tar emulsion product installation, including mix design and data sheets stipulated in these specifications.

Payments will be made under:

Item P-629-8.1 ~~Thermoplastic coal tar emulsion~~ Sand Slurry Seal – per square yard.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D36	Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D140	Standard Practice for Sampling Bituminous Materials
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys
ASTM D5727	Standard Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals

Code of Federal Regulations (CFR)

29 CFR Part 1910.1200	Hazard Communication
40 CFR	Protection of the Environment

END OF ITEM P-629

Section 207—Excavation and Backfill for Minor Structures

207.1 General Description

This work includes excavating, backfilling, or disposing of materials required to install a bridge culvert, box culvert, pipe, arch culvert, headwall and retaining wall according to the specifications, the plans, and the Engineer.

207.1.01 Definitions

General Provisions 101 through 150.

207.1.02 Related References

A. Standard Specifications

Section 104—Scope of Work

Section 109—Measurement and Payment

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 208—Embankments

Section 810—Roadway Materials

Section 812—Backfill Materials

B. Referenced Documents

GDT 7

207.1.03 Submittals

General Provisions 101 through 150.

207.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Foundation Backfill Material—Type I	Subsection 812.2.01
Foundation Backfill Material—Type II	Subsection 812.2.02
Imperfect Trench Backfill Material—Type III	Subsection 812.2.03
Graded Aggregate Material	Subsection 815.2.01

207.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

Section 207 — Excavation and Backfill for Minor Structures

207.3 Construction Requirements

207.3.01 Personnel

General Provisions 101 through 150.

207.3.02 Equipment

General Provisions 101 through 150.

207.3.03 Preparation

General Provisions 101 through 150.

207.3.04 Fabrication

General Provisions 101 through 150.

207.3.05 Construction

A. Locations and Elevations

The Engineer will determine final locations and elevations of the structure. The locations and elevations shown on the plans are approximate.

B. Excavation

The Engineer will determine the minimum requirements for length and depth of excavation for each structure. Assume the responsibility for the cost of installing necessary sheeting and bracing.

When excavating, follow these requirements:

- Excavate through rock or boulder formations to at least 1 ft. (300 mm) below the bottom of the structure, except for where the entire concrete or masonry structure rests on solid rock.
 - Backfill with Type I or Type II material to the proper subgrade elevation.
 - As the embankment is constructed, excavate and place pipe on the new embankment. Pipe may be placed incrementally on steep gradients.
 - Cut surfaces at structure trenches to prevent damage to the adjacent pavement when existing paved areas will be retained.
 - Saw pavements deep enough to cause the edges to break in straight lines.
 - Ensure that the width, depth, and vertical walls of an excavated imperfect trench conform to plan details and dimensions within 2 in. (50 mm).
 - Dispose of surplus and unsuitable materials as directed by the Engineer.
 - ~~Consider excavated material as unclassified excavation according to Section 205, except that the Department will not pay for excavation for minor structures.~~
 - Include the cost of fulfilling these requirements in the price bid for the pipe.
-

Section 207 — Excavation and Backfill for Minor Structures

C. Backfill

Obtain backfill materials that meet the Specifications from sources approved by the Engineer.

1. Foundation Backfill Materials, Types I and II

Use the following materials as shown on the Plans or as directed by the Engineer:

Use Type I material in dry structure trenches and Type II material in wet trenches.

Use Type I material as a finishing course for Type II material when permitted by the Engineer.

Backfill excavations beyond the specified limits with the same type of material required for the adjacent area; however, the Department Engineer will not measure excess backfill material for payment.

Place Type I and Type II backfill material in layers of no more than 6 in. (150 mm) loose.

Compact each layer as follows:

- 1) Type I Backfill Material: Compact to 95 percent of the theoretical dry density determined by GDT 7.
- 2) Type II Backfill Material: Compact to a satisfactory uniform density as directed by the Engineer.

2. Imperfect Trench Backfill Material, Type III

Place this material as loose uncompacted backfill over pipe structures as shown on the Plans where imperfect trench backfill is specified.

3. Normal Backfill

Ensure that normal backfill material meets the requirements of Subsection 810.2.01, Class I or II. Class IIIC1 material may be used in Districts 1, 6, and 7. Class IIIC2 or IIIC3 material may only be used in Districts 1, 6, and 7 if approved by the Office of Materials and Testing, Geotechnical Environmental Pavement Bureau. Place and compact according to Section 208 except as follows:

- a. Do not place rock more than 4 inches (100 mm) in diameter within 2 ft. (600 mm) of any drainage structure.

For backfill behind retaining walls, use a pervious material that meets the requirements of Case I or Case II as follows:

- 1) Case I. Case I refers to backfills for retaining walls that support roadbeds and parking areas.

Ensure that the backfill conforms to Section 208. Do not place rock more than 4 in. (100 mm) in diameter within 2 ft. (600 mm) of the retaining wall or finished surface.

- 2) Case II. Case II refers to backfills for retaining walls that do not support roadbeds or parking areas.

Ensure that the backfill conforms to the requirements of Case I above, except compact the backfill to the density of the adjacent soil.

4. Graded Aggregate Material

Ensure graded aggregate material meets the requirements of 815.2.01. Place and compact according to Section 208 except as follows:

- a. Backfill excavations beyond the specified limits with the same type of material required for the adjacent area; however, the Department Engineer will not measure excess backfill material for payment.
 - b. Place aggregate backfill material in layers of no more than 8 in. (200 mm) loose
 - c. Compact to 95 percent of the theoretical dry density determined by GDT 7
-

Section 207 — Excavation and Backfill for Minor Structures

D. Construction Vehicle and Equipment Traffic

1. Care shall be taken at all times to protect pipe installations from damage, including but not limited to that arising from construction equipment and vehicles driving over completed installations prior to base construction.
2. For thermoplastic pipe installations a minimum cover of 2' shall be provided over any completed installation subject to construction vehicle and equipment loads prior to allowing them to be crossed by same.

E. Pavement Replaced

Replace pavement removed at structure trenches in kind where adjacent pavements will be retained. An equal or better material may be used when approved by the Engineer.

Backfill and maintain a smooth riding surface until repaving is complete.

207.3.06 Quality Acceptance

General Provisions 101 through 150.

207.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

207.4 Measurement

A. Excavation

The following considerations are not measured for payment:

- Excavation for minor structures, including undercut for backfill materials as shown on the plans
- Excavation for an imperfect trench which is required at locations specified in the plans, but which is not measured for payment
- Removal of water
- Removal of material from any area required to be re-excavated
- Excavation and backfill of temporary drainage ditches

B. Extra Depth Excavation

The following extra depth excavations are not measured for payment:

1. Extra depth excavation because of Contractor negligence
2. Extra depth excavation (required by the Engineer) below the original plan elevation of the bottom of the footing or the flow line of a culvert pipe that does not exceed 3 ft. (1 m)

If the Engineer relocates the structure or orders the elevation of the bottom of the footing or the flow line of the pipe to be lowered or undercut more than 3 ft. (1 m), the Contractor will be compensated for the extra depth excavated below the 3 ft. (1 m) limit according to Subsection 104.04 and Subsection 109.05.

Calculate the width of extra depth excavation using the diameter of the pipe or the width of the footing plus 2 ft. (600 mm).

The length of extra depth excavation is equal to the length of that portion of the structure that is lowered more than 3 ft. (1 m) below Plan elevation.

Section 207 — Excavation and Backfill for Minor Structures

C. Backfill Materials Types I, II, III, and Graded Aggregate Materials

1. Types I and II

~~These materials (in place and accepted) are measured in cubic yards (meters) compacted.~~

~~Lateral measurements are confined to an area bounded by vertical planes lying not more than 1 ft. (300 mm) outside of and parallel to the limits of the structure.~~

~~Length and depth measurements are confined to the dimensions of compacted material in place as specified by the Engineer. Materials placed outside the above limitations are not measured for payment.~~

These materials (in place and accepted) are not measured separately for payment.

2. Type III

~~The Department measures Type III material (complete, in place, and accepted) in cubic yards (meters).~~

~~Lateral measurements of Type III material are confined to an area bounded by vertical planes lying directly above the outside walls of the structure.~~

~~Longitudinal measurements are confined to the length of treatment installed as specified. Measurements of depth are the dimensions shown on the plans or as directed.~~

These materials (in place and accepted) are not measured separately for payment.

3. Graded Aggregate Materials for Use with Thermoplastic Pipe

These materials (in place and accepted) are not measured separately for payment.

Standard 1030P specifies the minimum cubic feet of graded aggregate required per linear foot of installation for thermoplastic pipe diameters. This value shall be multiplied by the length of the pipe installation to determine the theoretical amount of graded aggregate, in cubic feet, necessary to construct a proper structural envelope around the pipe placed.

The theoretical total obtained above shall then be multiplied by the following formula:

- The dry density, in pounds per cubic foot, of graded aggregate material multiplied by .000475
Use QPL-2 to determine the dry density applicable to the source of the material.

The above computations shall serve to quantify a minimum tonnage of graded aggregate material associated with thermoplastic pipe installations that require QPL approved source documentation.

Width and depth excavations for thermoplastic pipe installation exceeding the dimensions provided on Standard 1030P by more than ten percent shall be multiplied by the pipe installation length and the above bulleted formula to compute additional required tonnage.

D. Normal Backfill

This Item is not measured separately but is included in the measurement of the Items of excavation from which normal backfill materials are obtained.

207.4.01 Limits

General Provisions 101 through 150.

207.5 Payment

A. Excavation for Minor Structures

This Item will not be paid for separately except as provided in Subsection 207.4.B.

B. Sheeting and Bracing

Sheeting and bracing will not be paid for separately unless these materials are left in place at the written direction of the Engineer. In this case, the Contractor will be paid at invoice cost plus 10 percent.

Section 207 — Excavation and Backfill for Minor Structures

C. Backfill Materials

Backfill material Type I, (measured as shown in Subsection 207.4.C.1) will be paid for according to Section 205 or Section 206.

The Department will pay for Types II and III separately at the Contract Unit Price per cubic yard (meter). This payment is full compensation for furnishing the materials from sources inside or outside the right of way, loading, unloading, hauling, handling, placing, and compacting the material.

This Item will not be paid for separately.

D. Normal Backfill

This Item will not be paid for directly but will be paid at the Unit Price for the applicable excavation item from which the normal backfill materials are obtained.

This Item will not be paid for separately.

E. Graded Aggregate Material

This Item will not be paid for separately.

207.5.01 Adjustments

General Provisions 101 through 150.

Section 209—Subgrade Construction

209.1 General Description

This work includes placing, mixing, compacting, and shaping the top 6 in. (150 mm) or the plan-indicated thickness of the roadbed in both excavation and embankment areas.

This work also includes subgrade stabilization, select material subgrade, and shoulder stabilization.

209.1.01 Definitions

General Provisions 101 through 150.

209.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment

Section 412—Bituminous Prime

Section 803—Stabilizer Aggregate

Section 810—Roadway Materials

Section 815—Graded Aggregate

B. Referenced Documents

GDT 7

GDT 20

GDT 21

GDT 24a

GDT 24b

GDT 59

GDT 67

209.1.03 Submittals

General Provisions 101 through 150.

209.2 Materials

A. Subgrade Materials

If the Plans do not show the source of material for subgrade, the Engineer will direct the Contractor according to the specifications or implement a Supplemental Agreement to ensure a satisfactory subgrade.

If the existing roadway excavation or borrow materials are not suitable or available for stabilizing the subgrade, use the quantity of stabilizer materials defined below in Subsection 209.2.B.

Section 209 — Subgrade Construction

B. Subgrade Stabilizer Materials

Material	Section
Type I Stabilizer Aggregate	803.2.01
Type II Stabilizer Aggregate	803.2.02
Class IIB3 or Better Soil	810.2.01.A.1
Type III Stabilizer Aggregate	803.2.03
Type IV Stabilizer Sand	803.2.04

C. Select Material Subgrade

Material	Section
Class IIB3 or Better Soil in Districts 2, 3, 4, and 5	810.2.01.A.1
Class IIB4 or Better Soil in Districts 1, 6, and 7	810.2.01.A.1
Class IIIC4, chert clay soils in District 6 with less than 55% passing the No. 10 (2 mm) sieve	810.2.01.A.1
Graded Aggregate	815

D. Shoulder Stabilization

Material	Section
Shoulder Stabilization	803.2.02, Type II

209.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

209.3 Construction Requirements

209.3.01 Personnel

General Provisions 101 through 150.

209.3.02 Equipment

General Provisions 101 through 150.

209.3.03 Preparation

General Provisions 101 through 150.

Section 209 — Subgrade Construction

209.3.04 Fabrication

General Provisions 101 through 150.

209.3.05 Construction

A. Subgrade Construction

Construct subgrade as follows:

1. Plow, harrow, and mix the entire surface of the in-place subgrade to a depth of at least 6 in. (150 mm).
2. After thoroughly mixing the material, bring the subgrade to Plan line and grade and compact it to 100 percent of the maximum laboratory dry density.
3. If the subgrade needs to be stabilized, or if a subsequent contract provides for base construction, do not apply density requirement at this stage.
If a subsequent Contract provides for base construction, eliminate mixing and compact the in-place subgrade to 95 percent of the laboratory maximum dry density.
4. that the subgrade can firmly support construction equipment before placing subsequent layers of base and paving materials. The subgrade must support construction equipment without excessive movement regardless of compaction.
5. Rework unstable areas of subgrade to a moisture content that will provide stability and compaction. The Engineer may direct the Contractor to proof roll the subgrade with a loaded dump truck.
6. Compact the subgrade using a sheepsfoot roller.
The Engineer may permit the use of vibratory rollers whenever the subgrade soils consist of Class IaA1, IA2, or IA3 materials.
7. Ensure that subgrade material used underneath soil-cement base Ensure meets the requirements of Subsection 301.3.03.A.

B. Subgrade Stabilization

Construct a stabilized subgrade according to Plans or as directed:

1. Undercut and dispose of the amount of subgrade material that will be displaced with the aggregate or selected material according to the Engineer's direction.
 2. Leave material off the subgrade in fill sections requiring stabilization.
 3. Place the amount of material specified in Subsection 209.2.B. on the subgrade as specified on the Plans or established by the Engineer.
 4. Thoroughly incorporate the material into the existing subgrade to a depth of 6 in. (150 mm), or as indicated on the plans. Plow, disk, harrow, blade, and then mix with rotary tillers until the mixture is uniform and homogeneous throughout the depth to be stabilized.
 5. Finish the stabilized subgrade to the plan line, grade, and cross-section. Compact it to 100 percent of the maximum laboratory dry density as defined in Subsection 209.3.06.
Plant mixing is permitted as an alternative to the mixed-in-place method.
 6. Eliminate the mixing and scarifying method before compaction in undercut areas where Type III Stabilizer Aggregates are specified, unless otherwise specified by the Engineer.
-

Section 209 — Subgrade Construction

C. Select Materials Subgrade

Place select materials as follows:

1. Place the subgrade with a uniform blanket of select material consisting of Class I or II soil or graded aggregate (according to Plan dimensions or as directed by the Engineer). Class IIIC1 soils may be used in Districts 1, 6, and 7 within the top 12 in. (300 mm) of subgrade if approved by the Office of Materials and Testing, Geotechnical Environmental Pavement Bureau. Do not use Class IIIC2, IIIC3, or IIIC4 soils within the top 12 in. (300 mm) of subgrade unless a stabilizing agent approved by the Engineer is added, or if approved by the Office of Materials and Testing, Geotechnical Environmental Pavement Bureau. Class IIIC4, chert clay soils in District 6 with less than 55 percent passing the No. 10 (2 mm) sieve may be used for subgrade.
2. Use the select material reserved from the grading or borrow operations. If material is not available through this source, obtain it from other sources.
3. Finish and compact the material according to Subsection 209.3.05.A.

D. ~~Shoulder Stabilization~~

~~Stabilize the shoulder as follows:~~

- ~~1. Spread the stabilizer aggregate at the rate and to the dimensions indicated on the Plans.~~
- ~~2. Mix the aggregate with the in-place shoulder material thoroughly to the Plan depth.~~
- ~~3. Compact the area thoroughly and finish it to Plan dimensions.~~
- ~~4. Prime the stabilized area according to Section 412 when a paving course is required on the shoulders.~~

E. Finishing Subgrade

When finishing subgrade use the following procedure:

1. Leave the underlying subgrade in cuts and fills low enough to accommodate the additional material when the work requires either subgrade stabilization, select material subgrade, or stabilization for shoulders.
2. Test short sections in curb and gutter areas might be necessary to obtain the proper elevation.
3. Blade the surface of the completed subgrade to a smooth and uniform texture.

209.3.06 Quality Acceptance

The ~~Department~~ Engineer's Quality Assurance Testing Firm will test representative samples of compacted material to determine the laboratory maximum dry density using GDT 7, GDT 24a, or GDT 67 as applicable.

The ~~Department~~ Engineer's Quality Assurance Testing Firm will determine in-place density of the compacted subgrade according to GDT 20, GDT 21, or GDT 59, as applicable.

Ensure that the centerline profile conforms to the established elevations with an acceptable tolerance of ± 0.5 in (± 13 mm). The acceptable tolerance under a template conforming to the designated cross section shall be ± 0.25 in. (± 6 mm).

Have the ~~Department~~ Engineer's Quality Assurance Testing Firm test the maximum dry density using methods according to Subsection 209.3.05.A. When base construction is not in the same Contract, the tolerances may be 1 in. (25 mm), 0.5 in. (13 mm), and 95 percent respectively.

209.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

Section 209 — Subgrade Construction

209.4 Measurement

A. Subgrade Construction and Finishing Subgrade

~~The Department will make~~ No separate measurement or payment for the work described in this Section ~~will be made.~~

B. Subgrade Stabilization

~~Subgrade stabilization materials, as defined in Subsection 209.3.05.B is measured by the ton (megagram), cubic yard (meter), or square yard (meter) of the specified thickness if none of the existing Roadway Excavation and/or Borrow Materials are suitable and available for stabilizing the subgrade.~~

~~No separate measurement or payment for the work described in this Section will be made.~~

C. Select Material Subgrade

~~Select materials, conforming to Subsection 209.3.05.C are measured by the cubic yard (meter) in the hauling vehicle, per ton (megagram) according to Subsection 109.01, or by the square yard (meter) of the specified thickness when roadway excavation and/or borrow materials are not available or suitable for this Item.~~

~~No separate measurement or payment for the work described in this Section will be made.~~

~~D. Shoulder Stabilization~~

~~Shoulder stabilization is measured by the cubic yard (meter) or ton (megagram) as specified in Subsection 209.4.B.~~

209.4.01 Limits

General Provisions 101 through 150.

209.5 Payment

A. Subgrade Construction

~~The Department will make~~ No separate payment for subgrade construction or for finishing subgrade ~~will be made.~~

B. Subgrade Stabilization

~~Subgrade stabilization complete and accepted according to Subsection 209.3.05.B will be paid for at the Contract Unit Price per cubic yard (meter), per ton (megagram), or per square yard (meter). This price is full compensation for furnishing the materials, hauling, placing, mixing, compacting, and finishing the stabilized subgrade.~~

~~No separate payment will be made for this item.~~

C. Select Material Subgrade

~~Select material complete, accepted, and measured according to Subsection 209.4.C will be paid for at the Contract Unit Price per cubic yard (meter), per ton (megagram), or per square yard (meter). This price is full compensation for furnishing the material where required, hauling, placing, mixing, compacting and finishing the select material subgrade.~~

~~No separate payment will be made for this item.~~

~~D. Shoulder Stabilization~~

~~This Item will be measured by Subsection 209.4.B. and paid for according to Subsection 209.5.B. This Item also includes furnishing and applying bituminous prime.~~

209.5.01 Adjustments

General Provisions 101 through 150.

Section 310—Graded Aggregate Construction

310.1 General Description

This work includes constructing a base, subbase or shoulder course composed of mineral aggregates. Construct according to these specifications and to the lines, grades, thickness, and typical cross-sections shown on the plans or established by the Engineer.

The provisions of Section 300 apply to this work.

310.1.01 Definitions

General Provisions 101 through 150.

310.1.02 Related References

A. Standard Specifications

Section 105—Control of Work

Section 300—General Specifications for Base and Subbase Courses

Section 412—Bituminous Prime

Section 815—Graded Aggregate

Section 821—Cutback Asphalt

Section 823—Cutback Asphalt Emulsion

B. Referenced Documents

AASHTO T 180

GDT 21

GDT 59

310.1.03 Submittals

General Provisions 101 through 150.

310.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Graded aggregate	815
Cutback asphalt, RC-30, RC-70, RC-250 or MC-30, MC-70, MC-250	821.2.01
Cutback Asphalt Emulsion, CBAE-2	823.2.01
Blotter material (sand)	412.3.05.G.3

310.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

310.3 Construction Requirements

310.3.01 Personnel

General Provisions 101 through 150.

Section 310 — Graded Aggregate Construction

310.3.02 Equipment

Provide equipment in satisfactory condition for proper construction of the base, subbase or shoulder course. Use any applicable equipment specified in Subsection 412.3.02, *Equipment* for Bituminous Prime.

310.3.03 Preparation

Prepare the subgrade or subbase as specified in Subsection 300.3.03.C, *Preparing the Subgrade* or Subsection 300.3.03.D, *Preparing the Subbase*. Place graded aggregate materials only on dry, thawed subgrade or subbase.

310.3.04 Fabrication

General Provisions 101 through 150.

310.3.05 Construction

A. Placing Material

Use the central plant mix method unless producing aggregates (from an approved source or deposit) that conform to the requirements of Section 815.

Use the following steps to mix base and spread subbase or shoulder course.

1. Mixing

When blending two sizes of aggregate, proportion the aggregate and water, if needed, into the central plant. Mix until producing a homogeneous and uniform mixture.

2. Spreading

To obtain the specified thickness, uniformly spread materials to the proper depth with a mixture spreader. Do not use materials containing frost or frozen particles.

a. One-Course Construction

Lay one course to a maximum thickness of 8 in. (200 mm) compacted.

b. Multiple-Course Construction

If the thickness of the base, subbase or shoulder course exceeds 8 in. (200 mm), construct it in 2 or more courses of equal thickness.

B. Compacting Material

Use the following steps to compact and finish a base, subbase, or shoulder course.

1. Moisture Content

Ensure that the moisture content of materials is uniformly distributed and allows compaction to the specified density.

Unless approved by the ~~Office of Materials and Research~~ **Engineer's Quality Assurance Testing Firm**, no graded aggregate will be shipped to a project when the moisture content of the material exceeds two percent of optimum moisture.

2. Compaction

After shaping the spread material to line, grade, and cross-section, roll to uniformly compact the course. If using Group 1 aggregate, roll to at least 98 percent of maximum dry density. If using Group 2 aggregate, roll to at least 100 percent of the maximum dry density.

If using graded aggregate mixtures composed of either group as base for paved shoulders 6 ft. (1.8 m) wide or less, compact to at least 96 percent of the maximum dry density.

Regardless of compaction, ensure that the compacted base is sufficiently stable to support construction equipment without pumping. If the base material is unstable from too much moisture, dry and rework the base material. Dry and rework the underlying subgrade, if necessary.

a. One-Course Construction

- 1) After compaction, shape to the required grade, line, and cross-section.
 - 2) Add water as necessary to develop the proper moisture content.
 - 3) Roll until the surface is smooth, closely knit, and free of cracks.
 - 4) Correct all defects according to Subsection 300.3.06.B, *Repairing Defects*.
-

Section 310 — Graded Aggregate Construction

b. Multiple-Course Construction

- 1) After compacting the first course, shape the surface again to line, grade, and cross section.
- 2) Add water as necessary to develop the proper moisture content.
- 3) Spread and compact the second and any succeeding courses without rolling the first course again.
- 4) Finish the surface according to the procedure specified for one-course construction.

c. Irregular Areas

In places inaccessible to the roller, obtain the required compaction with mechanical tampers approved by the Engineer. Apply the same density requirements as stated above in Subsection 310.3.05.B.

C. Finishing

Finish the surface of the subbase for Portland cement concrete pavement or the base of asphaltic concrete pavement with automatically controlled screed equipment when required by Subsection 300.3.02.H, *Fine Grading Machine* of the specifications. Furnish, install, and maintain the sensing wires needed to control the finish operation as a part of the Pay Item. When automatically controlled screed equipment is not required, fine grading with motor graders is permitted.

Finish immediately after the placing and compacting operations. After finishing, compact the subbase again, according to Subsection 310.3.05.B, *Compacting Material*.

D. Protecting the Base, Subbase or Shoulders

Maintain the course until the Engineer determines that it has cured sufficiently and is ready to prime. Maintain by additional wetting, rolling, and blading as necessary. Repair any defects according to Subsection 300.3.06.B, *Repairing Defects*.

These protection measures do not relieve the Contractor of maintaining the Work until final acceptance as specified in Section 105.

E. Priming the Base

Apply bituminous prime according to Section 412 unless using:

- Graded aggregate base under Portland cement concrete pavement
- Graded aggregate base under asphaltic concrete 5 in. (125 mm) or more in total thickness

310.3.06 Quality Acceptance

A. Compaction Tests

1. Determine the maximum dry density from representative samples of compacted material, according to AASHTO T180, Method D.
 2. Determine the in-place density of finished courses according to GDT 21 or GDT 59, where applicable.
-

Section 310 — Graded Aggregate Construction

B. Finished Surface

Check the finished surface of the base, subbase, or shoulder course as follows:

1. Check the longitudinal surface using a 15 ft. (4.5 m) straightedge parallel to the centerline.
2. Check the transverse surface by using one of the following tools:
 - A template, cut true to the required cross-section and set with a spirit level on non-super elevated sections
 - A system of ordinates, measured from a string line
 - A surveyor's level
3. Ensure that ordinates measured from the bottom of the template, string line, or straightedge, to the surface do not exceed 1/4 in. (6 mm) at any point. Rod readings shall not deviate more than 0.02 ft. (6 mm) from required readings.
4. Correct any variations from these requirements immediately according to Subsection 300.3.06.B, *Repairing Defects*.

C. Thickness Tolerances

1. Thickness Measurements
 - a. Thickness requirements apply to shoulder construction where the plans specify a uniform thickness, or where the shoulders will be surfaced.
 - b. Determine the thickness of the base, subbase, or shoulder course, by making as many checks as necessary to determine the average thickness.
 2. Deficient Thickness
 - a. If any measurement is deficient in thickness more than 1/2 in. (13 mm), make additional measurements to determine the deficient area.
 - b. Correct any area deficient between 1/2 in. (13 mm) and 1 in. (25 mm) to the design thickness by using one of the following methods according to these specifications:
 - Add additional quantities of the same materials and reconstruct to the required thickness
 - Leave in place and accept payment for the materials and area at ½ the Contract Unit Price for the deficient area.
 - c. Correct any area deficient in thickness by more than 1 in. (25 mm) by adding additional quantities of the same material and reconstructing to the required thickness in accordance with these Specifications.
 - d. If payment is made by the ton (megagram), payment for additional material to correct deficiencies will be made at the Contract Unit Price with no additional cost to the Department Sponsor for scarification, mixing or compaction.
 - e. If payment is made by the square yard (meter), no payment will be made for additional material required to correct deficiencies or for reconstructing deficient work.
 3. Average Thickness
 - a. The average thickness per linear mile (kilometer) is determined from all measurements within the mile (kilometer) increments except the areas deficient by more than 1/2 in. (13 mm) and not corrected.
 - b. The average thickness shall not exceed the specified thickness by more than 1/2 in. (13 mm).
 - c. If the basis of payment is per ton (megagram), and the average thickness for any mile (kilometer) increment exceeds the allowable 1/2 in. (13 mm) tolerance, the excess quantity in that increment will be deducted from the Contractor's payments.
 - d. The excess quantity is calculated by multiplying the average thickness that exceeds the allowable 1/2 in. (13 mm) tolerance by the surface area of the base, subbase, or shoulder.
 - e. If the basis of payment is per square yard (meter), no deduction will be made for excess thickness.
-

Section 310 — Graded Aggregate Construction

310.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

310.4 Measurement

A. Graded Aggregate

Where specified for payment by the ton (megagram), graded aggregate base, subbase or shoulder materials are measured in tons (megagrams), mixed and accepted. When hauling material to the roadway, the actual weight of each loaded vehicle is determined with an approved motor truck scale.

Where specified for payment by the square yard (meter) for a certain thickness, the surface length is measured along the centerline, and the width is specified on the plans. Measure irregular areas, such as turnouts and intersections, by the square yard (meter).

B. Bituminous Prime

Bituminous prime is not measured for separate payment.

310.4.01 Limits

General Provisions 101 through 150.

310.5 Payment

A. Graded Aggregate

Graded aggregate base, subbase, or shoulder course will be paid for at the Contract Unit Price per ton (megagram) or per square yard (meter), complete, in place, and accepted. This payment shall be full compensation for:

- Materials
 - Shaping and compacting the existing roadbed
 - Loading, hauling, and unloading
 - Crushing and processing
 - Mixing
 - Spreading
 - Watering
 - Compacting and shaping
 - Maintenance
 - Priming, when required
 - All incidentals necessary to complete the work
-

Section 310 — Graded Aggregate Construction

B. Graded Aggregate with Recycled Concrete Aggregate

If used in lieu of graded aggregate, the pay tons for graded aggregate with Recycled Concrete Aggregate calculated in accordance with Subsection 310.4.C will be paid for at the graded aggregate contract unit price. This pay shall be full compensation for:

- Materials
- Shaping and compacting the existing roadbed
- Loading, hauling, and unloading
- Crushing and processing
- Mixing
- Spreading
- Watering
- Compacting and shaping
- Maintenance
- Priming, when required
- All incidentals necessary to complete the work

Payment will be made under:

Item No. 310-1	Graded aggregate base course— including material	Per cubic yard (meter)
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310.5.01 Adjustments

General Provisions 101 through 150.

Section 400—Hot Mix Asphaltic Concrete Construction

400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. Ensure the mixture conforms with lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.

Acceptance of work is on a lot-to-lot basis according to the requirements of this Section and Section 106.

400.1.01 Definitions

Segregated Mixture: Mixture lacking homogeneity in HMA constituents of such magnitude there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

Wearing Course: The upper course of asphaltic concrete placed on a roadway, airport or other asphalt pavement.

Surface Course: The upper course of asphaltic concrete placed on a roadway, airport or other asphalt pavement ~~and also includes the dense graded asphaltic concrete mixture beneath Open Graded Friction Course (OGFC) or Porous European Mixture (PEM).~~

Intermediate (Binder) Course: The lift(s) of asphaltic concrete above the base course and below the wearing course.

Asphaltic Concrete Base Course: The lower lift(s) of asphaltic concrete generally placed on graded aggregate base (GAB), soil cement or other stabilized base material.

New Construction: A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If one or more lanes are added longitudinally adjacent to the existing lane, the lane(s) shall be tested under the criteria for a resurfacing project. If work is performed on the existing roadway including leveling, grade changes, widening and/or resurfacing then that lane shall be tested under the criteria for a resurfacing project.

Trench Widening: Widening no more than 4 ft. (1.2 m) in width.

Comparison Sample: Opposite quarters of material sampled by the Contractor.

Independent Sample (Quality Assurance Sample): A sample taken by the **Department Engineer** to verify an acceptance decision without regard to any other sample that may also have been taken to represent the material in question.

Referee sample: A sample of the material retained during the quartering process which is used for evaluation if a comparison of Contractor and **Departmental Engineer** split sample test results is outside allowable tolerances.

400.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 109—Measurement and Payment

Section 152—Field Laboratory Building

Section 413—Bituminous Tack Coat

Section 424—Bituminous Surface Treatment

Section 802—Aggregate for Asphaltic Concrete

Section 828—Hot Mix Asphaltic Concrete Mixtures

Section 400 — Hot Mix Asphaltic Concrete Construction

B. Referenced Documents

AASHTO T 324

AASHTO T 315

AASHTO T 209

AASHTO T 202

AASHTO T 49

Department of Transportation Standard Operating Procedure (SOP) 15

Department of Transportation Standard Operating Procedure (SOP) 27

Department of Transportation Standard Operating Procedure (SOP) 40

Department of Transportation Standard Operating Procedure (SOP) 46

GDT 38

GDT 39

GDT 42

GDT 59

GDT 73

GDT 78

GDT 83

GDT 119

GDT 125

GDT 126

GDT 134

GSP 15

GSP 21

QPL 1

QPL 2

QPL 7

QPL 26

QPL 30

QPL 39

QPL 41

QPL 45

QPL 65

QPL 67

QPL 70

QPL 77

QPL 88

QPL 91

Section 400 — Hot Mix Asphaltic Concrete Construction

QPL 92 (A, B, C)

QPL 97

400.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for all materials used in production of HMA when requested by the Department Engineer. Show the following on the Bill of Lading:

- Date shipped
- Quantity in tons (megagrams)
- Included with or without additives (for asphalt cement)

Purchase asphaltic cement directly from a supplier listed on Qualified Products List 7 and provide copies of Bill of Lading at the Department's Engineer's request.

B. Paving Plan

Before starting asphaltic concrete construction, submit a written paving plan to the Engineer for approval. Include the following on the paving plan:

- Proposed starting date
- Location of plant(s)
- Rate of production
- Average haul distance(s)
- Number of haul trucks
- Paver speed feet (meter)/minute for each placement operation
- Mat width for each placement operation
- Number and type of rollers for each placement operation
- Sketch of the typical section showing the paving sequence for each placement operation
- Electronic controls used for each placement operation
- Temporary pavement marking plan

If staged construction is designated in the plans or contract, provide a paving plan for each construction stage.

If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department Engineer.

C. Job Mix Formula

Submit to the Engineer a written job mix formula proposed for each mixture type to be used based on an approved mix design. Furnish the following information for each mix:

- Specific project for which the mixture will be used
 - Source and description of the materials to be used
 - Mixture I.D. Number
 - Proportions of the raw materials to be combined in the paving mixture
 - Single percentage of the combined mineral aggregates passing each specified sieve
 - Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
 - Single temperature at which to discharge the mixture from the plant
 - Theoretical specific gravity of the mixture at the designated asphalt content
 - Name of the person or agency responsible for quality control of the mixture during production
-

Section 400 — Hot Mix Asphaltic Concrete Construction

Do the following to have the Job Mix Formulas approved in accordance with SOP 40 *Approval of Contractor Job Mix Formulas* and to ensure their quality:

1. Submit proposed job Mix Formulas for review at least two weeks before beginning the mixing operations.
2. Do not start hot mix asphaltic concrete work until the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until the Engineer has given approval.
3. Provide mix designs for all SMA, Superpave and 4.75 mm mixes to be used. The Department will provide mix design results for other mixes to be used.
4. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied to the Department according to Subsection 106.01, *Source of Supply and Quantity of Materials*.

D. Quality Control Program

Submit a Quality Control Plan to the Office of Materials and Testing for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

400.2 Materials

Ensure materials comply with the specifications listed in Table 1.

TABLE 1—MATERIALS SPECIFICATIONS

Material	Subsection
Asphalt Cement, Grade Specified	820.2
Coarse Aggregates for Asphaltic Concrete	802.2.02
Fine Aggregates for Asphaltic Concrete	802.2.01
Mineral Filler	883.1
Heat Stable Anti-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid (When approved by the Office of Materials and Testing)	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828
Fiber Stabilizing Additives	819

~~When approved by the Office of Materials and Testing and required in the Contract, provide Untait material, hereafter referred to by the common trade name Gilsonite, as a reinforcing agent for bituminous mixtures. Supply a manufacturer's certification that the Gilsonite is a granular solid which meets the following requirements:~~

~~Softening Point (AASHTO: T-53) _____ 300-350 °F (150-175 °C)~~

~~Specific Gravity, 77 °F (25 °C) (AASHTO: T-228) _____ 1.04 ± 0.02~~

~~Flash Point, COC (AASHTO: T-48) _____ 550 °F (290 °C) Min.~~

~~Ash Content (AASHTO: T-111) _____ 1.0% Max.~~

~~Penetration, 77 °F (25 °C), 100 gm., 5 sec. (AASHTO: T-49) 0~~

Section 400 — Hot Mix Asphaltic Concrete Construction

400.2.01 Delivery, Storage, and Handling

Storage of material is allowed in a properly sealed and insulated system for up to 24 hours. Ensure Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures are not stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with the Engineer's approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. The Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

The Engineer may obtain mixture samples or recover asphalt cement according to GDT 119 or AASHTO T 324. AASHTO T 315, AASHTO T 202, or AASHTO T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred. AASHTO T-324 will be used to perform Hamburg Wheel Tracking Device testing to determine rutting and moisture damage susceptibility.

A. Vehicles for Transporting and Delivering Mixtures

Ensure trucks used for hauling bituminous mixtures have tight, clean, smooth beds.

Follow these guidelines when preparing vehicles to transport bituminous mixtures:

1. Use an approved releasing agent from QPL 39 in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.
2. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.
3. Insulate the front end and sides of each bed with an insulating material with the following specifications:
 - Consists of builders insulating board or equivalent;
 - Has a minimum "R" value of 4.0; and
 - Can withstand approximately 400 °F (200 °C) temperatures

Install the insulating material so it is protected from loss and contamination. A "Heat Dump Body" may be used in lieu of insulation of the bed. "Heat Dump Body" refers to any approved transport vehicle capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the "Heat Dump Body" clearly with "OPEN" and "CLOSE" position at the exhaust diverter. Install a padlock and lock it in the "OPEN" position when the "Heat Dump Body" is used to transport bituminous mixtures.

4. Mark each transporting vehicle with a clearly visible identification number.
5. Create a hole in each side of the bed so the temperature of the loaded mixture can be checked. Ensure the placement of these holes are located to assure the thermometer is being placed in the hot mix asphaltic concrete mixtures.

Ensure the mixture is delivered to the roadway at a temperature within ± 20 °F (± 11 °C) of the temperature on the job mix formula.

If the Engineer determines a truck may be hazardous to the project or adversely affect the quality of the work, remove the truck from the project.

B. Containers for Transporting, Conveying, and Storing Bituminous Material

To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

400.3 Construction Requirements

400.3. 01 Personnel

General Provisions 101 through 150.

Section 400 — Hot Mix Asphaltic Concrete Construction

400.3.02 Equipment

Hot mix asphaltic concrete plants producing mix for Department Contractor use are governed by Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.

The Engineer will approve the equipment used to transport and construct hot mix asphaltic concrete. Ensure the equipment is in satisfactory mechanical condition and can function properly during production and placement operations. Place the following equipment at the plant or project site:

A. Field Laboratory

Provide a field laboratory according to Section 152.

B. Plant Equipment

1. Scales

Provide scales as follows:

- a. Furnish (at the Contractor's expense) scales to weigh bituminous plant mixtures, regardless of the measurement method for payment.
- b. Ensure the weight measuring devices provide documentation complying with Subsection 109.01, *Measurement and Quantities*.
- c. Provide weight devices recording the mixture net weights delivered to the truck when not using platform scales. A net weight system will include, but is not limited to:
 - Hopper or batcher-type weight systems delivering asphaltic mixture directly to the truck
 - Fully automatic batching equipment with a digital recording device
- d. Use a net weight printing system only with automatic batching and mixing systems approved by the Engineer.
- e. Ensure the net weight scale mechanism or device manufacturer, installation, performance, and operation meets the requirements in Subsection 109.01, *Measurement and Quantities*
- f. Provide information on the Project tickets according to Department of Transportation SOP-15.

2. Time-Locking Devices

Furnish batch type asphalt plants with automatic time-locking devices controlling the mixing time automatically. Construct these devices to ensure the operator cannot shorten or eliminate any portion of the mixing cycle.

3. Surge- and Storage-Systems

Provide surge and storage bins as follows:

- a. Ensure bins for mixture storage are insulated and have a working seal, top and bottom, to prevent outside air infiltration and to maintain an inert atmosphere during storage. Bins not intended as storage bins may be used as surge bins to hold hot mixtures for part of the working day. However, empty these surge bins completely at the end of the working day.
 - b. Ensure surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.
 - c. Ensure surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.
 - d. Ensure the scale mechanism or device manufacture, installation, performance, and operation meets the requirements in Subsection 109.01 *Measurement and Quantities*.
-

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4. Controls for Dust Collector

Fines Control dust collection as follows:

- a. When collecting airborne aggregate particles and returning them to the mixture, have the return system meter all or part of the collected dust uniformly into the aggregate mixture and waste the excess. The collected dust percentage returned to the mixture is subject to the Engineer's approval.
- b. When the collected dust is returned directly to the hot aggregate flow, interlock the dust feeder with the hot aggregate flow, and meter the flow to maintain a constant, proportioned and uniform flow.

5. Mineral Filler Supply System

When mineral filler is required as a mixture ingredient:

- a. Use a separate bin and feed system to store and proportion the required quantity into the mixture with uniform distribution.
- b. Control the feeder system with a proportioning device meeting these specifications:
 - Is accurate to within ± 10 percent of the filler required
 - Has a convenient and accurate means of calibration
 - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes
- c. Provide flow indicators or sensing devices for the mineral filler system and interlock them with the plant controls to interrupt the mixture production if mineral filler introduction fails to meet the required target value after no longer than 60 seconds.
- d. Add mineral filler to the mixture as follows, according to the plant type:
 - Batch Type Asphalt Plant: add mineral filler to the mixture in the weigh hopper.
 - Continuous Plant Using Pugmill Mixers: feed the mineral filler into the hot aggregate before it is introduced into the mixer to ensure dry mixing is accomplished before the bituminous material is added.
 - Continuous Plants Using the Drier-Drum Mixers: add the mineral filler to ensure dry mixing is accomplished before the bituminous material is added and ensure the filler does not become entrained into the air stream of the drier.

6. Hydrated Lime Treatment System

When hydrated lime is required as a mixture ingredient:

- a. Use a separate bin and feed system to store and proportion the required quantity into the mixture.
 - b. Ensure the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Ensure the addition of hydrated lime will not become entrained in the exhaust system of the drier or plant.
 - c. Control the feeder system with a proportioning device meeting these specifications:
 - Is accurate to within ± 10 percent of the amount required
 - Has a convenient and accurate means of calibration
 - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure mixture produced is properly treated with lime
 - d. Provide flow indicators or sensing devices for the hydrated lime system and interlock them with the plant controls to interrupt mixture production if hydrated lime introduction fails to meet the required target value after no longer than 60 seconds.
-

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7. Net Weight Weighing Mechanisms

Certify the accuracy of the net weight weighing mechanisms by an approved registered scale serviceperson at least once every 6 months. Check the accuracy of net weight weighing mechanisms at the beginning of Project production and thereafter as directed by the Engineer. Check mechanism accuracy as follows:

- a. Weigh a load on a set of certified commercial truck scales. Ensure the difference between the printed total net weight and weight obtained from the commercial scales is no greater than 4 lbs./1,000 lbs. (4 kg/Mg) of load.

Check the accuracy of the bitumen scales as follows:

- Use standard test weights.
 - If the checks indicate printed weights are out of tolerance, have a registered scale serviceperson check the batch scales and certify the accuracy of the printer.
 - While the printer system is out of tolerance and before its adjustment, continue production only if using a set of certified truck scales to determine the truck weights.
- b. Ensure plants using batch scales maintain ten 50 lb. (25 kg) standard test weights at the plant site to check batching scale accuracy.
 - c. Ensure plant scales are used only to proportion mixture ingredients, and not to determine that pay quantities, are within two percent throughout the range.

8. Fiber Supply System

When stabilizing fiber is required as a mixture ingredient:

- a. Use a separate feed system to store and proportion by weight the required quantity into the mixture with uniform distribution.
 - b. Control the feeder system with a proportioning device meeting these specifications:
 - Is accurate to within ± 10 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times.
 - Has a convenient and accurate means of calibration.
 - Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds (kg) per minute, to verify feed rate.
 - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes.
 - c. Provide flow indicators or sensing devices for the fiber system and interlock them with the plant controls to interrupt the mixture production if fiber introduction fails or if the output rate is not within the tolerances given above.
 - d. Introduce the fiber as follows:
 - When a batch type plant is used, add the fiber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 8 to 12 seconds from the time the aggregate is completely emptied into the mixer to ensure the fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.
 - When a continuous or drier-drum type plant is used, add the fiber to the aggregate and uniformly disperse prior to the injection of asphalt cement. Ensure the fibers will not become entrained in the exhaust system of the drier or plant.
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9. ~~Crumb Rubber Modifier Supply System~~

~~When specified, crumb rubber modifier may be substituted at the Contractor's discretion to produce a PG 76-22 asphaltic cement at the production facility in accordance with Section 820:~~

- ~~a. Use a separate feed system to store and proportion by weight of the total asphaltic cement, the required percentage of crumb rubber into the mixture.~~
 - ~~b. Control the feeder system with a proportioning device meeting these specifications:
 - ~~• Is accurate to within ± 6 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times.~~
 - ~~• Has a convenient and accurate means of calibration.~~
 - ~~• Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. Ensure the supply system reports the feed in 1 lb. (454 gr.) increments using load cells enabling the user to monitor the depletion of the modifier. Monitoring the system volumetrically will not be allowed.~~
 - ~~• Interlocks with the aggregate weigh system and asphaltic cement pump to maintain the correct proportions for all rates of production and batch sizes.~~~~
 - ~~c. Provide flow indicators or sensing devices for the system and interlock them with the plant controls to interrupt the mixture production if the crumb rubber introduction output rate is not within the ± 6 percent tolerance given above. This interlock will immediately notify the operator if the targeted rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; ensure the modifier system runs until a uniform feed can be observed on the output display. Ensure all mix produced prior to obtaining a uniform feed is rejected.~~
 - ~~d. Introduce the crumb rubber modifier as follows:
 - ~~• When a batch type plant is used, add the rubber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 15 to 20 seconds from the time the aggregate is completely emptied into the mixer to ensure the modifiers are uniformly distributed prior to the injection of asphalt cement into the mixer. Increase the batch wet mix time by 15 to 20 seconds to ensure the crumb rubber modifier is uniformly blended with the asphaltic cement.~~
 - ~~• When a continuous or drier-drum type plant is used, add the rubber to the aggregate and uniformly disperse prior to the injection of asphalt cement. The point of introduction in the drum mixer will be approved by the Engineer prior to production. Ensure the crumb rubber modifier will not become entrained in the exhaust system of the drier or plant and will not be exposed to the drier flame at any point after induction.~~~~
 - ~~e. No separate measurement and payment will be made if Contractor elects to utilize crumb rubber.~~
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10. Fiber-Reinforcement Supply System

When reinforcement fiber is specified in the contract as a mixture ingredient:

Ensure, that the reinforcement fiber is an approved material and listed on QPL 97” Georgia’s List of Approved Reinforcement Fiber”. Use a separate Fiber Meetering Device feed system to proportion by weight of the total asphaltic cement, the required percentage of fiber-reinforcement into the mixture.

