Goodwyn Mills Cawood
11 North Water Street
Suite 19290
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T 251.460.4006
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FASCIMILE TRANSMITTAL COVER SHEET

DATE: **July 28, 2025**

TO: **Doris Furr**

FROM: **Planholder**

PROJECT: **NEW DORMITORY FOR THE DAUPHIN ISLAND SEA LAB CAMPUS**
FOR DAUPHIN ISLAND SEA LAB
GMC PROJECT NO. AMOB230181

RE: **ADDENDUM NO. 7 AND ACKNOWLEDGEMENT OF RECEIPT OF ADDENDUM NO. 7**

ACKNOWLEDGEMENT OF RECEIPT:

PLEASE PRINT RECIPIENT'S NAME, FIRM, AND DATE RECEIVED.

THEN FAX BACK TO (251) 460-4423 or EMAIL doris.furr@gmcnetwork.com
FOR OUR RECORDS AND TO ACKNOWLEDGE YOUR RECEIPT OF THIS ADDENDUM.

_____
NAME *(PLEASE PRINT)*

_____
FIRM *(PLEASE PRINT)*

_____
DATE RECEIVED *(PLEASE PRINT)*

Pages to follow this page

ADDENDUM NUMBER 7 **July 28, 2025**

PROJECT: NEW DORMITORY FOR THE DAUPHIN ISLAND SEA LAB CAMPUS
FOR DAUPHIN ISLAND SEA LAB
GMC PROJECT NO. AMOB230181
DCM PROJECT NO. 20240427

AD7-1 CLARIFICATIONS / RFI'S / RESPONSES:

1. Bidders shall acknowledge receipt of the Addendum in writing, as provided on the Acknowledgment Receipt.

2. Is there anyway that one you could look into moving the bid up to 10:00 am on the 31st?
Response: The bid time is being changed from 2:00 p.m. to 10:30 a.m. on July 31, 2025 at the same location.

3. Will the landscape planter at the front of the building need to be watered? No irrigation system is indicated or type of plant.
RESPONSE: Add a freeze proof plumbing hose bib in the planter with all required water conduit connections for a fully functional hose bib system.

4. We have run into an issue with the KODA XT Panels because the supplier is not supplying any of the metal framing for the project. I understand this is now an Alternate per Addendum 5. However, we do not have a detail showing how this material integrates with the CMU that is required per the exterior elevations. We will need this to know how to install this material since it is not a system that is provided.
RESPONSE: Alternate #3 Sunshades are to be removed from project.

5. The architectural drawings call for unit shower surrounds and the plumbing drawings call for tile showers, which are we to quote?
RESPONSE: Provide prefabricated showers unit systems or equal as specified on architectural.

6. We also do not have a civil grading specification. May we please receive this?
RESPONSE: New Specification Section 312000 Earthwork Addendum 7 is attached.

7. Do you already have an approved design from one of the other manufacturers or would you like me to propose something?

   NOTE: PREMANUFACTURED MILLWORK SYSTEM SHOWN IS FOR PICTORIAL USE ONLY. GENERAL CONTRACTOR SHALL REFER TO ARCHITECT APPROVED DESIGN FROM MANUFACTURER.

   RESPONSE: Please price what is in the bid documents.

8. The legend indicates a BOSS area of refuge system but the symbols are not on the drawings. Should this be included?

RESPONSE: Provide a Boss System for Stair 1 Second Floor Landing. Refer to Electrical E5.01 Riser Diagrams Detail 3 Smart Command System riser.

9. - Sheet C201 calls for a "safety rail per architectural plans" at the new retaining wall, but no architectural drawings or details are provided. Sheet C904 does not depict a rail either.
RESPONSE: Provide and install a black vinyl coated chain link fence a minimum 48 inches tall from grade.

10. - Addendum 6 states that new black vinyl coated fencing is required "along the new retaining wall," but it does not clarify whether this is to be installed on top, behind, or in front of the wall.

- Spec Section 32 31 13 describes an 8' tall black vinyl coated chain link fence with privacy slats, which may not be structurally feasible if installed on top of the wall, especially considering wind loads associated with slatted fencing. Clarification is needed regarding