- a. Control the meetering system with a proportioning device meeting these specifications:
 - Is accurate to within ± 6 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times.
 - Has a convenient and accurate means of calibration.
 - Provides in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds, or (kg) per minute, to verify feed rate
 - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes.
 - b. Provide flow indicators or sensing devices for the fiber system and interlock them with the plant controls to interrupt the mixture production if fiber introduction fails or if the output rate is not within the tolerances given above.
 - c. Introduce the fiber as follows:
 - When a batch type plant is used, add the fiber dosage to the aggregate in the weigh hopper. This may be done with loose fibers and a Fiber Meetering Device or may be done by using pre-measured packages that are specifically designed to disintegrate within the mixing cycle. Increase the batch dry mixing time by 8 to 12 seconds from the time the aggregate is completely emptied into the mixer to ensure the fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.
 - When a continuous or drier-drum type plant is used, add the fiber to the aggregate or RAP material at the beginning of the mixing cycle and uniformly disperse prior to the injection of asphalt cement. The final configuration of the fibers at the point when mixing begins, should closely resemble the fibers as they are packaged. Pre-distributing the fibers into their individual form should be avoided. Ensure the fibers will not become entrained in the exhaust system of the drier or plant. The producer should inspect their plant for any protrusions that may accumulate fibers and create the potential for fiber clumps.
 - When a continuous or drier-drum type plant is used for limited production volumes, the addition of the fibers may be done by using pre-measured packages that are specifically designed to disintegrate within the mixing cycle and adding them directly into the RAP port of the plant. Because this is not an automated process, a written protocol must be supplied by the producer to demonstrate how they will attain the dosage requirement, and documentation must be supplied by the material manufacturer assuring this method will produce the desired random fiber distribution.
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C. Equipment at Project Site

1. Cleaning Equipment

Provide sufficient hand tools and power equipment to clean the roadway surface before placing the bituminous tack coat. Use power equipment complying with Subsection 424.3.02.F, *Power Broom and Power Blower*.

2. Pressure Distributor

To apply the bituminous tack coat, use a pressure distributor complying with Subsection 424.3.02.B, *Pressure Distributor*.

3. Bituminous Pavers

To place hot mix asphaltic concrete, use bituminous pavers that can spread and finish courses that are:

- As wide and deep as indicated on the plans
 - True to line, grade, and cross section
 - Smooth
 - Uniform in density and texture
- a. Continuous Line and Grade Reference Control. Furnish, place, and maintain the supports, wires, devices, and materials required to provide continuous line and grade reference control to the automatic paver control system.
- b. Automatic Screed Control System. Equip the bituminous pavers with an automatic screed control system actuated from sensor-directed mechanisms or devices that will maintain the paver screed at a pre-determined transverse slope and elevation to obtain the required surface.
- c. Transverse Slope Controller. Use a transverse slope controller capable of maintaining the screed at the desired slope within ± 0.1 percent. Do not use continuous paving set-ups resulting in unbalanced screed widths or off-center breaks in the main screed cross section unless approved by the Engineer.
- d. Screed Control. Equip the paver to permit the following four modes of screed control. Ensure the method used is approved by the Engineer.
- Automatic grade sensing and slope control
 - Automatic dual grade sensing
 - Combination automatic and manual control
 - Total manual control

Ensure the controls are referenced with a taut string or wire set to grade, or with a ski-type device or mobile reference at least 30 ft. (9 m) long when using a conventional ski. Approved non-contacting laser or sonar-type skis listed on QPL 91 "Georgia's List of Approved Non-contacting Laser and Sonar-type Electronic Grade and Slope Controls" may be used in lieu of conventional 30 ft. (9 m) skis. Under limited conditions, a short ski or shoe may be substituted for a long ski on the second paver operating in tandem, or when the reference plane is a newly placed adjacent lane.

Automatic screed control is required on all projects; however, when the Engineer determines that project conditions prohibit the use of such controls, the Engineer may waive the grade control, or slope control requirements, or both.

- e. Paver Screed Extension. When the laydown width requires a paver screed extension, use bolt-on screed extensions to extend the screeds, or use an approved mechanical screed extension device. When the screed is extended, add auger extensions to assure a length of no more than 18 in. (0.5 m) from the auger to the end gate of the paver. Auger extensions may be omitted when paving variable widths. Ensure the paver is equipped with tunnel extensions when the screed and augers are extended.
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NOTE: Do not use extendible strike-off devices instead of approved screed extensions. Only use a strike-off device in areas that would normally be luted in by hand labor.

4. Compaction Equipment

Ensure that the compaction equipment is in good mechanical condition and can compact the mixture to the required density. The compaction equipment number, type, size, operation, and condition is subject to the Engineer's approval

5. Materials Transfer Vehicle (MTV)

a. Use a Materials Transfer Vehicle (MTV) when placing asphaltic concrete mixtures on projects on the state route system with the following conditions. If a project fails to meet any one of the following conditions, the MTV's use is not required other than during the placement of SMA, PEM and OGFC mixtures. MTVs are required during the placement of SMA, PEM and OGFC mixtures regardless of ADT, project length and mixture tonnage unless waived at the discretion of the Office of Materials and Testing.

1) When to use:

- The two-way ADT is equal to or greater than 6000
- The project length is equal to or greater than 3000 linear feet (915 linear meters)
- The total tonnage (megagrams) of all asphaltic concrete mixtures is greater than 2000 tons (1815 Mg)

2) Where to use:

- Mainline of the traveled way
- Collector/distributor (C/D) lanes on Interstates and limited access roadways
- Leveling courses at the Engineer's discretion

3) Do not use the MTV for the following conditions:

- A resurfacing project that only 9.5 mm mix is required.
- A project with lane width that is equal or less than 11 ft. (3.4 m).
- A passing lane only project.
- When noted on the plans.

b. Ensure the MTV and conventional paving equipment meet the following requirements:

1) MTV

- Has a truck unloading system which receives mixture from the hauling equipment and independently deliver mixtures from the hauling equipment to the paving equipment.
- Has mixture remixing capability approved by the Office of Materials and Testing and is listed on QPL 88 "Georgia's List of Approved Materials Transfer Vehicles".
- Provides to the paver a homogeneous, non-segregated mixture of uniform temperature with no more than 20 °F (11 °C) difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to twenty-five feet (0.3 m to 7.6 m) from the screed while the paver is operating. Ensure that the MTV is capable of providing the paver a consistent material flow that is sufficient to prevent the paver from stopping between truck exchanges.

2) Conventional Paving Equipment

- Has a paver hopper insert with a minimum capacity of 14 tons (13 Mg) installed in the hopper of conventional paving equipment when an MTV is used.
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- c. If the MTV malfunctions during spreading operations, discontinue placement of hot mix asphaltic concrete after there is sufficient mix placed to maintain traffic in a safe manner. However, placement of hot mix asphaltic concrete in a lift not exceeding 2 in. (50 mm) may continue until any additional hot mix in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV is operational.
- d. Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 5 mph (8 kph) without any acceleration or deceleration while crossing a bridge.

400.3.03 Preparation

A. Prepare Existing Surface

Prepare the existing surface as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to the Engineer's satisfaction.
2. Patch and Repair Minor Defects Before placing leveling course:
 - a. Correct potholes and broken areas requiring patching in the existing surface and base as directed by the Engineer.
 - b. Cut out, trim to vertical sides, and remove loose material from the areas to be patched.
 - c. Prime or tack coat the area after being cleaned. Compact patches to the Engineer's satisfaction. Material for patches does not require a job mix formula but must meet the gradation range shown in Section 828. The Engineer must approve the asphalt content to be used.

3. Apply Bituminous Tack Coat

Apply the tack coat according to Section 413. The Engineer will determine the application rate, which must be within the limitations in Tables 2A and 2B.

TABLE 2A—APPLICATION RATES FOR BITUMINOUS TACK, GAL/YD² (L/M²)

Tack Uses	Minimum	Maximum
Under OGFC and PEM Mixes	0.06 (0.27)	0.08 (0.36)
All Other Mixes	0.04 (0.18)	0.06 (0.27)
Non-tracking Hot Applied Polymer-Modified Tack (NTHAPT) (Note 2)	0.06 (0.27)	0.18 (0.81)
<p>Note 1: On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd² (0.09 to 0.18 L/m²).</p> <p>Note 2: Use higher application rate (0.12 to 0.18) within the minimum and maximum range under OGFC and PEM Mixes</p>		

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TABLE 2B – APPLICATION RATES FOR ANIONIC EMULSIFIED ASPHALT OR CATIONIC EMULSIFIED ASPHALT BITUMINUS TACK, GAL/YD² (L/M²)

Tack-Uses	Minimum	Maximum
New Asphaltic Concrete Pavement to New Asphaltic Concrete Pavement or Thin Lift Leveling	0.05 (0.23)	0.08 (0.36)
New Asphaltic Concrete Pavement (≤ 25% RAP) to Aged Existing Pavement or Milled Surface	0.06 (0.27)	0.10 (0.45)
New Asphaltic Concrete Pavement (> 25% RAP) to Aged Existing Pavement or Milled Surface	0.08 (0.36)	0.12 (0.54)
Non-tracking Emulsified Asphalt	0.07 (0.32)	0.12 (0.54)
CQS Special Modified Asphalt Emulsion (Note 1)	0.12 (0.54)	0.28 (1.27)
<ul style="list-style-type: none"> • Allow standard anionic emulsified asphalt or cationic emulsified asphalt to break per emulsion manufacturer’s recommendation. Proceed with paving only after the anionic emulsified asphalt or cationic emulsified asphalt has cured to the satisfaction of the Engineer. • Do not use anionic emulsified asphalt or cationic emulsified asphalt, other than CQS Special Modified Asphalt Emulsion in conjunction with a spray paver, under OGFC or PEM on interstates or limited access state routes. 		

Note 1: Use higher application rate (0.22 to 0.28) within the minimum and maximum under OGFC and PEM Mixes

B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring the surface area to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.
2. Place leveling at the locations and in the amounts directed by the Engineer.
3. Use leveling course mixtures meeting the requirements of the job mix formulas defined in:
 - Subsection 400.3.05.A, *Observe Composition of Mixtures*
 - Section 828
 - Leveling acceptance schedules in Subsection 400.3.06.A, *Acceptance Plans for Gradation and Asphalt Cement Content*
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3, but do not use 4.75 mm mix on interstate projects.
5. If patching is required to correct mat deficiencies in the final surface layer, ensure patches extend full lane width and no less than the length of the affected area as determined by the Engineer.

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TABLE 3—LEVELING AND PATCHING MIX TYPES

Thickness	Rate of Spread	Type of Mix
Up to 0.75 in. (19 mm)	Up to 85 lbs./yd ² (46 kg/m ²)	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in. (19 to 38 mm)	85 to 165 lbs./yd ² (46 to 90 kg/m ²)	9.5 mm Superpave Type 2
1.5 to 2 in. (38 to 50 mm)	165 to 220 lbs./yd ² (90 to 120 kg/m ²)	12.5 mm Superpave *
2 to 3 in. (50 to 75 mm)	220 to 330 lbs./yd ² (120 to 180 kg/m ²)	19 mm Superpave **
Over 2.5 in. (64 mm)	Over 275 lbs./yd ² (180 kg/m ²)	25 mm Superpave

* This mixture may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

** This mixture may be used for patching no more than 4 in. (100 mm) deep in limited confined deep mill and patching locations.

400.3.04 Fabrication

General Provisions 101 through 150.

400.3.05 Construction

Provide the Engineer at least one day's notice prior to beginning construction, or prior to resuming production if operations have been temporarily suspended.

A. Observe Composition of Mixtures

1. Calibration of plant equipment

If the material changes, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.

Calibrate as follows:

- a. Before producing mixture for the Project, calibrate by scale weight the electronic sensors or settings for proportioning mixture ingredients.
- b. Calibrate ingredient proportioning for all rates of production.

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2. Mixture control

Compose hot mix asphaltic concrete from a uniform mixture of aggregates, bituminous material, and if required, hydrated lime, mineral filler, or other approved additive.

Ensure the constituents proportional to produce mixtures meeting the requirements in Section 828. The general composition limits prescribed are extreme ranges within which the job mix formula must be established. Base mixtures on a design analysis that meets the requirements of Section 828.

Ensure the field performance of the in-place mixtures meet the requirements of Subsection 828.2B for Permeability, Moisture Susceptibility, Rutting Susceptibility and Fatigue. In-place mix may be evaluated for compliance with Subsection 828.2.B at the discretion of the State Bituminous Construction Engineer under the following conditions:

- Deviates greater than 10 percent on gradation for mixture control sieves from the approved Job Mix Formula based on Acceptance or Independent Samples.
- Deviates greater than 0.7 percent in asphalt cement content from the approved Job Mix Formula based on Acceptance or Independent Samples.
- The calculated mean pavement air voids result in an adjusted pay factor less than 0.80 or any single sub lot result in mean pavement air voids exceeding 10.5 percent.
- Mix produced not using an approved mix design and/or job mix formula.

Remove and replace any material determined to not meet the requirements established in Section 828.2.B at the Contractor's expense.

If control test results show the characteristic tested does not conform to the job mix formula control tolerances given in Section 828, take immediate action to ensure that the quality control methods are effective.

Control the materials to ensure extreme variations do not occur. Maintain the gradation within the composition limits in Section 828.

B. Prepare Bituminous Material

Uniformly heat the bituminous material to the temperature specified in the job mix formula with a tolerance of ± 20 °F (± 11 °C).

C. Prepare the Aggregate

Prepare the aggregate as follows:

1. Heat the aggregate for the mixture and ensure a mix temperature within the limits of the job mix formula.
2. Do not contaminate the aggregate with fuel during heating.
3. Reduce the absorbed moisture in the aggregate until the asphalt does not separate from the aggregate in the prepared mixture. If this problem occurs, the Engineer will establish a maximum limit for moisture content in the aggregates. When this limit is established, maintain the moisture content below this limit.

D. Prepare the Mixture

Proportion the mixture ingredients as necessary to meet the required job mix formula. Mix until a homogenous mixture is produced.

1. Add Mineral Filler

When mineral filler is used, introduce it in the proper proportions and as specified in Subsection 400.3.02.B.5, *Mineral Filler Supply System*.

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2. Add Hydrated Lime

When hydrated lime is included in the mixture, add it at a rate specified in Section 828 and the job mix formula. Use methods and equipment for adding hydrated lime according to Subsection 400.3.02.B.6, *Hydrated Lime Treatment System*.

Add hydrated lime to the aggregate by using Method A or B as follows:

Method A—Dry Form—Add hydrated lime in its dry form to the mixture as follows, according to the type of plant:

- a. Batch Type Asphalt Plant: Add hydrated lime to the mixture in the weigh hopper or as approved and directed by the Engineer.
- b. Continuous Plant Using Pugmill Mixer: Feed hydrated lime into the hot aggregate before it is introduced into the mixer to ensure dry mixing is complete before the bituminous material is added.

Method B—Lime/Water Slurry—Add the required quantity of hydrated lime (based on dry weight) in lime/water slurry form to the aggregate. This solution consists of lime and water in concentrations as directed by the Engineer.

Equip the plant to blend and maintain the hydrated lime in suspension and to mix the hydrated lime with the aggregates uniformly in the proportions specified.

- c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so to ensure the lime will not become entrained into the air stream of the drier and to ensure thorough dry mixing will be complete before the bituminous material is added.

3. Add Stabilizing Fiber

When stabilizing fiber is included in the mixture, add stabilizing fiber at a rate specified in Section 819 and the Job Mix Formula. Introduce it as specified in Subsection 400.3.02.B.8, *Fiber Supply System*.

4. Add Gilsonite Modifier

~~When approved by the Office of Materials and Testing and required by the Contract, add the Gilsonite modifier to the mixture at a rate to ensure eight percent by weight of the asphalt cement is replaced by Gilsonite. Use either PG 64-22 or PG 67-22 asphalt cement as specified in Subsection 820.2.01. Provide suitable means to calibrate and check the rate of Gilsonite being added. Introduce Gilsonite modifier by either of the following methods.~~

- ~~a. For batch type plants, incorporate Gilsonite into the pugmill at the beginning of the dry mixing cycle. Increase the dry mix cycle by a minimum of 10 seconds after the Gilsonite is added and prior to introduction of the asphalt cement. For this method, supply Gilsonite in plastic bags to protect the material during shipment and handling and store the modifier in a waterproof environment. Ensure the bags are capable of being completely melted and uniformly blended into the combined mixture.~~

~~Gilsonite may also be added through a mineral filler supply system as described in Subsection 400.3.02.B.5, *Mineral Filler Supply System*. Ensure the system is capable of injecting the modifier into the weigh hopper near the center of the aggregate batching cycle so the material can be accurately weighed.~~

- ~~b. For drier-drum plants, add Gilsonite through the recycle ring or through an acceptable means which will introduce the Gilsonite prior to the asphalt cement injection point. The modifier must proportionately feed into the drum mixer at the required rate by a proportioning device which shall be accurate within \pm 10 percent of the amount required. Ensure the entry point is away from flames and the Gilsonite will not be caught up in the air stream and exhaust system.~~

5. Materials from Different Sources

Do not use mixtures prepared from aggregates from different sources intermittently. This will cause the color of the finished pavement to vary.

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E. Observe Weather Limitations

Do not mix and place asphaltic concrete if the existing surface is wet or frozen. Do not lay asphaltic concrete OGFC mix or PEM at air temperatures below 60 °F (16 °C). When using a MTV, OGFC mix or PEM may be placed at 55 °F (13 °C) when approved by the Engineer. For other courses, follow the temperature guidelines in the following table:

TABLE 4—LIFT THICKNESS TABLE

Lift Thickness	Minimum Temperature
1 in. (25 mm) or less	55 °F (13 °C)
1.1 to 2 in. (26 mm to 50 mm)	45 °F (8 °C)
2.1 to 3 in. (51 mm to 75 mm)	40 °F (4 °C)
	35 °F (2 °C)
4.1 to 8 in. (101 mm to 200 mm)	32 °F (0 °C) and rising. Base material must not be frozen.

F. Perform Spreading and Finishing

Spread and finish the course as follows:

Determine the maximum compacted layer thickness by the type mix being used according to Table 5.

TABLE 5—MIX TYPE MINIMUM, MAXIMUM LAYER AND TOTAL THICKNESS

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
25 mm Superpave	2 1/2 in. (64 mm)	5 in. (125 mm)*	—
19 mm Superpave	1 3/4 in. (44 mm)	3 in. (75 mm)*	—
12.5 mm Superpave	1 3/8 in. (35 mm)	2 1/2 in. (64 mm)**/**	8 in. (200 mm)
9.5 mm Superpave Type 2	1 1/8 in. (29 mm)	1 1/2 in. (38 mm)**	4 in. (100 mm)
9.5 mm Superpave Type 1	7/8 in. (22 mm)	1 1/4 in. (32 mm)	4 in. (100 mm)
4.75 mm Mix	3/4 in. (19 mm)	1 1/8 in. (29 mm)	2 in. (50 mm)
9.5 mm OGFC	75 lbs./yd ² (41 kg/m ²)	95 lbs./yd ² (51 kg/m ²)	—
12.5 mm OGFC	85 lbs./yd ² (46 kg/m ²)	110 lbs./yd ² (60 kg/m ²)	—
12.5 mm PEM	110 lbs./yd ² (60 kg/m ²)	165 lbs./yd ² (90 kg/m ²)	—
9.5 mm SMA	1 1/8 in. (29 mm)	1 1/2 in. (38 mm)	4 in. (100 mm)
12.5 mm SMA	1 3/8 in. (35 mm)	3 in. (75 mm)	6 in. (150 mm)
19 mm SMA	1 3/4 in. (44 mm)	3 in. (75 mm)	—

* Allow up to 6 in. (150 mm) per lift on trench widening. **Allow up to 4 in. (100 mm) per lift on trench widening of ≤ 2 ft. when no overlay is required. ***Place 9.5 mm Superpave and 12.5 mm Superpave up to 4 in. (100 mm) thick for driveway and side road transition.

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1. Unload the mixture into the paver hopper or into a device designed to receive the mixture from delivery vehicles.
2. Except for leveling courses, spread the mixture to the loose depth for the compacted thickness or the spread rate. Use a mechanical spreader true to the line, grade, and cross section specified.
3. For leveling courses, use a motor grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in Subsection 400.3.02.C, *Equipment at Project Site*.
4. Obtain the Engineer's approval for the sequence of paving operations, including paving the adjoining lanes. Minimize tracking tack onto surrounding surfaces.
5. Ensure the outside edges of the pavement being laid are aligned and parallel to the roadway center line.
6. For New Construction or Resurfacing Contracts containing multiple lifts or courses, arrange the width of the individual lifts so the longitudinal joints of each successive lift are offset from the previous lift at least 1 ft. (300 mm). This requirement does not apply to the lift immediately over thin lift leveling courses.
7. Ensure the longitudinal joint(s) in the surface course and the mix immediately underneath asphaltic concrete OGFC or PEM are at the lane line(s).

NOTE: Perform night work with artificial light provided by the Contractor and approved by the Engineer.

8. Where mechanical equipment cannot be used, spread and rake the mixture by hand. Obtain the Engineer's approval of the operation sequence, including compactive methods, in these areas.
9. Keep small hand raking tools clean and free from asphalt build up. Do not use fuel oil or other harmful solvents to clean tools during the work.
10. Do not use mixture with any of these characteristics:
 - Segregated
 - Nonconforming temperature
 - Deficient or excessive asphalt cement content
 - Otherwise unsuitable to place on the roadway in the work
11. Remove and replace mixture placed on the roadway that the Engineer determines has unacceptable blemish levels from segregation, raveling, streaking, pulling and tearing, or other deficient characteristics. Replace with acceptable mixture at the Contractor's expense. Do not continually place mixtures with deficiencies.

Do not place subsequent course lifts over another lift or course while the temperature of the previously placed mix is 140 °F (60 °C) or greater.
12. Obtain the Engineer's approval of the material compaction equipment. Perform the rolling as follows:
 - a. Begin the rolling as close behind the spreader as possible without causing excessive distortion of the asphaltic concrete surface.
 - b. Continue rolling until roller marks are no longer visible.
 - c. Use pneumatic-tired rollers with breakdown rollers on all courses except asphaltic concrete OGFC, PEM and SMA or other mixes designated by the Engineer.
13. If applicable, taper or "feather" asphaltic concrete from full depth to a depth no greater than 0.5 in. (13 mm) along curbs, gutters, raised pavement edges, and areas where drainage characteristics of the road must be retained. The Engineer will determine the location and extent of tapering.

G. Maintain Continuity of Operations

Coordinate plant production, transportation, and paving operations to maintain a continuous operation. If the spreading operations are interrupted, construct a transverse joint if the mixture immediately behind the paver screed cools to less than 250 °F (120 °C).

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H. Construct the Joints

1. Construct Transverse Joints
 - a. Construct transverse joints to facilitate full depth exposure of the course before resuming placement of the affected course.
 - b. Properly clean and tack the vertical face of the transverse joint before placing additional material.

NOTE: Never burn or heat the joint by applying fuel oil or other volatile materials.

- c. Straightedge transverse joints immediately after forming the joint.
 - d. Immediately correct any irregularity that exceeds 3/16 in. in 10 ft. (5 mm in 3 m).
2. Construct Longitudinal Joints

Clean and tack the vertical face of the longitudinal joint before placing adjoining material. Construct longitudinal joints so that the joint is smooth, well-sealed, and bonded.
3. Construction Joint Detail for OGFC and PEM Mixtures

In addition to meeting joint requirements described above, construct joints and transition areas for 12.5 mm OGFC and 12.5 mm PEM mixtures as follows:

 - a. For projects which do not have milling included as a pay item:
 - 1) Place OGFC mixture meeting gradation requirements of 9.5 mm OGFC as specified in Section 828 on entrance and exit ramp gore areas and end of project construction joints.
 - Taper mixture from 3/8 in. (10 mm) at end of project to full plan depth within maximum distance of spread for one load of mixture.
 - Taper mixture placed on gore areas from thickness of the edge of the mainline to 3/8 in. (10 mm) at the point of the ramp transverse joint.
 - 2) Construct the ramp transverse joint at the point specified in the plans or as directed by the Engineer.
 - 3) Mixture placed in the transition and gore areas will be paid for at the contract unit price for 12.5 mm OGFC or 12.5 mm PEM, as applicable.
 - b. For projects which have milling included as a pay item:
 - 1) Taper milling for a distance of no less than 50 ft. (15 m) to a depth of 2 1/4 in. (59 mm) at the point of the transverse joint.
 - 2) Taper thickness, if needed, of the dense-graded surface mix within the 50 ft. (15 m) distance to 1 1/2 in. (40 mm) at the point of the transverse joint.
 - 3) Taper thickness of the 12.5 mm OGFC or 12.5 mm PEM to 3/4 in. (19 mm) to ensure the material ties in at grade level with the existing surface at the point of the transverse joint

I. Protect the Pavement

Protect sections of the newly finished pavement from traffic until the traffic will not mar the surface or alter the surface texture. If directed by the Engineer, use artificial methods to cool the newly finished pavement to open the pavement to traffic more quickly.

J. Modify the Job Mix Formula

If the Engineer determines that undesirable mixture or mat characteristics are being obtained, the job mix formula may require immediate adjustment.

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400.3.06 Quality Acceptance

A. Acceptance Plans for Gradation and Asphalt Cement Content

The Contractor will randomly sample and test mixtures for acceptance on a lot basis. The Department-Engineer's Quality Assurance Testing Firm will monitor the Contractor testing program and perform comparison and quality assurance testing. The Contractor's Quality Control Technicians shall participate in follow the Department's Independent Assurance Systems Basis Program.

1. Determine Lot Amount

A lot consists of the tons (megagrams) of asphaltic concrete produced and placed each production day. If this production is less than 500 tons (500 Mg), or its square yard (meter) equivalent, production may be incorporated into the next working day. The Engineer may terminate a lot when a pay adjustment is imminent if a plant or materials adjustment resulting in a probable correction has been made. Terminate all open lots at the end of the month, except for materials produced and placed during the adjustment period. The lot will be terminated as described in Subsection 400.5.01, *Adjustments*.

If the final day's production does not constitute a lot, the production may be included in the lot for the previous day's run; or, the Engineer may treat the production as a separate lot with a corresponding lower number of tests.

2. Determine Lot Acceptance

Determine lot acceptance as found in Subsection 400.5.01, *Adjustments*. The Department Engineer will perform the following task:

Determine the pay factor by using the mean of the deviations from the job mix formula of the tests in each lot and apply it to Table 10 Mixture Acceptance Schedule for Surface Mixes or Table 11 Mixture Acceptance Schedule for Subsurface Mixes, whichever is appropriate. This mean will be determined by averaging the actual numeric value of the individual deviations from the job mix formula, disregarding whether the deviations are positive or negative amounts. Do not calculate lot acceptance using test results for materials not used in the Work. Determine the pay factor for each lot by multiplying the contract unit price by the appropriate pay factor from the Mixture Acceptance Schedule - Table 10 or Table 11. When two or more pay factors for a specific lot are less than 1.0, determine the adjusted payment by multiplying the contract unit price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the lot acceptance tests for a control sieve or for asphalt cement content exceeds the tolerances established in the appropriate Mixture Acceptance Schedule, and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the Engineer determines that the material is not acceptable to leave in place, the materials shall be removed and replaced at the Contractor's expense.

3. Provide Quality Control Program

Provide a Quality Control Program as established in SOP 27 which includes:

- Assignment of quality control responsibilities to specifically named individuals who have been certified by the Office of Materials and Testing
 - Provisions for prompt implementation of control and corrective measures
 - Provisions for communication with Project Manager, Bituminous Technical Services Engineer, and Testing Management Operations Supervisor at all times
 - Provisions for reporting all test results daily through the Office of Materials and Testing computerized Field Data Collection System, AASHTO Trns*port SiteManager, or approved computerized application; other checks, calibrations and records will be reported on a form developed by the Contractor and will be included as part of the project records
 - Notification in writing of any change in quality control personnel
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a. Certification Requirements:

- Use laboratory and testing equipment certified by the Department. (Laboratories which participate in and maintain AASHTO accreditation for testing asphaltic concrete mixtures will be acceptable in lieu of Departmental certification.)
- Provide certified quality control personnel to perform the sampling and testing. A Quality Control Technician (QCT) may be certified at three levels:
 - 1) Temporary Certification – must be a technician trainee who shall be given direct oversight by a certified Level 1 or Level 2 QCT while performing acceptance testing duties during the first 5 days of training. The trainee must complete qualification requirements within 30 Georgia Department of Transportation funded production days after being granted temporary certification. A trainee who does not become qualified within 30 Georgia Department of Transportation funded production days will not be re-eligible for temporary certification. A certified Level 1 or Level 2 QCT shall be at the plant at all times during production and shipment of mixture to monitor work of the temporarily certified technician.
 - 2) Level 1 – must demonstrate they are competent in performing the process control and acceptance tests and procedures related to hot mix asphalt production and successfully pass a written exam.
 - 3) Level 2 – must meet Level 1 requirements and must be capable of and responsible for making process control adjustments, and successfully pass a written exam.
 - Technician certification is valid for 3 years from the date on the technician's certificate unless revoked or suspended. Eligible technicians may become certified through special training and testing approved by the GDOT Office of Materials and Testing. Technicians who lose their certification due to falsification of test data will not be eligible for recertification in the future unless approved by the State Materials and Testing Engineer.

b. Quality Control Management

- 1) Designate at least one Level 2 QCT as manager of the quality control operation. Ensure the Quality Control Manager meets the following requirements:
 - Be accountable for actions of other QCT personnel.
 - Ensure all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are followed.
 - Ensure all reports, charts, and other documentation are completed as required
 - 2) Provide QCT personnel at the plant as follows:
 - If daily production for all mix types is to be greater than 250 tons (megagrams), have a QCT person at the plant at all times during production and shipment of mixture until all required acceptance tests have been completed.
 - If daily production for all mix types will not be greater than 250 tons (megagrams), a QCT may be responsible for conducting tests at up to two plants, subject to random number sample selection.
 - Have available at the plant, or within immediate contact by phone or radio, a Level 2 QCT responsible for making prompt process control adjustments as necessary to correct the mix.
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3) Sampling, Testing, and Inspection Requirements.

- a. Provide all sample containers, extractants, forms, diaries, and other supplies subject to approval of the Engineer.
- b. Perform daily sampling, testing, and inspection of mixture production that meet the following requirements:
 - 1) Randomly sample mixtures according to GSP 15 and GDT 73 (Method C) and test on a lot basis. In the event less than the specified number of samples are taken, obtain representative 6 in. (150 mm) cores from the roadway at a location where the load not sampled was placed. Take enough cores to ensure minimum sample size requirements are met for each sample needed.
 - 2) Maintain a printed copy of the computer-generated random sampling data as a part of the project records.
 - 3) Perform sampling, testing, and inspection duties of GSP 21.
 - 4) Perform extraction or ignition test (GDT 83 or GDT 125) and extraction analysis (GDT 38). If the ignition oven is used, a printout of sample data including weights becomes a part of the project records. For asphalt cement content only, digital printouts of liquid asphalt cement weights may be substituted in lieu of an extraction test for plants with digital recorders. Calculate the asphalt content from the ticket representing the mixture tested for gradation.
 - 5) Save extracted aggregate, opposite quarters, and remaining material (for possible referee testing) of each sample as follows:
 - Store in properly labeled, suitable containers.
 - Secure in a protected environment.
 - Store for three working days. If not obtained by the Department Engineer's Quality Assurance Testing Firm within three days, they may be discarded in accordance with GSP 21.
 - 6) Add the following information on load tickets from which a sample or temperature check is taken:
 - Mixture temperature
 - Signature of the QCT person performing the testing
 - 7) Calibrate the lime system when hydrated lime is included in the mixture:
 - Perform a minimum of twice weekly during production
 - Post results at the plant for review.
 - Provide records of materials invoices upon request (including asphalt cement, aggregate, hydrated lime, etc.).

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- 8) Take action if acceptance test results are outside Mixture Control Tolerances of Section 828.
- One sample out of tolerance
 - a. Contact Level 2 - QCT to determine if a plant adjustment is needed.
 - b. Immediately run a process control sample. Make immediate plant adjustments if this sample is also out of tolerance.
 - c. Test additional process control samples as needed to ensure corrective action taken appropriately controls the mixture.
 - Two consecutive acceptance samples of the same mix type out of tolerance regardless of Lot or mix design level, or three consecutive acceptance samples out of tolerance regardless of mix type.
 - a. Stop plant production immediately.
 - b. Reject any mixture in storage:
 - Deviating more than 10 percent in gradation from the job mix formula based on the acceptance sample.
 - Deviating more than 0.7 percent in asphalt content from the job mix formula based on the acceptance sample.
 - c. Make a plant correction to any mix type out of tolerance prior to resuming production.
 - Do not send any mixture to the project before test results of a process control sample meets Mixture Control Tolerances.
 - Reject any mixture produced at initial restarting that does not meet Mixture Control Tolerances.

NOTE: Determine mixture temperature at least once per hour of production for OGFC and PEM mixes.

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4) Comparison Testing and Quality Assurance Program

- a. Periodic comparison testing by the Department Engineer's Quality Assurance Testing Firm will be required of each QCT to monitor consistency of equipment and test procedures. The Department Engineer's Quality Assurance Testing Firm will take independent samples to monitor the Contractor's quality control program.

1) Comparison Sampling and Testing

Retain samples for comparison testing and referee testing if needed as described in Subsection 400.3.06.A.3.b.3. Discard these samples only if the Contractor's acceptance test results meet a 1.00 pay factor and the Department Engineer's Quality Assurance Testing Firm does not procure the samples within three working days.

The Department Engineer's Quality Assurance Testing Firm will test comparison samples on a random basis. Results will be compared to the respective contractor acceptance tests, and the maximum difference is as follows:

TABLE 6—ALLOWABLE PERCENT DIFFERENCE BETWEEN DEPARTMENT AND CONTRACTOR ACCEPTANCE TESTS

Sieve Size	Surface	Sub-surface
1/2 in. (12.5 mm)		4.0%
3/8 in. (9.5 mm)	3.5%	4.0%
No. 4 (4.75 mm)	3.5%	3.5%
No. 8 (2.36 mm)	2.5%	3.0%
No. 200 (75 μ m)	2.0%	2.0%
A.C.	0.4%	0.5%

1) If test comparisons are within these tolerances:

- Continue production
- Use the Contractor's tests for acceptance of the lot

2) If test comparisons are not within these tolerances:

- Another Departmental Engineer's Quality Assurance Testing Firm's technician will test the corresponding referee sample.
- Results of the referee sample will be compared to the respective contractor and Departmental Engineer's Quality Assurance Testing Firm's tests using the tolerance for comparison samples given above.
 - a. If referee test results are within the above tolerances when compared to the Contractor acceptance test, use the Contractor's test for acceptance of the effected lot.
 - b. If referee test results are not within the above tolerances when compared to the Contractor acceptance test, the Department Engineer's Quality Assurance Testing Firm will review the Contractor's quality control methods and determine if a thorough investigation is needed.

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b. Independent Verification Sampling and Testing

- 1) Randomly take a minimum of two independent samples from the lesser of five days or five lots of production regardless of mix type or number of projects.
- 2) Compare test deviation from job mix formula to Mixture Control Tolerances in Section 828. If results are outside these tolerances, another sample from the respective mix may be taken.

If test results of the additional sample are not within Mixture Control Tolerances, the Department Engineer's Quality Assurance Testing Firm will take the following action:

- Take random samples from throughout the subject lot(s) as established in Subsection 400.3.06.A.3.b.3 and use these test results for acceptance and in calculations for the monthly plant rating. Applicable pay factors will apply and the contractor QCT test results will not be included in pay factor calculations nor in the monthly plant rating.
- Determine if the Contractor's quality control program is satisfactory and require prompt corrective action by the Contractor if specification requirements are not being met.
- Determine if the QCT has not followed Departmental procedures or has provided erroneous information.
- Take samples of any in-place mixture represented by unacceptable QCT tests and use the additional sample results for acceptance and in calculations for the monthly plant rating and apply applicable pay factors. The Contractor QCT tests will not be included in the pay factor calculations nor in the monthly plant rating.

NOTE: For leveling or dense graded surface courses less than 110 lb./yd² (60 kg/m²) having quality assurance test results outside the Mixture Control Tolerances of Section 828, use the Department's Engineer's Quality Assurance Testing Firm's test results only and applicable pay factors will apply.

B. Compaction

Determine the mixture compaction using either GDT 39, GDT 59, or AASHTO T 331. The method of GDT 39 for "Uncoated Specimens, Dense Graded Mixtures Only" shall not apply when the water absorption of a sample exceeds 2.0 percent, as measured according to AASHTO T 166. In this case, either AASHTO T 331 or the paraffin method of GDT 39 shall apply. The compaction is accepted in lots defined in Subsection 400.3.06. A, *Acceptance Plans for Gradation and Asphalt Cement Content* and is within the same lot boundaries as the mixture acceptance.

1. Calculate Pavement Mean Air Voids

The Department Engineer's Quality Assurance Testing Firm is responsible for pavement mean air void acceptance testing. The Contractor is responsible for establishing all roller patterns and any quality control testing. Upon written request by the Contractor, the Office of Materials and Testing Engineer's Quality Assurance Testing Firm will provide nuclear gauge testing assistance for compaction related issues.

The Department Engineer's Quality Assurance Testing Firm will calculate the pavement air voids placed within each lot as follows:

- a. One test per sub-lot.
 - Lots > 400 ton (400 Mg) of mix are divided into 5 sub-lots of equal distance.
 - Lots ≤ 400 tons (400 Mg) of mix are divided into a sub-lot or sub-lots of equal distance at a rate of one per 100 tons (100 Mg) mix each (Example: 299 tons of mix require 3 sublots and 301 tons of mix require 4 sublots). There will be less than 5 sub-lots.
 - b. Average the results of all tests run on randomly selected sites in that lot.
 - c. Select representative sites randomly using GDT 73.

Density tests are not required for asphaltic concrete placed at 90 lbs./yd² (50 kg/m²) or less, 4.75 mm mix, asphaltic concrete OGFC, PEM, and mixes placed as variable depth or width leveling. Compact these courses to the Engineer's satisfaction. Density tests will not be performed
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on turn-outs and driveways.

The targeted maximum Pavement Mean Air Void content for all Superpave and Stone Matrix Asphalt mixtures is 5.0 percent. Ensure that the maximum Pavement Mean Air Voids for all Superpave and Stone Matrix Asphalt mixtures does not exceed 7.0 percent. The maximum Pavement Mean Air Voids for 2 ft. shoulder widening is 9.0 percent. The adjustment period for density is four lots or four production days, whichever is less, in order for the contractor to ensure maximum compactive effort has been achieved, which will yield no more than the specified maximum allowed Mean Air Voids. One additional lot or production day of adjustment may be given for a reduction in asphalt cement content on the JMF made by the Office of Materials and Testing Engineer for mix designs incorporating the Corrected Optimum Asphalt Content COAC.

If the contractor needs to adjust the mixture to improve density results, a change in the job mix formula may be requested for approval during the adjustment period so long as the following values are not exceeded:

- Coarse pay sieve □ 4%
- No. 8 (2.36 mm) sieve □ 2%
- No. 200 (75 □m) sieve □ 1%
- Asphalt Content □ 0.2%
- All value changes must still be within specification limits.

If the Office of Materials and Testing Engineer is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain Pavement Mean Air Voids at no more than 7.0%, the Engineer may establish a maximum target for Pavement Mean Air Voids.

Ensure mixture placed during the adjustment period for density meets the requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01.C, *Calculate Mean Pavement Air Voids*. Mixture not meeting these density requirements is paid for using the applicable pay factor.

If the mean air voids of the pavement placed within a lot exceeds 100% of the maximum target air voids, if established, and the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer.

2. Obtain Uniform Compaction

For a lot to receive a pay factor of 1.00 for compaction acceptance, the air void range cannot exceed 5 percent for new construction or resurfacing projects. The range is the difference between the highest and lowest acceptance test results within the affected lot. If the air void range exceeds these tolerances, apply a Pay Factor of 95%.

The 5% reduced pay factor for the compaction range does not apply in these instances:

- The mixture is placed during the adjustment period as defined in Subsection 400.5.01.A, *Materials Produced and Placed During the Adjustment Period*.
- All air void results within a given lot are less than 7.0%.
- A lot containing two subplot or less.
- On two foot trench widening.
- For sub-surfaces mixes including 19 mm and 25 mm Superpave mixes if all air void results within a given lot are >2.5 % <8 %.

When lots are reevaluated for range penalty, as shown in Subsection 106.03, *Samples, Tests, Cited Specifications*, sampling and testing is according to GDT 73. Request for reevaluation must be made within 5 working days of notification of the lot results. The following procedures apply:

The Department Engineer's Quality Assurance Testing Firm will reevaluate the lot through additional testing by obtaining and testing three additional cores acquired in representative sites selected randomly throughout each sub-lot representing the high and low in-place air voids as detailed in GDT 73. The additional six cores (three cores from each sub-lot will be averaged) will replace the original five core results for range specified requirements only. The original five cores' results will be reported for Pavement Mean Air Voids for the lot. This will be the final evaluation for compaction range for the lot. Lots will not be re-evaluated for range when the Pavement Mean Air Voids result in a lower than 95% pay factor. Ensure requests for reevaluation are made within 5 working days of

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notification of the lot results.

The Department Engineer will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the Table 7 Average Air Voids Range Acceptance Schedule:

TABLE 7—AVERAGE AIR VOIDS RANGE FOR ACCEPTANCE SCHEDULE

Pay Factor	Range between High and Low Air Void Original 5 cores	Re-evaluated Range between High and Low Air Void Cores 6 New Cores obtained from High (3 cores) and Low location (3 cores)
100	≤ 5 %	≤ 4.50 %
0.95	> 5 %	> 4.50 %

C. Surface Tolerance

In this specification, pavement courses to be overlaid with an OGFC or PEM are considered surface courses. All OGFC or PEM are to be evaluated after the roadway has been opened to traffic for a minimum of 5 days and a maximum of 15 days. Asphaltic Concrete paving is subject to straightedge and visual inspection and irregularity correction as shown below:

1. Visual and Straightedge Inspection

Paving is subject to visual and straightedge inspection during and after construction operations until Final Acceptance. Locate surface irregularities as follows:

- a. Keep a 10 ft. (3 m) straightedge near the paving operation to measure surface irregularities on courses. Provide the straightedge and the labor for its use.
- b. Inspect the base, intermediate, and surface course surfaces with the straightedge to detect irregularities.
- c. Correct irregularities that exceed 3/16 in. in 10 ft. (5 mm in 3 m) for base and intermediate courses and surface courses.

Mixture or operating techniques will be stopped if irregularities such as rippling, tearing, or pulling occur and the Engineer suspects a continuing equipment problem. Stop the paving operation and correct the problem. Correct surface course evaluations on individual Laser Road Profiler test sections, normally 1 mile (1 km) long.

2. Target Surface Profile Smoothness

~~The Department will use the Laser Road Profiler method to conduct acceptance testing for surface course tolerance according to GDT 126. This testing will be performed only on:~~

- ~~• Surface courses on Projects with mainline traveled way measuring a minimum distance of 1 mile (1600 m)~~
- ~~• Ramps more than 0.5 mile (800 m) long~~

Combine partial sections measuring less than 0.5 mile (800 m) with the previous full mile for acceptance.

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Achieve the smoothest possible ride during construction. Do not exceed the target Laser Road Profiler smoothness index as shown below:

TABLE 8—PAVEMENT SMOOTHNESS TARGET REQUIREMENTS

Construction Description	Smoothness Index
All Asphaltic Concrete OGFC and PEM on interstate including resurfacing and new construction. Asphaltic Concrete OGFC and PEM placed on state routes as new construction.	750
Asphaltic Concrete SMA or dense graded surface mixtures placed directly beneath the Asphaltic Concrete OGFC or PEM on interstates. Asphaltic Concrete OGFC and PEM placed on state routes as resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	825
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	900
All Urban new construction and resurfacing on state routes within curb and gutter sections located in posted 40 miles per hour (MPH) or less speed zones.	1175

If the target values are not achieved, immediately adjust the operations to meet the target values. Placement operations may be suspended until a remedial plan to comply with target smoothness requirements is submitted and approved by the Engineer if adjustments do not satisfy target smoothness values.

TABLE 9—PAVEMENT SMOOTHNESS CORRECTIVE WORK REQUIREMENT

Construction Description	Smoothness Index
All Asphaltic Concrete OGFC and PEM placed on interstate including resurfacing and new construction. Asphaltic Concrete OGFC and PEM placed on state routes as new construction.	825
Asphaltic Concrete SMA or dense graded surface mixtures placed directly beneath the Asphaltic Concrete OGFC or PEM on interstates. Asphaltic Concrete OGFC and PEM placed on state routes as resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	900
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	1025
All Urban new construction and resurfacing on state routes within curb and gutter sections located in posted 40 miles per hour (MPH) or less speed zones.	1250

If surface tolerance deficiencies need correction, obtain the Engineer's approval of the methods and type mix used.

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3. Bridge Approach Profile Smoothness Quality

The following are subject to a ride quality test of roadway approaching each end of a bridge using the Laser Road Profiler, Rainhart Profiler or Lightweight Profiler:

- A state route with 4 lanes or more
- A 2 lane state route with a current traffic count two-way ADT 2,000 vpd or more
- Locations designated on the plans

All other bridge approaches not meeting the above criteria shall meet the 3/16 in. in 10 ft. (5 mm in 3 m) straightedge requirement. When the distance between the ends of two bridges, the end of a bridge and an intersection, or the end of a bridge and a vertical or horizontal curve is less than 540 ft. (165 m) and locations where the testing vehicle cannot maintain minimum testing speed while taking profile measurements will not be tested and will be subject to straightedge requirements.

The bridge approaches will meet the straightedge requirements.

Test ride quality as follows:

For Resurfacing Projects:

- a. The Department will determine a profile smoothness index value using the laser road profiler in accordance with test method GDT 126.
- b. The Department will determine the Half Car Simulation (HCS) IRI for each HMA asphalt 1/10th of mile (0.16 km) segments adjacent to each approach slab joint for each lane. The HCS IRI will be reported in 1/20th of mile (0.08 km) segment readings that will be averaged to calculate the final 1/10 mile section, in accordance with GDT 126.
 - Correct individual bumps or depression exceeding 3/16 in. in 10 ft. (3 mm in 3 m) straightedge requirement as directed by the Engineer.
 - Ensure the profile smoothness index shows an improvement over pre-construction profile smoothness or meets a profile smoothness index of ≤ 1025 mm/km (66 inches/mile) for the average 1/10 mile (0.16 km).
- c. Ensure Resurfacing projects meet the profile smoothness index improvement requirement for the specified 1/10th mile (0.16 km) segment of roadway up to the bridge approach/exit slab joint.

In accordance with Section 106.3.A.3, the Contractor may request reevaluation(s) for Laser Road Profiler Test results on Resurfacing Bridge Projects and straightedge measurement(s) on either that fail to meet specified requirements. Request for reevaluation shall be made to the Engineer within 5 working days of notification of failing results. At the Engineer's approval, reevaluation of failing results using the Lightweight Profiler Test, Laser Road Profiler Test and straightedge measurement(s) shall be conducted in conjunction with representatives from the Office of Materials and Testing in accordance with GDT 126 or GDT 134, whichever is applicable. The Department will perform ride quality testing up to two times on the bridge approaches/exits at no cost to the Contractor. For these reevaluations, evaluation of the bridge exit end may be taken testing towards the bridge against traffic if the contractor provides traffic control, at the contractors' expense, upon request.

For All New Construction Projects:

- a. The Department will determine a profile index value according to test method GDT 78 or GDT 134.
 - b. The Department will average the profile index value from the right and left wheelpath for each 100 ft. (30 m) section for each lane.
 - Keep the profile index value under 30 in/mile (475 mm/km), correct individual bumps or depressions exceeding 0.2 in. (5 mm) from blanking band on the profilograph trace.
 - c. Ensure New Construction projects meet the profile index value for the specified 100 ft. (30 m) section of roadway up to the bridge joint.
 - d. Schedule the ride quality testing on All New Construction projects 5 days before needed by contacting the Office of Materials and Testing. Clean and clear obstructions from the test area.
-

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~~Correct the sections that do not meet the ride quality criteria of this specification. After correction, these sections are subject to retesting with the Lightweight Profiler. The Engineer direct the type of correction method, which may include:~~

- ~~• Milling~~
- ~~• Grinding~~
- ~~• Removing and replacing the roadway~~

~~No additional compensation will be made.~~

~~In accordance with Section 106.3.A.3, the Contractor may request reevaluation(s) for Lightweight Profiler Test results on newly construction bridge projects, Laser Road Profiler Test results on resurfacing bridge projects and straightedge measurement(s) on either that fail to meet specified requirements. Request for reevaluation shall be made to the Engineer within 5 working days of notification of failing results. At the Engineer's approval, reevaluation of failing results using the Lightweight Profiler Test, Laser Road Profiler Test and straightedge measurement(s) shall be conducted by representatives from the Office of Materials and Testing in accordance with GDT 134.~~

~~The Department will perform ride quality testing up to two times on the bridge approaches at no cost to the Contractor. Additional testing will be charged to the Contractor in accordance with Section 500.5.01.B.~~

4. Surface Smoothness Acceptance

~~When recommended by the Office of Materials and Testing Engineer, a pay reduction may be accepted in lieu of correction for roadways and bridge approaches that fail to achieve specified smoothness indexes in accordance with SOP 46 "Procedure for Calculating Pay Reduction for Failing Roadway and Bridge Approach Smoothness" Roadway and Bridge Approach Smoothness. The Office of Materials and Testing Engineer may recommend a waiver of profile smoothness requirements when improvement over pre-construction smoothness profile exceeds 25 percent for urban roadways, as defined in Table 9.~~

D. Reevaluation of Lots

When lots are reevaluated as shown in Subsection 106.03, *Samples, Tests, Cited Specifications*, sampling and testing is according to GDT 73. Ensure request for reevaluation are made within 5 working days of notification of the lot results. The following procedures apply:

1. For asphaltic concrete mixtures other than OGFC and PEM mix types, thin lift courses < 110 lbs./yd² and mixture paid for as patching, the Department Engineer's Quality Assurance Testing Firm will take the same number of new tests using cores taken at randomly selected locations in accordance GDT 73. The Department Engineer will use only these test results for gradation and AC content obtained using these cores for acceptance. ~~For OGFC and PEM mix types, thin lift courses < 110 lbs./yd² and mixture paid for as patching, the retained opposite quarter shall be used for mixture acceptance reevaluation when requested by the Contractor.~~ The Department Engineer will use the absolute average deviations from the job mix formula for these tests to determine acceptance based on the appropriate column in the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 10 or 11.

2. Compaction Acceptance

The Department Engineer's Quality Assurance Testing Firm will reevaluate the lot through additional testing by cutting the same number of cores originally obtained and averaging these results with the results from the original density tests. The Department Engineer will use the average to determine acceptance according to the Compaction Acceptance Schedule in Subsection 400.5.01.C, *Calculate Pavement Mean Air Voids*.

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TABLE 10—MIXTURE ACCEPTANCE SCHEDULE—SURFACE MIXES

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.70	0.00 - 0.54	0.00 - 0.46	0.00 - 0.41	0.00 - 0.38	0.00 - 0.35	0.00 - 0.32	0.00 - 0.30
	0.95	0.71 - 0.80	0.55 - 0.61	0.47 - 0.52	0.42 - 0.46	0.39 - 0.43	0.36 - 0.39	0.33 - 0.36	0.31 - 0.34
	0.90	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.45	0.37 - 0.40	0.35 - 0.37
	0.80	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.70	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.50	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
3/8 in. (9.5 mm) Sieve (12.5 mm OGFC, 12.5 mm PEM, 12.5 mm Superpave)	1.00	0.00 - 9.0	0.00 - 6.6	0.00 - 5.6	0.00 - 5.0	0.00 - 4.6	0.00 - 4.2	0.00 - 3.9	0.00 - 3.6
	0.98	9.1 - 10.0	6.7 - 7.5	5.7 - 6.3	5.1 - 5.6	4.7 - 5.2	4.3 - 4.7	4.0 - 4.4	3.7 - 4.1
	0.95	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.90	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
	0.85	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
3/8 in. (9.5 mm) Sieve (12.5 mm SMA)	1.00	0.0 - 6.8	0.00 - 5.0	0.00 - 4.2	0.00 - 3.8	0.00 - 3.4	0.00 - 3.2	0.00 - 2.9	0.00 - 2.7
	0.98	6.9 - 7.5	5.1 - 5.6	4.3 - 4.7	3.9 - 4.2	3.5 - 3.9	3.3 - 3.5	3.0 - 3.3	2.8 - 3.1
	0.95	7.6 - 8.9	5.7 - 6.3	4.8 - 5.2	4.3 - 4.7	4.0 - 4.4	3.6 - 4.0	3.4 - 3.8	3.2 - 3.4
	0.90	9.0 - 9.8	6.4 - 7.0	5.3 - 5.8	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.9 - 4.1	3.5 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.6	5.9 - 6.4	5.3 - 5.7	4.9 - 5.2	4.5 - 4.7	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.7 - 7.9	6.5 - 6.7	5.8 - 6.0	5.3 - 5.6	4.8 - 5.1	4.5 - 4.8	4.2 - 4.5
No. 4 (4.75 mm) Sieve (9.5 mm OGFC, 9.5 mm Superpave)	1.00	0.00 - 9.0	0.00 - 6.7	0.00 - 5.7	0.00 - 5.2	0.00 - 4.8	0.00 - 4.4	0.00 - 4.1	0.00 - 3.8
	0.98	9.1 - 10.0	6.8 - 7.6	5.8 - 6.3	5.3 - 5.8	4.9 - 5.4	4.5 - 4.9	4.2 - 4.6	3.9 - 4.3
	0.95	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.90	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1

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Pay Factor	Mean of the Deviations from the Job Mix Formula							
	1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
0.85	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
0.80	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
1.00	0.00 - 6.8	0.00 - 5.0	0.00 - 4.3	0.00 - 3.9	0.00 - 3.6	0.00 - 3.3	0.00 - 3.1	0.00 - 2.8
0.98	6.9 - 7.5	5.1 - 5.7	4.4 - 4.7	4.0 - 4.4	3.7 - 4.0	3.4 - 3.7	3.2 - 3.4	2.9 - 3.2
0.95	7.6 - 8.9	5.8 - 6.4	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.5 - 3.8	3.3 - 3.5
0.90	9.0 - 9.8	6.5 - 7.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.9	4.1 - 4.4	3.9 - 4.1	3.6 - 3.8
0.85	9.9 - 10.5	7.1 - 7.7	5.7 - 6.0	5.3 - 5.7	5.0 - 5.2	4.3 - 4.8	4.2 - 4.4	3.9 - 4.1
0.80	10.6 - 10.9	7.8 - 7.9	6.1 - 6.2	5.8 - 6.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.8	4.2 - 4.4
1.00	0.00 - 7.0	0.00 - 5.6	0.00 - 4.8	0.00 - 4.3	0.00 - 4.0	0.00 - 3.6	0.00 - 3.4	0.00 - 3.2
0.98	7.1 - 8.0	5.7 - 6.3	4.9 - 5.4	4.4 - 4.8	4.1 - 4.5	3.7 - 4.1	3.5 - 3.8	3.3 - 3.6
0.95	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
0.90	9.1 - 10.9	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
0.85	11.0 - 12.0	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
0.75	12.1 - 12.5	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
1.00	0.00 - 5.3	0.00 - 4.2	0.00 - 3.6	0.00 - 3.2	0.00 - 3.0	0.00 - 2.7	0.00 - 2.6	0.00 - 2.4
0.98	5.4 - 6.0	4.3 - 4.7	3.7 - 4.0	3.3 - 3.6	3.1 - 3.4	2.8 - 3.1	2.7 - 2.9	2.5 - 2.7
0.95	6.1 - 6.8	4.8 - 5.3	4.1 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
0.90	6.9 - 8.2	5.4 - 5.8	4.6 - 5.0	4.1 - 4.5	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
0.85	8.3 - 9.0	5.9 - 6.4	5.1 - 5.4	4.6 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.4
0.75	9.1 - 9.4	6.5 - 6.6	5.5 - 5.0	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.5 - 3.7

GFC and PEM mixes: When the mean of the deviations from the Job Mix Formula for a particular lot exceeds the tolerance for a 1.00 pay factor, the lot will be paid for at 0.50 of the Contract Price.

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TABLE 11—MIXTURE ACCEPTANCE SCHEDULE—SUBSURFACE MIXES

Pay Factor	Mean of the Deviations from the Job Mix Formula							
	1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
1.00	0.00 - 0.80	0.00 - 0.61	0.00 - 0.52	0.00 - 0.46	0.00 - 0.43	0.00 - 0.39	0.00 - 0.36	0.00 - 0.34
0.95	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.43	0.37 - 0.40	0.35 - 0.37
0.90	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
0.80	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
0.70	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
0.50	1.41 - 1.60	0.86 - 0.88	0.73 - 0.75	0.65 - 0.67	0.60 - 0.63	0.56 - 0.60	0.52 - 0.56	0.49 - 0.52
1.00	0.00 - 12.9	0.00 - 8.1	0.00 - 6.9	0.00 - 6.1	0.00 - 5.5	0.00 - 5.0	0.00 - 4.7	0.00 - 4.4
0.98	13.0 - 14.0	8.2 - 9.1	7.0 - 7.7	6.2 - 6.8	5.6 - 6.1	5.1 - 5.6	4.8 - 5.2	4.5 - 4.9
0.95	14.1 - 15.0	9.2 - 10.1	7.8 - 8.5	6.9 - 7.5	6.2 - 6.7	5.7 - 6.1	5.3 - 5.7	5.0 - 5.4
0.90	15.1 - 16.0	10.2 - 11.1	8.6 - 9.3	7.6 - 8.2	6.8 - 7.4	6.2 - 6.7	5.8 - 6.3	5.5 - 5.9
0.85	16.1 - 17.0	11.2 - 11.5	9.4 - 9.6	8.3 - 8.6	7.5 - 7.8	6.8 - 7.0	6.4 - 6.5	6.0 - 6.1
0.80	17.1 - 18.0	11.6 - 11.9	9.7 - 9.9	8.7 - 9.0	7.9 - 8.1	7.1 - 7.3	6.6 - 6.8	6.2 - 6.4
1.00	0.00 - 9.7	0.00 - 6.0	0.00 - 5.2	0.00 - 4.6	0.00 - 4.1	0.00 - 3.8	0.00 - 3.5	0.00 - 3.3
0.98	9.8 - 10.5	6.2 - 6.8	5.3 - 5.8	4.7 - 5.1	4.2 - 4.6	3.9 - 4.2	3.6 - 3.9	3.4 - 3.7
0.95	10.6 - 11.2	6.9 - 7.8	5.9 - 6.4	5.2 - 5.6	4.7 - 5.0	4.3 - 4.6	4.0 - 4.3	3.8 - 4.0
0.90	11.3 - 12.0	7.9 - 8.3	6.5 - 7.0	5.7 - 6.1	5.1 - 5.6	4.7 - 5.0	4.4 - 4.7	4.1 - 4.4
0.85	12.1 - 12.8	8.4 - 8.6	7.1 - 7.2	6.2 - 6.5	5.7 - 5.9	5.1 - 5.3	4.8 - 4.9	4.5 - 5.6
0.80	12.9 - 13.5	8.7 - 8.9	7.3 - 7.4	6.6 - 6.8	6.0 - 6.1	5.4 - 5.5	5.0 - 5.1	4.7 - 4.8
1.00	0.00 - 10.0	0.00 - 7.5	0.00 - 6.3	0.00 - 5.6	0.00 - 5.2	0.00 - 4.7	0.00 - 4.4	0.00 - 4.1
0.98	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
0.95	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0

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Pay Factor	Mean of the Deviations from the Job Mix Formula							
	1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
0.85	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
0.80	14.6 - 15.0	10.6 - 10.8	9.0 - 9.2	8.1 - 8.4	7.6 - 7.8	6.9 - 7.3	6.5 - 6.8	6.1 - 6.5
1.00	0.00 - 10.0	0.00 - 7.6	0.00 - 6.3	0.00 - 5.8	0.00 - 5.4	0.00 - 4.9	0.00 - 4.6	0.00 - 4.3
0.98	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
0.95	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
0.90	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
0.85	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
0.80	14.6 - 15.0	10.6 - 10.8	8.4 - 8.6	8.1 - 8.4	7.6 - 8.0	7.0 - 7.4	6.5 - 6.8	6.0 - 6.3
1.00	0.00 - 8.0	0.00 - 6.3	0.00 - 5.4	0.00 - 4.8	0.00 - 4.5	0.00 - 4.1	0.00 - 3.8	0.00 - 3.6
0.98	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
0.95	9.1 - 10.0	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
0.90	10.1 - 11.9	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
0.85	12.0 - 13.0	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
0.75	13.1 - 14.0	8.9 - 9.1	7.6 - 7.8	6.9 - 7.2	6.4 - 6.6	5.8 - 6.1	5.4 - 5.7	5.0 - 5.3
1.00	0.00 - 6.0	0.00 - 4.7	0.00 - 4.1	0.00 - 3.6	0.00 - 3.4	0.00 - 3.1	0.00 - 2.9	0.00 - 2.4
0.98	6.1 - 6.8	4.8 - 5.2	4.2 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
0.95	6.9 - 7.5	5.3 - 5.8	4.6 - 5.0	4.1 - 4.4	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
0.90	7.6 - 8.9	5.9 - 6.4	5.1 - 5.4	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.5
0.85	9.0 - 9.8	6.5 - 6.6	5.5 - 5.6	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.6 - 3.7
0.75	9.9 - 10.5	6.7 - 6.8	5.7 - 5.9	5.2 - 5.4	4.8 - 5.0	4.4 - 4.6	4.1 - 4.3	3.8 - 4.0

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E. Segregated Mixture

Prevent mixture placement yielding a segregated mat by following production, storage, loading, placing, and handling procedures. Ensure needed plant modifications and provide necessary auxiliary equipment. (See Subsection 400.1.01, *Definitions*.)

If the mixture is segregated in the finished mat, the Department Engineer will take actions based on the degree of segregation. The actions are described below.

1. Unquestionably Unacceptable Segregation

When the Engineer determines the segregation in the finished mat is unquestionably unacceptable, follow these measures:

- a. Suspend Work and require the Contractor to take positive corrective action. The Department Engineer will evaluate the segregated areas to determine the extent of the corrective work to the in-place mat as follows:
 - Perform extraction and gradation analysis by taking 6 in. (150 mm) cores from typical, visually unacceptable segregated areas.
 - Determine the corrective work according to Subsection 400.3.06.E.3.
- b. Require the Contractor to submit a written plan of measures and actions to prevent further segregation. Work will not continue until the plan is submitted to and approved by the Department Engineer.
- c. When work resumes, place a test section not to exceed 500 tons (500 Mg) of the affected mixture for the Department Engineer to evaluate. If a few loads show that corrective actions were not adequate, follow the measures above beginning with step 1.a. above. If the problem is solved, work may continue.

2. Unacceptable Segregation Suspected

When the Engineer observes segregation in the finished mat and the work may be unacceptable, follow these measures:

- a. Allow work to continue at Contractor's risk.
- b. Require Contractor to immediately and continually adjust operation until the visually apparent segregated areas are eliminated from the finished mat. The Department Engineer will immediately investigate to determine the severity of the apparent segregation as follows:
 - Take 6 in. (150 mm) cores from typical areas of suspect segregation.
 - Test the cores for compliance with the mixture control tolerances in Section 828.

When these tolerances are exceeded, suspend work for corrective action as outlined in Subsection 400.3.06.E.3.

3. Corrective Work

- a. Remove and replace (at the Contractor's expense) any segregated area where the gradation on the control sieves is found to vary 10 percent or more from the approved job mix formula, the asphalt cement varies 1.0% or more from the approved job mix formula, or if in-place air voids exceed 13.5% based on GDT 39. The control sieves for each mix type are shown in Subsection 400.5.01.B *Determine Lot Acceptance*.
- b. Subsurface mixes. For subsurface mixes, limit removal and replacement to the full lane width and no less than 10 ft. (3 m) long and as approved by the Engineer.
- c. Surface Mixes. For surface mixes, ensure that removal and replacement is not less than the full width of the affected lane and no less than the length of the affected areas as determined by the Engineer.
- d. Surface tolerance requirements apply to the corrected areas for both subsurface and surface mixes.

Section 400 — Hot Mix Asphaltic Concrete Construction

400.3.07 Contractor Warranty and Maintenance

A. Contractor's Record

Maintain a dated, written record of the most recent plant calibration. Keep this record available for the Engineer's inspection at all times. Maintain records in the form of:

- Graphs
- Tables
- Charts
- Mechanically prepared data

400.4 Measurement

Thickness and spread rate tolerances for the various mixtures are specified in Subsection 400.4.A.2.b, Table 12, Thickness and Spread Rate Tolerance at Any Given Location. These tolerances are applied as outlined below:

A. Hot Mix Asphaltic Concrete Paid for by Weight

1. Plans Designate a Spread Rate

- a. Thickness Determinations. Thickness determinations are not required when the plans designate a spread rate per square yard (meter).

If the spread rate exceeds the upper limits outlined in the Subsection 400.4.A.2.b, Table 12, *Thickness and Spread Rate Tolerance at Any Given Location*, the mix in excess will not be paid for. If the rate of spread is less than the lower limit, correct the deficient course by overlaying the entire lot. The mixture used for correcting deficient areas is paid for at the Contract Unit Price of the course being corrected and is subject to the Mixture Acceptance Schedule—Table 10 or 11.

- b. Recalculate the Total Spread Rate. After the deficient hot mix course has been corrected, the total spread rate for that lot is recalculated, and mix in excess of the upper tolerance limit as outlined in the Subsection 400.4.A.2.b, Table 12, *Thickness and Spread Rate Tolerance at Any Given Location* is not paid for.

The quantity of material placed on irregular areas such as driveways, turnouts, intersections, feather edge section, etc., is deducted from the final spread determination for each lot.

2. Plans Designate Thickness

If the average thickness exceeds the tolerances specified in the Subsection 400.4.A.2.b, Table 12, *Thickness and Spread Rate Tolerance at Any Given Location*, the Engineer shall take cores to determine the area of excess thickness. Excess quantity will not be paid for.

If the average thickness is deficient by more than the tolerances specified in the Thickness and Spread Rate Tolerance at Any Given Location table below, the Engineer shall take additional cores to determine the area of deficient thickness. Correct areas with thickness deficiencies as follows:

- a. Overlay the deficient area with the same mixture type being corrected or with an approved surface mixture. The overlay shall extend for a minimum of 300 ft. (90 m) for the full width of the course.
- b. Ensure that the corrected surface course complies with Subsection 400.3.06.C.1, *Visual and Straightedge Inspection*. The mixture required to correct a deficient area is paid for at the Contract Unit Price of the course being corrected.

The mixture is subject to the Mixture Acceptance Schedule—Table 10 or 11. The quantity of the additional mixture shall not exceed the required calculated quantity used to increase the average thickness of the overlaid section to the maximum tolerance allowed under the following table.

Section 400 — Hot Mix Asphaltic Concrete Construction

TABLE 12—THICKNESS AND SPREAD RATE TOLERANCE AT ANY GIVEN LOCATION

Course	Thickness Specified	Spread Rate Specified
Asphaltic concrete base course	± 0.5 in. (± 13 mm)	± 55 lbs./yd ² (30 kg/m ²)
Intermediate and/or wearing course	± 0.25 in. (± 6 mm)	± 27.5 lbs./yd ² (15 kg/m ²)
Overall of any combination of 1 and 2	± 0.5 in. (± 13 mm)	± 55 lbs./yd ² (30 kg/m ²)

Note: For asphaltic concrete 9.5 mm OGFC and 12.5 mm OGFC, control the spread rate per lot within 7 lbs./yd² (4 kg/m²) of the designated spread rate. For asphaltic concrete 12.5 mm PEM, control the spread rate per lot within 10 lbs./yd² (6 kg/m²) of the designated spread rate.

Note: Thickness and spread rate tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness or spread rate not specified.

When the plans specify a thickness, the Engineer may take as many cores as necessary to determine the average thickness of the intermediate or surface course. The Engineer shall take a minimum of one core per 1,000 ft.

(300 m) per two lanes of roadway. Thickness will be determined by average measurements of each core according to GDT 42.

If the average exceeds the tolerances specified in the *Subsection 400.4.A.2.b, Table 12, Thickness and Spread Rate Tolerance at Any Given Location*, additional cores will be taken to determine the area of excess thickness and excess tonnage will not be paid for.

B. Hot Mix Asphaltic Concrete Paid for by Square Yard (Meter)

- ~~1. The thickness of the base course or the intermediate or surface course will be determined by the Department by cutting cores and the thickness will be determined by averaging the measurements of each core.~~
- ~~2. If any measurement is deficient in thickness more than the tolerances given in the table above, additional cores will be taken by the Department to determine the area of thickness deficiency. Correct thickness deficiency areas as follows:

 - ~~a. Overlay the deficient area with the same type mixtures being corrected or with surface mixture. Extend the overlay at least 300 ft. (90 m) for the full width of the course.~~
 - ~~b. Ensure the corrected surface course complies with Subsection 400.3.06.C.1, *Visual and Straightedge Inspection*.~~
 - ~~c. The mixture is subject to the Mixture Acceptance Schedule—Table 10 or 11.~~~~
- ~~3. No extra payment is made for mixtures used for correction.~~
- ~~4. No extra payment is made for thickness in excess of that specified.~~

C. Asphaltic Concrete

Hot mix asphaltic concrete, complete in place and accepted, is measured in tons (megagrams) or square yards (meters) as indicated in the Proposal. If payment is by the ton (megagram), the actual weight is determined by weighing each loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used.

The weight measured includes all materials. No deductions are made for the weight of the individual ingredients. The actual weight is the pay weight except when the aggregates used have a combined bulk specific gravity greater than 2.75. In this case the pay weight is determined according to the following formula:

Section 400 — Hot Mix Asphaltic Concrete Construction

$$T1 = T \times \left\{ \frac{\% AC + \left(\frac{\% \text{ Aggregate} \times 2.75}{\text{combined bulk Specific Gravity}} \right) + \% Y}{100} \right\}$$

Where:

T1	Pay weight, tonnage (Mg)
T=	Actual weight
% AC=	Percent asphalt cement by weight of total mixture
% Aggregate =	Percent aggregate by weight of total mixture minus the hydrated lime
Combined Bulk Sp. Gr.=	Calculated combined bulk specific gravity of various mineral aggregates used in the mixture
% Y=	Percent hydrated lime by weight of mineral aggregate

D. Bituminous Material

Bituminous material is not measured for separate payment.

E. Hydrated Lime

When hydrated lime is used as an anti-stripping additive, it is not measured for separate payment.

F. Field Laboratory

The field laboratory required in this specification is not measured for separate payment.

G. Asphaltic Concrete Leveling

Payment of hot mix asphaltic concrete leveling, regardless of the type mix, is full compensation for furnishing materials, bituminous materials, and hydrated lime (when required) for patching and repair of minor defects, surface preparation, cleaning, hauling, mixing, spreading, and rolling.

Mixture for leveling courses is subject to the acceptance schedule as stated in Subsection 400.3.06.A and Subsection 400.3.06.B.

H. Asphaltic Concrete Patching

Hot mix asphaltic concrete patching, regardless of the type mix, is paid for at the Contract Unit Price per ton (Megagram), complete in place and accepted. Payment is full compensation for:

- Furnishing materials such as bituminous material and hydrated lime (when required)
- Preparing surface to be patched
- Cutting areas to be patched, trimmed, and cleaned
- Hauling, mixing, placing, and compacting the materials

When mixture for patching is used paid for by the Department, ensure the mixture is subject to the acceptance schedule as stated in Subsection 400.3.06.A.

Section 400 — Hot Mix Asphaltic Concrete Construction

400.4.01 Limits

When the asphaltic concrete is paid for by the square yard (meter) and multiple lifts are used, the number and thickness of the lifts are subject to the Engineer's approval and are used to prorate the pay factor for the affected roadway section.

400.5 Payment

When materials or construction are not within the tolerances in this specification, the Contract Price will be adjusted according to Subsection 106.03, *Samples, Tests, Cited Specifications* and Subsection 400.3.06, *Quality Acceptance*.

Hot mix asphaltic concrete of the various types are paid for at the Contract Unit Price per ton (megagram) or per square yard (meter). Payment is full compensation for furnishing and placing materials including asphalt cement, hydrated lime when required, approved additives, and for cleaning and repairing, preparing surfaces, hauling, mixing, spreading, rolling, and performing other operations to complete the Contract Item.

Payment will be made under:

Item No. 400-1	Asphaltic concrete <u>Type 1</u> , Superpave, <u>9.5 mm group-blend</u> , including bituminous materials	Per ton (megagram)
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400.5.01 Adjustments

A. Materials Produced and Placed During the Adjustment Period

An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract. ~~Asphaltic Concrete OGFC or PEM shall be granted an adjustment period for the first 500 tons (500 Mg) produced for the Contract.~~ A new adjustment period shall not be granted for a change of producer, mix design or asphalt plant location. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (megagrams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (megagrams) produced and placed on the first day of operation with the tons (megagrams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.

Section 400 — Hot Mix Asphaltic Concrete Construction

This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the Mixture Acceptance Schedule—Table 10 or 11.

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs./yd² (50 kg/m²) or less is also used for the surface mix at a spread rate greater than 90 lbs./yd² (50 kg/m²), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 10 or 11 for both asphalt content and gradation.
 - Meets the minimum requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01C, *Calculate Mean Pavement Air Voids*.

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

B. Determine Lot Acceptance

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm SMA	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm SMA	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm PEM	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm OGFC	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm SMA	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
concrete 9.5 mm OGFC	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieve and asphalt cement

~~For projects which do not have milling quantities established as a Pay Item, the Department will pay for 12.5 mm OGFC and PEM placed on ramps and end of project transitions under the appropriate mixture pay item, but the mix shall be subject to the same gradation and control sieve requirements as asphaltic concrete 9.5 mm OGFC. Add polymer modified bituminous material, hydrated lime, and stabilizing fiber to this mix.~~

The Department Engineer will perform the following tasks:

1. Using the Mixture Acceptance Schedule—Table 10 or 11, determine the mean of the deviations from the job mix formula per test results per lot.
2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.
3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 10 to determine acceptance of surface mixes and the Mixture Acceptance Schedule—Table 11 to determine acceptance of subsurface mixes.

Section 400 — Hot Mix Asphaltic Concrete Construction

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

1. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable Mixture Acceptance Schedule—Table 10 or 11.
2. Minimum requirements for a 0.90 pay factor in Table 13 of Subsection 400.5.01C, *Calculate Pavement Mean Air Voids*.

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

C. Calculate Pavement Mean Air Voids

The Department Engineer will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department Engineer will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

TABLE 13 - AIR VOIDS ACCEPTANCE SCHEDULE

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests) (for Reevaluations)
1.00	≤100	≤100
0.97	100.1 — 105	100.1 — 104
0.95	105.1 — 112	104.1 — 109
0.90	112.1 — 124	109.1 — 118
0.80	124.1 — 149	118.1 — 136
0.70	149.1 — 172	136.1 — 153
0.50	172.1 — 191	153.1 — 166

When recommended by the Office of Materials and Testing Engineer, Lots receiving less than 0.5 pay factor shall be removed and replaced at the Contractor's expense.

When the range tolerance is exceeded, the Department Engineer will apply a pay factor of 0.95 as described in Subsection 400.3.06.B.2.

D. ~~Asphaltic Concrete for Temporary Detours~~

~~Hot mix asphaltic concrete placed on temporary detours not to remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price. Ensure the payment for this item covers all cost of construction, maintenance and removal of all temporary mix. Ensure hot mix asphaltic concrete placed as temporary mix meets requirements established in Subsection 400.3.05.F.~~

~~Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting \$0.75/ton (\$0.85/mg) of mix used.~~

~~Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting \$0.04/yd² (\$0.05/m²) per 1 in. (25 mm) plan depth.~~

Section 400 — Hot Mix Asphaltic Concrete Construction

~~Further price adjustments required in Subsection 400.3.06, *Quality Acceptance*, which are based on the appropriate adjusted Contract Price for mix used in the temporary detour work shall apply should temporary mix be left in place. Ensure hot mix asphalt produced as temporary mix containing no hydrated lime is removed and replaced with permanent mix containing hydrated lime.~~

E. Determine Lot Payment

Determine the lot payment as follows:

1. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.
2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the Mixture Acceptance Schedule—Table 10 or 11 and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the Air Voids Acceptance Schedule – Table 13, remove and replace the materials at the Contractor's expense.

If the Engineer determines the material is not acceptable to leave in place, remove and replace the materials at the Contractor's expense.

Section 412—Bituminous Prime

412.1 General Description

This work includes preparing and treating an existing surface with bituminous material and blotter material, if required. Treat the surface according to these specifications and conform to the lines shown on the plans or established by the Engineer.

412.1.01 Definitions

General Provisions 101 through 150.

412.1.02 Related References

A. Standard Specifications

Section 424—Bituminous Surface Treatment

Section 821—Cutback Asphalt

B. Referenced Documents

General Provisions 101 through 150.

412.1.03 Submittals

General Provisions 101 through 150.

412.2 Materials

Unless otherwise specified, select the types of bituminous materials. The Engineer will determine the grade of materials to be used. The specifications for the bituminous materials include:

Material	Section
Cutback Asphalt, RC-30, RC-70, RC-250 or MC-250, MC-30, or MC-70	821.2.01
Blotter Material (Sand)	412.3.05.G.3

412.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

412.3 Construction Requirements

412.3.01 Personnel

General Provisions 101 through 150.

412.3.02 Equipment

Provide equipment that is in good repair, including at least the following units that meet the requirements of Subsection 424.3.02, *Equipment*.

- Pressure distributor
 - Power broom and blower
 - Aggregate spreader (if required)
 - Pneumatic-tired roller
-

Section 412 — Bituminous Prime

412.3.03 Preparation

See Subsection 412.3.05.B, *Condition of Surface*.

412.3.04 Fabrication

General Provisions 101 through 150.

412.3.05 Construction

Prime the following bases and other areas:

- Cement or lime stabilized bases or sub-bases, regardless of pavement thickness
- Soil or aggregate bases or sub-bases on which bituminous surface treatment will be placed
- Soil or aggregate bases or sub-bases on which less than 5 in. (125 mm) total thickness of hot mix asphaltic concrete will be placed

Prime is not required on driveway construction and paved shoulders.

A. Weather Limitations

Do not apply bituminous prime under any of these conditions:

- Surface is wet.
- Air temperature is below 40 °F (4 °C) in the shade.
- Rain is imminent.
- Weather conditions may prevent proper prime coat construction.

B. Condition of Surface

Ensure that the surface to which the prime is to be applied has been finished to the line, grade, and cross-section specified.

Ensure that the surface is uniformly compacted and bonded. Correct surface irregularities according to the specifications for the construction being primed.

C. Cleaning

Remove from the road loose material, dust, caked clay, and other material that may prevent bonding of the prime with the surface. Use power sweepers or blowers the full width of the prime and 2 ft. (600 mm) more on each side. Where necessary, sweep by hand.

D. Moisture

Ensure that the surface is only slightly damp. If the surface is too wet, allow it to dry. If it is too dry, the Engineer may require that it be sprinkled lightly just before priming.

E. Temperature and Surface Texture

The surface texture and condition of the surface determine the bituminous material grades to be used.

The following table shows the bituminous material grades and application temperatures as they are applied to various surface textures.

Base Texture	Tight	Average	Open
Materials and grade	MC-30 RC-30	RC-70 or MC-70	RC-250 or MC-250
Application temperature °F (°C)	80–120 (27–49)	105–180 (41–82)	145–220 (63–104)

The Engineer will determine the temperature for applying bituminous prime within the limits shown above.

Section 412 — Bituminous Prime

Heat and apply bituminous materials as specified in Subsection 424.3.05.D, *Heating Bituminous Material* and Subsection 424.3.05.E, *Applying Bituminous Material*.

F. Amount and Extent of Prime

The Engineer will determine the exact amount of bituminous material to be used within minimum and maximum rates of 0.15 to 0.30 gal/yd² (0.7 to 1.4 liters/m²). Apply the specified amount as follows:

1. Apply the determined amount uniformly and accurately. Ensure that the amount applied to any 0.5-mile (800 m) section is within 5 percent of the amount specified.
2. Apply the prime the full width of the proposed wearing surface that will be superimposed plus 6 in. (150 mm) more on each side.

G. Protection, Curing, and Maintenance

Do the following after priming the surface:

1. Close to Traffic

Do not allow traffic on the primed surface. Leave the surface undisturbed until the prime thoroughly cures and does not pick up under traffic.

2. Roll

If the surface becomes soft after it is primed, roll the surface longitudinally with a pneumatic-tired roller at no more than 6 mph (10 kph) until the surface is firmly set.

3. Blot

If necessary to prevent the prime from being picked up, spread clean, dry, sharp sand over the surface by hand or mechanically. Apply sand only to places that are tacky and use the least amount needed to prevent pick up. No extra payment for this work or material will be made.

4. Open to Traffic

After rolling and sanding (if required), open the primed surface to ordinary traffic subject to the conditions in Subsection 412.3.05.G.1, *Close to Traffic*.

5. Curing and Maintenance

6. The primed surface is properly cured when it has penetrated the base sufficiently to not be picked up or displaced by traffic. Temperature and weather conditions may increase curing time. Insure the primed surface has cured to the satisfaction of the Engineer prior to its being covered by other construction.

7. Maintain the prime coat and the primed surface course until it is covered by other construction. Repair potholes, scabs, and soft spots prior to covering with other construction. Remove excess bituminous material.

412.3.06 Quality Acceptance

General Provisions 101 through 150.

412.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

412.4 Measurement

Bituminous material for prime is not measured for separate payment will be measured per gallon (liter).

412.4.01 Limits

General Provisions 101 through 150.

Section 412 — Bituminous Prime

412.5 Payment

Bituminous material for prime ~~is not paid for separately~~ will be paid for at the Contract Unit Price per gallon (liter). The cost to clean the surface, furnish, haul and apply materials including water and sand, roll, and perform repairs and maintenance is included in the Unit Price bid for each individual Base Item.

Payment will be made under:

Item No. 412-1	Asphalt Prime coat	Per gallon (liter)
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412.5.01 Adjustments

General Provisions 101 through 150.

Section 413—Bituminous Tack Coat

413.1 General Description

This work includes furnishing and applying a bituminous tack coat on a prepared road surface including cleaning the road surface.

413.1.01 Definitions

General Provisions 101 through 150.

413.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment

Section 400—Hot Mix Asphaltic Concrete Construction

Section 424—Bituminous Surface Treatment

Section 427—Emulsified Asphalt Slurry Seal

Section 820—Asphalt Cement

Section 822 – Emulsified Asphalt

Section 824—Cationic Asphalt Emulsion

SOP 4

B. Referenced Documents

General Provisions 101 through 150.

413.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for the bituminous materials for sole use of tack coat when requested by the Department Engineer. Show the following on the Bill of Lading:

- Date Manufactured for emulsified asphalt materials.
 - Date shipped
 - Quantity in gallons
 - Included with or without additives
-

Section 413 — Bituminous Tack Coat

413.2 Materials

Ensure materials meet the following specifications:

TABLE 1 – BITUMINOUS MATERIALS

Material	Section
Asphalt cement, performance grade PG 58-22, PG 64-22, or PG 67-22	820.2.01
Approved non-tracking Anionic Emulsified Asphalt	822.2.01
Cationic emulsified asphalt CSS-1h, CRS-1h, CRS-2h, CRS-3, CQS-1h and other approved non-tracking cationic emulsified asphalt products listed on QPL 7	824.2.01

Use any of the materials shown in Table 1 as bituminous tack coat for work performed under Section 400 as directed by the Engineer.

The ~~Department~~ Engineer may change the grade or type of bituminous materials without a change in the Contract Unit Price if the Engineer determines the grade or type selected is not performing satisfactorily.

413.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

Emulsified Asphalt

Maintain all equipment used for the delivery, storage, and handling of anionic emulsified asphalt or cationic emulsified asphalt to prevent contamination of the emulsion. Transfer anionic emulsified asphalt or cationic emulsified asphalt directly to the pressure distributor from the transport tanker. Emulsified asphalt may be stored in an onsite bituminous storage tank in accordance with Note 1.

Provide and maintain temperature measuring devices to continuously monitor the temperature of anionic emulsified asphalt or cationic emulsified asphalt in storage and in the pressure distributor. Do not allow anionic emulsified asphalt or cationic emulsified asphalt to freeze.

Note 1: Asphalt emulsion that has been stored longer than 30 days from the time of initial manufacture shall be tested and approved for compliance with specified requirements prior to being used as tack coat for work performed under Section 400

413.3 Construction Requirements

413.3.01 Personnel

General Provisions 101 through 150.

413.3.02 Equipment

Provide equipment in good repair, including the following units that meet the requirements of Subsection 424.3.02, *Equipment*.

- Power broom and blower
- Pressure distributor

Provide a properly cleaned distributor to avoid contamination with incompatible materials.

413.3.03 Preparation

General Provisions 101 through 150.

Section 413 — Bituminous Tack Coat

413.3.04 Fabrication

General Provisions 101 through 150.

413.3.05 Construction

A. Seasonal and Weather Limitation

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

B. Application

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas inaccessible to spray bars.

Table 2 - Application Rates for Anionic Emulsified Asphalt or Cationic Emulsified Asphalt, gal/yd² (L/m²)

Tack-Uses	Minimum	Maximum
New Asphaltic Concrete Pavement to New Asphaltic Concrete Pavement or Thin Lift Leveling	0.05 (0.23)	0.08 (0.36)
New Asphaltic Concrete Pavement (≤ 25 % RAP) to Aged Existing Pavement or Milled Surface	0.06 (0.27)	0.10 (0.45)
New Asphaltic Concrete Pavement (> 25 % RAP) to Aged Existing Pavement or Milled Surface	0.08 (0.36)	0.12 (0.54)

- Allow standard anionic emulsified asphalt or cationic emulsified asphalt to break per emulsion manufacturer's recommendation. Proceed with paving only after the anionic emulsified asphalt or cationic emulsified asphalt has cured to the satisfaction of the Engineer.
- Do not use anionic emulsified asphalt or cationic emulsified asphalt under OGFC or PEM on interstates or limited access state routes.

Note: Application rates for PG Binder Asphalt Cement are specified in Section 400.3.03.A.3.C.

C. Temperature of Material

Apply bituminous materials within the temperature ranges specified below.

TABLE 3 – BITUMINOUS MATERIALS AND APPLICATION TEMPERATURES

Bituminous Materials	Temperature of Application °F (°C)
Asphalt cement	350 – 400 (175 – 205)
Approved non-tracking Anionic Emulsified Asphalt	140 – 180 (60 – 80)
Cationic Emulsified Asphalt CSS-1h, CRS- 1h, CRS-2h, CRS-3, CQS-1h and other approved non-tracking cationic emulsified asphalt products listed on QPL 7	140 - 180 (60 - 80)

D. Cleaning

Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

Section 413 — Bituminous Tack Coat

E. Application Rate

The Engineer will determine the application rate of the bituminous tack coat.

F. Limitations and Areas Coated

Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

G. Maintenance and Protection

After applying a standard emulsified asphalt tack coat material, allow it to break per emulsion manufacturer's recommendation. Do not allow construction equipment or traffic on the tack. When directed by the Engineer, provide a revised paving plan when excessive tracking of the tack material by construction related traffic is evident.

413.3.06 Quality Acceptance

General Provisions 101 through 150.

413.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150 shall apply with specific consideration given to General Provision Sections 105.12, 105.14, and 105.16.

413.4 Measurement

Bituminous materials for tack coat applied and accepted are measured as outlined in Subsection 109.02, *Measurement of Bituminous Materials*.

Diluting emulsified tack coat is not ordinarily allowed except when used underneath slurry seal and approved by the Engineer. The composition of diluted emulsified tack coat defined in Subsection 427.3.05, *Construction* is measured by the gallon (liter) of diluted mix.

413.4.01 Limits

General Provisions 101 through 150.

413.5 Payment

The accepted volume of bituminous material will be paid for at the Contract Unit Price per gallon (liter) for bituminous tack coat of the type and grade and approved by the Engineer, complete in place. Payment is full compensation for preparing, cleaning, furnishing, hauling, applying material, and providing incidentals to complete the work.

Payment will be made under:

Item No. 413-1	Asphalt Tack coat	Per gallon (liter)
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Section 424—Bituminous Surface Treatment

424.1 General Description

This work includes placing one or more applications of bituminous material and aggregate on a previously prepared base or pavement.

424.1.01 Definitions

- **Single Surface Treatment:** One application of bituminous material that is covered with aggregate.
- **Double Surface Treatment:** A bituminous material application that is covered with aggregate of the size specified in the proposal followed by a second bituminous material application that is covered with a second specified size aggregate.
- **Triple Surface Treatment:** A bituminous material application that is covered with a specified size aggregate followed by subsequent applications of bituminous material that are covered with successively smaller size nominal aggregates.

424.1.02 Related References

A. Standard Specifications

Section 105—Control of Work

Section 800—Coarse Aggregate

Section 802—Aggregates for Asphaltic Concrete

Section 820—Asphalt Cement

Section 824—Cationic Asphalt Emulsion

B. Referenced Documents

QPL 65

424.1.03 Submittals

General Provisions 101 through 150.

424.2 Materials

A. Bituminous Material

Select the bituminous material from any type and grade listed in the materials table below. Notify the Engineer at least 10 days before ordering the bituminous material. The Engineer must approve the bituminous material choice.

For a list of latex sources, see QPL 65.

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Asphalt Cement, Performance Grade PG 58-22 or PG 64-22*	820.2.01
Cationic Asphalt Emulsion, Grade CRS-2h or CRS-3*	824.2.01
Latex-Modified Cationic Asphalt Emulsion, Grade CRS-2L	824.2.02

* Use PG 64-22 or CRS-3 only at the Engineer's direction. (See Subsection 424.3.05.B.)

Section 424 — Bituminous Surface Treatment

B. Aggregates

The size and group of aggregates used in the surface treatment are specified in the Proposal under the appropriate Line Item.

Do not use unconsolidated limerock unless provided for in the plans or proposal.

Use Class B aggregates only where the surface treatment is used for shoulder construction or where it is to be overlaid with asphaltic concrete.

Material	Section
Coarse Aggregate, Class A Crushed Stone or Crushed Slag, Group I or II	800.2.01
Fine Aggregate for Asphaltic Concrete*	802.2.01
*For sand seal application, use WA 10 washed screenings made from Group II aggregates.	

424.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

424.3 Construction Requirements

424.3.01 Personnel

General Provisions 101 through 150.

424.3.02 Equipment

Have the Engineer approve equipment types and quantities before using equipment on the Project.

Ensure that the equipment used to construct the surface treatment:

- Produces work that complies with the standards in this section
- Is on the Project and in proper working order before construction begins and during construction.

A. Aggregate Spreader

The Department will inspect annually the aggregate spreader before it is used in the work. If the spreader is approved, the Department will attach an equipment certification sticker to the spreader.

Use a self-propelled aggregate spreader that can apply aggregate at the desired rate uniformly and accurately without corrugation, overlaps, or excess deficient areas.

Ensure that the spreader can spread courses to the required widths. Provide spreaders to promptly cover the full width of the asphalt application.

B. Pressure Distributor

The Department will inspect annually the pressure distributor before it is used in the work. If the distributor is approved, the Department will attach an equipment certification sticker to the distributor. The pressure distributor should be equipped as follows:

1. Mount the pressure distributor on pneumatic tires wide enough to prevent damage to the road surface.
 2. Design, equip, maintain, and operate the distributor so that the bituminous material will be heated and applied evenly throughout the length of the spray bars. Ensure that it maintains a constant, uniform pressure on the nozzles.
 3. Install screens between the tank and the nozzles and clean them frequently to prevent clogging.
 4. Use an adjustable distributor that can deliver controlled amounts of bituminous material from 0.04 to 1.0 gal/yd², ± 0.02 gal/yd² (0.18 to 4.53 L/m², ± 0.10 L/m²) up to 24 ft. (7.2 m) wide without atomization, streaking, or pulsation in the flow.
-

Section 424 — Bituminous Surface Treatment

5. Use a distributor equipped with the following:

- A tachometer and thermometers to indicate the application rate and the temperature of the tank contents
- Measuring devices to accurately indicate the amount of bituminous material, in gallons (liters), in the distributor before and after each application
- Full circulating spray bars that can be adjusted laterally to conform to a stringline and capable of vertical and horizontal adjustment.
- A positive shut-off control to prevent dripping bituminous material on the roadway
- A distributor tank equipped with a sample valve in a safe and convenient location to obtain bituminous material samples

C. Heating Equipment

Ensure that heating equipment will heat and maintain the bituminous material uniformly at the temperature required. Provide an accurate thermometer.

D. Steel-Wheeled Rollers

Use self-propelled, tandem-type steel-wheeled rollers. The rollers shall weigh from 3 to 8 tons (3 to 7 Mg). Ensure that the roller weights within these limits can properly seat the aggregate without fracturing the aggregate particles. Equip the roller drums with scrapers to prevent pick up of material. Combination rollers with pneumatic-tired wheels that can be alternated with a steel drum are permitted as a substitute for steel-wheeled rollers.

E. Pneumatic-Tired Rollers

Use self-propelled, two axles, pneumatic-tired rollers with smooth-tread rubber tires aligned such that gaps between the tires on one axle are covered by the tires of the other axle. Equip the roller tires with scrapers and scrubbers to prevent pick up of material. Ensure that all tires are of the same size and ply rating and inflated to a minimum of 60 psi (415 kPa). Maintain tire pressure such that the difference in pressure between any two tires does not exceed 5 psi (35 kPa). Provide ballast as directed by the Engineer.

F. Power Broom and Power Blower

Provide at least one power broom and one power blower, or a combination power broom and blower that can remove dust or loose materials from the road surface.

424.3.03 Preparation

Firmly compact, finish, and prime new bases. Ensure that the bases conform to the lines, grades, and cross sections within the tolerances specified.

A. Removing Foreign Material

Use power brooms, power blowers, hand brooms, or other means to remove loose material, dust, dirt, clay, and other materials that prevent bituminous materials from adhering to the base.

Take special care to clean the outer edges thoroughly. Where necessary, use a motor grader blade to remove excess material off the paving edge.

B. Condition of Prime

Check the condition of prime as follows:

1. Ensure the prime is cured before placing the mat course.
2. Repair the prime if it is loose, soft, unbonded, removed, or damaged.
3. Remove concentrations of excess prime.
4. Perform additional rolling with a pneumatic-tired roller before surface treatment when directed by the Engineer.

424.3.04 Fabrication

General Provisions 101 through 150.

Section 424 — Bituminous Surface Treatment

424.3.05 Construction

A. Observing Seasonal and Weather Limitations

Apply bituminous surface treatment only between April 15 and October 15 and only when:

- Ambient temperature has not been less than 45 °F (7 °C) for 48 hours immediately prior to application.
- No forecast of ambient temperature less than 45 °F (7 °C) for 48 hours immediately following application.
- Ambient temperature and road surface temperature is at least 60 °F (16 °C) and stable at the time of application.

No exceptions are permitted except as authorized by the Engineer.

Do not apply asphalt cement to a wet surface.

NOTE 1: When the relative humidity exceeds 80%, the ambient temperature exceeds 95 °F (35 °C), the pavement temperature exceeds 125 °F (52 °C) or the weather is windy or overcast, application of bituminous surface treatment will be at the discretion of the Engineer.

NOTE 2: If hot mix asphaltic concrete will be applied over the surface treatment, the Engineer may waive the seasonal limitations providing that traffic is not permitted on the surface treatment until it is covered with hot mix asphaltic concrete.

B. Using PG 64-22 or CRS-3

Only use PG 64-22 or CRS-3 when directed by the Engineer due to a problem with excessive aggregate pickup during high ambient temperature.

C. Observing Sequence of Operations and Quantities of Materials

The sequence of operations and quantities of materials are shown in Table 1, Table 2 and Table 3 (Table 1a—metric, Table 2a—metric and Table 3a—metric).

The Engineer will determine the material quantities to be used during construction and may change the minimum or maximum application rate of any course during construction if the total quantities are within the amounts shown in the Tables. Any deviation from the table quantities will require a negotiated adjustment of the Contract price authorized by an approved Supplemental Agreement.

When a single application of bituminous surface treatment is used as a Crack-Relief Interlayer, use the quantities of materials shown in Table 2 (Table 2a—Metric).

When a sand seal application is Specified, use the quantities of materials shown in Table 3 (Table 3a—Metric).

Section 424 — Bituminous Surface Treatment

Section 424—Bituminous Surface Treatment – Table 1

Application		Type Construction									
		Single			Double			Triple			
Stone Sizes	1st		#89	#7	#6		#7	#6		#6	#5
	2nd						#89	#7		#7	#7
	3rd									# 89	# 89
		Control Tolerance				Control Tolerance			Control Tolerance		
1st Application Bituminous Materials (gal/yd ²) PG58-22 or PG64-22		± .02	.17–.19	.18–.25	.22–.30	± .02	.20–.27	.26–.34	± .02	.20–.30	.24–.34
CRS-2h, CRS-3		± .02	.20–.22	.21–.29	.25–.35	± .02	.23–.32	.30–.40	± .02	.23–.35	.28–.40
1st Application Stone (ft ³ /yd ²)		± .03	.14–.18	.18–.26	.30–.42	± .03	.18–.26	.30–.42	± .03	.30–.42	.41–.53
2nd Application Bituminous Materials (gal/yd ²) PG58-22 or PG64-22						± .02	.18–.24	.24–.31	± .02	.20–.27	.20–.27
CRS-2h, CRS-3						± .02	.21–.28	.28–.36	± .02	.23–.32	.23–.32
2nd Application Stone (ft ³ /yd ²)						± .03	.14–.18	.18–.26	± .03	.18–.26	.18–.26
3rd Application Bituminous Materials (gal/yd ²) PG58-22 or PG64-22									± .02	.18–.24	.18–.24
CRS-2h, CRS-3									± .02	.21–.28	.21–.28
3rd Application Stone (ft ³ /yd ²)									± .03	.14–.18	.14–.18
Total Bituminous Materials (gal/yd ²) PG58-22 or PG64-22		± .02	.17–.19	.18–.25	.22–.30	± .03	.38–.51	.50–.65	± .04	.58–.81	.62–.85
CRS-2h, CRS-3		± .02	.20–.22	.21–.29	.25–.35	± .03	.44–.60	.58–.76	± .04	.67–.95	.72–1.0
Total Stone (ft ³ /yd ²)		± .03	.14–.18	.18–.26	.30–.42	± .04	.32–.44	.48–.68	± .05	.62–.86	.73–.97

Notes:

1. Target application rates for bituminous material, coarse aggregate and seal sand will be established by the Engineer within the limits shown in Table 1, based on roadway and traffic conditions.
2. Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application unless directed by the Engineer in accordance with No. 3 below.
3. At the Engineer's direction, application rates for bituminous materials and aggregate may be varied outside the specified limits for each course at no additional cost provided the combined total of materials is within the specified total minimum and total maximum application rates for the combined total of all courses.
4. Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
5. Apply at least one seal coat to the mat course on the same day when multiple applications are specified.

Section 424 — Bituminous Surface Treatment

Section 424—Bituminous Surface Treatment, Crack-Relief Interlayer – Table 2

Bituminous Material Application (gal/yd ²)	Application Rate	Control Tolerance
PG 58-22 or PG 64-22	.20 – .27	± .02
CRS-2h, CRS-2L or CRS 3	.25 – .35	± .02
Aggregate Application (ft ³ /yd ²)	Application Rate	Control Tolerance
#89	.14 – .18	± .02
#7	.18 – .26	± .02

Notes:

- Target application rates for bituminous material and aggregate will be established by the Engineer within the limits shown in Table 2.
- When single surface treatment stone size No. 89 or No. 7 is applied over a milled surface, the minimum application rate for CRS-2h, CRS-2L or CRS 3 shall be 0.30 (gal/yd²) and for PG 58-22 or PG 64-22 shall be 0.22 (gal/yd²).
- Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the single surface treatment Crack-Relief Interlayer with HMA Leveling on the same day.

Section 424—Bituminous Surface Treatment, Sand Seal – Table 3

Aggregates	Application Rate (ft ³ /yd ²)	Control Tolerance	Bituminous Material	Application Rate (gal/yd ²)	Control Tolerance
#6	.30 – .42	± .02	CRS-2h, CRS-2L or CRS 3	.23 – .35	± .02
			PG 58-22 or PG 64-22	.20 – .30	± .02
#7	.18 – .26	± .02	CRS-2h, CRS-2L or CRS 3	.21 – .29	± .02
			PG 58-22 or PG 64-22	.18 – .25	± .02
#89	.14 – .18	± .02	CRS-2h, CRS-2L or CRS 3	.20 – .22	± .02
			PG 58-22 or PG 64-22	.17 – .19	± .02
WA 10 Washed Screenings	.10 – .14	± .02	CRS-2h, CRS-2L or CRS 3	.10 – .25	± .02
			PG 58-22 or PG 64-22	.10 – .17	± .02

Notes:

1. Target application rates for bituminous material, coarse aggregate and seal sand will be established by the Engineer within the limits shown in Table 3, based on roadway and traffic conditions.
2. Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application unless directed by the Engineer in accordance with No. 3 below.
3. At the Engineer's direction, application rates for bituminous materials and aggregate may be varied outside the specified limits for each course at no additional cost provided the combined total of materials is within the specified total minimum and total maximum application rates for the combined total of all courses.
4. Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
5. Cover the coarse aggregate seal stone with seal sand on the same day.

Section 424 — Bituminous Surface Treatment

Section 424—Bituminous Surface Treatment – Table 1a (Metric)

Application		Type Construction									
		Single			Double			Triple			
Stone Sizes	1st		#89	#7	#6		#7	#6		#6	#5
	2nd						#89	#7		#7	#7
	3rd									# 89	# 89
	Control Tolerance					Control Tolerance			Control Tolerance		
1st Application Bituminous Materials (L/m ²) PG58-22 or PG64-22	± .09	.77–.86	.82–1.13	1.00–1.36	± .09	.91–1.22	1.18–1.54	± .09	.91–1.36	1.09–1.54	
CRS-2h, CRS-3	± .09	.91–1.00	.95–1.31	1.13–1.58	± .09	1.04–1.45	1.36–1.81	± .09	1.04–1.58	1.27–1.81	
1st Application Stone (m ³ /m ²)	± .001	.005–.006	.006–.009	.01–.014	± .001	.006–.009	.01–.015	± .001	.01–.014	.014–.018	
2nd Application Bituminous Materials (L/m ²) PG58-22 or PG64-22					± .09	.82–1.09	1.09–1.40	± .09	.91–1.22	.91–1.22	
CRS-2h, CRS-3					± .09	.95–1.26	1.27–1.63	± .09	1.04–1.45	1.04–1.45	
2nd Application Stone (m ³ /m ²)					± .001	.005–.006	.006–.009	± .001	.006–.009	.006–.009	
3rd Application Bituminous Materials (L/m ²) PG58-22 or PG64-22								± .09	.82–1.09	.82–1.09	
CRS-2h, CRS-3								± .09	.95–1.27	.95–1.27	
3rd Application Stone (m ³ /m ²)								± .001	.005–.006	.005–.006	
Total Bituminous Materials (L/m ²) PG58-22 or PG64-22	± .09	.77–.86	.82–1.13	1.00–1.36	± .14	1.72–2.31	2.26–2.94	± .18	2.63–3.67	2.81–4.53	
CRS-2h, CRS-3	± .09	.91–1.00	.95–1.31	1.13–1.58	± .14	1.99–2.72	2.63–3.44	± .18	3.04–4.30	3.26–4.53	
Total Stone (m ³ /m ²)	± .001	.005–.006	.006–.009	.01–.014	± .0013	.011–.015	.016–.024	± .0016	.021–.029	.025–.033	

Notes:

1. Target application rates for bituminous material, coarse aggregate and seal sand will be established by the Engineer within the limits shown in Table 1a, based on roadway and traffic conditions.
2. Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application unless directed by the Engineer in accordance with No. 3 below.
3. At the Engineer's direction, application rates for bituminous materials and aggregate may be varied outside the specified limits for each course at no additional cost provided the combined total of materials is within the specified total minimum and total maximum application rates for the combined total of all courses.

Section 424 — Bituminous Surface Treatment

4. Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
5. Apply at least one seal coat to the mat course on the same day when multiple applications are specified.

Section 424—Bituminous Surface Treatment, Crack-Relief Interlayer – Table 2a (Metric)

Bituminous Material Application (L/m ²)	Application Rate	Control Tolerance
PG 58-22 or PG 64-22	.91 – 1.22	± .09
CRS-2h, CRS-2L or CRS 3	1.13 – 1.58	± .09
Aggregate Application (m ³ /m ²)	Application Rate	Control Tolerance
#89	0.005 – 0.006	± .0007
#7	.006 – .009	± .0007

Notes:

- Target application rates for bituminous material and aggregate will be established by the Engineer within the limits shown in Table 2a.
- When single surface treatment stone size No. 89 or No. 7 is applied over a milled surface, the minimum application rate for CRS-2h, CRS-2L or CRS 3 shall be 1.36 (L/m²) and for PG 58-22 or PG 64-22 shall be 1.00 (L/m²).
- Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application.
- Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
- Cover the single surface treatment Crack-Relief Interlayer with HMA Leveling on the same day.

Section 424 — Bituminous Surface Treatment

Section 424—Bituminous Surface Treatment, Sand Seal – Table 3a (Metric)

Aggregates	Application Rate (m ³ /m ²)	Control Tolerance	Bituminous Material	Application Rate (L/m ²)	Control Tolerance
#6	0.0102 – 0.0142	± .0007	CRS-2h, CRS-2L or CRS 3	1.04 – 1.58	± .09
			PG 58-22 or PG 64-22	0.91 – 1.36	± .09
#7	0.0061 – 0.0088	± .0007	CRS-2h, CRS-2L or CRS 3	0.95 – 1.31	± .09
			PG 58-22 or PG 64-22	0.81 – 1.13	± .09
#89	0.0047 – 0.0061	± .0007	CRS-2h, CRS-2L or CRS 3	0.91 – 1.00	± .09
			PG 58-22 or PG 64-22	0.77 – 0.86	± .09
WA 10 Washed Screenings	0.0034 – 0.0047	± .0007	CRS-2h, CRS-2L or CRS 3	0.45 – 1.13	± .09
			PG 58-22 or PG 64-22	0.45 – 0.77	± .09

Notes:

1. Target application rates for bituminous material, coarse aggregate and seal sand will be established by the Engineer within the limits shown in Table 3a, based on roadway and traffic conditions.
2. Do not apply bituminous material or aggregate outside the specified minimum and maximum application rates regardless of the control tolerances shown for each application unless directed by the Engineer in accordance with No. 3 below.
3. At the Engineer's direction, application rates for bituminous materials and aggregate may be varied outside the specified limits for each course at no additional cost provided the combined total of materials is within the specified total minimum and total maximum application rates for the combined total of all courses.
4. Maintain the control tolerances shown above or stop the work until the necessary corrections are made.
5. Cover the coarse aggregate seal stone with seal sand on the same day.

D. Heating Bituminous Material

Evenly heat the entire mass of bituminous material for each application under positive control. While the material is being applied, maintain it within the specified temperature range.

E. Applying Bituminous Material

The following are temperatures at which bituminous material shall be applied.

Bituminous Material	Asphalt Cement	CRS-2h	CRS-3	CRS-2L
Application temperature °F (°C)	275–350 (135–177)	140–180 (60–82)	140–180 (60–82)	140–180 (60–82)

NOTE 1: Do not store emulsified asphalts at temperatures exceeding 150 °F (65 °C) for any extended time.

NOTE 2: Do not place bituminous surface treatment on fresh asphaltic concrete, except for paved shoulders, until the asphaltic concrete has been in place at least 30 days.

Section 424 — Bituminous Surface Treatment

The Engineer will designate the maximum area to which bituminous material may be applied at one time. Apply the material as follows:

1. After applying the bituminous material to the section, immediately cover it with the correct application rate of aggregate before beginning the next section.

Do not apply the bituminous material to the full width of the pavement unless the aggregate spreader can immediately cover the full width of the applied material.

NOTE: Never allow bituminous material to chill, set up, dry, or reach a condition that impairs the retention of cover aggregate before the aggregate is applied.

2. When a longitudinal joint is necessary:
 - Do not overlap the applications more than 4 in. (100 mm).
 - Do not leave any area uncovered.
 - Never allow excess quantities of bituminous materials to build up.
3. On curves that require widening:
 - a. Shoot the extra width on the outside first.
 - b. Shoot the normal width with the distributor and follow the inside paving edge.
4. Ensure that the spray of bituminous material is uniform at all times. If the spray is not uniform:
 - a. Stop the work.
 - b. Change equipment, personnel, or methods to attain the required uniformity.
 - c. Apply bituminous material at one-half the width of the roadway, if necessary.
5. If streaking develops:
 - a. Stop the distributor and correct the problem before proceeding.
 - b. Use a hand hose or a hand pouring pot to cover the streaked areas at approximately the same application rate of bituminous material.
6. If a part of the work cannot be reached by the distributor, treat it by hand hoses with nozzles.
7. Protect curbs, gutters, handrails, and other structures from discoloration by the bituminous material. Remove bituminous material that is sprayed or spilled on these structures.
8. Ensure that the bituminous material joins neatly in place by beginning and ending the asphalt application from a heavy paper or tight trough that is longer than the width of the treatment being applied. Place it to catch and hold the surplus material.
9. When cleaning and emptying the distributor, empty it where the bituminous material can be covered with dirt and completely disposed of without damaging the Rights-of-Way.

F. Spreading Aggregates

Spread the aggregates as follows:

1. Ensure that aggregates do not contain free moisture when spread.
 2. Apply aggregate immediately after applying bituminous materials.
 3. Uniformly spread the aggregate at the specified rate without corrugations, overlaps, excess, or deficient areas.
 4. Move the spreader at a uniform speed, regardless of the grade.
 5. Ensure that the distance that the aggregate free falls remains constant during spreading.
 6. Remove corrugations. Operate the spreader to prevent overlap of aggregates. If overlap occurs, remove the excess aggregate before rolling.
 7. Ensure a uniform aggregate spread by hand spotting and brooming as necessary.
-

Section 424 — Bituminous Surface Treatment

G. Rolling

Observe the following guidelines for rolling bituminous surface treatment:

1. Synchronize the speed of the distributor and aggregate spreader with that of the rolling operation.
2. Use a minimum of two (2) individual rollers, one of which must be a pneumatic-tired roller meeting the requirements of Subsection 424.3.02.E.
3. If a steel-wheeled roller will fracture the aggregate, use pneumatic-tired rollers only.
4. Begin rolling within one minute after spreading the aggregate.
5. Operate rollers at speeds not exceeding 5 mph.
6. Proceed in a longitudinal direction, beginning at the outside edge of the aggregate application.
7. A roller pass is defined as one trip in a single direction.
8. Overlap each roller pass by approximately 1/2 the roller width.
9. Provide a minimum of three (3) roller passes per roller for each layer of aggregate to properly embed the aggregate particles.

Note: Unless a sufficient number of rollers are in operation to complete the above requirements, do not make subsequent applications of bituminous material until rolling of the previous application is completed.

H. Brooming

Use a revolving broom as necessary, supplemented by hand brooming, to remove or redistribute excess stone. Sweep the completed surface treatment within the first three hours of the next available workday following placement. Take care not to unseat bonded stone when sweeping.

I. Controlling Traffic

Do not allow traffic on the surface treatment until the bituminous material has cured sufficiently to ensure that the aggregate will not be loosened, dislodged, or whipped off by slow moving traffic.

Control traffic to speeds not exceeding 25 mph for a minimum of two hours after application of the seal stone and until the Engineer permits the road to be opened to normal traffic speeds.

Use pilot vehicles to control traffic speeds.

424.3.06 Quality Acceptance

General Provisions 101 through 150.

424.3.07 Contractor Warranty and Maintenance

Maintain and protect the surface course as specified in Section 105 until the project has been accepted. Make repairs as the Engineer directs. The cost of maintenance, protection, and repair is included in the Unit Prices Bid for the Item for which they apply.

424.4 Measurement

The area to be measured is ~~not paid for separately the number of square yards (meters) of each type surface treatment completed and accepted.~~

424.4.01 Limits

The length is measured along the surface. The width is specified on the Plans, plus or minus any authorized changes. Irregular areas are measured by the surface square yard (meter) within the lines shown on the plans or authorized changes.

Section 424 — Bituminous Surface Treatment

424.5 Payment

The accepted area of surface treatment will be paid for at the Contract Unit Price per square yard (meter) complete for each type and stone size specified is not paid for separately.

Section 430—Portland Cement Concrete Pavement

430.1 General Description

This work includes constructing pavement composed of Portland cement concrete, with or without reinforcement as specified, on a prepared subgrade or subbase course.

Follow the requirements of these Specifications and conform to the lines, grades, thicknesses, and cross-sections shown on the plans or by the Engineer.

430.1.01 Definitions

General Provisions 101 through 150.

430.1.02 Related References

A. Standard Specifications

- Section 106—Control of Materials
- Section 152—Field Laboratory Building
- Section 431—Grind Concrete Pavement
- Section 461—Sealing Roadway and Bridge Joints and Cracks
- Section 500—Concrete Structures
- Section 800—Coarse Aggregate
- Section 801—Fine Aggregate
- Section 830—Portland Cement
- Section 831—Admixtures
- Section 832—Curing Agents
- Section 833—Joint Fillers and Sealers
- Section 853—Reinforcement and Tensioning Steel
- Section 880—Water
- Section 886—Epoxy Resin Adhesives

B. Referenced Documents

- AASHTO T 126
 - AASHTO T 97
 - AASHTO T 22
 - AASHTO T 23
 - ACI 214
 - ASTM C 94, Requirements for Uniformity
 - ASTM C 684, Method A
 - GDT 26
 - GDT 27
 - GDT 28
 - GDT 31
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Section 430 — Portland Cement Concrete Pavement

GDT 32

GDT 72

GDT 78

SOP 34

Report form, furnished by the Engineer

Requests for certification

430.1.03 Submittals

A. Profilograph Equipment and Operator Certification

~~Include in the Contract Unit Bid Price the cost to furnish and operate a Rainhart (Model 860) Profilograph to measure pavement profile deviations.~~

~~Before paving, ensure that the operator and the profilograph are certified by the Office of Materials and Research in accordance with Standard Operating Procedure No. 34, Certification of Contractor Personnel and Equipment for Smoothness Testing of Portland Cement Concrete Pavement with the Rainhart Profilograph. Certification includes a mechanical check of the profilograph functions and a written examination by the operator.~~

~~Request certification in writing to the Office of Materials and Research at least two weeks before it is needed.~~

Not required.

B. Concrete Design

Submit for approval a concrete design that is prepared by a testing laboratory approved by the Office of Materials and Research. The Contractor will transmit the design to the Engineer for approval at least 35 days before use.

C. Approval of Mix Design Proportions

Obtain approval from the ~~Office of Materials and Research~~ Engineer for proposed concrete mix designs. Class 1 and 2 concrete mix designs will be verified for early compressive strength according to ASTM C-684, Method A. Class HES concrete mix designs will be verified for compressive strength development at 72 hours according to AASHTO T 126 and AASHTO T 22.

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430.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Portland cement	830.2.01
Portland Pozzolan cement	830.2.03
Water	880.2.01
Fine Aggregate, Size No. 10	801.2.02
Coarse Aggregate, Class A or B Crushed Stone or Gravel, Sizes as Specified	800.2.01
Steel Bars for Reinforcement	853.2.01
Steel Wire for Concrete Reinforcement	853.2.06
Welded Steel Wire Fabric for Concrete Reinforcement	853.2.07
Dowel Bars and Bar Coatings	853.2.08
Curing Agents	832
Air Entraining Admixtures	831.2.01
Fly Ash and Slag	831.2.03
Joint Fillers and Sealers	833
Low Modulus Silicone Sealant for Roadway Construction Joints	833.2.06
Epoxy Adhesive for Repairing Cracks	886.2.01
Chemical Admixtures	831.2.02

A. Fly Ash

Use fly ash, if appropriate, as a concrete additive to promote workability and plasticity. It may be used as a partial replacement for Portland cement in concrete, but follow these limits:

1. Do not replace the cement quantity more than 15 percent by weight.
 2. Replace cement with fly ash at the rate of 1.25 to 2.0 lbs. (1.25 to 2.0 kg) of fly ash to 1 lb. (1.0 kg) of cement.
 3. Ensure that the fly ash mix conforms to Subsection 430.3.06, *Quality Acceptance*.
 4. Do not use Type IP cement in fly ash mixes.
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B. Granulated Iron Blast-Furnace Slag

If high early strengths are not desired, use granulated slag as a partial replacement for Portland cement in concrete. Follow these limits:

1. Replace the quantity of cement 50 percent or less by weight if the 5-day forecast of the National Weather Service expects temperatures higher than 60 °F (15 °C).
 - a. If the 5-day expected low temperature is less than 60 °F (15 °C) but not less than 40 °F (4 °C), replace the quantity of cement 30 percent or less by weight.
 - b. If the 5-day expected low temperature is less than 40 °F (4 °C), do not use granulated slag.
2. Replace cement with slag at the rate of 1 lb. (1 kg) of slag to 1 lb. (1 kg) of cement.
3. Ensure that the granulated slag mix conforms to Subsection 430.3.06, "Quality Acceptance."
4. Do not use Type IP cement or fly ash in slag mixes.

C. Composition of Concrete

Design the concrete mix to conform to the following requirements:

1. Coarse Aggregate

Use coarse aggregate size No. 467, 67, or 57 for plain Portland cement concrete pavement.
Use size No. 67 or 57 coarse aggregate for continuous reinforced concrete pavement.
Separate size No. 467 or 456 in individual stockpiles of size No. 4 and size No. 67. Blend according to approved mix proportions.
2. Fine Aggregate

Use fine aggregate that meets the requirements for size No. 10.
When using two sizes or sources of fine aggregate to produce the proper gradation, blend according to the approved design proportions.

D. Protective Materials

Provide materials to protect the concrete edges and surface from rain, including:

- Standard metal forms or wood planks to protect the pavement edges
- Covering material such as burlap or cotton mats, curing paper, or plastic sheeting material to protect the pavement surface

430.2.01 Delivery, Storage, and Handling

Store aggregate from different sources in separate stockpiles.

430.3 Construction Requirements

430.3.01 Personnel

A. Certified Operator

~~Before paving, have the Office of Materials and Research, certify a profilograph equipment operator. Certification includes a written examination by the operator.~~

Not required.

430.3.02 Equipment

A. Equipment Requirements

Provide equipment and tools to perform the work. Provide equipment that allows the paver to operate at a constant production rate and rarely start and stop. The Engineer may limit the production rate or batch size if equipment does not keep pace with the other operations or causes poor workmanship.

B. Scales

Before use, the Engineer will inspect and approve the scales to weigh concrete materials and the devices to measure water. Tolerances are ± 1.0 percent throughout the operating range. Measure admixtures to ± 3.0 percent.

C. Paving Equipment

Ensure that equipment operating on the pavement has rubber-tired wheels or flat steel wheels. Wait to operate concrete or shoulder paving equipment on the pavement until the concrete slab is 14 days old or has ~~2,500 psi (15 MPa)~~ 3,500 psi (25 MPa) compressive strength.

Paving equipment may be either slip-form or fixed form.

~~D. Surface Finish Equipment~~

~~Use mechanical equipment to produce the surface finish of the mainline and transverse plastic concrete grooving. Ensure that the equipment uses rectangular shaped steel tines of the same size and uniform length. Use tines with a width between 0.08 in. (2 mm) and 0.130 in. (3.5 mm). Space the tines approximately 1/2 in. (13 mm) apart.~~

E. Field Laboratory

Provide a field laboratory according to Section 152.

F. Mechanical Sprayers

Provide fully atomizing spraying equipment with a tank agitator to place curing compounds.

430.3.03 Preparation

A. Prepare the Road Bed

Prepare the roadbed as required by the Plans and Specifications before placing concrete pavement.

B. Observe Condition of Subgrade and Subbase

Check the subgrade and subbase as follows:

1. Prepare the full width of the subgrade and subbase according to the plans and specifications.
2. Ensure that the surface immediately under the concrete pavement allows proper pavement thickness and yield.
3. Trim high areas to the proper elevation.
4. Ensure that the subbase can support paving equipment without rutting or bogging.

430.3.04 Fabrication

General Provisions 101 through 150.

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430.3.05 Construction

A. Mix the Concrete

Produce Portland cement concrete by combining authorized proportions of materials in batches according to the construction methods in this Specification.

Mix the concrete produced in a stationary central mix plant for at least 60 seconds after all materials have entered the drum. Reduce the mix time if representative tests show that the concrete meets requirements of ASTM C 94, Requirements for Uniformity. Never reduce the mix time to less than 50 seconds.

B. Set Forms

Set the forms as follows:

1. Compact the foundation under the forms true to grade. Set the form so that it firmly contacts the foundation for the entire length at the specified grade.
2. Prevent the forms from settling or springing under the finishing machine.
3. Clean and oil the forms before placing the concrete.

C. Dowel Bars

Provide dowel bars at transverse joints unless otherwise noted in the Contract Plans.

D. Place Concrete

After depositing the concrete on the grade, avoid re-handling. Unload and place it as follows:

1. Unload the concrete into an approved spreading device and mechanically spread it on the grade.
2. Place the concrete continuously between transverse joints without using intermediate bulkheads.
3. Hand spread the concrete with shovels, not rakes.

NOTE: Do not allow personnel to walk in freshly mixed concrete with shoes coated with dirt or other materials.

4. Thoroughly consolidate the concrete against the faces of forms and along the full length and sides of joint assemblies.
 5. Ensure that vibration does not cause puddling or grout accumulation on the surface.
For construction or expansion joints, do not use grout that accumulates ahead of the paver.
 6. Deposit concrete near the formed joints. Dump or discharge concrete only in the center of a joint assembly.
 7. Take slab depth measurements as follows:
 - a. Probe the plastic concrete behind the paver.
 - b. Record the station number and depth measurements at least every 500 ft. (150 m) at 3 random increments across the slab.
 - c. Provide these measurements to the Engineer when requested.
 8. Take air and slump determination tests at a rate of at least three of each test evenly distributed during the workday. Provide the results to the Engineer when requested.
 9. Keep reinforcing steel free of dirt, oil, paint, grease, mill scale, and loose or thick rust that could impair the bond of the steel to the concrete.
 10. Arrange operations to prevent “leave-outs” in continuous reinforced concrete pavement. The Engineer may approve “leave-outs” in emergencies if a plan is approved to increase the reinforcement. The ~~Department~~ Sponsor will not pay for extra leave-outs.
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E. Place Reinforcement

Place reinforcement according to the plans and as follows:

1. Do not insert lane tie bars in unsupported sides of fresh concrete.
2. Ensure that the steel placement method does not damage or disrupt concrete.
3. Use bent lane tie bars if needed in longitudinal formed joints construction. However, replace broken or damaged bars at no additional cost to the Department Sponsor.

F. Construct the Ramps

Prevent pavement slab stress by constructing a ramp of compacted earth or other material for movement on and off the pavement. Do not allow equipment that exceeds legal load limits on the pavement.

G. Consolidate and Finish

Ensure that the sequence of operations is continuous from placement to final finish.

1. Consolidation

Perform vibration for the full width and depth of the pavement as follows:

- a. Do not allow the vibrators to misalign load transfer devices, or to contact forms or base.
- b. Ensure that the vibrator amplitude is within the range recommended by the manufacturer.
Use spud vibrators with an adjustable operating frequency between 8,000 and 12,000 vibrations per minute.
Use surface pan vibrators with an adjustable operating frequency between 3,000 and 6,000 vibrations per minute.
- c. If appropriate, use surface vibrators and internal vibrators on concrete greater than 8 in. (200 mm) thick.
- d. If appropriate, use surface vibrators exclusively on pavements less than 8 in. (200 mm) thick.
- e. Stop vibration when the machine cannot go forward.
- f. Obtain uniform consolidation and density throughout the pavement.

If it is not uniform, stop the operation and provide methods or equipment that will produce pavement that conforms to the Specifications.

2. Finishing

After striking off and consolidating the concrete, follow these steps:

- a. Smooth and true the concrete using a float or finishing machine to minimize or eliminate hand finishing.
Perform hand finishing only under the following conditions:
Irregular dimension areas where operating mechanical equipment is impractical
Mechanical equipment breakdown (only finish the concrete already deposited when the breakdown occurred)
Abnormal circumstances approved by the Engineer
 - b. Ensure that the pavement surface final finish is true to grade, uniform in appearance, and free of irregular, rough, or porous areas.
 - c. Prevent the surface within 6 in. (150 mm) of the pavement edge to deviate more than 0.25 in. (6 mm) in 10 ft. (3 m) when tested with a 10 ft. (3 m) straightedge in both transverse and longitudinal directions.
 - ~~d. Use mechanical equipment to produce a surface finish of transverse plastic concrete grooving for the mainline and ramps.~~
 - e. Have the Engineer determine the texture depth by conducting pavement surface tests such as GDT 72 at selected locations.
 - ~~f. Transversely saw-groove mainline and ramp areas with a surface texture depth less than 0.018 in. (0.5 mm). Meet the depth requirement of 0.035 in. (0.9 mm) or greater.~~
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Perform saw grooving to meet the following dimensions:

Width	1/8 in. (3 mm)
Depth	3/16 in. (5 mm)
Spacing	3/4 in. (19 mm) center to center

- g.** If required, use hand tools to texture ramps, acceleration lanes, and deceleration lanes to surface texture mainline requirements. Finish irregular sections to a surface texture of at least 0.025 in. (0.64 mm) as shown in GDT 72.

- 3.** Numbering Stations

Cast station numbers with a die in the pavement every 500 ft. (200 m) and 1 ft. (300 mm) from the right edge of the travel lane.

- 4.** Protection from Rain

Protect the unhardened concrete from rain. See Subsection 430.2.D, *Protective Materials*.

When rain is imminent, stop paving operations and place forms against the sides of the pavement. Cover the surface of the unhardened concrete with the protective covering.

H. Remove Forms

Do not remove forms from freshly placed concrete until it has set for at least 12 hours, unless otherwise provided.

- 1.** Remove forms carefully to avoid damaging the pavement.
- 2.** After removing the forms, immediately cure the sides of the slab using the same method used to cure the pavement surface.
- 3.** Remove and replace major honeycombed areas.

I. Work at Night

Provide adequate lighting for work performed at night. If lighting will not be provided at night, stop the concreting operation in time to finish and saw during daylight hours.

J. Provide Joints

Ensure that joints are designed, configured, and located as shown on the Plans or required by the specifications.

- 1.** Provide dowel bars at transverse joints unless otherwise noted.
 - 2.** Remove and replace plain concrete pavement that cracks during construction with no additional cost to the Department Sponsor, at the Engineer's discretion.
 - 3.** When chipping out random cracks for sealing, use nonrigid epoxy on cracks that are not under expansion-contraction influence and that meet Subsection 886.2.01.
 - 4.** Seal continuous cracks that are under movement with sealant that meets Subsection 833.2.06.
 - 5.** When removing and replacing a pavement section, remove an area at least 6 ft. (1.8 m) long and the full width of the lane.

 - a.** Saw to vertical face the sections to be removed and replace the concrete as a construction joint with dowels.
 - b.** Use deformed bars as dowels in the saw-cut construction joint. Use the size specified for contraction joints in the plans.
 - 6.** Thoroughly clean the drilled holes of contaminants and set the dowels into the hardened concrete face of the existing pavement with a Type VIII epoxy bonding compound. See Section 886 for epoxy bonding requirements.
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7. For contraction joints, use undamaged and properly positioned dowels in existing construction or slab replacement areas. Coat the protruding dowel portions with a thin film of heavy grease.
8. When both sides of an existing construction or contraction joint require slab replacements, replace slabs continuously from saw-cut construction joint to saw-cut construction joint. Use dowels specified for contraction joints.
9. Before placing concrete, uniformly apply a thin coat of heavy grease to epoxy-coated dowels.
10. When placing slabs continuously across transverse contraction joint locations, use saw-cuts to provide planes of weakness according to the requirements of this Specification and the standard drawing for contraction joints.

K. Types of Joints

1. Longitudinal Joints

For longitudinal joints, use unpainted and uncoated deformed steel bars that are the size and length specified on the plans.

Place the bars perpendicular to the joint using a mechanical device, or rigidly secure the bars in place with supports.

2. Longitudinal Formed Joints

Construct longitudinal formed joints while the concrete is in a plastic state.

Use methods and equipment that locate the joint reinforcement properly without disrupting it during construction.

3. Longitudinal Sawed Joints

Cut longitudinal sawed joints with a mechanical saw within three days after the concrete is placed and before traffic or equipment enters the pavement.

4. Transverse Joints

Transverse joints consist of construction joints, contraction joints, or expansion joints constructed at required locations.

- a. Construct transverse joints in partial width or adjoining lanes to abut the same joint of adjacent lanes unless otherwise specified on the plans.
- b. Ensure that transverse joints in plain Portland cement concrete requiring load transfer devices contain either plastic-coated or epoxy-coated dowels.
- c. Before placing concrete, secure dowel bars in place with supporting assemblies.
- d. Secure the assemblies in position on the subbase to keep the dowels from moving during concrete placement.
- e. Place dowel bars to a vertical and horizontal tolerance of plus or minus 1 in. (25 mm) of the plan position. Do not misalign the dowel bar more than 3/8 in per 1 ft. (10 mm per 300 mm) in the horizontal or the vertical plane.
- f. Remove and replace dowel assemblies displaced from the Plan position more than the tolerances in Subsection 430.3.05.J.
- g. When using epoxy-coated dowels, coat the entire surface with a thin film of heavy waterproof grease.
- h. Ensure accurate positioning of transverse sawed joints by marking the position of dowel bar assembly locations.

5. Construction Joints

Construct transverse construction joints when interrupting concreting operations for more than one hour.

NOTE: Do not construct transverse construction joints within 10 ft (3 m) of an expansion joint, contraction joint, or transverse plane of weakness.

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- a. Move an unanticipated construction joint back to the last plan joint, if necessary. Remove and dispose of excess concrete.
- b. Form construction joints by securing in place a removable bulkhead or header board.
 - 1) Place the board so that it conforms to the full cross section of the pavement. Secure it flush with the subbase and parallel to the normal transverse joints.
 - 2) Slot or drill the board to allow placement of reinforcement as required by the plans.

NOTE: Do not use the roll of laitance and grout that forms in front of the paver adjacent to transverse construction joints.

- c. Consolidate to full width and depth concrete adjacent to transverse construction joints with mechanical hand-type spud vibrators. Keep one auxiliary vibrator available in case of mechanical malfunctions.
 - d. Before applying the final finish to the concrete, string line and correct variations of the concrete surface within 30 ft. (9 m) on either side of the transverse construction joints. Provide equipment and tools such as:
 - Work bridges
 - Personnel
 - String lines
 - Straightedges
 - Lighting
 - e. While the concrete is in a plastic condition, stringline the surface longitudinally and correct surface deviations greater than 1/8 in. per 15 ft. (3 mm per 4.6 m) in any direction.
 - f. When using plain Portland cement concrete pavement, place dowel bars in construction joints. Cast half the length of each dowel bar in the concrete during each phase of joint construction.
 - g. When using epoxy coated dowels, coat the protruding half of each dowel bar with a thin film of heavy waterproof grease before resuming joint construction. Grease coating is not required on plastic coated dowels.
 - h. After the concrete has hardened, dismantle the bulkhead supporting the dowels. Do not disturb the dowels.
- 6. Contraction Joints**
- Create planes of weakness in plain Portland cement concrete pavement by cutting joints in the pavement surface. Create the planes according to the Plans as follows:
- a. Saw transverse contraction joints before the pavement cracks. Begin sawing when the concrete has hardened enough to prevent surface raveling, usually 4 hours after placement, but no more than 24 hours.
 - b. Continue sawing day and night regardless of weather conditions.
- 7. Expansion Joints**
- Transverse expansion joints are required at locations shown on the plans.
- a. Form expansion joints by securing a removable bulkhead that conforms to the full cross section of the pavement. Use bulkheads that can construct a vertical expansion wall without offsets, indentations, or burrs.
 - b. Use expansion joint filler required by the plans.
 - c. Furnish and install preformed joint filler in lengths equal to the pavement width or the width of one lane. Do not use damaged or repaired joint fillers.
 - d. Position the expansion joint filler vertically in the joint and at the proper grade. Use an installing bar or other device to secure the expansion joint filler at the proper grade and alignment.
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L. Cure the Concrete

Immediately after finishing the concrete, cure the entire surface when the concrete will not mar. Use one or more of these methods:

1. Impervious Membrane Method

To use this method:

- a. Spray the entire surface of the pavement with white pigmented curing compound immediately after finishing the surface and before the concrete has set.

If the pavement is cured initially with cotton mats, burlap, or cotton fabric, apply the compound after removing the mats.

NOTE: Do not apply curing compound during rain.

- b. Use mechanical sprayers to apply curing compound under pressure at a minimum rate of 1 gal per 150 ft² (1 L per 3.5 m²).
- c. Thoroughly mix the compound with uniformly dispersed white pigments.
- d. During application, use a mechanical device to stir the compound continuously.
- e. Use a hand sprayer (if required) to spray odd widths, odd shapes, and concrete surfaces exposed by removing forms.
- f. Do not apply curing compound to the inside faces of joints to be sealed.
- g. If the membrane film becomes damaged within the curing period, repair the damaged portions immediately with additional compound.

2. White Polyethylene Sheeting

To use this method:

- a. Cover the top surface and sides of the pavement with polyethylene sheeting. Lap the units at least 18 in. (450 mm).
- b. Place the sheeting and weigh it down so that it contacts the surface.
- c. Extend the sheeting beyond the edges of the slab at least twice the thickness of the pavement.
- d. Unless otherwise specified, maintain the covering in place for 72 hours after placing the concrete.

3. Burlap, Cotton Fabric, or Other Methods

Contractors may cure the pavement with burlap, cotton fabrics, or other materials if the section remains wet for the duration specified by the Engineer.

4. Cold Weather Curing

To use this method:

- a. Remove and replace concrete that freezes before the initial set time at no cost to the Department Sponsor.
 - b. Use polyethylene or canvas to protect concrete that has set but is exposed to freezing temperatures within 24 hours of placement. Ensure that the internal concrete temperature is above freezing for at least 24 hours after placing the concrete.
 - c. Obtain approval from the Engineer to use other protection methods such as hay, straw, or grass, or to change the duration of the protection.
-

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M. Seal the Joints

Clean and seal the joints according to Section 461 and the plans.

Immediately after completing the curing period, fill in the joints with joint sealing material before opening the pavement to traffic.

During sealing, do not spill the material on the concrete surface. Immediately remove excess material on the concrete surface and clean the surface.

Do not use sand or similar material as a cover for the seal. Seal joints according to the plans.

N. Open Pavement to Traffic

Wait to open the pavement slab to traffic, ~~except for joint sawing vehicles~~, until the concrete is 14 days old unless representative compressive tests show that the slab has a compressive strength of ~~2,500 psi (15 MPa)~~ 3,500 psi (25 MPa). Cure compressive test specimens used for traffic opening as near as possible to the roadway.

Protect the pavement against traffic from the public, employees, and agents.

1. Erect and maintain barricades. Employ watchmen to block traffic from the newly constructed pavement for the period required in this specification.
2. Arrange the barriers away from public traffic on lanes remaining open.
3. Maintain signs that clearly indicate the lanes open to public traffic.
4. If traffic must go across the pavement, construct crossings satisfactory to the Engineer to bridge over the concrete. Construct the crossing without additional compensation.
5. Repair or replace pavement damaged by traffic or other causes before Final Acceptance without additional compensation. Make repairs to the Engineer's satisfaction.

430.3.06 Quality Acceptance

The typical section sheet in the Plans gives specific uses for each concrete classification. Refer to this specification for the minimum requirements of the concrete classifications for concrete design approval, concrete mix design proportions, batching control responsibilities, and acceptance of hardened concrete based upon compressive strength development.

A. Transit Mixed Concrete

Ensure that transit mixed concrete meets the requirements of Subsection 500.2, *Materials*.

B. Mix Design Criteria

Proportion concrete mix designs using the following requirements:

	Minimum Cement Content per Cubic Yard Concrete (CWT)	Max. Water-Cement Ratio (lbs./lb.)	Design Air Content Range (%)
Class 1	5.41	0.53	4.0 to 5.5
Class 2	5.64	0.50	4.0 to 5.5
Class HES	6.58	0.47	4.0 to 5.5

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	Minimum Cement Content per Cubic Meter Concrete (kg)	Maximum Water-Cement Ratio (kg/kg)	Design Air Content Range (%)
Class 1	320	0.53	4.0 to 5.5
Class 2	335	0.50	4.0 to 5.5
Class HES	390	0.47	4.0 to 5.5

Produce evidence that the mix design proportions for Class 1 and 2 concrete have strength development potential for 24 hours plus or minus 15 minutes and at 28 days as specified in Subsection 430.3.06.C, *Approval of Mix Design Proportions*.

C. Approval of Mix Design Proportions

The Department Engineer will approve each proposed combination of materials and mix designs based on the use of approved materials, compliance with Subsection 430.3.06.B, *Mix Design Criteria*, and the following:

1. Flexural Strength

Prepare at least 9 normally cured flexural specimens and test according to AASHTO T 126 and T 97 to ensure that the demonstrated laboratory flexural design strength at 28 days meets the following minimum Design Acceptance Requirement (DAR).

NOTE: Take the 9 flexural specimens from 3 separate trial batches. Make 3 specimens from each

Class No. 1	Concrete DAR = 700 psi + .67 s Concrete DAR = 4.8 MPa + .67 s
Class No. 2	Concrete DAR = 700 psi + .50 s Concrete DAR = 4.8 MPa + .50 s
Class HES	Concrete DAR = 700 psi + .50 s Concrete DAR = 4.8 MPa + .50 s

s = a standard deviation of all 28-day flexural specimens for a given combination of materials and mix proportions prepared together. Do not use a value of "s" greater than 37 psi (255 kPa) to calculate DAR.

2. Compressive Strength

Prepare and test at least 6 cylinders according to AASHTO T 126 and T 22 to ensure that the demonstrated laboratory compressive strength at 28 days for Class 1 and 2 concrete exceeds the minimum Job Performance Value (JPV).

Produce similar evidence that demonstrates strength development at 72 hours for Class HES concrete.

Class 1	Concrete JPV Minimum = 4,000 psi + .18 R Concrete JPV Minimum = 28 MPa + .18 R
Class 2	Concrete JPV Minimum = 3,500 psi + .21 R Concrete JPV Minimum = 25 MPa + .21 R
Class HES	Concrete JPV Minimum = 3,000 psi + .05 R Concrete JPV Minimum = 20 MPa + .05 R

R = the difference between the largest observed value and the smallest observed value for all compressive strength specimens at 28 days for a combination of materials and mix proportions prepared together.

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d. Class 1 and 2 Concrete

- 1) Submit early compressive strength test results made at 24 hours plus or minus 30 minutes for at least 12 cylinders. Prepare and test according to ASTM C 684, Method A.
- 2) Prepare cylinders from three separate trial batches and make four specimens from each batch.
- 3) Determine the average strength, standard deviation, and coefficient of variation for the design according to ACI 214. Do not use designs that produce a coefficient variation greater than 10 percent.

e. Class HES Concrete

Submit evidence that designs proposed for use as Class HES concrete have compressive strength development potential at 72 hours of 3,000 psi (20 MPa) plus .05 R.

D. Field Adjustments on Concrete Mixes

Determine the aggregate surface moisture and apply free moisture corrections to the approved mix design. The Engineer will verify that the corrections are made properly.

Adjust the approved proportions of the fine and coarse aggregate and water as desired, provided:

1. The cement factor is not decreased.
2. The water-cement ratio is not increased.
3. Adjustments produce concrete proportions according to this Specification.
4. The Engineer is notified before use.

E. Concrete Mix Tolerances

Keep concrete consistency and air content to vary within the following limits:

1. Consistency

Immediately before placement, use GDT 27 to determine concrete slump. Do not use concrete for Portland cement concrete pavement with a slump value greater than 2.5 in. (65 mm).

2. Air Content

Immediately before placement, use GDT 26, GDT 28, or GDT 32 to determine the air content of the concrete. Concrete will not be accepted that has an air content outside of these limits:

Lower acceptance limit	3.0%
Upper acceptance limit	6.5%

F. Concrete Strength Acceptance

The concrete strength of Portland cement concrete pavement is accepted based upon development of compressive strength at a specific time.

Strength development is determined by a lot acceptance plan. The pavement is subdivided into separate concrete lots of approximately 5,334 yd² (4400 m²) placed continuously, except for required work stoppages.

1. Ramps

Ramps may be set apart as individual lots. Include acceleration or deceleration lanes, wedges, or other varied width sections in other lots if the total paving quantity is not greater than 7,500 yd² (6300 m²). The Engineer will randomly select three production units from each lot for strength determination tests.

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2. Class 1 and 2 Concrete

- a. Cast at least two cylinder sets for each production unit selected for acceptance testing. Cure one set according to ASTM C-684, Method A. Cure the other set according to AASHTO T 23.

NOTE: A set is defined as two 6 by 12 inch (150 by 300 mm) or three 4 by 8 inch (100 by 200 mm) cylinders.

- b. After curing, test each concrete cylinder according to AASHTO T 22. The test result is the average strength of the two cylinders.

3. Acceptance Based on 24-Hour Strength

Concrete may be accepted by early strength determinations. However, concrete will not be accepted based on early strength development when the difference between the largest observed strength value and the smallest observed strength value exceeds 35 percent of the average.

- a. Compute the average (X) and the range (R) from the three acceptance tests results.
- b. Have the Engineer establish the minimum early strength (S) to be used for concrete acceptance.
The minimum early acceptance strength is the average strength at 24 hours plus or minus 30 minutes of the laboratory design less 1.5 times the standard deviation of the laboratory design.
- c. If the average (X) of the three lot acceptance tests equal or exceed the value (S), the lot will be accepted at the full contract price, and 28-day cylinders for this lot can be discarded.
- d. If the average of the three lot acceptance tests fails to meet the acceptance limit, the Engineer will contact the Contractor immediately. The Contractor may immediately remove the concrete in the lot or leave it in place pending acceptance or rejection from the 28-day strength test results.

4. Acceptance Based on 28-Day Strength Tests

When a lot is potentially defective based on the early strength determinations and the Contractor leaves the lot in place to be judged by the 28-day strength tests results, retain and cure all 3 sets of 28-day cylinders.

- a. If the average 28-day strength of the lot does not meet the lower acceptance limit for a 0.70 pay factor, the Engineer may either:
Order removal of the concrete in the lot
Apply a pay factor of 0.50 for the lot
- b. The Unit Price of concrete pavement will be reduced for areas represented by each lot that does not meet the specified compressive strength at 28 days according to the following schedule:

Pay Factor Schedule for Strength Determinations at 28 Days			
Acceptance Limits for Pay Factor Levels			
	1.00 LAL*	0.95 LAL	0.70 LAL
Concrete Class 1	4,000 psi (28 MPa) + 0.18 R	4,000 psi (28 MPa) - 0.07 R	4,000 psi (28 MPa) - 0.30 R
Concrete Class 2	3,500 psi (25 MPa) + 0.21 R	3,500 psi (25 MPa) - 0.07 R	3,500 psi (25 MPa) - 0.30 R

* Lower acceptance limit (LAL)

Section 430 — Portland Cement Concrete Pavement

5. Classification HES Concrete

Cast at least two sets of cylinders for each production unit selected for acceptance testing.

- a. Cure one set for 72 hours under conditions similar to those under which the pavement is cured. Cure the other set of cylinders for 28 days according to AASHTO T 23.
- b. Test each cylinder according to AASHTO T 22 when the specified curing is complete. The test results are the average strength of the two cylinders.
- c. The Engineer may accept the concrete at full contract price if the average of the three 72-hour test results exceeds the JPV established in Subsection 430.3.06.C.
- d. When the 72-hour strength tests determine that a lot is potentially defective, the Engineer will immediately notify the Contractor. At this time, the Engineer may require the immediate removal of the pavement in question.

If the Engineer does not require immediate removal of the pavement, select removal or acceptance on the basis of the 28-day strength development.

- e. When the 72-hour strength tests determine that a lot is potentially defective and the concrete is retained for subsequent judgment, conduct acceptance tests at 28 days on selected cylinders cured according to AASHTO T 23.

Questionable lots will be accepted based on the 28-day strength and provisions for testing, computations, and payment for Classification No. 2 concrete in Subsection 430.3.06.F.2, *Class 1 and 2 Concrete*.

G. Smoothness

~~Pavement smoothness will be accepted only after the Engineer determines that the work was performed according to this and other specifications. The completed pavement, including corrective work, must meet the applicable profile index value requirements.~~

~~Perform smoothness testing as follows:~~

- ~~1. Ensure that the mainline riding surface produces a profile index value no greater than 7 in./mile (100 mm/km) on each travel lane. Conduct tests according to GDT 78.~~
- ~~2. Determine a profile index value for each tracing for each 0.25-mile (0.5 km) segment. Correct individual bumps or depressions that exceed the blanking band by more than 0.2 in. (5 mm) at no additional expense to the Department.~~
- ~~3. If a paving operation exceeds a profile index value of 7 in./mile (100 mm/km) per lane for any segment, suspend the paving operation and take corrective action approved by the Engineer.~~
- ~~4. Use GDT 78 to test ramps and acceleration and deceleration lanes to attain an average profile index value no greater than 12 in./mile (200 mm/km) by Rainhart Profilograph for the entire section length. Correct individual bumps or depressions that exceed 0.2 in. (5 mm) from the blanking band at no additional expense to the Department.~~
- ~~5. Take pavement profiles that are 4 ft. (1.2 m) away from and parallel to the new pavement edges on pavements greater than 16 ft. (4.8 m) wide and up to 24 ft. (7.2 m) wide.
Test pavement 6 to 16 ft. (1.8 to 4.8 m) wide parallel to and at the center line of the pavement section.~~
- ~~6. Begin the 0.25-mile (0.5 km) record segments at the first day's placement and continue until project completion, except as noted in this specification.~~
- ~~7. Combine pavement sections less than 700 ft. (200 m) long that approach a bridge. Use the previous 0.25-mile (0.5 km) segment to determine the profile index.~~

~~Calculate as a separate record segment 700 ft. (200 m) sections or greater that approach a bridge. This exception applies also to sections at project limits.~~

Section 430 — Portland Cement Concrete Pavement

- ~~8. Determine a separate profile index value using GDT 78 for the 100 ft. (30 m) of roadway approaching each end of a bridge up to and including the joint with the approach slab.~~

~~Average the profile index from the right and left wheel paths for each 100 ft. (30 m) segment for each lane for each approach. The average profile index value shall not exceed 30 in./mile (500 mm/km).~~

- ~~9. Before paving farther, perform and evaluate profiles from the first day's placement.~~

~~a. After completing and evaluating this test run, adjust equipment as required by the Engineer to improve smoothness before paving continues.~~

~~b. Complete the report form furnished by the Engineer and attach to the profilograph tracings of each day. Include the following information in each trace:~~

- ~~• Project number~~
- ~~• Beginning and ending station numbers~~
- ~~• 500 ft. (150 m) paving stations~~
- ~~• Traffic direction~~
- ~~• Lane number~~
- ~~• Date paved and tested~~
- ~~• Construction joint locations~~

~~Have the certified profilograph operator obtain and evaluate the traces and submit the evaluation to the Engineer. Provide results no later than the end of the second work day following placement.~~

- ~~10. For mainline pavement, correct 0.25 mile (0.5 km) segments not meeting the profile index requirement using one of these methods:~~

~~a. Grind the entire lane surface of the 0.25 mile (0.5 km) segment to a profile index value less than 7 in./mile (100 mm/km). Use equipment that meets requirements in Section 431.~~

~~b. Grind roughness in small segment areas no more than 50 ft. (15 m) of full lane width to produce a profile index value no greater than 7 in./mile (100 mm/km).~~

~~If more than 50 ft. (15 m) of grinding is required, grind the complete 0.25 mile (0.5 km) segment according to Method a, above.~~

- ~~11. Correct ramps and acceleration and deceleration lanes that do not meet the profile index requirement to a profile index no greater than 12 in./mile (200 mm/km). Prevent individual bumps from exceeding 0.2 in. (5 mm) from the blanking band. Use equipment specified in Section 431.~~

- ~~12. Correct 100 ft. (30 m) bridge approach sections that do not meet the profile index requirement.~~

~~a. Grind according to Section 431.~~

~~b. If appropriate, use a bump grinder to correct bumps with a baseline of 5 ft. (1.5 m) or less.~~

~~c. Grind the full lane width even when grinding including individual bumps.~~

~~d. Retest pavement segments containing corrective slab replacements for Final Acceptance.~~

- ~~13. Correct segments that do not meet the profile index criteria of this specification at no additional expense to the Department. Retest segments after correction with the Rainhart Profilograph.~~

- ~~14. Notify the Engineer before profile testing. The Engineer will verify the results by randomly selecting a minimum of 1 out of every 10 consecutive record segment profiles to compute the profile index and to compare with Contractor results.~~

~~The Engineer may conduct profilograph tests at any time to verify Contractor results. The Department may test record segments if the Engineer determines that the Contractor test results are inaccurate. See Subsection 430.5.01, *Adjustments*.~~

~~Not required.~~

H. Thickness

The Engineer shall determine the pavement thickness using average core measurements tested according to GDT 31.

Section 430 — Portland Cement Concrete Pavement

The following table contains units for paving widths:

Paving Widths – Feet (meters)	Length of Unit (Bridges Excluded)—Feet (meters)
0 – 24.0 (0 – 7.2)	1000 (300)
24.1 – 36.0 (7.2 – 10.8)	750 (225)
36.1 – 48.0 (10.8 – 14.4)	500 (150)

Areas of equal depth in intersections, entrances, crossovers, ramps, etc. are considered one unit, and the thickness of each unit is determined separately. If appropriate, include small irregular areas as part of another unit.

15. Take one core for each 2,000 yd² (1675 m²) of pavement, or fraction of pavement, in each unit where the Engineer selects.

The Department Engineer's laboratory will take one core at random in each unit.

- a. When the core measurement is deficient 0.2 in. (5 mm) or less from the plan thickness, full payment is made.
 - b. When the measurement is deficient more than 0.2 in. (5 mm) and not more than 1 in. (25 mm) from the plan thickness, two additional cores are secured from the unit and used to determine the average thickness.
 - c. A random selection process determines where to secure additional cores. However, do not secure cores within 50 ft. (15 m) of other thickness measurement cores. The adjusted Unit Price in Subsection 430.5.01.A, *Concrete Pavement Thickness Deficiency* is used to determine payment for the unit.
16. Consider pavement more than 0.2 in. (5 mm) thicker than the specified thickness to be the specified thickness plus 0.2 in. (5 mm). Measurements more than 1 in. (25 mm) less than the specified thickness are not included in the average.
17. When the core measurement is at least 1 in. (25 mm) less than the specified thickness:
- a. Determine the pavement thickness in the affected location by taking additional cores at no less than 10 ft. (3 m) intervals parallel to the center line in each direction.
 - b. Continue until a core is found that is not deficient by more than 1 in. (25 mm).
 - c. Have the Engineer evaluate areas more than 1 in. (25 mm) deficient in thickness. Remove deficient areas and replace with concrete pavement of the thickness shown on the plans, if the Engineer requires. Exploratory cores for deficient thickness are not used in averages for adjusted Unit Price.

430.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

430.4 Measurement

The area that will be paid for under this Item is the number of square yards (meters) of concrete pavement accepted as measured complete in place. The pavement width measured is shown on the typical cross section of the plans, including additional widening as required or widening directed in writing by the Engineer.

The length is measured along the pavement surface.

Work is accepted lot-to-lot according to Section 106 and this specification.

430.4.01 Limits

General Provisions 101 through 150.

Section 430 — Portland Cement Concrete Pavement

430.5 Payment

Concrete pavement completed and accepted that meets the Specification requirements will be paid for at the full Contract Unit Price per square yard (meter).

Payment for other accepted concrete pavement will be based on an adjusted Unit Price per square yard (meter). This price will be adjusted for payment for concrete pavement accepted but deficient in depth or compressive strength at 28 days. Price adjustments are specified in Subsection 430.5.01, *Adjustments*.

No additional payment over the Contract Unit Price will be made for pavement units with an average thickness greater than on the Plans. No additional payment over the Contract Unit Price will be made for a lot of concrete that develops more strength at 28 days than the compressive strength established in Subsection 430.3.06.F, *Concrete Strength Acceptance*.

Payment is full compensation for furnishing and placing materials, reinforcements, dowel and joint materials, supplies, and incidentals to complete the work.

Payment will be made under:

Item No. 430-1	Concrete Paved Walkway, Pads, & Sidewalks, class no. 1 concrete, 4 in (mm) thick	Per square yard
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430.5.01 Adjustments

The Contract Unit Price per square yard (meter) of concrete pavement will be adjusted for concrete pavement accepted but deficient in thickness or compressive strength at 28-days. Adjusted Unit Prices per square yard (meter) of concrete pavement are based on one or both of the following conditions:

Section 430 — Portland Cement Concrete Pavement

A. Concrete Pavement Thickness Deficiency

1. If the core is deficient 0.2 in. (5 mm) or less from the plan thickness, full payment will be made. If the core is deficient in thickness more than 0.2 in. (5 mm), but not more than 1 in. (25 mm) from the Plan thickness, 2 additional cores will be taken from the area.
 - a. If the average measurement of these 3 cores is deficient 0.2 in. (5 mm) or less from the plan thickness, full payment will be made.
 - b. Where the average pavement thickness is deficient by more than 0.2 in. (5 mm), but not more than 1 in. (25 mm), payment will be made at a portion of the Unit Price per square yard (meter) of concrete pavement as shown in the following table:

Concrete Pavement Deficiency	
Deficiency in Thickness Determined by Cores—in. (mm)	Proportional Part of Contract Price Allowed
0.0 through 0.20 (0.0 through 5.0)	100 percent
0.21 through 0.25 (5.1 through 6.4)	95 percent
0.26 through 0.30 (6.5 through 7.6)	91 percent
0.31-0.40 (7.7 through 10.0)	86 percent
0.41-0.50 (10.1 through 12.8)	80 percent
0.51-0.75 (12.9 through 19.2)	70 percent
0.76-1.00 (19.3 through 25.0)	60 percent

- c. When the thickness of pavement is deficient by more than 1 in. (25 mm) and the Engineer determines that the deficient area should not be removed or replaced, 50 percent of the Contract Unit Price will be paid.

2. No payment or compensation for cost will be made for removing concrete according to this provision.

B. Compressive Strength Deficiency

When the compressive strength at 28-days, expressed as an average strength (X) for a lot of concrete pavement is less than the values established by the Pay Factor Table, payment will be made at a reduced Unit Price per square yard (meter) as shown in the Pay Factor Table.

C. Combined Deficiencies

When a pavement section is deficient in thickness and compressive strength, the Contract Unit Price will be adjusted by the total reduction from applying the percentages in Subsections 430.5.01.A and Subsection 430.5.01.B, above.

For combined deficiencies of 50 percent or more, the Engineer may leave the pavement in place at the combined payment reduction or order the deficient areas removed and replaced at no additional cost to the Department Sponsor.

If the Engineer orders removal of the pavement, payment will not be made for the original pavement or removal. Pavement replaced will be paid for at the appropriate Unit Price.

D. Profilograph Testing

~~If, based on the Department's profilograph tests, the Engineer determines that the Contractor profilograph test results are inaccurate, the Contractor will be charged for profilograph testing at \$500 for each trace mile (\$250 for each trace kilometer), with a minimum charge of \$500.~~

Not required.

Section 432—Mill Asphaltic Concrete Pavement

432.1 General Description

This work includes milling existing asphaltic concrete pavement to restore proper grade and/or transverse slope, removing structurally unsound material, providing clearance for overlay in curb and gutter sections, or other purposes deemed necessary due to existing conditions. Perform the work according to these Specifications and Plan details.

432.1.01 Definitions

General Provisions 101 through 150.

432.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment

B. Referenced Documents

GDT 126

432.1.03 Submittals

General Provisions 101 through 150.

432.2 Materials

432.2.01 Delivery, Storage, and Handling

When specified, stockpile the milled material at locations shown on the plans.

1. Uniformly stockpile the materials approximately 6 – 8 ft. (1.8 – 2.4 m) high.
 2. Maintain the existing drainage pattern of water from the stockpile storage area.
 3. Dress the reclaimed asphalt area to drain rainwater from the material.
 4. Obtain the Engineer's approval of the stockpile locations and the method used to prevent milled material degradation, segregation, and reconsolidation.
-

432.3 Construction Requirements

432.3.01 Personnel

General Provisions 101 through 150.

432.3.02 Equipment

A. Conventional Milling Equipment

Use power-driven, self-propelled milling equipment that is the size and shape that allows traffic to pass safely through areas adjacent to the work. Also, use equipment that is:

- Designed to mill and remove a specified depth of existing asphalt paving
- Equipped with grade and slope controls operating from a string line or ski and based on mechanical or sonic operation
- Capable of removing pavement to an accuracy of 1/8 in. (3 mm)
- Furnished with a lighting system for night work, as necessary
- Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

B. Micro-milling Equipment

When micro-milling is specified, use power-driven, self-propelled micro-milling equipment possessing the size and shape to allow traffic safe passage through areas adjacent to the work. Also, ensure the micro milling is equipped as follows:

- Equipped with a cutting mandrel with carbide or equivalent tipped cutting teeth designed for micro-milling bituminous pavement full lane width to close tolerances. Micro-milling heads with less than full lane widths may be used for non-mainline travel way when approved by the engineer and milled surface meets all specified acceptance criteria.
- Equipped with grade and slope controls operating from a string line or ski and based on mechanical or sonic operation
- Capable of removing pavement to an accuracy of 1/16 in. (1.6 mm.)
- Furnished with a lighting system for night work, as necessary
- Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck.

C. Dust Control

Provide power brooms, vacuum sweepers, power blowers, or other means to remove loose debris or dust. Do not allow dust control to restrict visibility of passing traffic or to disrupt adjacent property owners.

432.3.03 Preparation

General Provisions 101 through 150.

432.3.04 Fabrication

General Provisions 101 through 150.

Section 432 — Mill Asphaltic Concrete Pavement

432.3.05 Construction

A. Conventional Milling Operation

Follow the plans to mill the designated areas and depths including bridge decks, shoulders, and ramps, as required. Ensure the following requirements are met:

1. Schedule the construction operation. Use milling methods that will produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.
2. Provide positive drainage to prevent water accumulation on the milled pavement, as shown on the plans or directed by the Engineer.
3. Bevel back the longitudinal vertical edges greater than 2 in. (50 mm.) that are produced by the removal process and left exposed to traffic. Bevel them back at least 3 in. for each 2 in. (75 mm. for each 50 mm.) of material removed. Use an attached mold board or other approved method.
4. When removing material at ramp areas and ends of milled sections, taper the transverse edges 10 ft. (3 m) to avoid creating a traffic hazard and to produce a smooth surface.
5. Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenance greater than 1/2 in. (12.5 mm) that are left open to traversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance.
6. Remove dust, residue, and loose milled material from the milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

The reclaimed asphaltic pavement becomes the Contractor's property unless otherwise specified.

B. Micro-milling Operation

Ensure the micro-milling operations comply with Subsection 432.3.05.B, when micro-milling is specified in the contract to remove aged open-graded mix types, remove wheel ruts and other surface irregularities; restore proper grade and/or transverse slope of pavement as indicated in the Plans and as directed by the Engineer. The micro-milled surface shall provide a texture suitable for use as a temporary riding surface or an immediate overlay with OGFC or PEM with no further treatment or overlays. Micro-milling is required when placing OGFC or PEM mixtures on a milled surface. The use of the micro-milled pavement as a temporary riding surface shall be a maximum of five (5) Available days. Perform the work according to these Specifications and Plan details.

1. Micro-milling Process

- a. Follow the Plans to micro-mill the designated areas and depths including bridge decks, shoulders, and ramps, as required. Ensure the following requirements are met:
 - Prior to commencement of the work, construct a test section that is 1000 ft. (305 m) in length with a uniformly textured surface and cross section as approved by the Engineer.
 - The final pavement surface shall have a transverse pattern of 0.2 in. (5 mm) center to center of each strike area. The targeted difference between the ridge and valley (RVD) measurement of the mat surface shall not exceed 1/16 in. (1.6 mm).
 - Milled surface acceptance testing will be performed using the Laser Road Profiler in accordance with GDT-126. Ensure the measured indices meet a target of 825 mm/km in the test section.
 - Work shall be halted and the contractor shall submit a written plan of action detailing what steps will be taken to improve operations if any of these requirements are exceeded in the test section. If approved by the Engineer, the contractor will construct another 1000 ft. (305 m) test section. This test section shall be located in a different area than the initial section using the approved corrective action. This designated section shall be micro-milled to conform to the same requirements as those required in the initial test section. The contractor shall not be allowed to start continual micro-milling until an acceptable test section is obtained.

Section 432 — Mill Asphaltic Concrete Pavement

- b. Ensure micro-milling methods produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.
- c. Provide positive drainage to prevent water accumulation on the micro-milled pavement, as shown on the Plans or directed by the Engineer.
- d. Bevel back the longitudinal vertical edges greater than 2 in. (50 mm) produced by the removal process and left exposed to traffic. Bevel the vertical edges back at least 3 in. for each 2 in. (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.
- e. Taper the transverse edges 10 ft. (3 m) to avoid creating a traffic hazard and to produce a smooth surface when removing material at ramp areas and ends of milled sections.
- f. Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenances greater than 1/2 in areas left open to traversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance.
- g. Remove dust, residue, and loose milled material from the micro-milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

432.3.06 Milling Quality Acceptance

A. Conventional Milling Acceptance Criteria

Ensure that the milling operation produces a uniform pavement texture that is true to line, grade, and cross-section.

Milled pavement surface acceptance testing will be performed using the Laser Road Profiler method in GDT 126. Milled pavement will be evaluated on individual test sections, normally 1 mile (1 km) long.

When the milled surface is to be left as the final wearing surface, ensure that indices do not exceed:

- 1025 on milled pavement surfaces on interstates when the milled surface will be the final wearing surface
- 1175 for other on-system routes when the milled surface will be the final wearing surface
- 1175 on Interstates and 1325 for other on-system routes if the milled surface will be overlaid

Remill mile (kilometer) areas to meet the specified limits when the indices are exceeded. Remill at no additional cost to the ~~Department~~ **Sponsor**.

Milled pavement surfaces are subject to visual and straightedge inspection. Keep a 10 ft. (3 m) straightedge near the milling operation to measure surface irregularities of the milled pavement surface. Remill irregularities greater than 1/8 in. per 10 ft. (3 mm in 3 m) at no additional cost to the ~~Department~~ **Sponsor**.

Ensure that the cross slope is uniform and that no depressions or slope misalignments greater than 1/4 in. per 12 ft. (6 mm in 3.6 m) exist when the slope is tested with a straightedge placed perpendicular to the center line.

Section 432 — Mill Asphaltic Concrete Pavement

B. Micro-Milling Acceptance Criteria

Ensure the micro-milling operation produces a uniform pavement texture true to line, grade, and cross section.

Micro-mill additional depth to eliminate excessive scabbing of the in place material as directed by the Engineer.

Micro-milled pavement surface acceptance testing will be performed using the Laser Road Profiler method in GDT 126.

Micro-milled pavement will be evaluated on individual test sections, measuring 0.50 mile (0.50 km). Ensure micro-milled pavement meets specified measured tolerances for RVD and profile surface smoothness indices of Target 825 mm/km and not exceed the Correction index of 900 mm/km

- Micro-milled pavement surfaces are subject to visual and straightedge inspections. Ensure a 10 ft. (3 m). straightedge is kept at the micro-milling operation to measure surface irregularities of the milled pavement surface.
- Any areas exceeding 1/8 in. (3.2 mm) between the ridge and valley of the mat surface or fail to meet pavement surface acceptance testing using the Laser Road Profiler shall subject the micro-milled surface to a pay reduction of 20% based on the micro-milling unit cost per square yd. at the recommendation of the ~~Office of Materials and Testing~~ Engineer.
- Any areas exceeding 3/16 in. (4.8 mm) between the ridge and valley of the mat surface or fail to meet pavement surface acceptance testing using the Laser Road Profiler shall subject the locations to being removed and replaced with acceptable material as directed by the Engineer at no additional cost to the ~~Department~~ Sponsor. All corrective work shall be performed in a minimum 500 ft. section.
- Ensure the cross slope is uniform and no depressions or slope misalignments greater than 1/4 in. per 12 ft. (6 mm in 3.6 m) exist when the slope is tested with a straightedge placed perpendicular to the center line.

432.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

432.4 Measurement

Conventional milling and micro-milling existing asphaltic concrete pavement is measured by the square yard (meter) as described in Subsection 109.01, *Measurement and Quantities*.

432.4.01 Limits

General Provisions 101 through 150.

432.5 Payment

Conventional milling and micro-milling asphaltic concrete pavement, measured as specified, will be paid for at the Contract Unit Price bid per square yard (meter). The price bid for this item includes the credit value of all Reclaimed Asphalt Pavement (RAP) recovered, and no adjustment in the unit price for this item or other items will be considered for variations in the amount of RAP actually recovered.

Payment is full compensation for furnishing equipment, milling, hauling, stockpiling milled material, and satisfactorily performing the work.

Payment will be made under:

Item No. 432-1	Asphalt Pavement Milling, 2 inch (mm) depth	Per square yard (meter)
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Section 432 — Mill Asphaltic Concrete Pavement

432.5.01 Adjustments

General Provisions 101 through 150.

Section 652—Painting Traffic Stripe

652.1 General Description

This work includes furnishing and applying reflectorized high build standard and high build wet weather traffic line paint according to the plans and these specifications.

This Item also includes applying words and symbols according to plan details, specifications, and the current Manual on Uniform Traffic Control Devices.

652.1.01 Definitions

Painted Stripes: Solid or broken (skip) lines. The location and color are designated on the plans.

Skip Traffic Stripes: Painted segments with unpainted gaps as specified on the plans. The location and color are designated on the plans.

652.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

Section 656—Removal of Pavement Markings

Section 870 – Paint

EPA Method 3052

EPA Method 6010

B. Referenced Documents

ASTM	ASTM	Other
D711	E4941	AASHTO M 247
D3335	E1710	QPL 46, QPL 71
D3718	E2177	SOP 39
D4144		TT-P-1952E

652.1.03 Submittals

General Provisions 101 through 150.

652.2 Materials

Ensure that materials for painting traffic stripe, words, and symbols meet the following requirements:

A. Traffic Line Paint

Material	Section
Traffic Line Paint 6A and 6B	870.2.02.A.4 and 870.2.02.A.5

Section 652 — Painting Traffic Stripe

~~B. Glass Spheres and Reflective Composite Optics~~

~~Use glass spheres and/or reflective composite optics for the reflective media system that ensures the high-build paint pavement markings meet the reflectance performance requirements in Subsection 652.3.06. Do not use glass spheres and/or reflective composite optics containing greater than 200 ppm total arsenic, 200 ppm total antimony, or 200 ppm total lead when tested according to the most recent US EPA Methods 3052 and 6010, or other approved methods.~~

~~Ensure glass spheres meet the requirements of AASHTO M 247. Use glass spheres produced from an approved source listed on QPL 71. Glass beads conforming to an alternative gradation may be used provided all other requirements of AASHTO M 247 and this specification are met. Obtain approval from the Office of Materials and Research to use alternate gradations.~~

652.2.01 Delivery, Storage, and Handling

A. Storage

Ensure the paint does not cake, liver, thicken, curdle, gel, or show any other objectionable properties after storage for six months above 32 °F (0 °C).

B. Handling

Mix thoroughly before use.

652.3 Construction Requirements

652.3.01 Personnel

General Provisions 101 through 150.

652.3.02 Equipment

A. Traveling Traffic Stripe Painter

Use a traffic stripe painter that can travel at a predetermined speed both uphill and downhill, applying paint uniformly. Ensure that the painter feeds paint under pressure through nozzles spraying directly onto the pavement.

Use a paint machine equipped with the following:

1. Three adjacent spray nozzles capable of simultaneously applying separate stripes, either solid or skip, in any pattern.
2. Nozzles equipped with the following:
 - Cutoff valves for automatically applying broken or skip lines
 - ~~• A mechanical bead dispenser that operates simultaneously with the spray nozzle to uniformly distribute glass spheres and/or reflective composite optics at an application rate to meet the reflectance performance requirements in Subsection 652.3.06.~~
 - Line-guides consisting of metallic shrouds or air blasts
3. Tanks with mechanical agitators
4. Small, portable applicators or other special equipment as needed

B. Hand Painting Equipment

Use brushes, templates, and guides when hand painting.

C. Cleaning Equipment

Use brushes, brooms, scrapers, grinders, high-pressure water jets, or air blasters to remove dirt, dust, grease, oil, and other foreign matter from painting surfaces without damaging the underlying pavement.

Section 652 — Painting Traffic Stripe

652.3.03 Preparation

Locate approved paint manufacturers on QPL 46.

Before starting each day's work, thoroughly clean paint machine tanks, connections, and spray nozzles, using the appropriate solvent.

Thoroughly mix traffic stripe paint in the shipping container before putting it into machine tanks.

Before painting, thoroughly clean pavement surfaces of dust, dirt, grease, oil, and all other foreign matter.

652.3.04 Fabrication

General Provisions 101 through 150.

652.3.05 Construction

A. Alignment

Ensure that the traffic stripe is the specified length, width, and placement. On sections where no previously applied markings are present, ensure accurate stripe location by establishing control points at spaced intervals. The Engineer will approve control points.

B. Application

Apply traffic stripe paint by machine. If areas or markings are not adaptable to machine application, use hand equipment.

1. Application Rate

Paint will be subject to application rate checks.

Apply 5 in (125 mm) wide traffic stripe at the following minimum rates:

- a. Solid Traffic Stripe Paint: At least 34 gal/mile (80 L/km)
- b. Skip Traffic Stripe Paint: At least 10 gal/mile (24 L/km)

NOTE: Change minimum rate proportionately for varying stripe widths.

2. Thickness

Maintain 25 mils (0.58mm) minimum wet average thickness above the surface of the pavement.

3. Do not apply paint to areas of pavement when:

- The surface is moist or covered with foreign matter.
- Air temperature in the shade is below 50 °F (10 °C)
- Wind causes dust to land on prepared areas or blows paint and glass spheres and/or reflective composite optics around during application

~~4. Apply a layer of glass spheres and/or reflective composite optics immediately after laying the paint. Apply glass spheres and/or reflective composite optics at a rate to meet the reflectance performance requirements in Subsection 652.3.06.~~

C. Protective Measures

Protect newly applied paint as follows:

1. Traffic

Control and protect traffic with warning and directional signs during painting. Set up warning signs before beginning each operation and place signs well ahead of the painting equipment. When necessary, use a pilot car to protect both the traffic and the painting operation.

Section 652 — Painting Traffic Stripe

2. Fresh Paint

Protect the freshly painted stripe using cones or drums. Repair stripe damage or pavement smudges caused by traffic according to Subsection 652.3.06.

D. Appearance and Tolerance of Variance

Continually deviating from stated dimensions is cause for stopping the work and removing the nonconforming stripe. (See Section 656—Removal of Pavement Markings.) Adhere to the following measurements:

1. Width

Do not lay stripe less than the specified width. Do not lay stripe more than 1/2 in. (13 mm) over the specified width.

2. Length

Ensure that the 10 ft. (3 m) painted skip stripe and the 30 ft. (10 m) gap between painted segments vary no more than ± 1 ft. (300 mm) each.

3. Alignment

- a. Ensure that the stripe does not deviate from the intended alignment by more than 1 in. (25 mm) on straight lines or curves of 1 degree or less.
- b. Ensure that the stripe does not deviate by more than 2 in. (50 mm) on curves exceeding 1 degree.

652.3.06 Quality Acceptance

A. General

For a minimum of 30 days from the time of placement, ensure the high build traffic paint pavement marking material shows no signs of failure due to blistering, excessive cracking, shipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, spilling, poor adhesion to the pavement material, vehicular damage, and normal wear. In the event that failures mentioned above occur, ensure corrective work is completed at no additional cost to the Department.

Obtain pavement marking retro-reflectivity values with a 30-meter geometry retro-reflectometer.

B. Initial Retro-reflectivity

1. Longitudinal Lines

Within 30 days of installation, ensure the in-place markings meet the following minimum reflectance values:

a. High Build Wet Weather Traffic Paint

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m ²	250 mcd/lux/m ²
Wet recovery (ASTM E 2177)	150 mcd/lux/m ²	100 mcd/lux/m ²

b. High Build Standard Traffic Paint

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m ²	250 mcd/lux/m ²

For each center line, edge line, and skip line, measure retro-reflectivity 9 times for each mile; 3 times within the first 500 feet, 3 times in the middle, and 3 times within the last 500 feet. For projects less than one mile in length, measure retro-reflectivity 9 times as above.

Record all retro reflectivity measurements on the form OMR CVP 66 in SOP 39.

Section 652 — Painting Traffic Stripe

2. Messages, Symbols, and Transverse Lines

Within 30 days of installation, ensure the in-place markings when tested according to ASTM E 1710 meet the following minimum reflectance value of 275 mcd/lux/m².

Perform at a minimum, one retro-reflectivity measurement at one message, one symbol and one transverse line per intersection. Take one measurement per mile for locations other than intersections (i.e. school messages, railroad messages, bike symbols etc.)

C. Six Month Retro-reflectivity (Longitudinal Lines)

Maintain the following minimum reflectance values for 180 days after installation:

a. Wet Weather High Build Wet Weather Traffic Paint

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m ²	250 mcd/lux/m ²
Wet recovery (ASTM E 2177)	150 mcd/lux/m ²	100 mcd/lux/m ²

b. High Build Standard Traffic Paint

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m ²	250 mcd/lux/m ²

Retest the in-place markings according to Subsection 652.3.06.B.1, 180 days after installation to ensure these minimum retroreflectance values are maintained.

NOTE: The Contractor is responsible for retro-reflectivity testing. Furnish initial test results to the Engineer within 30 days of application. Furnish 6-month test results to the Engineer within 180 days of application or prior to final acceptance, whichever comes first.

D. Thickness

At the time of installation, check the thicknesses on all skip lines, edge lines and center lines according to ASTM D 4114.

For each center line, edge line, and skip line, measure thickness above the pavement 3 times for each mile; once within the first 500 ft., once in the middle, and once within the last 500 ft. For projects less than one mile in length, measure the thickness above the pavement 3 times.

Record thickness measurements on the form OMR CVP 66 in SOP 39.

Submit results to the Engineer.

E. Corrective Work

For each mile section, if paint stripe fails to meet plan details or specifications or deviates from stated dimensions, correct it at no additional cost to the Department. If removal of pavement markings is necessary, perform it according to Section 656 and place it according to this specification. No additional payment will be made for removal and replacement of unsatisfactory striping. Ensure corrective work is completed at no additional cost to the Department. Perform testing according to this specification. Any retest due to failures will be performed at no additional cost to the Department. Furnish all test reports to the Department.

Retro-reflectivity and Thickness Longitudinal Line Deficiency: A deficiency will ensue when two or more Location Average results as recorded on form OMR CVP 66 within a One-Mile Section do not meet the performance criteria herein. The entire line within this one-mile section will be determined to be deficient. If the evaluated section is less than 1.0 mile, a single Location Average result not meeting the performance criteria herein will result in the entire line to be determined to be deficient.

Section 652 — Painting Traffic Stripe

Retro-reflectivity Transverse Markings and Symbol Deficiency: A single Location Average result on the marking or symbol not meeting the performance criteria herein will result in the marking or symbol to be determined to be deficient.

F. Acceptance Criteria

Ensure that stripes and segments of stripes are clean-cut and uniform. Markings that do not appear uniform or satisfactory, either during the day or night, or do not meet specifications, will be corrected at the Contractor's expense. Paint will be subject to application rate checks.

1. Correction of Alignment

When correcting a deviation that exceeds the permissible tolerance in alignment, do the following:

- a. Remove the affected portion of stripe, plus an additional 25 ft. (8 m) in each direction according to Section 656—Removal of Pavement Markings.
- b. Paint a new stripe according to these specifications.

2. Removal of Excess Paint

Remove misted, dripped, or spattered paint to the Engineer's satisfaction. Do not damage the underlying pavement during removal.

Refer to the applicable portions of Section 656—Removal of Pavement Markings.

652.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

652.4 Measurement

When traffic stripe is paid for by the square yard (meter), the number of square yards (meters) painted is measured and the space between stripes is included in the overall measurement.

Linear measurements are made on the painted surface by an electronic measuring device attached to a vehicle. On curves, chord measurements, not exceeding 100 linear feet (30 linear meters), are used.

Traffic stripe and markings, complete in place, are measured and accepted for payment as follows:

A. Solid Traffic Stripe

Solid traffic stripe is measured by the linear foot (meter), linear mile (kilometer), or square yard (meter). Breaks or omissions in solid lines or stripes at street or road intersections are not measured.

B. Skip Traffic Stripe

Skip traffic stripe is measured by the gross linear foot (meter) or gross linear mile (kilometer). Unpainted spaces between the stripes are included in the overall measurements if the plan ratio of 1 to 3 remains uninterrupted. Measurement begins and ends on a stripe.

C. Pavement Markings

Markings are words and symbols completed according to plan dimensions. Markings are measured by the unit.

652.4.01 Limits

General Provisions 101 through 150.

Section 652 — Painting Traffic Stripe

652.5 Payment

Payment will be full compensation for the work under this section, including the following:

- Cleaning and preparing surfaces
- Furnishing materials, including paints, beads, and thinners
- Applying, curing, and protecting paints
- Protecting traffic, including providing and placing necessary warning signs
- Furnishing tools, machines, and other equipment necessary to complete the Item

Payment will be made under:

Item No. 652-1	Permanent Pavement Marking (White)	Per square feet (meter)
Item No. 652-2	Permanent Pavement Marking (Yellow)	Per square feet (meter)
Item No. 652-3	Permanent Pavement Marking (Blue)	Per square feet (meter)

652.4.01 Adjustments

General Provisions 101 through 150.

Section 700—Grassing

700.1 General Description

This work includes preparing the ground, furnishing, planting, seeding, fertilizing, sodding, and mulching disturbed areas within the Right-of-Way limits and easement areas adjacent to the right-of-way as shown on the plans except as designated by the Engineer to remain natural.

700.1.01 Definitions

General Provisions 101 through 150.

700.1.02 Related References

A. Standard Specifications

Section 160—Reclamation of Material Pits and Waste Areas

Section 163—Miscellaneous Erosion Control Items

Section 718—Wood Fiber

Section 822—Emulsified Asphalt

Section 882—Lime

Section 890—Seed and Sod

Section 891—Fertilizers

Section 893—Miscellaneous Planting Materials

Section 895—Polyacrylamide

B. Referenced Documents

QPL 33

QPL 84

700.1.03 Submittals

Submit manufacturer's product expiration date along with written instructions to ensure proper application, safety, storage, and handling of Polyacrylamide products used in the work.

700.2 Materials

Use materials that meet the requirements of the following specifications:

Material	Section
Wood Fiber Mulch	718.2
Agricultural Lime	882.2.01
Seed	890.2.01
Sod	890.2.02
Fertilizer	891.2.01
Plant Topsoil	893.2.01
Mulch	893.2.02
Inoculants	893.2.04

Section 700 — Grassing

Material	Section
Tackifiers	QPL 33
Anionic Polyacrylamide	QPL 84 & Section 895

A. Seeds

Whenever seeds are specified by their common names, use the strains indicated by their botanical names.

B. Water

Obtain the water for grassing from an approved source. Use water free of harmful chemicals, acids, alkalies, and other substances that may harm plant growth or emit odors. Do not use salt or brackish water.

C. Agricultural Lime

Agricultural lime rates will be based on a laboratory soil test report. The Contractor is responsible for ensuring the tests are performed by an approved laboratory. Provide a copy of test results to the Engineer. Refer to Section 882 Lime and GSP 18 of the Sampling and Testing Inspection manual for additional information on rates, use, handling and sampling procedures.

D. Fertilizer Mixed Grade

Fertilizer analysis and rates will be based on a laboratory soil test report. The Contractor is responsible for ensuring the tests are performed by an approved laboratory. Provide a copy of test results to the Engineer. Refer to Section 891 Fertilizer and GSP 18 of the Sampling and Testing Inspection manual for additional information on rates, use, handling and sampling procedures.

E. Mulch

Use straw or hay mulch according to Subsection 700.3.05.G.

Use wood fiber mulch in hydroseeding according to Subsection 700.3.05.F.1.

700.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

700.3 Construction Requirements

700.3.01 Personnel

General Provisions 101 through 150.

700.3.02 Equipment

Use grassing equipment able to produce the required results.

Never allow the grading (height of cut) to exceed the grassing equipment's operating range.

A. Mulch Material Equipment

Use mulching equipment that uniformly cuts the specified materials into the soil to the required control depth.

B. Hydroseeding Equipment

For hydroseeding equipment, see Subsection 700.3.05.F.

700.3.03 Preparation

General Provisions 101 through 150.

700.3.04 Fabrication

General Provisions 101 through 150.

Section 700 — Grassing

700.3.05 Construction

Follow the planting zones, planting dates, types of seed, seed mixtures, and application rates described throughout this Section. The Engineer has the authority to alter the planting dates as set forth by a period of 2 weeks. This 2-week period may be applied to either the beginning of the specified planting and/or to the end of the end of the specified planting season.

In general:

- Obtain the Engineer's approval before changing the ground cover type.
 - Do not use annual rye grass seeds with permanent grassing.
 - Follow the planting zones indicated on the Georgia State Planting Zone Map, below.
 - Sod may be installed throughout the year, weather permitting.
 - For permanent grassing, apply the combined amounts of all seeds for each time period within each planting zone and roadway location listed in the Seeding Table, below. Do not exceed the amounts of specified seed.
-

Planting Zone Map



Section 700 — Grassing

NON-NATIVE GRASS SEEDING TABLE 1

(Temporary and Permanent Seed Types for Shoulders, Medians and Slopes 3:1 or Flatter)

Common Name	Botanical Name	Class/Type	Rate/Acre	Planting Zone	Planting Dates
Common Bermuda Grass (Hulled)	<i>Cynodon dactylon</i>	Required Permanent Grass	10 (11)	4	April 16 – August 31
Common Bermuda Grass (Unhulled)			10 (11)		
Common Bermuda Grass (Hulled)	<i>Cynodon dactylon</i>	Required Permanent Grass	10 (11)	2,3,4	April 1 – October 15
Common Bermuda Grass (Unhulled)			10 (11)		
Bahaia Grass	<i>Paspalum motatum</i>		10 (11)		
Rye Grass, Millet, Cereal Grass (Oats)	<i>Lolium penne-spsp.</i> <i>Multiflorum,</i> <i>Echinochloa cursgalli,</i> <i>Avena sativa</i>	Temporary Grass	50 (56)	4	September 1 – April 15
Rye Grass, Millet, Cereal Grass (Oats)	<i>Lolium penne-spsp.</i> <i>Multiflorum,</i> <i>Echinochloa cursgalli,</i> <i>Avena sativa</i>	Temporary Grass	50 (56)	2,3,4	October 16 – March 31

Section 700 — Grassing

NON-NATIVE SEEDING TABLE 2

(Temporary and Permanent Seed Types for back slopes, fill slopes and areas which will not be subject to frequent mowing, slopes steeper than 3:1)

Common Name	Botanical Name	Class/Type	Rate/Acre	Planting Zone	Planting Dates
Interstate Lespedeza	<i>Lespedeza sericea</i>	Permanent Grass	50(56)	1,2	March 1— August 31
Weeping Lovegrass	<i>Eragrostis curvula</i>	Temporary Grass	40(11)		
Interstate Lespedeza	<i>Lespedeza sericea</i>	Permanent Grass	75(84)	1,2	September 1- February 28
Tall Fescue	<i>Festuca arundinacea</i>	Temporary Grass	50(56)		
Interstate Lespedeza	<i>Lespedeza sericea</i>	Permanent Grass	50(56)	3,4	April 1— October 31
Weeping Love Grass	<i>Eragrostis curvula</i>	Temporary Grass	40(11)		
Interstate Lespedeza	<i>Lespedeza sericea</i>	Permanent Grass	50(56)	3,4	November 1— March 31
Weeping Love Grass	<i>Eragrostis curvula</i>	Temporary Grass	40(11)		

NATIVE GRASS SEEDING TABLE 3

For Non-mowable Slopes or Areas Designated as Permanent Native Grass Plots.

(Plant native seed mixes on back slopes, fill slopes and areas which will not be subject to frequent mowing (slopes steeper than 3:1).

Common Name	Botanical Name	Class/Type	Rate/Acre	Planting Zone	Planting Dates
Canada Wild Rye	<i>Elymus canadensis</i>	Cool Season	Minimum 2 (2)	1,2,3,4	October 31— March 31
Virginia Wild Rye	<i>Elymus virginicus</i>	Cool Season	Minimum 2 (2)	1,2,3,4	October 31— March 31
Bottle-brush Grass	<i>Hystrix patula</i>	Cool Season	Minimum 2 (2)	1,2,3,4	October 31— March 31
Little Bluestem	<i>Schizachyrium scoparium</i> (<i>Andropogon scoparius</i>)	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31
Indiangrass	<i>Sorghastrum nutans</i>	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31
Eastern Gama Grass	<i>Tripsacum dactyloides</i>	Warm Season	Minimum 2 (2)	1,2,3,4,1,2,3,4	March 31— August 31
Rice Cut Grass	<i>Leersia oryzoides</i>	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31
Deertongue	<i>Panicum clandestinum</i>	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31
Switchgrass	<i>Panicum virgatum</i>	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31
Woolgrass	<i>Scirpus cyperinus</i>	Cool Season	Minimum 2 (2)	1,2,3,4	October 31— March 31
River Oats	<i>Chasmanthium latifolium</i>	Cool Season	Minimum 2 (2)	1,2,3,4	October 31— March 31
Purple Top	<i>Tridens flavus</i>	Warm Season	Minimum 2 (2)	1,2,3,4	March 31— August 31

See plan sheets/plant lists for detailed native restoration and riparian mitigation seed mix combinations to be applied at a minimum rate total of 10 (11) lbs. per acre (kg/hectare) for each combined mix. If the mix is not provided in the plan sheets, use a minimum of 3 species based on planting dates shown above.

Section 700 — Grassing

HERBACEOUS PLANT SEEDING TABLE 4

(Approved for Riparian Mitigation or for Seed Mixes on Slopes Steeper than 3:1 Requiring Permanent Planting)

Common name	Botanical name	Class/type	Rate/Acre	Planting Zone	Planting Dates
Joe Pye Weed	<i>Eupatorium fistulosum</i>	Herbaceous-Perennial	Minimum-2 (2)	1,2,3,4	September 4 – May 4
Ironweed	<i>Vernonia noveboracensis</i>	Herbaceous Perennial	Up to 40(11)	1,2,3,4	March 1– August 31,
White snakeroot	<i>Ageratina altissima</i> (<i>Eupatorium rugosum</i>)	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Swamp milkweed	<i>Asclepias incarnata</i>	Herbaceous Perennial	Up to 40(11)	1,2,3,4	March 1– August 31,
Frost aster	<i>Aster pilosus</i> (<i>Symphotrichum pilosum</i>)	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Partridge pea	<i>Chamaecrista fasciculata</i> (<i>Cassia fasciculata</i>)	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	March 1– August 31,
Lance-leaf coreopsis	<i>Coreopsis lanceolata</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Tall coreopsis	<i>Coreopsis tripteris</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Boneset	<i>Eupatorium perfoliatum</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Sneezeweed	<i>Helenium autumnale</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4
Swamp sunflower	<i>Helianthus angustifolius</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	March 1– August 31,
Fringed loosestrife	<i>Lysimachia ciliata</i>	Herbaceous-Perennial	Up to 40(11)	1,2,3,4	September 4 – May 4

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Wild bergamot	<i>Monarda fistulosa</i>	Herbaceous- Perennial	Up to 10(11)	1,2,3,4	September 4 —May 4
Mountain mint	<i>Pycnanthemum tenuifolium</i>	Herbaceous- Perennial	Up to 10(11)	1,2,3,4	September 4 —May 4
Black-eyed susan	<i>Rudbeckia hirta</i>	Herbaceous- Perennial	Up to 10(11)	1,2,3,4	September 4 —May 4
Goldenrod	<i>Solidago nemoralis</i>	Herbaceous- Perennial	Up to 10(11)	1,2,3,4	September 4 —May 4
Butterfly Weed	<i>Aesclepias tuberosa</i>	Herbaceous Perennial	Up to 10(11)	1,2,3,4	March 1— August 31,

Species	Rates per 1000 sq. ft.	Rates per Acre	Planting Date By Zone		
			1 & 2	2	3 & 4
Rye (Grain)	3.9 lbs	168 lbs	8/1 — 11/30	8/15 — 12/1	9/1 — 2/28
Ryegrass	0.9 lbs	40 lbs	8/1 — 11/30	9/1 — 12/15	9/15 — 1/1
Rye & Annual Lespedeza	0.6 lbs 0.6 lbs	28 lbs 24 lbs	3/1 — 4/1	2/1 — 3/1	2/1 — 3/1
Weeping Lovegrass	0.1 lbs	4 lbs	3/15 — 6/15	3/15 — 7/15	3/15 — 7/15
Sudangrass	1.0 lbs	60 lbs	4/1 — 8/31	4/1 — 8/31	3/15 — 8/1
Browntop Millet	1.1 lbs	50 lbs	4/1 — 6/30	4/1 — 7/15	4/1 — 7/15
Wheat	3.9 lbs	168 lbs	9/1 — 12/31	9/1 — 12/31	9/15 — 1/31

For native restoration and riparian mitigation seed mix combinations, use Table 4 for approved native herbaceous seed types in combination with Table 3 of native grass seeds. Native restoration and riparian seed mixes should incorporate a mix of 60% native grass types (see Table 3) and 40% native herbaceous types (see Table 4) applied at a minimum rate total of 10 (11) lbs. per acre (kg/hectare) for each combined mix.

TABLE 5: TEMPORARY GRASS - SPECIES, SEEDING RATES AND PLANTING DATES

When stage construction or other conditions prevent completing a roadway section continuously, apply temporary grassing to control erosion. Temporary grassing is used to stabilize disturbed areas for more than sixty (60) calendar days. Temporary grass may be applied any time of the year, utilizing the appropriate seed species and application rate as shown in the chart above. Apply mulch to areas planted in temporary grass at the rate of ¾ inch to 1.5 inches. Do not place slope mats on areas planted in temporary grass.

Section 700 — Grassing

A. Ground Preparation

Prepare the ground by plowing under any temporary grass areas and preparing the soil as follows:

1. Slopes 3:1 or Flatter

On slopes 3:1 or flatter, plow shoulders and embankment slopes to between 4 in. and 6 in. (100 mm and 150 mm) deep.

Plow front and back slopes in cuts to no less than 6 in. (150 mm) deep. After plowing, thoroughly disk the area until pulverized to the plowed depth.

2. Slopes Steeper Than 3:1

Serrate slopes steeper than 3:1 according to plan details when required.

On embankment slopes and cut slopes not requiring serration (sufficient as determined by the Engineer), prepare the ground to develop an adequate seed bed using any of the following methods as directed by the Engineer:

- Plow to a depth whatever depth is practicable.
- Use a spiked chain.
- Walk with a cleated track dozer.
- Scarify.

Disking cut slopes and fill slopes is not required.

3. All Slopes

a. Obstructions

Remove boulders, stumps, large roots, large clods, and other objects that interfere with grassing or may slide into the ditch.

b. Topsoil

Spread topsoil stockpiled during grading evenly over cut and fill slopes after preparing the ground.

Push topsoil from the top over serrated slopes. Do not operate equipment on the face of completed serrated cuts.

4. Native Restoration Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas.

For Permanent Grassing in native restoration areas, multitrophic native planting areas, riparian areas, stream restoration areas, and wetland and stream mitigation areas, provide the minimum ground preparation necessary to provide seed to soil contact. Riparian areas may also be seeded using the no-till method. The no-till method is defined by planting permanent grass seeds using a drill-type seeder over existing vegetation without plowing or tilling soil. Ensure that existing vegetation is less than 3 inches in height (this may be achieved by mowing or using a mechanical string trimmer).

B. Grassing Adjacent to Existing Lawns

When grassing areas adjacent to residential or commercial lawns, the Engineer shall change the plant material to match the type of grass growing on the adjacent lawn. The Contract Unit Price will not be modified for this substitution.

C. Temporary Grassing

Apply temporary grassing according to Subsection 163.3.05.F. Determine lime requirements by a laboratory soil test. Refer to seeding Table 5 for species, amounts of seed and planting dates.

In March or April of the year following planting and as soon as the weather is suitable, replace all areas of temporary grass with permanent grass by plowing or overseeding using the no-till method. If the no-till method is used, ensure that temporary grass is less than 3 in. in height (this may be achieved by mowing). Additional mulch will be required only if the temporary grass does not provide adequate mulch to meet the requirements of Subsection 700.3.05.G, *Mulching*.

Temporary grass, when required, will be paid for according to Section 163.

Projects that consist of asphalt resurfacing with shoulder reconstruction and/or shoulder widening: Type II Wood Fiber Blanket is used to stabilize disturbed areas, no till seeding will be used when permanent grassing is applied and the areas will not be re-disturbed.

Section 700 — Grassing

D. Applying Agricultural Lime and Fertilizer Mixed Grade

Apply and mix lime and fertilizer as follows:

1. Agricultural Lime

Uniformly spread agricultural lime on the ground at the approximate rate determined by the laboratory soil test.

a. Agricultural Lime may be used as filler material in mixed grade fertilizer in lieu of inert material. The use of agricultural lime as filler material is to be shown on the fertilizer bag or invoice from the supplier. Do not deduct any amount of fertilizer when lime is used as filler.

2. Fertilizer Mixed Grade

Uniformly spread the fertilizer selected according to Subsection 700.2.D over the ground or by use of hydroseeding.

For bid purposes base estimated quantities on an initial application of 400 lb./acre of 19-19-19.

3. Mixing

Before proceeding, uniformly work the lime and fertilizer into the top 4 in. (100 mm) of soil using harrows, rotary tillers, or other equipment acceptable to the Engineer.

On cut slopes steeper than 3:1, other than serrated slopes, reduce the mixing depth to the maximum practical depth as determined by the Engineer.

Omit mixing on serrated slopes.

4. Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas

Omit the application of lime and fertilizer within riparian areas.

E. Seeding

Prepare seed and sow as follows:

1. Inoculation of Seed

Inoculate each kind of leguminous seed separately with the appropriate commercial culture according to the manufacturer's instructions for the culture.

When hydroseeding, double the inoculation rate.

Protect inoculated seed from the sun and plant it the same day it is inoculated.

2. Sowing

Weather permitting, sow seed within 24 hours after preparing the seed bed and applying the fertilizer and lime.

Sow seed uniformly at the rates specified in the seeding tables. Use approved mechanical seed drills, rotary hand seeders, hydroseeding equipment, or other equipment to uniformly apply the seed. Do not distribute by hand.

To distribute the seeds evenly sow seed types separately, except for similarly sized and weighted seeds. They may be mixed and sown together.

Do not sow during windy weather, when the prepared surface is crusted, or when the ground is frozen, wet, or otherwise non-tillable.

3. Overseeding

Temporary grass areas that were prepared in accordance with Subsection 700.3.05.A, may be overseeded using the no-till method. The no-till method is defined by planting permanent grass seeds using a drill-type seeder over existing temporary grass without plowing or tilling soil and in accordance with Subsection 700.3.05.C.

4. Riparian Seed Mix shall be used when specified in the plans. A mix of at least three (3) species from Seeding Table 3 (Native Grasses) and at least two (2) species from Seeding Table 4 (Approved Riparian Mitigation - Herbaceous Plants). The seed, shall be applied as Permanent Grassing within those areas designated on the plans. The kinds of seed, shall be used according to the appropriate Planting Dates given in the tables.

Section 700 — Grassing

F. Hydroseeding

Hydroseeding may be used on any grassing area. Under this method, spread the seed, fertilizer, and wood fiber mulch in the form of a slurry. Seeds of all sizes may be mixed together. Apply hydroseeding as follows:

1. Use wood fiber mulch as a metering agent and seed bed regardless of which mulching method is chosen. Apply wood fiber mulch at approximately 500 lbs./acre (560 kg/ha).
2. Prepare the ground for hydroseeding as for conventional seeding in Subsection 700.3.05.A.
3. Use specially designed equipment to mix and apply the slurry uniformly over the entire seeding area.
4. Agitate the slurry mixture during application.
5. Discharge slurry within one hour after being combined in the hydroseeder. Do not hydroseed when winds prevent an even application.
6. Closely follow the equipment manufacturer's directions unless the Engineer modifies the application methods.
7. Mulch the entire hydroseeded area according to Subsection 700.3.05.F.1, above, and Subsection 700.3.05.G, below. Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas may be hydroseeded. When hydroseeding in these areas only use water, seed and wood fiber mulch.

G. Mulching

Except as noted in Subsection 700.3.05.B and Subsection 700.3.05.C, apply mulch immediately after seeding areas as follows:

Areas with permanent grass seed and covered with slope mats or blankets will not require mulch.

Evenly apply straw or hay mulch between 3/4 in. and 1-1/2 in. (20 mm and 40 mm) deep, according to the texture and moisture content of the mulch material.

Mulch shall allow sunlight to penetrate and air to circulate as well as shade the ground, reduce erosion, and conserve soil moisture. If the type of mulch is not specified on the plans or in the Proposal, use any of the following as specified.

1. Mulch with Tackifier

Apply mulch with tackifier regardless of whether using ground or hydroseeding equipment for seeding.

- a. Mulch uniformly applied manually or with special blower equipment designed for the purpose. When using a blower, thoroughly loosen baled material before feeding it into the machine so that it is broken up.
- b. After distributing the mulch initially, redistribute it to bare or inadequately covered areas in clumps dense enough to prevent new grass from emerging (if required).
Do not apply mulch on windy days.
- c. Apply enough tackifier to the mulch to hold it in place. Immediately replace mulch that blows away.
If distributing the mulch by hand, immediately apply the tackifier uniformly over the mulched areas.
 - Tackifier: Use a tackifier listed in the Laboratory Qualified Products Manual and apply at the manufacturer's recommended rates.

2. Walked-in-Mulch

Apply walked-in-mulch on slopes ranging in steepness from 5:1 to 2:1 and treat as follows:

- a. Immediately walk it into the soil with a cleated track dozer. Make dozer passes vertically up and down the slope.
 - b. Where walked-in-mulch is used, do not roll or cover the seeds as specified in Subsection 700.3.05.E.3.
3. Apply only wheat straw mulch on Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas after they have been seeded. The wheat straw mulch is to be applied with a maximum thickness of 1 in.

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H. Sod

Furnish and install sod in all areas shown on the plans or designated by the Engineer.

1. Kinds of Sod

Use only Common Bermudagrass (Cynodon dactylon) ~~or one of the following Bermudagrass varieties:~~

~~Tifway 419~~

~~Tifway II~~

~~Tift 94~~

~~Tifton 10~~

~~Midlawn~~

~~Midiron~~

~~GN-1~~

~~Vamont~~

No dwarf Bermuda types shall be used. Sod shall be nursery-grown and be accompanied with a Georgia Department of Agriculture Live Plant License Certificate or Stamp. Sod shall consist of live, dense, well-rooted material free of weeds and insects as described by the Georgia Live Plant Act.

2. Type and Size Of Sod:

Furnish either big roll or block sod. Ensure that big roll sod is a minimum of 21 in. wide by 52 ft. long. Minimum dimensions for block sod are 12 in. wide by 22 in. long. Ensure all sod consists of a uniform soil thickness of not less than 1 in.

3. Ground Preparation

Excavate the ground deep enough and prepare it according to Subsection 700.3.05.A to allow placing of sod. Spread soil, meeting the requirements of Subsection 893.2.01, on prepared area to a depth of 4 in.

4. Application of Lime and Fertilizer

Apply lime and fertilizer according to Subsection 700.3.05.D within 24 hours prior to installing sod.

5. Weather Limitation

Do not place sod on frozen ground or where snow may hinder establishment.

6. Install Sod

Install Sod as follows:

- Place sod by hand or by mechanical means so that joints are tightly abutted with no overlaps or gaps. Use soil to fill cracks between sod pieces, but do not smother the grass.
- Stake sod placed in ditches or slopes steeper than 2:1 or any other areas where sod slipping can occur.
- Use wood stakes that are at least 8 in (200 mm) in length and not more than 1 in. (25 mm) wide.
- Drive the stakes flush with the top of the sod. Use a minimum of 8 stakes per square yard (meter) to hold sod in place.
- Once sod is placed and staked as necessary, tamp or roll it using adequate equipment to provide good contact with soil.
- Use caution to prevent tearing or displacement of sod during this process. Leave the finished surface of sodded areas smooth and uniform.

7. Watering Sod

After the sod has been placed and rolled or tamped, water it to promote satisfactory growth. Additional watering will be needed in the absence of rainfall and during the hot dry summer months. Water may be applied by Hydro Seeder, Water Truck or by other means approved by the Engineer.

8. Dormant Sod

Dormant Bermuda grass sod can be installed. However, assume responsibility for all sod through establishment and until final acceptance.

9. Establishment

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I. Application of Nitrogen

Apply nitrogen at approximately 50 lbs./acre (56 kg/ha) when specified by the Engineer after plants have grown to 2 in. (50 mm) in height.

One application is mandatory and must be applied before Final Acceptance.

Apply nitrogen with mechanical hand spreaders or other approved spreaders capable of uniformly covering the grassed areas. Do not apply nitrogen on windy days or when foliage is damp.

Do not apply nitrogen between October 15 and March 15 except in Zone 4.

1. Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas

Do not apply nitrogen to these areas.

J. Application of Polyacrylamide (PAM)

1. Prepare soil according to project plans and specifications prior to applying PAM.
2. Apply PAM according to manufacturer's recommendations and the requirements listed herein.
3. Apply Polyacrylamide (PAM) to all areas that receive permanent grassing.
4. Apply PAM (powder) before grassing or PAM (emulsion) to the hydroseeding operation.
5. Use only anionic PAM.
6. Ensure that the application method provides uniform coverage to the target and avoids drift to non-target areas including waters of the state.
7. Achieve > 80% reduction in soil loss as measured by a rainfall simulator test performed by a certified laboratory (1-hour storm duration, 3 in. (75 mm) rainfall per hour).
8. Ensure uniform coverage to the target area and minimize drift to non-target areas. Apply anionic PAM to all cut and fill slopes, permanently grassed or temporarily grassed, either prior to grassing or in conjunction with hydroseeding operations. Mulch will not be eliminated.
9. Use application rates in accordance with manufacturer's instructions.
10. Do not exceed 200 lbs./acre/year (224 kg/ha/year).
11. Do not include polyacrylamide when planting in Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas

700.3.06 Quality Acceptance

The Engineer may require replanting of an area that shows unsatisfactory growth for any reason at any time.

Except as otherwise specified or permitted by the Engineer, prepare replanting areas according to the specifications as if they were the initial planting areas. Use a soil test or the Engineer's guidance to determine the fertilizer type and application rate, then furnish and apply the fertilizer.

700.3.07 Contractor Warranty and Maintenance

A. Plant Establishment

Before Final Acceptance, provide plant establishment of the specified vegetation as follows:

1. Plant Establishment
Preserve, protect, water, reseed or replant, and perform other work as necessary to keep the grassed areas in satisfactory condition.
2. Watering
Water the areas during this period as necessary to promote maximum growth.
3. Mowing
Mow seeded areas of medians, shoulders, and front slopes at least every 6 months. Avoid damaging desirable vegetation.

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In addition, mow as necessary to prevent tall grass from obstructing signs, delineation, traffic movements, sight distance, or otherwise becoming a hazard to motorists.

Do not mow lespedezas or tall fescue until after the plants have gone to seed.

4. Do not mow riparian areas, stream restoration areas, or wetland and stream mitigation areas after planting.

B. Additional Fertilizer Mixed Grade

Apply fertilizer based on the initial soil test report at half the recommended rate each spring after initial plant establishment. For bid purposes apply 200 lbs./acre of 19-19-19. Continue annual applications until Final Acceptance. This additional fertilizer will be measured and paid for at the Contract Unit Price for fertilizer mixed grade.

Do not apply additional fertilizer to Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas.

C. Growth and Coverage

Provide satisfactory growth and coverage, ensuring that vegetation growth is satisfactory with no bare spots larger than 1 ft.² (0.1 m²). Bare spots shall comprise no more than 1 percent of any given area. An exception is given for seed not expected to have germinated and shown growth at that time.

D. Permissible Modifications

When all Items of the work are ready for Final Acceptance except for newly planted repaired areas or other areas with insufficient grass, the Contractor may fill the eroded areas or treat bare areas with sod obtained, placed, and handled according to Subsection 700.3.05.H.

Carefully maintain the line and grade established for shoulders, front slopes, medians, and other critical areas.

Sod as described above will not be paid for separately but will be an acceptable substitute for the satisfactory growth and coverage required under this specification. These areas treated with sod are measured for payment under the Item for which the sod is substituted.

700.4 Measurement

A. Permanent Grassing

Permanent Grassing will be measured for payment by the acre (hectare).

B. Mulches

Straw or hay mulch applied to permanent grassing areas will be measured by the ton (megagram). Wood fiber mulch furnished by the Contractor for permanent grassing is not measured for separate payment.

C. Quantity of Sod

Sod is measured for payment by the number of square yards (meters), surface measure, completed and accepted.

D. Water

Water furnished and applied to promote a satisfactory growth is not measured for payment.

E. Quantity of Lime and Fertilizer Mixed Grade

Lime and fertilizer are measured by the ton (megagram). Lime used as a filler in fertilizer is measured by the ton (megagram).

F. Quantity of Nitrogen Used for Permanent Grassing

Nitrogen is measured in pounds (kilograms) based on the weight of fertilizer used and its nitrogen content.

G. Replanting and Plant Establishments

No measurement for payment is made for any materials or work required under Subsection 700.3.06 and Subsection 700.3.07.

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H. Temporary Grass

Temporary grass is measured for payment by the acre (hectare) according to Section 163.

I. Seeded Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas

Seeded Native Restoration Areas, Multitropic Native Planting Areas, Riparian areas, Stream Restoration area, and Wetland and Stream Mitigation areas will be measured by the acre (hectare) and included under the pay item *Native Restoration and Riparian Seeding*.

700.4.01 Limits

General Provisions 101 through 150.

700.5 Payment

As grassing and planting progress, the Contractor will receive full measurement and payment on regular monthly estimates provided the work complies with the specifications.

A. Permanent Grassing

Permanent grassing will be paid for at the Contract Price per acre (hectare), complete and in place. Payment is full compensation for preparing the ground, seeding, wood fiber mulch, polyacrylamide, and providing plant establishment, soil tests and other incidentals.

B. Straw or Hay Mulch

Straw or hay mulch required for Permanent Grassing will be paid for according to Section 163.

C. Fertilizer Mixed Grade

Fertilizer mixed grade will be paid for at the Contract Price per ton (megagram). Payment is full compensation for furnishing and applying the material.

D. Lime

Lime will be paid for at the Contract Price per ton (megagram). Lime used as filler in fertilizer will be paid for per ton (megagram). Payment is full compensation for furnishing and applying the material.

E. Nitrogen

Nitrogen will be paid for at the Contract Price per pound (kilogram) of nitrogen content. Payment is full compensation for furnishing and applying the material.

F. Sod

1. Sod will be paid by the square yard (meter) in accordance with the following schedule of payments. Payment is full compensation for ground preparation, including addition of topsoil, furnishing and installing live sod, and for Plant Establishment.
2. 70 percent of the Contract Price per square yard will be paid at the satisfactory completion of the installation.
3. 20 percent of the Contract Price will be paid upon satisfactory review of sod which is healthy, weed free and viable at the inspection made at the end of the first spring after installation.
4. 10 percent of the contract price will be paid upon satisfactory review of sod that is healthy, weed free and viable at the Final Acceptance.

G. Temporary Grass

Temporary Grass will be paid for under Section 163.

Section 700 — Grassing

H. Seeded Native Restoration Areas, Multitropic Native Planting Areas, Riparian Areas, Stream Restoration Areas, and Wetland and Stream Mitigation Areas

Seeded Native Restoration Areas, Multitropic Native Planting Areas, Riparian areas, Stream Restoration area, and Wetland and Stream Mitigation areas will be paid for at the Contract Price per acre (hectare), complete and in place. Payment is full compensation for preparing the ground, seeding, and providing plant establishment and other incidentals. and included under the pay item “Native Restoration and Riparian Seeding”.

Payment will be made under:

Item No. 700-1	Sodding	Per square yard (meter)
Item No. 700-2	Permanent grassing	Per acre (hectare)

700.5.01 Adjustments

General Provisions 101 through 150.

Section 702—Vine, Shrub, and Tree Planting

702.1 General Description

This work includes furnishing and planting vines, shrubs, trees and plants, treating regenerated areas, and environmental mitigation planting for riparian buffers and tidal marsh areas.

702.1.01 Definitions

General Provisions 101 through 150.

702.1.02 Related References

A. Standard Specifications

- Section 108—Prosecution and Progress
- Section 214—Mitigation Site Construction
- Section 700—Grassing
- Section 882—Lime
- Section 891—Fertilizers
- Section 893—Miscellaneous Planting Materials

B. Referenced Documents

- Standardized Plant Names
- ANSI A300 Part 1 Pruning Standards
- ANSI Z60.1 American Standards for Nursery Stock

702.1.03 Submittals

A. Certificates of Inspection

Submit certificates of inspection with the invoice for each shipment of plants as required by law for transportation. File certificates with the Engineer before the material is accepted. Plants may be rejected at the site regardless of Federal or State government inspections at the place of growth.

B. Substitutions

When both primary and alternate plants are specified, use the alternate only after providing written proof that the primary plants specified are not available. In this case a Supplemental Agreement is not required to use the alternate plants.

When a primary or an alternate plant cannot be furnished, provide the Engineer written proof that neither is available. A Supplemental Agreement is required for substitute plants in this case.

Use approved substitute plants, as designated by the Engineer, equal in value to specified plants. Request substitutions at least thirty (30) days before the end of the planting season in the area.

702.2 Materials

Ensure that materials meet the requirements of the following specifications:

Material	Section
Water	700.2.B
Agricultural Lime	882.2.01
Fertilizers	891.2.01

Section 702 — Vine, Shrub, and Tree Planting

Material	Section
Plant Topsoil	893.2.01
Landscape Mulch	893.2.02
Vines, Shrubs, Trees, and Miscellaneous Plants	893.2.03
Tree Paint	893.2.06
Prepared Plant Topsoil	893.2.07
Stakes	893.2.08
Organic Soil Additives	893.2.09

A. Plant Specifications

Furnish plants according to the plant name and specifications included on the plan sheets.

1. Plant Names

Ensure that the botanical and common names of plants specified conform to the most current edition of Standardized Plant Names, as adopted by the American Joint Committee on Horticultural Nomenclature.

2. Plants should be clearly labeled at the nursery. Labels should remain on the plants until inspected by the engineer.

3. Grades

Ensure that plants meet the grade requirements of the most current American Nursery and Landscape Association ANSI Z60.1 and any other requirements.

Caliper used for establishing plant grades or trunk sizes is measured according to the American Nursery and Landscape Association ANSI Z60.1. Plant trees with straight stems and symmetrical branches according to their natural growth. Trees with broken or damaged terminal or main stems will be rejected. There shall be a single dominant leader to the top of the all large canopy shade trees. There can be a double leader in the top 10% of the tree height.

Trees should be rooting into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted, but not root bound. The trunk should bend when gently pushed and should not be loose so it pivots at or below the soil line.

There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around in the top half of the root ball. Roots larger than this may be cut provided they are smaller than one-third the trunk diameter.

The leaf-bearing crown should be full and uniform. Leaves should show no evidence of chlorosis, necrosis, disease or insect infestation.

B. Bare root seedlings

Use nursery-grown bare root seedlings which are a minimum of three (3) ft. (1 meter) in height above the ground with a 1/4 in. (6.35mm) caliper, and a minimum primary root length of five in. (5) unless specified differently on the plan drawings.

Use approved substitute plants, as designated by the Engineer, equal in value to specified plants. Request substitutions at least 30 calendar days before the end of the planting season in the area. Wet swale bare root *Juncus effuses* shall be fresh divisions with a full, dense root base.

C. Nursery Plants

Unless otherwise specified, use plants stock-grown in a licensed nursery under intensive care and cultivation for at least one year. The largest branches of shade trees should be spaced at least 6 inches apart. The branch system shall be normally developed and free of disease, injurious insects, disfiguring knots, sun-scald, injuries, bark abrasions, dead or dry wood, broken terminal growth, or other disfigurements. Stems should show no evidence of die-back. Ensure that proper certificates of inspection and a complete list of the nursery growers accompany nursery grown plants. See Subsection 893.2.03.

Section 702 — Vine, Shrub, and Tree Planting

D. Approval and Selection of Materials and Work

Select materials and execute operations required under the specifications and drawings with the approval of the Engineer. Remove rejected materials from the site promptly.

702.2.01 Delivery, Storage, and Handling

A. Bare-Rooted Plants

Protect bare root plants from drying out until planted. Uncovered roots without moisture-loss gel coating shall be exposed to air no longer than 15 minutes.

B. Balled and Burlapped Plants (B&B)

1. Burlap shall be a natural biodegradable material. Do not use synthetic burlap.
2. Replace plants rejected because of broken or loose balls, or balls of less diameter than that specified.
3. Protect the roots of balled and burlapped plants from moisture loss, unless they are planted immediately after they are delivered.
4. Plants shall be harvested with the ball of earth in which they are growing intact.

C. Container-Grown Plants

Keep container-grown plants moist but well drained until planted. Handle plants by the container or soil ball and not by the top growth.

D. Heeled-in Plants

Properly maintain heeled-in plants until they are planted. Do not allow plants to remain heeled-in over the summer or for over 30 days without the Engineer's consent.

E. Injury Prevention

Injured plants will be rejected. Protect tops of shrubs and trees while in transit to prevent windburn.

F. Live Willow Stake Material

Live stakes shall be moistened, capable of rooting, without injury and stripped of all stems and leaves with a minimum of scarring. The stakes shall be from 5 to 8 ft. (1.5m to 2.4m) in length with a basal end of 0.5 to 1.5 in. (1.27cm to 3.8cm) in diameter. The top ends shall be blunt and cut square and the butt ends angled.

702.3 Construction Requirements

702.3.01 Personnel

General Provisions 101 through 150.

702.3.02 Equipment

General Provisions 101 through 150.

702.3.03 Preparation

A. Inspect Plant Material before Digging

The Engineer will inspect trees or plants from the bidder's source for acceptability and conformity to specification requirements for approval by the Engineer. When rejecting the trees or plants, the Engineer reserves the right to pursue and examine other sources of plants to find acceptable specimens. This change will not constitute an increase in cost to the State.

B. Clear and Grub

Clear and grub the planting area before planting or beginning to prepare the plant bed, unless noted differently on the plans. See Section 201.

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C. Prepare Plant Bed

Prepare for planting as follows:

1. Planting Limits

Stake planting limits according to plan details and the Engineer. Have the Engineer approve the method of plant identification before planting.

For median plantings, keep any woody plant a minimum of 3 ft. (1m) from the edge of the plant bed to avoid vegetative growth into the roadway.

For stream buffers identified as “Stream Buffer” or “wet swales”, on plans, the plant species shall be planted in a random, intermixed manner throughout the entire planting area. At the edges of the planting zone, keep new plants a minimum of 8 ft. (2.4m) from existing trees or permanent structures.

2. Applications of Soil Additives

- a. Apply fertilizer and lime to the plant bed according to the soil test report.
- b. Spread an organic soil additive, (See Subsection 893.2.09), evenly throughout the designated area to at least 2 in. (50 mm) deep. Thoroughly dig it into the soil to at least 6 in. (150 mm) deep using a rotary hoe type tiller or other equipment that evenly mixes the soil, lime, fertilizer, and organic soil additive.
- c. Till the area until the surface is smooth and free of weeds, roots, rocks, and other debris, to the satisfaction of the Engineer.
- d. If the planting area lies within a multitrophic native planting area, stream buffer, wetland, wet swale, or marsh the addition of fertilizer or lime is prohibited.

702.3.04 Fabrication

General Provisions 101 through 150.

702.3.05 Construction

A. Seasonal Limitations for Planting

For geographic seasonal limitations, refer to the Planting Zones Map found in Subsection 700.3.05. Plant in Zones 1 and 2 between October 15 and March 15. Plant in Zones 3 and 4 between November 1 and January 1.

B. Planting Operations

Plant using the method called for on the details and plan sheets. Before beginning planting of each area, have available the necessary materials including prepared plant topsoil (see Subsection 893.2.07), water, stakes, and mulch. Plants shall be installed as straight/upright as possible. Any plants found to be leaning or broken will not be accepted or paid for by the engineer.

When seasonal limitations and weather conditions permit, continuously water, mulch, guy, provide tree guards, and stake as indicated on the plans and details until completing the last operation.

After completing planting, provide a method for retaining water adjacent to the plant according to the details shown on the plans or as directed by the Engineer.

Protect marsh restoration areas from vehicles and machinery. Typical protective barriers are not to be used in tidal areas. Stakes that remain secure and are taller than the highest tide, flagged with highly visible flagging tape, are required to mark the area to be protected and off-limits for vehicles and machinery.

3. Planting by the Pit Method

a. Placing Bare-Rooted Plants

Plant bare-rooted plants delivered to the pit area. Protect roots from drying out until placing them in the pit.

- 1) Center plants in pits and spread roots as they originally grew.
- 2) Cover and prepare the topsoil according to details shown on the plans.

b. Placing Balled and Burlapped Plants

Immediately plant these plants after they are delivered to the pit site.

Section 702 — Vine, Shrub, and Tree Planting

- 1) The pit diameter shall be a minimum of 3 times the diameter of the rootball. Center the ball in the prepared pit, leaving the top of the ball 1 in (25 mm) above the top of the ground for settlement.
- 2) Cut away and remove the top 1/3 of burlap from the rootball. Cut all ropes and twine, pull the nails, and drop the remaining burlap to the bottom of the hole. Cut away and remove all wire from the root ball.
- 3) Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly. Add mycorrhizal inoculant to plant topsoil if specified in plans.

c. Placing Container-Grown Plants

- 1) When the container is delivered to the pit site, split the container from top to bottom and carefully remove the plant.
- 2) The pit diameter shall be a minimum of 3 times the diameter of the rootball. Spread into the hole any major roots growing around the container or prune them to remove any circular growth.
- 3) Place the ball in the center of the prepared pit, leaving the top of the ball 1 in. (25 mm) above the top of the ground for settlement.
- 4) Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly. Add mycorrhizal inoculant to plant topsoil if specified in plans.

d. Completing Pit Plantings

After placing pit plantings, water plants thoroughly the same day regardless of weather or soil moisture conditions.

- 1) After the water has soaked in, add prepared plant topsoil and compact firmly up to 2 in. (50mm) below the adjacent ground.
- 2) Stop compacting when the compacted prepared topsoil is 2 in (50 mm) below the adjacent ground.
- 3) Fill the remainder of each pit with loose, prepared plant topsoil according to the details shown on the plans.
- 4) Prepare the loose topsoil to retain water adjacent to the plant according to the Plans or as directed by the Engineer.

e. Live Stake Plantings

- 1) Plant live willow stakes at four (4) ft. (1.2m) intervals or as indicated on the drawings with the buds facing upward.
- 2) Eighty (80) percent of the stake shall be installed below ground, leaving twenty (20) percent extending above ground.
- 3) Stakes shall be placed deep enough to reach the water table during the dry season at an angle perpendicular to the slope.
- 4) Pack soil firmly around the hole after installation.
- 5) Install live willow (*Salix spp.*) stakes only in the dormant season, according to the planting details and landscape plan notes.
- 6) Replace any live stakes that split during installation.

4. Planting using a Dibble, Hoedad, or Reinforced Planting Shovel for Wet Swale and Bare Root Seedlings.

Planting shall only be done when there is adequate moisture in the ground and when the ground is not frozen.

Provide proper root positioning and contact with the soil and eliminate all air pockets around roots. Roots of seedlings shall not be pinched or bent in a sideways or upturned direction.

Each tree, division, or seedling shall be inserted into the hole such that the root collar of the tree will be at ground level after backfilling is complete. Allowance for burying the root collar below ground level shall not exceed one-half inch in depth. In no case shall planting result in the root collar remaining above ground level. The soil back-filled around the root system shall be compacted sufficiently to support the plant. Mow or use a

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string trimmer to a height of 1 in. (25 mm) in the area designated for restoration. Do not trim wet swales or retention basins where standing water is present.

Grass the area designated for restoration with a native restoration or riparian seed mix and apply wheat straw mulch to the area before planting seedlings.

Plant within 48 hours after mowing or string trimming the site.

5. Restoration and enhancement of tidal marsh areas are subject to possible wave energy, requiring the use of a plant anchor for each plant. See planting plan sheets and details for plant anchor and anchoring descriptions.

C. Landscape Mulching

1. For Pit Plantings

Follow these requirements when mulching for pit plantings:

- a. Where the distance between plants is 8 ft. (2.4 m) or less, spread mulch throughout and 3 ft. (900 mm) beyond the outermost plants. Where plants are more than 8 ft. (2.4 m) apart, apply mulch in a circular fashion around each plant, forming a ring 5 ft. (1.5 m) in the outside diameter.
 - b. If plant pits are greater than 5 ft. (1.5 m) in diameter, ensure that the mulch extends out to cover the berm as shown in the planting details on the plans.
 - c. Apply mulch within 3 days of planting at least 4 in. (100 mm) in depth to obtain a compacted depth of at least 3 in. (75 mm).
 - d. Compaction occurs naturally. Check compaction at least two months after spreading and exposing the mulch to the elements.
 - e. If the compacted depth is less than 3 in. (75 mm), apply additional mulch to deficient areas within 1 month following notification.
 - f. Apply mulch to a uniform depth and remove lumps for a neat appearance. Tuck mulch neatly against all paving edges, drainage structures, and where planting beds meet grassed areas.
 - g. Leave a 1 in. (25 mm) to 2 in. (50 mm) ring of non-mulched area directly around all tree trunks.
 - h. Do not mulch with Cypress Mulch.
2. For Plantings using a Dibble, Hoedad, or Reinforced Shovel
Apply landscape mulch according to Subsection 702.3.05.C.1 with the following exceptions:
 - a. Apply mulch before planting.
 - b. Use only wheat straw mulch in restoration areas.
 - c. Ensure that the mulch coverage is open enough to allow seed germination to take place and dense enough to conserve moisture in the seed bed.
 3. For Native Multitrophic or Stream Buffer Restoration Planting Areas, wheat straw shall be the only types of mulch used.
 4. Do not use mulch in a tidal marsh area. Do not mulch wet swale or retention ponds where standing water is present.

D. Wrapping

Do not wrap the trunks of tree unless specified in the plans. When wrapping is specified, tightly wrap the trunks of deciduous trees over 1.25 in. (32 mm) in caliper. Wrap in strip burlap or waterproof crepe tree wrapping paper or other approved materials.

1. Begin wrapping at the ground and extend spirally up and beyond the first rosette of branches with an overlap of one half the width of the wrapping material.
 2. Tie the wrapping material securely with binder twine spaced every 12 in. (300 mm) for the full length of the wrapping. Wrap immediately after planting.
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Section 702 — Vine, Shrub, and Tree Planting

E. Staking and Guying

1. Do not use staking and guying unless specified in the plans or details.
2. Perimeter Staking
3. Place perimeter stakes 2 in. x 2 in. x 36 in. (50 mm x 50 mm x 900 mm). Stake the perimeter of indicated regenerated areas within specified planting dates according to the Plans or as directed by the Engineer. Keep staking for tidal marsh areas secured with supports taller than the highest tide with highly visible flagging tape to mark the area as off-limits for vehicles and machinery.
4. Vine, Shrub, and Miscellaneous Plant Staking
5. Use stakes to identify isolated vines, shrubs, and miscellaneous plants outside of solid mulched beds according to plan details.
6. Tree Staking and Guying
7. Stake trees using a system that will prevent trees from leaning or tilting and keep the root ball stable until the roots become anchored. The system should allow the top some movement and flexibility without damaging the tree.

F. Pruning

1. Prune plants on the site before planting and after initial inspection by the Engineer as needed for the health of the plant. Never prune severely to get plants to meet specifications.
 - a. Follow ANSI A300 Part 1 standards and use approved tools designed for pruning.
 - b. Lopping, topping, or shearing trees or shrubs is not permitted.
 - c. Prune back damaged, scarred, frayed, split, and skinned branches, limbs, and roots to live wood nearest to the next sound, outside lateral bud, branch, limb, or root.
 - d. Leave the terminal leaders or buds in trees intact.
 - e. Prune roots, when necessary, as directed by the Engineer.
 - f. Prune Crape Myrtles to maintain natural form only. Severely cutting back or stump pruning crape myrtles is not permitted. Remove sucker growth from Crape Myrtles.
 - g. Damaged, scarred, frayed, split and skinned branches, limbs and roots shall be pruned back to live wood nearest to the next viable outside lateral bud, branch, limb or root.

G. Watering

1. Apply water in a manner to prevent erosion. Water plants deeply and thoroughly at the time of planting. Water after applying fertilizer called for in Subsection 702.3.05.H and as necessary to maintain enough moisture to promote plant growth. Use water reservoir bags if specified in plans or details.
 - a. Apply enough water to wet the soil to a depth slightly below the roots. Direct the water to the ground around the plant, not the tops.
 - b. Do not allow plant foliage to dry out or plants to defoliate from lack of water. Remove plants in such condition from the site immediately. Apply supplemental watering to maintain vigorous growth and to keep plants moist and as directed by the Engineer.
 - c. Apply water once per week throughout the planting season in which the plants are installed. Follow Subsection 702.3.07.B and 702.3.07.C for shrub and tree watering requirements throughout the life of the project.
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Section 702 — Vine, Shrub, and Tree Planting

H. Spring Application of Fertilizer

1. Method and Rate of Application

Follow these requirements when applying fertilizer in the spring:

a. Trees

Apply a slow-release fertilizer according to soil test results. Assume 8-12-12 with a rate of 1 cup (0.25 L) per caliper inch of tree for bidding purposes.

2. Shrubs and vines

Fertilize shrubs according to soil test results with a slow release fertilizer by spreading fertilizer around the base of the plant and working it into the soil by hand. Assume 6-12-12 with a rate of 0.5 cup (0.12 L) per foot of shrub height for bidding purposes.

Bed Areas

Spread fertilizer on bed areas (defined by method of planting in Subsection 702.3.05.B), over the mulch according to soil test results. Assume 3 lbs./100ft² of 6-12-12 for bidding purposes. Thoroughly water in the plants.

3. Native Restoration or Stream Buffer Areas

The addition of fertilizer or lime is prohibited within the native restoration or stream buffer planting areas.

4. Tidal March Areas

The addition of fertilizer or lime is prohibited within marsh areas.

5. Time of Spring Fertilizer Application

Apply fertilizer in the spring in Zones 1 and 2 (with reference to the Planting Zones specified in Subsection 702.3.05.A) between April 1 and April 15. Apply between March 15 and April 1 for Zones 3 and 4. For late plantings, do not apply fertilizer less than 30 days after the plantings.

6. Additional Fertilizer

Approximately one month after the spring fertilizer is applied; the Engineer will inspect planted areas and determine if an additional application of fertilizer is needed for any plant or group of plants.

If the Engineer determines additional fertilizer is required, apply fertilizer according to soil test results between June 15 and July 15th.

I. Tree Guards for Stream Buffer Saplings

Each planted bare root, sapling-sized plant shall be fitted with a tree guard to protect the saplings from wildlife browsing. The tree guards shall be at least 36 in. tall, with appropriately sized wooden stakes or bamboo to securely support the tree guard [i.e., a 4 ft. (1.2 meter) stake for a 36 in. (914.4 mm) guard]. Mesh tube-type tree guards are required. Vexar tubes, or equivalent, are to be used. All tree guards shall be removed from the saplings at final inspection.

J. Restoration and Cleanup

Restore areas where existing grass has been damaged or scarred during planting operations at no expense to the Department Sponsor. Restore the disturbed areas to their original conditions as directed by the Engineer. Clean up debris, spoil piles, and containers and leave the Project area clean.

Clean up and remove all debris, spoil piles, containers, water reservoirs, trash, etc. and leave the project area in an acceptable condition. Inspect all installed erosion control devices weekly and clean out or repair as required.

Remove all erosion control devices at final acceptance unless otherwise instructed by the Engineer.

702.3.06 Quality Acceptance

Preserve the plants in a healthy growing condition and keep plants moist, particularly during drought conditions (no rain for any two-week period). The acceptability of the plant material planted and maintained as specified will be determined at the end of an establishment period.

The plant establishment period is the period from the last planting specified in Subsection 702.3.05.B until the following October 1. Plant all plants in one planting season unless otherwise approved by Engineer.

Section 702 — Vine, Shrub, and Tree Planting

A. First Establishment Period

At the end of the first planting season, the first establishment period begins. The Department Engineer will make the first semi-final inspection 30 days before the end of the first establishment period. Replace dead, dying, diseased, unsatisfactory, and missing plants, by January 20 of the next (second) planting season. For stream buffer areas, all replacement plants shall be tagged with 18 in. (457.2 mm) lengths of brightly-colored survey tape. Tree guards shall be placed around all replacement saplings. All costs for replanting, tagging and tree guards for replacement trees shall be included in the contract price bid for the original planting.

B. Second Establishment Period

At the end of the second planting season, the second plant establishment period begins. The Department Engineer will make the second semi-final inspection 30 days before the end of the second establishment period. Again, replace dead, dying, diseased, unsatisfactory, and missing plants, by January 20 of the next (third) planting season. For stream buffer areas, all replacement plants shall be tagged with 18 in. (457.2 mm) lengths of brightly-colored survey tape. Tree guards shall be placed around all replacement saplings. All costs for replanting, tagging and tree guards for replacement trees shall be included in the contract price bid for the original planting.

C. Final Inspection

The Department Engineer will make the final inspection of the plants during May, following any needed replacements during the previous planting season. Assume responsibility for the plants until the Final Acceptance of the project or a portion of the project.

702.3.07 Contractor Warranty and Maintenance

Project maintenance includes, but is not limited to, watering, cultivating, weeding, pruning, repairing, adjusting guys and stakes, and performing other work as ordered by the Engineer until final acceptance.

Promptly remove from the project area dead plants or those that no longer conform to the requirements of Subsection 702.2.A.2.

Mow the entire right-of-way within the limits of the project up to a maximum of four times per calendar year. Do not mow native restoration areas, wet swales, or riparian mitigation sites.

A. Leaning Trees

Straighten leaning trees as directed by the Engineer. Follow Staking and Guying requirements for replacements or repairs as per Subsection 702.3.05.E.

B. Shrub Maintenance

1. Pruning

Prune dead or diseased limbs to provide for plant health and appearance as directed by the Engineer.

2. Landscape Mulching

Continuously maintain shrub and tree beds with a clean, freshly mulched appearance using the mulch originally specified. See Subsection 702.3.05.C. Do not mulch shrub and tree beds within riparian mitigation sites.

a. Apply a 2 in. (50 mm) loose layer of specified mulch (top-dressing) on top of all areas, including tree pits, initially mulched, at the following times:

- 1) In August, during the first plant establishment period.
- 2) In April, during the second plant establishment period.
- 3) In August, during the second plant establishment period.
- 4) In April, prior to the final inspection.

3. Applying Fertilizer

See Subsection 702.3.05.H.

Section 702 — Vine, Shrub, and Tree Planting

4. Applying Pesticides

- a. Inspect all planted or seeded vegetation for insects, grubs, mites, diseases, etc., once every two weeks. Apply insecticides, fungicides, and herbicides according to the manufacturer's recommendations to effectively control or eradicate the problem.
- b. Perform all pesticide applications under the direct supervision of a trained licensed commercial pesticide operator whose license includes subcategory 27 – Right of Way Pest Control. Carry the pesticide license/certification on the work site during applications. Carry all labeling associated with the chemical being applied at the work site.
- c. Submit all product information data sheets and EPA approval numbers on all pesticides proposed to be used prior to application for approval.
- d. Notify the Engineer a minimum of 48 hours prior to any and all pesticide applications.
- e. Add a blue dye to all spray applications unless approved otherwise by the Engineer.
- f. Monitor the weather and spray under proper weather conditions. Spraying shall not occur when the weather is greater than 10 miles per hour.
- g. Wear the proper safety attire. Wear long sleeve shirts, long pants, gloves, and safety glasses. Wear or use any additional protective safety attire or gear as recommended by the product's manufacturer.
- h. Repair any damage that is a result of mishandling or misuse of materials, at no expense to the ~~Department Sponsor~~, to the satisfaction of the Engineer.
- i. For stream buffer and marsh restoration areas, pesticides are not to be used unless approved by the Department Ecology Manager.

5. Edging

- a. Edge all shrub pits, shrub beds, and tree pits once a month throughout the life of the project such that the vee-cut edging detail specified on the plans is maintained. Prevent grass and weeds from growing over or into the shrub beds and tree pits.
- b. Use equipment specifically designed for edging. Line trimming equipment shall not be used.

6. Watering

- a. Check all planted material once a week throughout the contract for dryness by removing the mulch from their base and "sampling the soil" approximately 4 in. (100mm) deep. Water if the soil is not moist.
 - b. Water all planted material if a drought (no rain for two weeks) occurs. Provide the water required to meet the watering requirements.
 - c. Water each plant thoroughly until the ground is saturated to a depth slightly below the root ball. Apply water in a manner to prevent erosion.
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Section 702 — Vine, Shrub, and Tree Planting

7. Weed Control

Perform weed control throughout the project, a minimum of once every two weeks, in all areas within the project limits to maintain tree pits, shrub beds, sidewalks, curb and gutter, walkways, ditch paving, concrete medians, and other pavement weed free. Meet the following conditions:

- a. Perform weed control to prevent weeds from becoming established, setting seed, or from becoming visible in the planting beds.
- b. Completely remove all undesirable plants (weeds) by hand pulling. Removal of weeds may be accomplished using herbicides if approved by the Engineer. However, the use of herbicides is prohibited in stream buffer areas unless approved by the Department Ecology Manager.
- c. Apply an approved pre-emergent herbicide twice each year, once in the spring and once in the fall, throughout the contract. The use of pre-emergent herbicides is prohibited in stream buffer areas. Apply pre-emergent to all shrub beds and tree pits. Notify the Engineer 48 hours prior to spraying. Use a blue dye in all applications unless approved otherwise by the Engineer.
- d. Eradicate all invasive exotic pest plants found within the project limits throughout the life of the project, including stream buffer and marsh areas. Volunteer, non-invasive plant material within stream buffer restoration areas is acceptable.
- e. Dispose off site on a daily basis all weed, exotic plants, clippings, litter, and debris generated.

8. Policing

Remove debris such as paper, broken limbs, bottles, cans, etc., a minimum of the first and third week of each month from all areas within the project limits while maintaining the site.

9. Mitigation Areas

Pruning, mulching, edging, and applying spring fertilizer are not required within wet swales, native restoration areas, stream buffers and regenerated forest areas.

C. Tree Maintenance

1. Watering

See Subsection 702.3.07.B.6

2. Landscape Mulch

See Subsection 702.3.07.B.2

3. Fertilizer

See Subsection 702.3.05.H.

4. Abnormal Conditions

Periodically (once every two weeks) observe trees and shrubs for abnormal conditions such as insects, borers, web worms, red spiders, etc., and immediately treat.

5. Sucker Growth

Remove sucker growth once a month. Sucker growth is the shoots that sprout out around the base of the tree trunk.

6. Pruning and Deadwood

Remove deadwood at least two times a year. Prune dead branches. Paint cuts, and wounds or scars with tree paint only when specified in the plans. Do not top Grape Myrtles. See Subsection 702.3.05.F.

7. Pesticide Control

NOTE: Apply pesticides as necessary to control harmful insects and diseases. Follow the manufacturer's instructions. See Subsection 702.3.07.B.4. NOTE: Use chemicals according to Federal, State and county directives on environmental control that carry an EPA approval number.

8. Weed Control

See Subsection 702.3.07.B

Section 702 — Vine, Shrub, and Tree Planting

9. Staking and Guying

Remove all support guy wires, strapping and stakes from plants which have gone through one complete growing season.

702.4 Measurement

A. Plants

Plants of the name and size specified are measured for payment according to the number planted that are still living and viable and in an acceptable condition at the time of Final Acceptance. A viable plant must have a minimum of 75 percent of the leaf-bearing crown with healthy foliage.

B. Fertilizer

Spring application fertilizer applied to planted and regenerated areas will be the actual number of pounds (kilograms) placed and accepted. Fertilizer, lime, and plant topsoil used in prepared plant topsoil or plant bed preparation are not measured for separate payment. For stream buffer and marsh areas, the addition of fertilizer or lime is prohibited.

C. Perimeter Stakes

Perimeter stakes is not measured for payment unless such item is shown as a separate Pay Item in the proposal.

D. Clearing and Grubbing

Clearing and grubbing is not measured for payment unless the Item is shown as a separate Pay Item in the proposal.

E. Landscape Mulch

The quantity of landscape mulch and top-dressing measured for payment will be the actual number of square yards (meters) completed as specified and accepted. The presence of weeds or other growth, or foreign material, will be cause for rejection.

702.4.01 Limits

General Provisions 101 through 150.

702.5 Payment

A. Plants

Plants measured for payment will be paid for as follows:

1. After planting satisfactorily, the Department Sponsor will pay 50 percent of the Contract Unit Price bid per each on the next estimate.
2. Until Final Acceptance, perform all required maintenance according to Subsection 702.3.07 when necessary or as ordered by the Engineer.

If the Contractor fails to properly maintain the landscaping, daily charges shall be assessed against any money due or that may become due the Contractor in accordance with the schedule of deductions shown in Subsection 108.08, but not less than \$150 per calendar day, and will continue until project maintenance is approved by the Engineer.

The charges are in addition to those specified for delay or failure in completing the Work within the specified time.

3. After the first semi-final inspection, the Department Sponsor will pay 15 percent of the Contract Unit Price bid per each of the live, viable plants.
 4. After the second semi-final inspection, the Department Sponsor will pay 15 percent of the Contract Unit Price bid per each of the live, viable plants.
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Section 702 — Vine, Shrub, and Tree Planting

- At Final Acceptance, the Department Sponsor will pay the remaining 20 percent less the Full Contract Unit Price bid per each plant not accepted.

Payments are full compensation for furnishing, planting, replanting as required, pruning, staking, guying, soil conditioning, and preparing plant beds, including applying additives, digging plant pits, preparing plant topsoil and mulch, disposing of waste material, and maintaining the plants during the plant-establishment period.

B. Fertilizer

All grades of fertilizer applied in the spring, measured as specified above, are paid for at the Contract Price per pound (kilogram) or per ton (megagram), whichever is indicated in the proposal. Payment is full compensation for furnishing and applying and for watering regenerated areas.

For native restoration, stream buffer and marsh restoration areas, the addition of fertilizer or lime is prohibited.

C. Perimeter Stakes

Perimeter stakes will not be measured for payment. The cost will be included in the overall contract price.

D. Landscape Mulch

Landscape mulch measured for payment will be paid for as follows:

- After mulching satisfactorily, the Department Sponsor will pay 40 percent of the Contract Unit Price bid per square yard (meter).
- After satisfactorily completing mulch (topdressing) in August of the first plant establishment period, the Department Sponsor will pay 15 percent of the Contract Unit Price bid per square yard (meter).
- After satisfactorily completing mulch (topdressing) in April of the second plant establishment period, the Department Sponsor will pay 15 percent of the Contract Unit Price bid per square yard (meter).
- After satisfactorily completing mulch (topdressing) in August of the second plant establishment period, the Department Sponsor will pay 15 percent of the Contract Unit Price bid per square yard (meter).
- After satisfactorily completing mulch (topdressing) in April of the final planting season, (a month before the Final Inspection), the Department Sponsor will pay 15 percent of the Contract Unit Price bid per square yard (meter).
Such payment shall be full compensation for furnishing, installing, topdressing, and maintaining mulch as required.
- Do not mulch marsh restoration areas.
- Do not apply additional applications of mulch after the initial application in stream buffer restoration areas.

Payment will be made under:

Item No. 702-1	Trees (Crepe Myrtle)	Per each
Item No. 702-2	Trees (Hardwoods)	Per each
Item No. 702-3	Landscaping (Small flowering plants)	Per square feet (meter)

702.5.01 Adjustments

General Provisions 101 through 150.

Section 708—Plant Topsoil

708.1 General Description

This work includes furnishing and applying approved plant topsoil at the locations shown on the plans or as directed by the Engineer and according to these specifications.

708.1.01 Definitions

General Provisions 101 through 150.

708.1.02 Related References

A. Standard Specifications

Section 104—Scope of Work

Section 106—Control of Materials

Section 107—Legal Regulations and Responsibility to the Public

Section 893—Miscellaneous Planting Materials

B. Referenced Documents

General Provisions 101 through 150.

708.1.03 Submittals

General Provisions 101 through 150.

708.2 Materials

A. Plant Topsoil Materials

Use plant topsoil that meets the requirements of Subsection 893.2.01.

B. Sources of Material

Except as modified in this Section, furnish plant topsoil material according to Section 106.

1. Plant Topsoil Obtained from the Work

The requirements of Subsection 104.06, *Right in and Use of Material Found on the Work* are in effect for plant topsoil obtained from the work.

- a. Obtain the quantity of plant topsoil called for on the plans.
- b. Use plant topsoil material present on the Project as long as the topsoil meets the specifications applying to the Item.
- c. Excavate for topsoil only within the construction limits of the project. Obtain topsoil from embankment areas, excavation areas, or borrow excavation pits.
- d. When obtaining plant topsoil from borrow excavation pits or the roadway, cross section the excavated areas a second time before beginning regular excavation.

2. Plant Topsoil Furnished by the Contractor

When insufficient material is obtainable from the work, obtain additional topsoil offsite.

The Contract Price will include the costs necessary to locate, purchase, and deliver the required amount of acceptable material to the Work.

Section 708 — Plant Topsoil

708.2.01 Delivery, Storage, and Handling

For the purpose of measurement, the Contractor may haul plant topsoil in any type of vehicle, provided the vehicle when loaded to capacity and traveling over public roads and streets meets the provisions of Subsection 107.14, *Load Restrictions*.

When using pans or scrapers, the capacity will be the manufacturer's rated capacity.

708.3 Construction Requirements

708.3.01 Personnel

General Provisions 101 through 150.

708.3.02 Equipment

General Provisions 101 through 150.

708.3.03 Preparation

General Provisions 101 through 150.

708.3.04 Fabrication

General Provisions 101 through 150.

708.3.05 Construction

A. General Requirements

Unless otherwise specified in the plans, uniformly spread plant topsoil to at least 2 in. (50 mm) loose depth.

1. Erosion Control

Only use plant topsoil on slopes where the gradient is 3:1 or flatter.

To reduce loss of plant topsoil by erosion, place the soil shortly before and in conjunction with grassing operations.

Place topsoil and complete grassing within specified seasonal limits.

2. Spreading Procedure

Before applying plant topsoil, scarify the designated areas 6 in. to 8 in. (150 mm to 200 mm) deep.

Mix the plant topsoil, lime when required, and the first application fertilizer with the underlying soil when preparing the soil for grassing. Spread and smooth the topsoil uniformly.

B. Plant Topsoil Obtained from The Work

1. Stockpiling

When obtaining topsoil from the work site, strip and stockpile the topsoil in suitable locations in advance of grading operations.

Just before grassing, remove the plant topsoil from the stockpile and spread it over the designated areas.

If grassing is started before grading operations are finished, if feasible, haul the topsoil from undisturbed areas before grading begins directly to the areas designated for the topsoil, eliminating the cost of stockpiling and removing the stockpile.

2. Surplus Material

When stockpiling more material than specified in the Contract, use the surplus material as additional plant topsoil material if directed by the Engineer.

After constructing the Item, use the surplus material left in the stockpiles to maintain the Item or to fill washes that occur within a reasonable haul distance.

Otherwise, remove or dress down the remaining material as directed by the Engineer, without additional compensation.

Section 708 — Plant Topsoil

C. Plant Topsoil Furnished by Contractor

When locating, obtaining, and paying for plant topsoil from pits outside the right-of-way, excavate the topsoil and haul it directly to the designated areas just before the planting begins.

Notify the Engineer, according to Subsection 893.2.01, *Plant Topsoil*, of the source of the material. The Engineer will inspect the topsoil. If the material is suitable, the Engineer will specify the permissible excavation depth. If the permissible excavation depth is exceeded, the material obtained from the areas will be rejected.

708.3.06 Quality Acceptance

After placing the plant topsoil, replace material lost by erosion at no expense to the Department Sponsor.

708.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

708.4 Measurement

Accepted plant topsoil for this Item is measured by the cubic yard (meter) of material delivered in vehicles to the designated areas for plant topsoil. Only vehicles loaded to full capacity are measured for payment. No payment will be made for material delivered in partially filled vehicles.

Plant topsoil is not measured for payment when it is used for an Item that includes the cost of the plant topsoil in the price bid per Unit for the Item.

708.4.01 Limits

General Provisions 101 through 150.

708.5 Payment

Plant topsoil, eligible for payment, will be paid for at the Contract Unit Price per cubic yard (meter). Payment is full compensation for furnishing the material, removing objectionable matter from the material, loading and unloading, stockpiling and removing from the stockpile, hauling, spreading, preparing the ground, pulverizing, mixing, remixing, and for all maintenance.

Payment will be made under:

Item No. 708-1	Topsoil (Final Placement), 4 inch	Per cubic yard (meter)
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708.5.01 Adjustments

General Provisions 101 through 150.

Section 815—Graded Aggregate

815.1 General Description

This section includes the requirements for material to be used for base, subbase, or shoulder course material, and includes graded aggregate, unconsolidated limerock base, and recycled concrete base.

815.1.01 Related References

A. Standard Specifications

Section 800—Coarse Aggregate

B. Referenced Documents

AASHTO T 11

AASHTO T 27

AASHTO T 193

ASTM C 295

ASTM D 3042

FL DOT Method FM5-515

SOP-1

QPL-2

GDT 63

EPA Method 3050/6010

EPA Method 1311

EPA Polarized Light Microscopy Method

EPA Transmission Electron Microscopy Method

815.2 Materials

815.2.01 Graded Aggregate

A. Requirements

1. Type

Use graded aggregate base, subbase, or shoulder course material of uniform quality.

a. Obtain the graded aggregate from an approved source or deposit that will yield a satisfactory mixture meeting all requirements of this specification.

b. Use material that is crushed or processed as a part of the mining operations, or, mix two grades of material so that when combined in the central mix plant, the mixture meets the specifications.

c. May use material that is a blend of not more than 20 percent (max) recycled crushed concrete from known sources (see 815.2.03.A.1.a) and virgin aggregate if approved by the Office of Materials and Testing.

2. Retained on the No. 10 (2 mm) sieve

Ensure the material retained on the No. 10 (2 mm) sieve is Class A or B aggregate that meets the requirements of Section 800.

Section 815 — Graded Aggregate

3. Passing the No. 10 (2 mm) sieve

Ensure material passing the No. 10 (2 mm) sieve is relatively free of detrimental substances, such as soil overburden, decomposed rock, and/or swelling silts.

4. Stabilized Mixtures

Ensure mixtures to be stabilized react satisfactorily when mixed with Portland cement. The Engineer will specify the percentage of Portland cement to use.

5. Gradation

Grade the graded aggregate base, subbase, or shoulder material as follows:

Sieve Size	Percent Passing By Weight
Group I Aggregates	
2 in. (50 mm)	100
1-1/2 in. (37.5 mm)	95-100
3/4 in. (19.0 mm)	60-95
No. 10 (2 mm)	25-50 (Note 1, 2 and 3)
No. 60 (250 µm)	10-35
No. 200 (75 µm)	7-15
Group II Aggregates	
2 in. (50 mm)	100
1-1/2 in. (37.5 mm)	95-100
3/4 in. (19 mm)	60-90
No. 10 (2 mm)	25-45 (Note 2 and 4)
No. 60 (250 µm)	5-30
No. 200 (75 µm)	4-11
NOTE 1: Group I aggregates having less than 37% passing the No. 10 (2 mm) sieve, shall have at least 9 percent passing the No. 200 (75 µm) sieve.	
NOTE 2: For graded aggregate stabilized with Portland Cement, 30-50 percent by weight shall pass the No. 10 (2 mm) sieve. All other requirements remain the same.	
NOTE 3: Material passing the No. 10 (2 mm) sieve shall have a sand equivalent of at least 20 for Group I aggregates.	
NOTE 4: Material passing the No. 10 (2 mm) sieve shall have a sand equivalent of at least 28 for Group II aggregates. Sand Equivalent values as low as 20 will be acceptable provided they are attributed exclusively to rock flour and the percent passing the No. 10 (2 mm) sieve does not exceed 40.	

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Section 815 — Graded Aggregate

Test	Method
Material that passes a No. 200 (75µm) sieve	AASHTO T 11
Gradation	AASHTO T 27
Sand Equivalent	GDT 63

D. Materials Warranty

General Provisions 101 through 150.

815.2.02 Unconsolidated Limerock Base

A. Requirements

1. Type

Use limerock base, subbase, or shoulder course material of uniform quality.

- a. To ensure uniform quality, the Department may restrict approved sources to specific mining areas, mining processes at a specific mining site, or both.
- b. Use a limerock base that yields a mixture to meet these specifications.
- c. Use material that is crushed or processed as a part of the mining operations, or mix two grades of material so that when combined in the central mix plant the mixture meets the specifications.
- d. Use limerock base, subbase, or shoulder material that has the following characteristics:

Limerock bearing ratio	At least 100.
Deleterious substances	Do not allow chert or other extremely hard pieces that will not pass the 2 in. (50 mm) sieve. Do not allow clay, sand, organics, or other materials in quantities that may damage bonding, finishing, or strength. All material passing the No. 40 (425 µm) sieve shall be non-plastic.
Carbonate content (magnesium or calcium)	At least 80%.

2. Gradation

Grade the limerock base so at least 97 percent by weight passes the 3-1/2 in. (90 mm) sieve.

- a. Grade the material uniformly to dust. The fine portion passing the No. 10 (2 mm) sieve shall all be dust of fracture.
- b. Crush or break the limerock base, if necessary to meet size requirements before placing the material on the road.
- c. Ensure materials having soundness losses of 20 percent or less, comply with the following gradation requirements:

Section 815 — Graded Aggregate

GRADATION REQUIREMENTS

Sieve Size	Percent Passing By Weight
2 in. (50 mm)	100
1-1/2 in. (37.5 mm)	95-100
¾ in. (19 mm)	60-95
No. 10 (2.00 mm)	25-45
No. 60 (250 µm)	10-30
No. 200 (75 µm)	7-20

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Material that passes a No. 200 (75µm) sieve	AASHTO T 11
Gradation	AASHTO T 27
Limerock bearing ratio	FL DOT Method FM5-515
Petrographic analysis	ASTM C 295
Total carbonates (insoluble residue)	ASTM D 3042

D. Materials Warranty

General Provisions 101 through 150.

815.2.03 Recycled Concrete Base

A. Requirements

1. Sources

Use recycled concrete materials from sources approved by the Office of Materials and Testing and listed on Qualified Products List 2. The criteria for approval will be as outlined in Standard Operating Procedure No. 1, "Monitoring the Quality of Coarse and Fine Aggregates" except the raw material will be recyclable concrete as specified herein rather than a geological deposit of aggregate.

2. Type

a. Recycled Concrete Base from Known Sources

Use recycled concrete derived exclusively from Portland cement concrete pavement or structural concrete as a base, subbase, or shoulder course.

Section 815 — Graded Aggregate

b. Recycled Concrete Base from Unknown Sources

Use recycled concrete derived from sources of demolition materials that comply with the following requirements as a base, subbase or shoulder course. Due to the condition and type of raw material used to produce this base and the resulting difficulty in producing a consistent product, refer to SOP-1 for environmental requirements and preferred production procedures.

Ensure the finished product does not exceed the regulatory limit for asbestos of 1 percent (based on microscopy) and the regulatory limit for lead of 5 ppm. These determinations must be made prior to shipping.

Ensure the California Bearing Ratio (CBR) of the finished product is not less than 140.

3. Gradation and Load-Bearing Capacity

Ensure the finished product meets the quality and gradation requirements of Subsection 815.2.01 for Group II aggregates, except the material finer than a #200 (75µm) sieve shall be 2 – 11 percent.

Ensure the California Bearing Ratio (CBR) of the finished product is not less than 140.

4. Contaminants

Ensure the recycled concrete is substantially free of foreign materials such as steel reinforcement, wood, clay balls, soils, epoxy expansion material and non-construction materials.

Note – Substantially free, in the context of this specification, shall mean concentrations of the above-mentioned foreign materials individually shall not exceed 0.1 percent by weight, nor shall the total concentration of these materials exceed 0.5 percent by weight.

Ensure the finished product does not exceed the regulatory limit for asbestos of 1% (based on microscopy) and the regulatory limit for lead of 5 ppm.

Keep the following ancillary materials within these limits:

Substance	Maximum Percent by Weight
Brick	2
Asphaltic Concrete	5
Weathered Rock	2
Any combination of Brick, Asphaltic Concrete or Weathered Rock	7

B. Fabrication

General Provisions 101 through 150.

Section 815 — Graded Aggregate

C. Acceptance

Test as follows:

Test	Method
Gradation	AASHTO T 27
Material that passes a #200 (75µm) sieve	AASHTO T 11
Sand Equivalent	GDT 63
California Bearing Ratio (CBR)	AASHTO T 193
Petrographic Analysis	ASTM C 295
Total Lead	EPA Method 3050/6010
Toxicity Characteristic Leaching Procedure	EPA Method 1311
Asbestos	EPA Polarized Light Microscopy Method or EPA Transmission Electron Microscopy Method

D. Materials Warranty

General Provisions 101 through 150.

Section 824—Cationic Asphalt Emulsion

824.1 General Description

This section includes the requirements for cationic asphalt emulsions.

824.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 49

AASHTO T 44

AASHTO T 51

AASHTO T 53

AASHTO T 59

AASHTO T 72

AASHTO T 301

AASHTO T 302

ASTM D 5546 - 01

QPL 65

GDT 44

GDT 91

GDT 135

824.2 Materials

824.2.01 Cationic Asphalt Emulsion

A. Requirements

1. Use a homogenous emulsion. After thorough mixing at the viscosity testing temperature, the emulsion cannot show signs of separation within 30 days from manufacture date.
2. Use cationic emulsion grades that meet the requirements in Table 1, Table 2, Table 3 and Table 4.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Testing emulsified asphalts (with the following exception):	AASHTO T 59
Frictional value	GDT 44

Section 824 — Cationic Asphalt Emulsion

Coating, after spraying												
Coating, wet aggregate												
Coating, after spraying												
Particle charge test AASHTO T59	Positive		Positive		Positive		Positive		Positive		Positive	
Sieve test, percent AASHTO T59		0.10		0.10		0.10		0.10		0.10		0.10
Oil distillate by vol. of emulsion, % AASHTO T59		3		3		3		3				
Residue, By Distillation, (%) (Note 7)	60		65		65		65		57		60	
Residue, By Evaporation, (%) (Note 8)	60		65		65		65		57		60	
Test on Residue from Distillation Test: Penetration, 77 °F (25 °C), 100 g, 5 sec., (dmm) AASHTO T49	40	100	80	140	60	110	80	175	40	90	40	90
Ductility, 77 °F (25 °C), 5 cm/min., (cm) AASHTO T51	40		40		40		125		40		40	
Solubility in trichloroethylene, % AASHTO T44	97.5		97.5		97.5		97.5		97.5		97.5	
Softening Point (°F) AASHTO T53 or other method approved by Office of Materials and Testing							125				135	
Elastic Recovery @ 77°F (25 °C), % AASHTO 301							50					

Section 824 — Cationic Asphalt Emulsion

Note 1: May be acceptable for limited use in conjunction with OMAT's recommendation

Note 2: Slurry Seal containing CQS-1h must set sufficiently within 2 hours to allow traffic to resume.

Note 3: In the laboratory, Slurry Seal containing CQS-1h shall not set while being mixed according to GDT 91 for a minimum of 90 seconds.

Note 4: Failure to break within 30 minutes after application and/or other than minor tracking of the tack once it has broken may subject the non-tracking tack product to re-evaluation for QPL 7 "Georgia's List of Approved Bituminous Materials".

Note 5: The 24-hour storage stability test may be used. However, this test does not predict whether the 5-day settlement test will pass.

Note 6: Perform the demulsibility test within 30 days from date of manufacture.

Note 7: AASHTO T 59 modified to include a maximum temperature of 350 °F ± 10 °F to be held for 20 minutes.

Note 8: Use Residue by Evaporation for all testing on residue material. Residue by Distillation may be used if penetration, softening point and/or ductility test fail on residue by evaporation.

Table 2—Requirements for Special Emulsified Asphalts				
Grade	Manufacturer Specific (Note 1)		C-AEP	
Type	Tack Coat		Prime	
Tests	Min.	Max.	Min.	Max.
Viscosity. Saybolt Furol at 77 °F (25 °C), sec. AASHTO T72	15	150	10	50
Storage stability test, (Note 2) 24 hours, % AASHTO T59		1		1
Settlement (Note 2) 5 days, % AASHTO T59		5		5
Particle charge test AASHTO T59	Positive		Positive	
Sieve test, percent AASHTO T59		0.20		0.10
Oil distillate by vol. of emulsion, % AASHTO T59		1	5	12
Residue, By Evaporation (%) (Note 3)	50		45	
Residue, By Distillation, (%) (Note 3)	50		45	
Test on Residue from Distillation Test: Penetration, 77 °F (25 °C), 100 g, 5 sec., (dmm) AASHTO T49		90		
Softening Point (°F) AASHTO T53 or other method approved by Office of Materials and Testing	125			
Solubility in Trichloroethylene, (Percent)			97.5	
Float at 140 °F (60 °C), (Sec.)			20	

Note 1: Failure to break within 30 minutes after application and/or other than minor tracking of the tack once it has broken may subject the non-tracking tack product to re-evaluation for QPL 7 "Georgia's List of Approved Bituminous Materials".

Section 824 — Cationic Asphalt Emulsion

Note 2: The 24-hour storage stability test may be used. However, this test does not predict whether the 5-day settlement test will pass.

Note 3: Use Residue by Evaporation or Distillation for all testing on residue material. Residue by Distillation may be used if penetration, softening point and/or ductility test fail on residue by evaporation.

Table 3—Requirements for Cationic Emulsified Asphalt										
Type	Medium Setting					Slow Setting				
Grade	CMS-2		CMS-1P (Note 1)		CMS-1P(R) (Notes 1 & 5)		CSS-1h		ECR-1	
Uses	Pre-Coating		Scrub Seal		Rejuv.Seal		Slurry Seal		(Note 2)	
Tests	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Viscosity. Saybolt Furol at 77 °F(25 °C), sec. AASHTO T 72			50	350	20	100	20	100	50	500
Viscosity. Saybolt Furol at 122 °F (50 °C), sec. AASHTO T 72	50	450								
Storage stability test, (Note 3) 24 hours, percent AASHTO T 59		1		1		1		1		1
Settlement (Note 3) 5 days, percent AASHTO T59		5		5		5		5		5
Demulsibility (Note 4) 35 ml, 0.8% dioctyl sodium sulfosuccinate, percent										
Coating Ability and Water Resistance: AASHTO T 59										
Coating, dry aggregate	Good									
Coating, after spraying	Fair									
Coating, wet aggregate	Fair								Good	
Coating, after spraying	Fair									
Particle charge test AASHTO T59	Positive		Positive		Positive		Positive		Positive	
Sieve test, percent AASHTO T59		0.10		0.10		0.10		0.10		0.10

Section 824 — Cationic Asphalt Emulsion

Oil distillate by volume of emulsion, percent AASHTO T59		12		0.5		0.5				6
Residue, By Evaporation, (%) (Note 6) AASHTO T59	65		60		57		57		60	
Residue, By Distillation, (%) (Note 6) AASHTO T59	65		60		57		57		60	
Test on Residue from Distillation Test: Penetration, 39.2 °F (4 °C), 200 g, 60 sec., (dmm) AASHTO T49			30	90	30	90				
Test on Residue from Distillation Test: Penetration, 77 °F (25 °C), 100 g, 5 sec., (dmm) AASHTO T49	100	250					40	90	125	225
Ductility, 77 °F (25 °C), 5 cm/min., (cm) AASHTO T51	40						40		40	
Solubility in trichloroethylene, % AASHTO T44	97.5						97.5		97.5	
Softening Point (°F) AASHTO T53 or other method approved by Office of Materials and Testing			125		125					

Note 1: May be acceptable for limited use in conjunction with OMAT's recommendation

Note 2: Use ECR-1 in cold mix recycling of reclaimed pavements.

Note 3: The 24-hour storage stability test may be used. However, this test does not predict whether the 5-day settlement test will pass.

Note 4: Perform the demulsibility test within 30 days from date of manufacture.

Note 5: Use CMS-1P(R) as a Rejuvenation Seal diluted 1:1. Sample undiluted for testing at the manufacture site. Sample diluted for testing from distributor on project (Minimum Residue 29%).

Note 6: Use Residue by Evaporation for all testing on residue material. Residue by Distillation may be used if penetration, softening point and/or ductility test fail on residue by evaporation.

824.2.02 Latex-Modified Cationic Asphalt Emulsion

A. Requirements

1. Latex Rubber Additive (LRA)

- Ensure the LRA is a natural latex or an unvulcanized styrene-butadiene rubber in an emulsified latex form.
- Ensure that the LRA comes from an approved source listed in the Department's current QPL 65 for use in cationic asphalt emulsion.

Section 824 — Cationic Asphalt Emulsion

2. Latex-Modified Cationic Asphalt Emulsion

- a. Use PG58-22 as the base asphalt.
- b. Co-mill the LRA and asphalt cement while manufacturing the emulsified asphalt to produce a homogeneous mixture.
- c. Ensure the latex-modified cationic asphalt emulsion, when undisturbed for 24 hours, shows no separation of emulsion and LRA and no color striations, but has a uniform color throughout.
- d. Use a latex-modified cationic asphalt emulsion that meets the requirements in Table 4.

Table 4 – Requirements for Latex-Modified Cationic Asphalt Emulsion

Type	Rapid Setting	
Grade	CRS-2L	
Use	Surface Treatment	
Tests on Emulsion	Min	Max
Viscosity, Saybolt Furol @ 122 °F (50 °C), sec. AASHTO T 72	100	400
Storage stability, 24 hours, percent AASHTO T 59		1
Settlement, 5 days, percent AASHTO T 59		5
Demulsibility, 35 ml, 0.8% dioctyl sodium sulfosuccinate, percent AASHTO T 59	40	
Particle charge test AASHTO T59	Positive	
Sieve test, percent AASHTO T 59		0.10
Oil distillate by volume of emulsion, percent AASHTO T 5 9		3
Residue by Evaporation, percent (Notes 1 & 2)	65	
Residue by Distillation, percent AASHTO T 59 (Note 3)	65	
Tests on Emulsion Residue	Min	Max
Penetration @ 77 °F (25 °C), 100g, 5 sec., (dmm) AASHTO T 49	80	175
Ductility, @ 77 °F (25 °C), 5 cm/min., (cm) AASHTO T 51	125	
Elastic recovery @ 77°F (25°C), (%) AASHTO 301	50	
Softening Point (°F) AASHTO T53 or other method approved by Office of Materials and Testing	125	
1. GDT-135, Residue by evaporation. 2. Use Residue by Evaporation for all testing on residue material. Residue by Distillation may be used if penetration, softening point and/or ductility tests fail on residue by evaporation. 3. AASHTO T 59 modified to include a maximum temperature of 350 °F ± 10 °F to be held for 20 minutes.		

Note 1: GDT-135, Residue by evaporation.

Note 2: Use Residue by Evaporation for all testing on residue material. Residue by Distillation may be used if penetration, softening point and/or ductility tests fail on residue by evaporation.

Note 3: AASHTO T 59 modified to include a maximum temperature of 350 °F ± 10 °F to be held for 20 minutes.

B. Fabrication

General Provisions 101 through 150.

Section 824 — Cationic Asphalt Emulsion

C. Acceptance

Test as follows:

Test	Method
Penetration of bituminous materials	AASHTO T 49
Ductility	AASHTO T 51
Softening point of bitumen	AASHTO T 53
Testing emulsified asphalts	AASHTO T 59
Viscosity	AASHTO T 72
Elastic recovery	AASHTO T 301
Polymer content of polymer-modified emulsions	AASHTO T 302
Solubility of asphalt binders in toluene by centrifuge	ASTM D 5546 – 01
Residue by evaporation of latex-modified asphalt emulsions	GDT-135

D. Materials Warranty

General Provisions 101 through 150.

Section 828—Hot Mix Asphaltic Concrete Mixtures

828.1 General Description

This specification includes the requirements for hot mix asphaltic concrete mixtures, including:

- Open-graded surface mixtures (OGFC and PEM)
- Stone Matrix Asphalt mixtures (SMA)
- Superpave mixtures
- Fine-graded (4.75 mm) mixtures

828.1.01 Definitions

The Nominal Maximum Sieve Size is one standard sieve size larger than the first sieve to retain more than ten percent of the aggregate, per AASHTO R35. Mixture types in this section are identified according to Nominal Maximum Sieve Size.

828.1.02 Related References

A. Standard Specifications

Section 400-Hot Mix Asphaltic Concrete Construction

Section 402-Hot Mix Recycled Asphaltic Concrete

Section 800—Coarse Aggregate

Section 802—Aggregates for Asphaltic Concrete

Section 819—Fiber Stabilizing Additives

Section 820—Asphalt Cement

Section 831—Admixtures

Section 882—Lime

Section 883—Mineral Filler

B. Referenced Documents

AASHTO R30

AASHTO R35

AASHTO T 321

AASHTO T 112

AASHTO T 209

AASHTO T 305

AASHTO T 312

AASHTO T 245

AASHTO T 324

AASHTO T 340

SOP-36

SOP-2

GDT 1

GDT 56

GDT 63

Section 828 — Hot Mix Asphaltic Concrete Mixtures

GDT 66

GDT 114

GDT 115

GDT 123

QPL 1

QPL 2

QPL 7

QPL 26

QPL 41

QPL 77

QPL 81

828.2 Materials

A. Requirements

Use approved hot mix asphalt concrete mixtures that meet the following requirements:

1. Produce each asphalt mixture according to a Department approved Job Mix Formula and Asphalt Mix Design, see Subsection 400.1 for submittal and approval of Job Mix Formulas.
 2. Ensure individual acceptance test results meet the Mixture Control Tolerances specified in the appropriate table below, Subsections 828.2.01 through 828.2.04.
 3. Ensure the Engineer approves all materials used to prepare and place the mixtures before incorporating them into the Work. Use only the ingredients listed in the approved Asphalt Mix Design and Job Mix Formula. For virgin aggregates use sources meeting the requirements of Section 802 and are listed in QPL 1 or QPL 2; for mixes in which local sand is permitted, use the approved sand source identified in the mix design. For mixtures containing Reclaimed Asphalt Pavement (RAP), use only RAP from the approved stockpile identified in the mix design. Use asphalt cement meeting the requirements of Section 820, from a source listed in QPL 7.
 4. Obtain approved SMA mix designs, Superpave mix designs and 4.75 mm mix designs from a mix design laboratory certified by the Department. Obtain approved mix designs for types PEM and OGFC mixtures from the Department's Office of Materials, which produces and furnishes these mix designs.
 5. Ensure all SMA mix designs are designed in accordance with GDT-123 ("Determining the Design Proportions of Stone Matrix Asphalt Mixtures"). Ensure SMA mix designs are verified and approved by the Department prior to use. Ensure Superpave and 4.75 mm mix designs are designed in accordance with SOP-2 ("Control of Superpave Bituminous Mixture Designs") and are approved by the Department as provided therein. Ensure these mixes are designed by a laboratory and technician certified in accordance with SOP-36, ("Certification of Laboratories and Personnel for Design of SMA and Superpave Asphalt Mixtures").
 6. Use only mixtures composed of the aggregate groups and blends indicated in the Proposal and Plans by their pay item designations, defined as follows:
-

Section 828 — Hot Mix Asphaltic Concrete Mixtures

TABLE 1 – AGGREGATE GROUPS

Pay Item Designation	Allowable Aggregate Groups
Group I or II	Group I, Group II, or Blend I
Group II only	Group II only
Blend I	Either 100% Group II material or a blend of Group I and Group II. Do not use Group I material for more than 60%, by weight, of the total aggregate nor more than 50%, by weight, of the coarse aggregate fraction.

7. For patching or leveling use Group I, Group II, or Blend I. Mix types for patching and leveling are specified in Subsection 400.3.03.B.
8. Include lime (hydrated lime) from an approved source and meeting the requirements of Section 882 in all paving courses except as otherwise provided in the Contract. For a list of approved sources of lime, see QPL 41.
 - a. Add lime to each mixture at the rate prescribed in the approved mix design.
 - b. Ensure mix designs using only virgin aggregate include lime at a minimum rate of 1.00% of the total dry aggregate weight. Ensure mix designs using RAP include lime at a minimum rate equal to 1.00% of the virgin aggregate fraction plus 0.50% of the aggregate in the RAP fraction.
 - c. Add more lime or add lime plus an approved Heat-Stable Anti-Stripping Additive meeting the requirements of Section 831, if necessary to meet requirements for mixture properties, and pursuant to an approved mix design. However, the Department will not make additional payment for these materials. For a list of sources of Heat-Stable Anti-Stripping Additives, see QPL 26.
 - d. Where specifically allowed in the contract on LARP, airport, and parking lot projects, an approved Heat-Stable Anti-Stripping Additive meeting the requirements of Section 831 may be substituted for hydrated lime. Ensure the mix gradation is adjusted to replace the lime with an equivalent volume of fines passing the 0.075 mm sieve. Add Heat-Stable Anti-stripping Additive at a minimum rate of 0.5 percent of the asphalt cement portion.
9. Use performance grade PG 64-22 or PG 67-22 asphalt cement in all mix designs and mixtures except as follows:
 - a. The State Materials Engineer will determine the performance grade to be used, based on Table 2 – Binders Selection Guideline for Reclaimed Asphalt Pavement (RAP) Mixtures, AASHTO M323 and laboratory testing results as required in Section 828.2.B for mixtures containing $\geq 25\%$ equivalent binder replacement for RAP/RAS mixtures.
 - b. Use only grade PG 76-22, excluding shoulder construction in the following mixes: all SMA, 12.5 mm PEM, 9.5 mm and 12.5 mm OGFC, 12.5 mm Superpave, on projects with two-way ADT greater than 25,000; and in all mixtures for which polymer-modified asphalt is specified in the pay item.
10. Use of local sand is restricted as follows:
 - a. Do not place mixtures containing local sand on the traveled way of the mainline or ramps of the Interstate System. Mixtures with local sand may be used for shoulder construction on these facilities.
 - b. Ensure local sand will not constitute more than 20 % of the total aggregate weight of any mix design or production mix.
 - c. Subject to the above limits, 19 mm, 12.5 mm, and 9.5 mm Superpave mix designs and 4.75 mm mix designs containing local sand may be used on projects with a current ADT not exceeding 4,000 VPD providing that all performance testing meets specified requirements.
 - d. 25 mm Superpave mix designs containing not more than 20 % local sand may be used on all facilities except the main line and ramps of the Interstate System.
 - e. Obtain local sand for use in asphalt mixtures from a source approved by the Department.

Section 828 — Hot Mix Asphaltic Concrete Mixtures

- f. Approval of local sand sources: The Department will sample, test, and approve sources of local sand. Ensure local sand contains no more than 7.0% clay by weight and is free of foreign substances, roots, twigs, and other organic matter. Ensure sand is free of clay lumps, as determined by AASHTO T 112, and has a sand equivalent value exceeding 25%, as determined by GDT 63.

B. Fabrication

1. Design procedures: For all Superpave and 4.75 mm mixes, ensure conformance with the Superpave System for Volumetric Design (AASHTO T 312 and AASHTO R30), as adapted in SOP-2. Ensure Superpave mixes are designed at a design gyration number (N_{des}) of 65 gyrations and initial gyration number (N_{ini}) of 6 gyrations. Ensure 4.75 mm mixes, (N_{des}) are designed at 50 gyrations, and (N_{ini}) at 6 gyrations. Open-graded mix designs will be designed by the Department in accordance with GDT 114. In all cases, the procedure for measuring Maximum Specific Gravity (G_{mm}) is AASHTO T 209. In addition to gradation and volumetric analysis, ensure mix designs include the following performance tests, as applicable.
 2. Performance Test:
 - a. Permeability test: Ensure Superpave and Stone Matrix mix designs include testing according to GDT -1 Measurement of Water Permeability of Compacted Asphalt Paving Mixtures. Ensure specimen air voids for this test are 6.0 ± 1.0 %. The average permeability of three specimens may not exceed 3.60 ft per day (125×10^{-5} cm per sec).
 - b. Moisture susceptibility test: Fabricate and test specimens in accordance with GDT 66, when required by the Office of Materials and Testing due to visible signs of stripping in laboratory fabricated or plant produced asphaltic concrete mixtures, ensure specimen air voids for this test are 7.0 ± 1.0 % for all mixes excluding Stone Matrix mixes. Ensure specimen air voids for this test are 6.0 ± 1.0 % for Stone Matrix mixes. The minimum tensile splitting ratio is 0.80, except a tensile splitting ratio of no less than 0.70 may be acceptable if all individual strength values exceed 100 psi (690 kPa). Ensure average splitting strength of the three conditioned and three controlled samples are not less than 60 psi (415 kPa) for either group. Ensure retention of coating as determined by GDT 56 is not less than 95%.
 - c. Hamburg Wheel-Tracking Test for rutting and moisture susceptibility test: Ensure mix designs of all mix types except Open-graded Surface Mixes (OGFC and PEM), and Open-graded Crack Relief Interlayer (OGI) mix, include testing in accordance with AASHTO T 324. Ensure specimen air voids for this test are 7.0 ± 1.0 % for all mix types and at a testing temperature of 50°C (122°F). Use the testing and acceptance criteria established in Table 2.

TABLE 2 – HAMBURG WHEEL TRACKING DEVICE TESTING AND ACCEPTANCE CRITERIA

Binder Performance Grade (PG)	Mix Type	Number of Passes	Maximum Rut Depth	Stripping Inflection Point
PG 64-22 and PG 67-22	4.75 mm, 9.5 mm SP Type I, and 9.5 mm SP Type II	15,000	≤ 12.5 mm	$> 15,000$
PG 64-22 and PG 67-22	12.5 mm SP, 19 mm SP and 25 mm SP	20,000	≤ 12.5 mm	$> 20,000$
PG 76-22	All Mix types	20,000	≤ 12.5 mm	$> 20,000$

Tested specimens shall be inspected for any visible signs of stripping and any mix design's tested specimens that fail to maintain 95% of asphalt cement coating, as described in GDT 56 section D.2.d, will be required to meet specified requirements for GDT 66 as detailed in 828.2.B.2.b.

- d. Fatigue testing: The Department may verify dense-graded mix designs by fatigue testing according to AASHTO T 321 or other procedure approved by the Department.

Section 828 — Hot Mix Asphaltic Concrete Mixtures

C. Acceptance

See Subsection 106.03 and Section 400. Ensure individual test results meet the Mixture Control Tolerances listed in Subsections 828.2, 828.2.01, 828.2.02, 828.2.03, or 828.2.04, whichever applies with the following exception. Ensure field verification results for rutting susceptibility tests performed on laboratory fabricated and/or roadway cores obtained from asphalt plant produced mixtures meet specified requirements for AASHTO T 324 as detailed in Subsection 828.2.B.2.c. All GDOT approved mix designs are required to have full field mix design verifications, using plant produced mixture, sampled by the contractor and submitted to the applicable GDOT laboratory (Central or District) at a minimum of once per two years. Field mix design verification results that fail to comply with performance testing specified in Subsection 828.2.B will require a complete laboratory mix design verification, to be completed by the original mix designer, for continued use of that design. If a mix design has not been produced within two years, a full field mix design verification will be sampled by the contractor and submitted to the applicable GDOT laboratory (Central or District) on the first Lot produced thereafter. Any mix design that fails to meet performance test requirements established in Subsection 828.2.B, using laboratory fabricated specimens due to failing field mix design results, may subject that mix design to invalidation after the field mix design verification results are confirmed with a second field mix design verification. Field mix design verifications as specified in Section 402, Section 400, SOP 2 and GSP 21, are not precluded by the requirements specified herein.

D. Materials Warranty

See General Provisions 101 through 150.

~~828.2.01 Open Graded Surface Mixtures~~

~~A. Requirements~~

~~Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Open Graded Surface Mixtures meet the following mixture control tolerances and mix design criteria:~~

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing		
		9.5 mm OGFC	12.5 mm OGFC	12.5 mm PEM
3/4 in. (19 mm) sieve	±0.0		100*	100*
1/2 in. (12.5 mm) sieve	±6.1	100*	85-100	80-100
3/8 in. (9.5 mm) sieve	±5.6	85-100	55-75	35-60
No. 4 (4.75 mm) sieve	±5.7	20-40	15-25	10-25
No. 8 (2.36 mm) sieve	±4.6	5-10	5-10	5-10
No. 200 (75 µm) sieve	±2.0	2-4	2-4	1-4
Range for % AC	±0.4	6.0-7.25	5.75-7.25	5.5-7.0
Class of stone (Section 800)		"A" only	"A" only	"A" only
Drain down (AASHTO T305), %		<0.3	<0.3	<0.3

* Mixture control tolerance is not applicable to this sieve for this mix.

- ~~1. In 12.5 mm and 9.5 mm OGFC and 12.5 mm PEM mixes, use only PG 76-22 asphalt cement (specified in Section 820).~~
- ~~2. Ensure all OGFC and PEM mixes include a stabilizing fiber of the type (cellulose or mineral) specified in the mix design and meeting the requirements of Section 819. Ensure the dosage rate is as specified in the mix design and sufficient to prevent drain-down exceeding the above tolerance.~~

~~B. Fabrication~~

~~See Section 400.~~

Section 828 — Hot Mix Asphaltic Concrete Mixtures

828.2.02 Stone Matrix Asphalt Mixtures

A. Requirements

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Stone Matrix Asphalt mixtures meet the following mixture control tolerances and mix design criteria:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		9.5 mm SMA	12.5 mm SMA	19 mm SMA
1 in. (25 mm) sieve	±0.0			100*
3/4 in. (19 mm) sieve	±7.0	100*	100*	90-100
1/2 in. (12.5 mm) sieve	±6.1	98-100**	85-100	44-70
3/8 in. (9.5 mm) sieve	±5.6	70-100	50-75	25-60
No. 4 (4.75 mm) sieve	±5.7	28-50	20-28	20-28
No. 8 (2.36 mm) sieve	±4.6	15-30	16-24	15-22
No. 50 (300 µm) sieve	±3.8	10-17	10-20	10-20
No. 200 (75 µm) sieve	±2.0	8-13	8-12	8-12
Range for % AC (Note 1)	±0.4 (Note 2)	6.0-7.5	5.8-7.5	5.5-7.5
Design optimum air voids (%)		3.5 ±0.5	3.5 ±0.5	3.5 ±0.5
% aggregate voids filled with AC (VFA)		70-90	70-90	70-90
Tensile splitting ratio after freeze thaw cycle GDT 66		80%	80%	80%
Drain-down (AASHTO T305), %		<0.3	<0.3	<0.3

*Mixture control tolerance is not applicable to this sieve for this mix.

**Mixture control tolerance is ± 2.0% for this sieve for 9.5 mm SMA mixes placed at spread rates greater than 135 lb./yd². For 9.5 mm SMA mixes placed at spread rates of 135 lb./yd² or less, 100% passing is required on this sieve.

Note 1: Range for % AC is Original Optimum AC (OOAC) at 35 gyrations (Gyratory compactor) or 50 blows (Marshall compactor) prior to Corrected Optimum AC (COAC) calculation detailed in GDT 123 (Appendix A)

Note 2: Quality Acceptance Test Results for AC content that deviate > ± 0.3% from the approved Job Mix Formula (JMF) consistently over three lots may subject the mix to a revised AC content on project JMF at the discretion of the State Materials Engineer based on statistical trend.

1. Ensure SMA mixtures are compacted at 35 gyrations with the Superpave Gyratory compactor or 50 blows with the Marshall compactor.
2. Ensure SMA mixtures contain mineral filler and fiber stabilizing additives and meet the following requirements:
 - a. Asphalt cement grade PG 76-22 (specified in Section 820) is required in all SMA mixtures.
 - b. Aggregates for SMA meet the requirements of Subsection 802.2.02.A.3.
 - c. Use the approved mineral filler specified in the mix design and meeting the requirements of Section 883. Approved sources of mineral filler are listed in QPL 81.

Use the approved Fiber Stabilizing Additive of the type (cellulose or mineral) specified in the mix design and meeting the requirements of Section 819. Approved sources of Fiber Stabilizing Additive are listed in QPL 77.

Section 828 — Hot Mix Asphaltic Concrete Mixtures

The dosage rate will be as specified in the mix design and sufficient to prevent drain-down exceeding the above tolerance.

B. Fabrication

See Section 400.

828.2.03 Superpave Asphalt Concrete Mixtures

A. Requirements for Superpave Mixtures (except Parking Lot Mixtures)

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Superpave Asphalt Concrete mixtures meet the following mixture control tolerances and mix design limits:

1. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing				
		9.5 mm Superpave Type I	9.5 mm Superpave Type II	12.5 mm Superpave (Note 1)	19 mm Superpave	25 mm Superpave
1½ in. (37.5 mm)						100*
1 in. (25.0 mm)	± 8.0			100*	100*	90-100
¾ in. (19.0 mm)	±8.0**	100*	100*	98-100****	90-100	55-89**
½ in. (12.5 mm)	±6.0***	98-100****	98-100****	90-100	60-89***	50-70
⅜ in. (9.5 mm)	±5.6	90-100	90-100	70-89	55-75	
No. 4 (4.75 mm)	±5.6	65-85	55-75			
No. 8 (2.36 mm)	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 µm)	±2.0	5.0-7.0	5.0-7.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for % AC (Note 3)	± 0.4 (Note 2)	5.50-7.25	5.25-7.00	5.00-6.25	4.25-5.50	4.00-5.25

* Mixture control tolerance is not applicable to this sieve for this mix.

** Ensure mixture control tolerance is within ± 10.0% for this sieve for 25 mm Superpave.

***Ensure mixture control tolerance is within ± 8.0% for this sieve for 19 mm Superpave.

****Ensure mixture control tolerance is within ± 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: Use PG 76-22 in 12.5 mm Superpave, excluding shoulder construction, on all projects with ADT greater than 25,000 as detailed in the Contract Pay Item.

Note 2: Quality Acceptance Test Results for AC content deviating > ± 0.3 % from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the State Materials Engineer based on statistical trend.

Note 3: Range for % AC is Original Optimum AC (OOAC) at 65 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

Section 828 — Hot Mix Asphaltic Concrete Mixtures

2. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (Gmm) at design gyrations, (Ndes)	All	96%
% Gmm at the initial number of gyrations, Ni	All	91.5% maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 Type II and 12.5 mm	Min. 72; Max. 76
	19 mm	Min. 71; Max 76
	25 mm	Min. 69; Max 76
Fines to effective asphalt binder ratio (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	All	> 7.00
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate (Gse). See SOP-2SP.	25 mm	13.0
	19 mm	14.0
	12.5 mm	15.0
	9.5 Type I	16.0
	9.5 Type II	16.0

*Superpave Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials Engineer.

B. Requirements for Superpave Parking Lot Mixes (NOT FOR STANDARD HIGHWAY/STREET PAVING)

1. Surface layers for parking facilities:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		4.75 mm Mix	9.5 mm Superpave Type I	9.5 mm Superpave Type II
1 in. (25.0 mm) sieve	± 8.0			
3/4 in. (19.0 mm) sieve	±8.0**		100*	100*
1/2 in. (12.5 mm) sieve	±6.0	100*	98-100****	98-100****
3/8 in. (9.5 mm) sieve	±5.6	90-100	90-100	90-100
No. 4 (4.75 mm) sieve	±5.6	75-95	65-85	55-75
No. 8 (2.36 mm) sieve	±4.6	60-65	48-55	42-47
No. 50 (300 µm) sieve	+3.8	20-50		
No. 200 (75 µm) sieve	±2.0	4-12	5.0-7.0	5.0-7.0
Range for Total AC	+ 0.4	6.00 - 7.50	5.50 - 7.25	5.25 - 7.00

Section 828 — Hot Mix Asphaltic Concrete Mixtures

2. Subsurface layers for parking facilities:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		12.5 mm Superpave	19 mm Superpave	25 mm Superpave
				100*
1 in. (25.0 mm) sieve	± 8.0	100*	100*	90-100
3/4 in. (19.0 mm) sieve	±8.0**	98-100****	90-100	55-89**
1/2 in. (12.5 mm) sieve	±6.0***	90-100	60-89***	50-70
3/8 in. (9.5 mm) sieve	±5.6	70-89	55-75	
No. 8 (2.36 mm) sieve	±4.6	38-46	32-36	30-36
No. 200 (75 µm) sieve	±2.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for Total AC	+ 0.4	5.00 - 6.25	4.25 - 5.50	4.00 - 5.25

All * and notes apply to both 828.2.03.B.1 and 828.2.03.B.2.

*Mixture control tolerance is not applicable to this sieve for this mix.

**Ensure mixture control tolerance is within ±10.0% for this sieve for 25 mm Superpave mixes.

*** Ensure mixture control tolerance is within ±8.0% for this sieve for 19 mm Superpave mixes.

****Ensure mixture control tolerance is within ±2.0% for this sieve for 12.5 mm and 9.5 mm Superpave mixes.

Note 1: Quality Acceptance Test Results for AC content deviating > ± 0.3 % from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the State Materials Engineer based on statistical trend.

Note 2: Range for % AC is Original Optimum AC (OOAC) at 65 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

3. Volumetric limits for parking facilities are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (Gmm) at design gyrations, Ndes)	All	96%
% Gmm at the initial number of gyrations, Ni	All	91.5 % maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 Type II and 12.5 mm	Min. 72; Max. 78
	19 and 25 mm	Min. 71; Max 76
Fines to effective asphalt binder ration (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	4.75 mm	> 6.00
	All other types	> 7.00
Minimum % Voids in Mineral Aggregate (VMA)	25 mm	13.0

Section 828 — Hot Mix Asphaltic Concrete Mixtures

Design Parameter	Mix Type	Limits
Note: VMA shall be calculated using the effective specific gravity of the aggregate (Gse). See SOP-2	19 mm	14.0
	12.5 mm	15.0
	9.5 mm Types I, II	16.0

* Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials Engineer.

C. Fabrication

See Section 400.

828.2.04 Fine Graded Mixtures

A. Requirements

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure that fine graded mixtures meet the following mixture control tolerances and design limits:

ASPHALTIC CONCRETE – 4.75 mm Mix		
Sieve Size	Mixture Control Tolerance	Design Gradation Limits, % passing
1/2 in. (12.5 mm) sieve*	±0.0	100*
3/8 in. (9.5 mm) sieve	±5.6	90-100
No. 4 (4.75 mm) sieve	±5.7	75-95
No. 8 (2.36 mm) sieve	±4.6	60-65
No. 50 (300 µm) sieve	±3.8	20-50
No. 200 (75 µm) sieve	±2.0	4-12
Range for % AC	±0.4	6.00 – 7.50
Design optimum air voids (%)		4.0 – 7.0
% Aggregate voids filled with AC		60 – 80
Minimum Film Thickness (microns)		> 6.00

* Mixture control tolerance is not applicable to this sieve for this mix.

Note 1: Quality Acceptance Test Results for AC content deviating $> \pm 0.3\%$ from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the State Materials Engineer based on statistical trend.

Note 2: Range for % AC is Original Optimum AC (OOAC) at 50 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

B. Fabrication

See Section 400.

C. Acceptance

See Subsection 106.3 and Section 400. Ensure individual test results meet the Mixture Control Tolerances listed in Subsections 828.2, 828.2.01, 828.2.02, 828.2.03, 828.2.04, whichever applies.

D. Materials Warranty

See General Provisions 101 through 150.

Section 893—Miscellaneous Planting Materials

893.1 General Description

This section includes the requirements for miscellaneous planting materials, such as the following:

- Plant topsoil
- Mulch
- Vines, shrubs, trees, and miscellaneous plants
- Inoculants
- Porous material
- Prepared plant topsoil
- Tree paint
- Stakes
- Organic soil additives
- Erosion Control Compost
- Engineered Topsoil

893.1.01 Related References

A. Specifications

Section 814—Soil Base Materials

Section 822—Emulsified Asphalt

B. Referenced Documents

ANSI Z60.1 American Standard for Nursery Stock

Standardized Plant Names

Method of Test for Moisture Content of Hay or Straw United States Department of Agriculture and the United States Composting Council, *Test Methods for the Examination of Composting and Compost* (TMECC).

GDT 41

893.1.02 Submittals

For erosion control compost submit a notarized certification that includes the following:

- The feedstock by percentage in the final compost product.
- A statement that the compost meets federal and state health and safety regulations.
- A statement that the composting process has met time and temperature requirements.
- A copy of the lab analysis, less than four months old, performed by a Seal of Testing Assurance certified lab verifying that the compost meets the physical requirements specified.

When requested by the Engineer, one Solvita Compost Maturity Test kit (six tests) for every 1000 yd.³ (765 m³) of compost supplied shall be provided. The Solvita Compost Maturity Test kit is available from:

Woods End Research Laboratory Inc.
Box 297
Mt. Vernon, Maine 04352
1-800-0451-0337
email: info@woodsend.org
or approved equal.

893.2 Materials

893.2.01 Plant Topsoil

A. Requirements

1. Use plant topsoil with the following characteristics:
 - Obtained from well-drained, arable land, but not from fields where tobacco grew in the last three years, or where Johnson grass or kudzu is present.
 - Friable, loamy soil with between 2 and 30 percent organic matter. Determine the percentage by measuring the loss on ignition of oven-dried samples ignited at 1,200 °F (650 °C).
 - Reasonably free from subsoil, heavy or stiff clay, coarse sand, and other deleterious substances.
 - Has no toxic amounts of acid or alkaline elements.
 - Can sustain healthy plant life.
 - Meets the grade requirements of Subsection 814.2.01.A.8.
2. The Department Engineer reserves the right to inspect all plant topsoil during the planting period. The Department Engineer will reject any material that does not meet the specifications.
3. Do not use frozen, muddy, or nonfriable topsoil.
4. Before delivering any topsoil to the job site, clear stones larger than 2 in. (50 mm) size and roots, sticks, brush, coarse litter, and other substances that would interfere with mixing, planting, and maintenance.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.02 Mulch

A. Requirements

1. Use mulch materials from two groups:
 - a. Grassing and Erosion Control: Threshed rye, oat or wheat straw; or Bermuda grass hay
 - b. Vine, Shrub, Tree, and Miscellaneous Plant Plantings: Pine straw, pine bark, or hardwood mulch (see 893.2.07.A.2 for pine bark and hardwood mulch).
2. Use mulch materials from either group that meet the following requirements:
 - Are accepted by the Engineer.
 - Can be distributed uniformly when properly loosened
 - Produce the desired results

Section 893 — Miscellaneous Planting Materials

- Meet the moisture requirements specified herein
 - Contain no excessive amounts of noxious weed seeds
3. Noxious Weed Seeds

Do not use hay or straw mulch material that has matured seeds from noxious weeds or other species that would harm surrounding farmland.

4. Moisture Content

Ensure that the mulch material is reasonably dry.

5. Erosion Control Compost

Use compost that meets the requirements in Table 1. Erosion Control Compost can be 100% compost or a blend of no more than 50% wood chips by volume.

- a. Wood Chips shall be fresh or partially composted wood chips less than or equal to 3 in. (75 mm) in length with 100% passing a 2 in. (50 mm) sieve and less than 10% passing a 1 in. (25 mm) sieve. Wood chips shall not contain any visible refuse or other physical contaminants, material toxic to plant growth, or over 5% sand, silt, clay or rock material.
- b. Produce General Use Compost by aerobic (biological) decomposition of organic matter. Compost feedstock may include, but is not limited to, leaves and yard trimmings, Class A biosolids, food scraps, food processing residuals, manure or other agricultural residuals, forest residues, bark, and paper. Compost shall not contain any visible refuse or other physical contaminants, material toxic to plant growth, or over 5% sand, silt, clay or rock material. Mixed municipal solid waste compost and Class B biosolids, as defined in the United States Environmental Protection Agency Code of Federal Regulations (USEPA, CFR), Title 40, Part 503 are unacceptable. Ensure Compost meets all applicable USEPA, CFR, Title 40, Part 503 Standards for Class A biosolids and the following requirements:

TABLE 1 – PHYSICAL REQUIREMENTS FOR COMPOST

Test	Requirements	Test Method
Organic Matter Content	25-100% (dry mass)	TMECC 05.07-A
Particle Size	100% passing 2 in. (50 mm) sieve 50-70% retained on 3/8 in. (9.5 mm) sieve	TMECC 02.02-B
Soluble Salts	5.0 max. * dS/m	TMECC 04.10-A
Fecal Coliform	Pass	TMECC 07.01-B
pH	5.5 – 8.5 pH	TMECC 04.11-A
Stability	8 or below	TMECC 05.08-B,
Maturity	greater than 80%	TMECC 05.05-A
Heavy Metals	Pass	TMECC 04.06 and TMECC 04.13-B

*A soluble salt content up to 10.0 dS/m for compost used in Compost Manufactured Topsoil will be acceptable.

NOTE: All physical requirements are in accordance with the United States Department of Agriculture and the United States Composting Council, “Test Methods for the Examination of Composting and Compost” (TMECC). Organic Matter Content and Particle Size requirements are in accordance with AASHTO R51-13.

Section 893 — Miscellaneous Planting Materials

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. If the material feels damp, the Department Contractor will use GDT 41 to test for moisture content.
2. To pass, materials shall have a moisture content of 12 percent or less.

D. Materials Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.03 Vines, Shrubs, Trees, and Miscellaneous Plants

A. Requirements

1. Use stock that meets the requirements of all State and Federal Laws for inspection of plant diseases and infestation.
2. Use nursery grown and collected plant materials that meet all regulations of the States of their origin and destination, and that meet Federal regulations governing interstate movement of nursery stock.
3. Use stock that is true to name and variety and is of first class quality with well developed tops and vigorous, healthy root systems.

NOTE: Use plant names according to the edition of "Standardized Plant Names" in effect at the time of Invitation For Bids.

4. Use only nursery-grown stock that conforms to ANSI Z60.1 American Standard for Nursery Stock.
 - a. The Department Engineer will not accept plants and/or trees that are severely cut back or pruned to conform to contract size requirements.
 - b. The Department Engineer will reject trees and shrubs that are undersized, have poorly developed tops or root systems, or are infected with disease or infested with insects.
5. Certification

Furnish all certificates of disease and infestation inspection, a list of plant materials purchased, and a complete list of nurseries from which each plant was grown.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department Engineer will inspect plants at the nursery whenever necessary.

1. Inspect and grade living plants for type, size, and quality according to ANSI Z60.1 American Standard for Nursery Stock.
2. Even if the Department Engineer accepts materials after a test at the source, the Department Engineer may inspect the stock during planting and reject any that does not meet specification.

Section 893 — Miscellaneous Planting Materials

3. The ~~Department~~ Engineer will reject any of the following:
 - Stock damaged during digging, loading, transporting, planting, and transplanting
 - Broken or loose balls or balls of less diameter than that specified
 - Large canopy shade trees without a single dominant central leader
4. Replace rejected stock at your own expense.
5. Dispose of rejected stock to the satisfaction of the Engineer.

D. Materials Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.04 Inoculants

A. Requirements

1. Use a pure culture of nitrogen-fixing bacteria for an inoculant to treat seeds. Select an inoculant for maximum vitality and ability to transform nitrogen from the air into soluble nitrates and deposit them into the soil.
2. Use only purebred cultures less than one year old.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Engineer will review acceptable cultures.

D. Material Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.05 Prepared Plant Topsoil

A. Requirements

1. Use prepared plant topsoil made from plant topsoil, organic soil additive, commercial fertilizer, and lime, as described in Subsection 893.2.07.B.
2. Base any volume for peat moss used as an organic soil additive on the compressed bale.
3. For loose peat, double the volume.

Section 893 — Miscellaneous Planting Materials

B. Fabrication

1. Make prepared plant topsoil from the following:
 - Four parts plant topsoil, Subsection 893.2.01
 - At least one part organic soil additive, by volume, Subsection 893.2.07.
 - A commercial fertilizer, grade 6-12-12, at the rate of 3 lbs./yd³ (1.8 kg/m³)
 - Lime at the rate of 5 lbs./yd³ (3 kg/m³)
2. Base the above volumes on naturally compacted, undisturbed topsoil.

C. Acceptance

The Department Engineer will accept the materials based upon their compliance with this specification.

D. Material Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.06 Stakes

A. Requirements

1. Use wood stakes as indicated in the specifications or shown on the plans. Use the stakes for vine, shrub, tree, and miscellaneous plantings.
2. Saw wood stakes from either oak or gum. Use only stakes that are number two common or better, either rough or dressed.

B. Fabrication

1. Cut the stakes from sound, solid, undecayed wood, without unsound knots.
2. Shape stakes to within 1/4 in. (6 mm) for all dimensions.
3. Taper all stakes at one end.

C. Acceptance

The Department Engineer will reject any stake that does not meet the following test:

1. Draw a line from the center of the top to the center of the butt of each stake.
2. Ensure that the line stays within the body of the stake and is not more than 1 in. (25 mm) from the geometric center of the stake.

D. Materials Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery
 - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
 - b. Send an invoice with each shipment that shows the sizes and varieties of material included.

Section 893 — Miscellaneous Planting Materials

2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.07 Organic Soil Additives

A. Requirements

Use four types of organic additives: peat moss, pine bark, compost, and hardwood mulch.

1. Peat Moss

Use peat moss that meets the following requirements:

- Be granulated sphagnum virtually free from woody substances, consisting of at least 75 percent partially decomposed stems and leaves of sphagnum
- Be essentially brown in color
- Be free of sticks, stones, and mineral matter
- Be in an air-dry condition
- Shows an acid reaction of 3.5 pH to 5.5 pH
- Meets State and Federal regulations

2. Pine Bark

Use pine bark that meets the following requirements:

- Be obtained from disease-free wood, 100 percent of which is 9 in.² (5625 mm²) or less in area, and 50 percent is more than 1 in.² (625 mm²) in area.
- Contain no noxious weed seeds, soil, sawdust or any substance toxic to plant growth
- Be at least two years old

3. Compost

Use compost that meets the following requirements:

- Be organic materials that have undergone biological decomposition
- Be disinfected using composting or similar technologies
- Be stabilized so it is beneficial to plant growth
- Be mature, dark brown or black in color and have minimal odors
- Contain no human pathogens
- Fall within a pH range of 5 to 8

Provide to the Department Engineer a list of all the ingredients in the original compost mix in the order of their relative proportions on a weight basis.

4. Hardwood Mulch

Use hardwood mulch that meets the following requirements:

- Derived from disease-free deciduous trees
- Particle size of less than 1 in. (25 mm) diameter and less than 3 in. (75 mm) in length. Hardwood mulch shall complete two composting cycles of 140 °F (60 °C) so that all viable weed seeds are destroyed and no further decomposition due to nitrification will occur
- Free from toxic levels of acidity and alkalinity
- Derived from sources other than cypress trees

Provide test results stating that the ingredients meet Federal, State, and local requirements for priority pollutant limits and do not contain levels of any chemicals that are harmful to plants or humans.

Section 893 — Miscellaneous Planting Materials

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department Engineer will accept the materials based upon their compliance with this specification.

D. Material Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery

- a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
- b. Send an invoice with each shipment that shows the sizes and varieties of material included.

2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

893.2.08 Engineered Topsoil

A. Requirements

1. Use an engineered mixture meeting the requirements herein. Do not use a mixture containing deleterious substances. Obtain the materials from sources approved by the Engineer. Ensure the aggregate retained on No. 10 (2 mm) sieve is of hard, durable particles.
2. Remove particles with diameters greater than 2 in. (50 mm) before placing the topsoil. Remove particles with screens or by hand if few oversized pieces exist. Otherwise, crush the oversized pieces to less than 2 in. (50 mm) and use them in the proportions shown by the sieve table below.
3. Use 5-10% by dry weight aerobically composted organic matter as topsoil components. The composting pile shall reach temperatures of 55-65oC (131-149oF) for a minimum period of 24 hours to kill pathogens. Obtain composted organic matter certified as having gone through the prescribed composting process and whose raw materials are from the following approved sources: grass clippings; leaf litter; cafeteria waste (with the exception of meat products); livestock manure from cows, sheep, goats, pigs, horses, chickens, etc.; and brewery waste. All components shall be free of pesticides and herbicides.
4. Use 90-95% by dry weight inorganic topsoil components with the following properties:

Sieve Size	Percent Passing by Weight
Passing 2 in. (50 mm)	100
Passing 1-1/2 in. (37.5 mm)	95-100
Passing No. 10 (2 mm) sieve	75-90
Passing No. 40 (425 µm)	50-70
Passing No. 60 (250 µm) sieve	30-60
Passing No. 200 (75 µm) sieve	10-25
Clay size (< 2 µm)	3-10

Section 893 — Miscellaneous Planting Materials

5. Ensure material passing the No. 10 (2 mm) sieve meets the following requirements:

Property	Value
Liquid Limit (LL)	25 or less
Plasticity Index (PI)	10 or less
Volume change, max. percent	12
Maximum dry density, lb./ft. ³ (kg/m ³)*	105 (1680)
*by standard proctor	

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The engineered topsoil to be used shall be sampled and tested as directed by the Engineer according to the following properties:

Test	Method
Soil gradation	GDT 4
Volume change	GDT 6
Maximum density	GDT 7
Liquid Limit	AASHTO T 89
Plastic Limit and Plasticity Index	AASHTO T 90

The engineered topsoil shall be resampled and retested as directed by the Engineer when 150 tons of use on a project is reached; and it shall be resampled and retested for every 150 tons of use thereafter.

D. Materials Warranty

General Provisions 101 through 150.

E. Delivery and Packaging

1. Delivery

- a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
- b. Send an invoice with each shipment that shows the sizes and varieties of material included.

2. Packaging

Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.

SECTION 05 73 15 - FRAMELESS GLAZED METAL RAILINGS**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Railing and handrail assemblies.
- B. Structural glass railings.
- C. Floor- and deck-mounted lighting system.
- D. Floor- and deck-mounted windscreen assemblies.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- D. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- G. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- I. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017.
- J. ICC-ES ESR-4405 - Evaluation Report for Shoe Glass Panel Railing System; 2022, with Editorial Revision.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Schedule and conduct a preinstallation meeting one week before starting work of this section. Attendees shall include, but not be limited to:
 - 1. Contractor.
 - 2. Manufacturer's representative.
 - 3. Architect.
 - 4. Other subcontractors of adjacent work.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, and finishes.
- C. ICC Certification: Submit documentation from manufacturer showing specified systems comply with ICC-ES ESR-4405.
- D. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, transitions, and terminations.
- E. Samples: Submit one (1) of each item below for each type and condition shown.
 - 1. Glass: 12 inches by 12 inches, showing color, thickness and edge condition.
- F. Manufacturer's qualification statement.
- G. Maintenance Data: Manufacturer's instructions for care and cleaning.

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

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than fifteen years of documented experience.
- B. Installer Qualifications: Company specializing in installing decorative railing systems and acceptable to manufacturer.

1.06 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide mock-up of wind screen system and glazed railing system, 4 feet long, indicating each type of material and finish.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory-provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials upon delivery for damage. Replace damaged items.
- D. Prior to installation, store materials and components under cover in a dry location.

1.08 FIELD CONDITIONS

- A. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.
- B. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

1.09 WARRANTY

- A. Warranty: Manufacturer's standard one-year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: IG Railing, <https://igrailing.com/>.
- B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 RAILING SYSTEMS, GENERAL

- A. Factory- or shop-fabricate to suit project conditions, for proper connection to building structure, and in largest practical sizes for delivery to site.
- B. Structural GlasGuardrails: Comply with applicable accessibility requirements of ADA Standards.
- C. Joints: Tightly fitted and secured, machined smooth with hairline seams.
- D. Field Connections: Provide sleeves, anchors, and other devices required for site assembly and installation.
- E. Welded Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.

2.03 STRUCTURAL GLASS RAILINGS

- A. Structural Glass Railing System, Clamp-Mounted: Engineered, point-supported railing system with structural glass.
 - 1. Product:
 - a. Basis of Design: IG Railing; Frameless Glass Railing: <https://igrailing.com/>.

- b. Substitutions: See Section 01 60 00 - Product Requirements
2. Top Rail: None.
3. Integral Lighting: Manufacturer's field-installed light-emitting diode (LED) kit system installed within clamps.
4. Clamps: Stainless steel pressure clamps; no holes drilled in glass.
5. Glass: As specified in this section.
6. Fasteners:
 - a. Attachment to Stone: Provide anchors capable of sustaining, without failure, a load equal to four times the load imposed when installed in stone. Fasten per guardrail manufacturer's recommendation.

2.04 MATERIALS AND FINISHES

- A. Stainless Steel Components:
 1. ASTM A666, Type 316.
 2. Stainless Steel Bars, Shapes, and Moldings: ASTM A276/A276M, Type 316.
 3. Stainless Steel Finish - Spigots: PVDF Matte Black Finish per manufacturer's finish recommendations.
 4. Stainless Steel Finish - Adjustable Connectors: No. 8 Reflective Polished Finish per manufacturer's finish recommendations.
- B. Glass:
 1. Fully Tempered, Low Iron Safety Glass: ASTM C1048 and ASTM 2353 compliance; Condition A, Type 1, transparent, Class 1, Quality Q3, unless otherwise indicated.
 - a. Plastic Interlayer: SGP, 0.060 inch thick.
 - b. Impact Strength: Category II, tested in accordance with 16 CFR 1201.
 - c. Thickness: 9/16 inch.
 - d. Width: 48 inch.
 - e. Height: 42 inch.
 - f. Configuration: As indicated on drawings.
 - g. Edges: Ground smooth and polished.
 - h. Finish: Plain, no finish.
 - i. Color: Clear, no tint.

2.05 ACCESSORIES

- A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure and as recommended by manufacturer, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable, provide flush countersunk fasteners.
 1. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- B. Mounting Plate for Bullnose Coping to Railing Spigots:
 1. See Section 07 76 00 - Roof Pavers for Bullnose Coping.
 2. Basis of Design Product: Nill Building Solutions, NB-17 Special in Inox 304.
 3. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Finish Touch-Up Materials: As recommended by manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify Architect immediately of conditions that would prevent satisfactory installation.

- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

3.02 PREPARATION

- A. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
- B. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

3.03 INSTALLATION

- A. Use manufacturer's approved installer.
- B. Comply with manufacturer's drawings and written instructions.
- C. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
- D. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Anchor securely to structure.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- G. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, noncumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.05 FIELD QUALITY CONTROL

- A. Field Services: Provide the services of the manufacturer for field observation of installation of railings.

3.06 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.
- C. Glass and Glazing: Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances.

3.07 PROTECTION

- A. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
 - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION

SECTION 09 30 00 - TILING**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Stone thresholds.

1.02 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Submit samples for color selection.
- E. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS**2.01 TILE**

- A. Manufacturers: Basis of Design as noted on drawings.

1. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Ceramic Mosaic Tile: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- C. Ceramic Floor Tile, Type CT-2: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- D. Ceramic Floor Tile, Type CT-3: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- E. Ceramic Floor Tile, Type CT-4: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- F. Ceramic Wall Tile at Base, Type CTB-1: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.

8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- G. Ceramic Wall Tile at Base, Type CTB-2: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- H. Ceramic Wall Tile at Base, Type CTB-3: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 12 by 12 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- I. Ceramic Wall Tile, Type WT-1: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 6 by 6 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- J. Ceramic Wall Tile, Type WT-2: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 6 by 6 inch, nominal.
 3. Shape: Square.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: Stacked.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- K. Ceramic Wall Tile, Type WT-3: ANSI A137.1 standard grade.
 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 2 by 5 inch, nominal.
 3. Shape: Hexagon.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Pattern: As indicated on drawings.
 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.

- L. Ceramic Wall Tile, Type WT-4: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 by 12 inch, nominal.
 - 3. Shape: Rectangle.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): As indicated on drawings.
 - 7. Pattern: As indicated on drawings.
 - 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- M. Ceramic Wall Tile, Type WT-4: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 12 by 12 inch, nominal.
 - 3. Shape: Square.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): As indicated on drawings.
 - 7. Pattern: Stacked.
 - 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- N. Ceramic Wall Tile, Type WT-6: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 by 12 inch, nominal.
 - 3. Shape: Square.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): As indicated on drawings.
 - 7. Pattern: Stacked.
 - 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- O. Ceramic Wall Tile, Type WT-7: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 12 by 12 inch, nominal.
 - 3. Shape: Square.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): As indicated on drawings.
 - 7. Pattern: As indicated on drawings.
 - 8. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- P. Ceramic Bullnose Tile, Type BN-1: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 3 by 6 inch, nominal.
 - 3. Shape: Rectangle.
 - 4. Edges: Square.
 - 5. Surface Finish: Matte glazed.
 - 6. Color(s): As indicated on drawings.
 - 7. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- Q. Ceramic Bullnose Tile, Type BN-2: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.

2. Size: ___by___ inch, nominal.
 3. Shape: Rectangle.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Trim Units: Matching cove shapes in sizes coordinated with field tile.
- R. Ceramic Bullnose Tile, Type BN-3: ANSI A137.1 standard grade.
1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 2. Size: 3 by 6 inch, nominal.
 3. Shape: Rectangle.
 4. Edges: Square.
 5. Surface Finish: Matte glazed.
 6. Color(s): As indicated on drawings.
 7. Trim Units: Matching cove shapes in sizes coordinated with field tile.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
1. Applications:
 - a. Open edges of wall tile.
 - b. Wall corners, outside and inside.
 - c. Floor to wall joints.
 - d. Borders and other trim as indicated on drawings.
 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com/#sle.
- B. Thresholds: Marble, As selected by Architect from full range, honed finish; 4 inches wide by full width of wall or frame opening; thickness to fit application; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
1. Applications:
 - a. At doorways where tile terminates.

2.03 SETTING MATERIALS

- A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
 2. Products:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. TEC, an H.B. Fuller Construction Products Brand: www.tecspecialty.com/#sle.
- B. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.

2.04 GROUTS

- A. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Color(s): As indicated on drawings.
 2. Products:
 - a. LATICRETE International, Inc; ____: www.laticrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 MAINTENANCE MATERIALS

- A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
 - 1. Composition: Water-based colorless silicone.
 - 2. Products:
 - a. Merkrete, by Parex USA, Inc; Merkrete Grout Sealer: www.merkrete.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 ACCESSORY MATERIALS

- A. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 - 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
 - 2. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber or Acrylic.
 - b. Thickness: 25 mils, minimum, dry film thickness.
 - c. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
 - 2) Merkrete, by Parex USA, Inc; Merkrete Hydro Guard 2000: www.merkrete.com/#sle.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Request tile pattern. Do not interrupt tile pattern through openings.

- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles square.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep control and expansion joints free of mortar, grout, and adhesive.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
 - 1. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

3.05 INSTALLATION - WALL TILE

- A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

3.06 CLEANING

- A. Clean tile and grout surfaces.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

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SECTION 09 91 23 - INTERIOR PAINTING**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In all areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - c. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Ceramic and other tiles.
 - 8. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 9. Glass.
 - 10. Concrete masonry units in utility, mechanical, and electrical spaces.
 - 11. Acoustical materials, unless specifically indicated.
 - 12. Concealed pipes, ducts, and conduits.
 - 13. Infrared tube heater

1.02 SUBMITTALS

- A. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

- B. Samples: Submit two paper chip samples, in size illustrating range of colors and textures available for each surface finishing product scheduled.
- C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 2. Label each container with color in addition to the manufacturer's label.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified approved by manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.05 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 - 2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.

- B. Paints:
 - 1. Base Manufacturer: Sherwin Williams.
 - 2. Behr Process Corporation: www.behr.com/#sle.
 - 3. Benjamin Moore & Co.
 - 4. PPG Paints: www.ppgpaints.com/#sle.
 - 5. Valspar Corporation: www.valsparpaint.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 - 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 - 3. In all areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

- A. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board and plaster.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
 - a. Products:
 - 1) PPG Paints Pitt-Glaze WB1 Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510 Series, Semi-Gloss.
 - 2) Sherwin-Williams Pre-Catalyzed Waterbased Epoxy, Semi-Gloss. (MPI #141)

- 3) Valspar Professional Interior Pre-Catalyzed Epoxy, No. 33400 Series, Semi-Gloss.
3. Top Coat Sheen:
 - a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
4. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
 1. Medium duty applications include doors and door frames.
 2. Two top coats and one coat primer.
 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
 - a. Products:
 - 1) PPG Paints Pitt-Glaze WB Water-Borne Acrylic Epoxy, 16-598 Series, Semi-Gloss.
 - 2) Sherwin-Williams Waterbased Catalyzed Epoxy, Semi-Gloss.
 4. Top Coat Sheen:
 - a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
 5. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Medium Duty Overhead: Including uncoated steel, shop primed steel, and galvanized steel.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143, 144, 145, 146, 147, or 148.
 - a. Products:
 - 1) PPG Paints Pure Performance Interior Latex, 9-100 Series, Flat. (MPI #143)
 - 2) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat.
 3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
- D. Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
 1. Shop primer by others.
 2. One top coat.
 3. Top Coat: Alkyd Dry Fall; MPI #55, 89, or 225.
 - a. Products:
 - 1) PPG Paints Speedhide Super Tech Alkyd Dry-Fog, 6-150XI, Flat. (MPI #55)
 - 2) PPG Paints Speedhide Alkyd Dry-Fog, 6-160XI, Flat. (MPI #55)
 - 3) Sherwin-Williams Dryfall Flat. (MPI #55)
 4. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen at all locations.
 5. Primer: As recommended by top coat manufacturer for specific substrate.
- E. Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
 1. Two top coats.
 2. Top Coat: Alkyd Dry Fall; MPI #55, 89, or 225.
 - a. Products:
 - 1) PPG Paints Speedhide Super Tech Alkyd Dry-Fog, 6-150XI, Flat. (MPI #55)
 - 2) PPG Paints Speedhide Alkyd Dry-Fog, 6-160XI, Flat. (MPI #55)

- 3) Sherwin-Williams Dryfall Flat. (MPI #55)
3. Top Coat Sheen:
 - a. Flat: MPI gloss level 1; use this sheen at all locations.
4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
 1. Interior/Exterior Latex Block Filler; MPI #4.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums, refer to manufacturer recommendations for additional information:
 1. Gypsum Wallboard: 12 percent.
 2. Plaster and Stucco: 12 percent.
 3. Masonry, Concrete, and Concrete Masonry Units : 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Masonry:
 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 2. Prepare surface as recommended by top coat manufacturer.
- F. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- H. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- I. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- J. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 21 13.17 - PHENOLIC TOILET COMPARTMENTS**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Phenolic toilet compartments.
- B. Urinal screens.

1.02 RELATED REQUIREMENTS

- A. Section 10 28 00 - Toilet, Bath and Laundry Accessories.

1.03 REFERENCE STANDARDS

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

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples: Submit two samples of partition panels, 2 by 2 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Phenolic Toilet Compartments:
 - 1. All American Metal Corp - AAMCO: www.allamericanmetal.com/#sle.
 - 2. Partition Systems International of South Carolina; Phenolic Toilet Partitions: www.psisc.com/#sle.
 - 3. Substitutions: Section 01 60 00 - Product Requirements.

2.02 PHENOLIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, floor-mounted unbraced.
 - 1. Color: Single color as selected.
- B. Doors:
 - 1. Thickness: 3/4 inch.
 - 2. Width: 24 inch.
 - 3. Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 58 inch.
- C. Panels:
 - 1. Thickness: 3/4 inch.
 - 2. Height: 58 inch.
 - 3. Depth: As indicated on drawings.
- D. Pilasters:

1. Thickness: 3/4 inch.
 2. Width: As required to fit space; minimum 3 inch.
- E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets with vertical support/bracing same as compartments.

2.03 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings.
- B. Head Rails: Hollow anodized aluminum, 1 inch by 1-1/2 inch size, with anti-grip profile and cast socket wall brackets.
- C. Wall and Pilaster Brackets: Anodized aluminum, color as selected; manufacturer's standard type for conditions indicated on drawings.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hardware: Satin stainless steel:
1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 2. Door Latch: Slide type with exterior emergency access feature.
 3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 4. Coat hook with rubber bumper; one per compartment, mounted on door.
 5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return outswinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00 - TOILET, BATH AND LAUNDRY ACCESSORIES**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Under-lavatory pipe supply covers.
- D. Utility room accessories.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.
- C. Coordinate the work with the placement of internal wall reinforcement and concealed ceiling supports to receive anchor attachments.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: Submit two samples of each accessory, illustrating color and finish.
- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.04 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, visible silver spoilage defects.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Commercial Toilet Accessories:
 - 1. AJW Architectural Products: www.ajw.com/#sle.
 - 2. American Specialties, Inc: www.americanspecialties.com/#sle.
 - 3. Bradley Corporation: www.bradleycorp.com. Basis-of-Design manufacturer, alternate products will be reviewed on an or equal basis.
 - 4. Georgia-Pacific Professional: www.blue-connect.com/#sle.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide 2 keys for each accessory to Owner; master key lockable accessories.

- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Adhesive: Two component epoxy type, waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser with Utility Shelf: Double roll, surface mounted.
 - 1. Basis-of-Design Product: Bobrick Model B-2840.
 - 2. Description: Two-roll unit with utility shelf.
 - 3. Mounting: Surface mounted.
 - 4. Capacity: Designed for 2 standard-core toilet tissue rolls up to 5-1/2" diameter tissue rolls.
 - 5. Material and Finish: Stainless steel, No. 4 finish (satin).
- B. Combination Towel (Automatic) Dispenser/Waste Receptacle: Recessed with projecting waste receptacle, stainless steel; seamless wall flanges, continuous piano hinges.
 - 1. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
 - 2. Waste receptacle liner: Reusable, heavy-duty vinyl.
 - 3. Waste receptacle capacity: 12 gallons.
 - 4. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 5. Lockset: Tumbler type for towel-dispenser compartment and waste receptacle.
 - 6. Products:
 - a. Basis-of-Design: Bobrick Model B3974..
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- C. Automated Soap Dispenser: Foam soap dispenser, wall-mounted, with stainless steel cover and window to gauge soap level, tumbler lock.
 - 1. Minimum Capacity: 48 ounces.
 - 2. Products:
 - a. Substitutions: Section 01 60 00 - Product Requirements.
- D. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
 - 1. Size: As indicated on drawings.
 - 2. Frame: 0.05 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
- E. Grab Bars: Stainless steel, nonslip grasping (peened) surface finish.
 - 1. Heavy Duty Grab Bars: Floor supports are not acceptable.
 - a. Push/Pull Point Load: Minimum 1000 pound-force, minimum.
 - b. Dimensions: 1-1/2 inch outside diameter, minimum 0.125 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Mounting: Flanges with concealed fasteners.
 - d. Length and Configuration: As indicated on drawings.
- F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
 - 1. Products:

- a. Bobrick Model B-270.
- G. Hat and Coat Hook: Heavy-duty stainless steel, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 - 1. Attached to back of door at toilet room.
 - 2. Product: Bradley Model 9134.

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Shower Curtain Rod: Per manufacturer's recommendation.
 - 1. Products:
 - a. Freedom Showers, Curtain Rod with U-cup Holders, Stainless Steel; <https://www.freedomshowers.com/Shower-and-ADA-Bathroom-Accessories/Handicapped-Accessible-Shower-Accessories/APFCRSSL>.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- B. Shower Curtain: Per manufacturer's recommendation.
 - 1. Products:
 - a. Substitutions: Section 01 60 00 - Product Requirements.
- C. Pressure Balance Mixing Valve: Per manufacturer's recommendations.
 - 1. Products:
 - a. Freedom Showers, Freedom Pressure Balanced Mixing Valve; <https://www.freedomshowers.com/Shower-and-ADA-Bathroom-Accessories/Handicapped-Accessible-Shower-Accessories/APFMVLS>.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- D. Handheld Shower and Slide Bar: Per manufacturer's recommendations.
 - 1. Products:
 - a. Freedom Showers, Freedom Handheld Shower Kit with Glide Bar; <https://www.freedomshowers.com/Shower-and-ADA-Bathroom-Accessories/Handicapped-Accessible-Shower-Accessories/APFHHGBLS>.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- E. Caulkless Drain: Per manufacturer's recommendations.
 - 1. Products:
 - a. Freedom Showers, 2" Brass Drain and Strainer; <https://www.freedomshowers.com/Shower-and-ADA-Bathroom-Accessories/Handicapped-Accessible-Shower-Accessories/APFDR>.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- F. Shower Grab Bars: Per manufacturer's recommendations.
 - 1. Arrangement: ADA Standards compliant as indicated on drawings.
 - 2. Products:
 - a. Freedom Showers, Freedom Grab Bars, Straight, 1.25" dia. Satin Stainless Finish; <https://www.freedomshowers.com/Shower-and-ADA-Bathroom-Accessories/Bathroom-Grab-Bars/APFGSS-SATINGB>.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- G. Folding Shower Seat: Per manufacturer's recommendations.
 - 1. Size: ADA Standards compliant.
 - 2. Products:
 - a. Freedom Showers, 26" x 22½" ADA Reversible Shower Seat, Wall Supported, Phenolic Solid WHITE; <https://www.freedomshowers.com/Shower-and-Bath-Seats/Wall-Supported-Shower-Seat/APFSLR-260225PWS>.

- b. Substitutions: Section 01 60 00 - Product Requirements.
- H. Towel Bar: Stainless steel, 3/4 inch round tubular bar; rectangular brackets, concealed attachment, satin finish.
 - 1. Length: as indicated on drawings.
- I. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.

2.06 UNDER-LAVATORY PIPE AND SUPPLY COVERS

- A. Under-Lavatory Pipe and Supply Covers:
 - 1. Insulate exposed drainage piping including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
 - 2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
 - 3. Construction: 1/8 inch flexible PVC.
 - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - b. Comply with ICC A117.1.
 - c. Microbial and Fungal Resistance: Comply with ASTM G21.
 - 4. Color: White.
 - 5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

2.07 UTILITY ROOM ACCESSORIES

- A. Paper Towel Dispenser:
 - 1. Description: Lever-actuated mechanism permits controlled delivery of paper rolls in preset lengths per stroke.
 - 2. Mounting: Surface mounted.
 - 3. Minimum Capacity: 8-inch wide, 800-foot long roll.
- B. Liquid-Soap Dispenser:
 - 1. Description: Designed for dispensing soap in liquid or lotion form.
 - 2. Mounting: Vertically oriented, surface mounted.
 - 3. Capacity: 16 oz.
 - 4. Products: Bradley Model 6562.
- C. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
 - 1. Drying rod: Stainless steel, 1/4 inch diameter.
 - 2. Hooks: 3, 0.06 inch stainless steel rag hooks at shelf front.
 - 3. Mop/broom holders: 4 spring-loaded rubber cam holders at shelf front.
 - 4. Length: Manufacturer's standard length for number of holders/hooks.
 - 5. Products:
 - a. Bradley Model 9984.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
 - 1. Grab Bars: As indicated on drawings.
 - 2. Other Accessories: As indicated on drawings.

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

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SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.02 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions.
- C. Shop Drawings: Indicate locations of individual fire extinguishers, mounting measurements for wall bracket, installation procedures, and accessories required for complete installation.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.03 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Fire Extinguishers:
 - 1. Ansul, a Tyco Business: www.ansul.com.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com.
 - 3. Nystrom, Inc: www.nystrom.com/sle.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
 - 2. Provide quantity indicated on plans.
 - 3. Fire Marshal has final say on type, location and number of Fire Extinguishers; the extinguishers specified in schedule is basis of design.

2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Fire Rated Cabinet Construction: One-hour fire rated.
- C. Cabinet Configuration: Semi-recessed type as indicated on drawings.
 - 1. Size to accommodate accessories.
 - 2. Trim: Flat square edge, with 1 inch wide face.
 - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

- D. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- E. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- I. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
- B. Graphic Identification:
 - 1. Location: Above Fire Extinguisher.
 - 2. Application: fire extinguisher arrow sign pictogram with downward arrow, 7"x10" min.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets and on wall brackets.
- E. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or uncharged fire extinguishers.

3.03 SCHEDULES

- A. Lobby/Waiting (100), Corridor (120), Line Operations (110), West Stair (111), East Stair (114), Restaurant (200), Commercial Kitchen (201), Administrative Conference Room (202), Kitchenette (203), Corridor (216): 2A:10B:C, semi-recessed cabinet (Basis-of-Design as indicated on drawings).
- B. IT Closet (115): FE-36 Type, Class 5-B:C, pressurized, 2 required wall bracket mounting, white color.

END OF SECTION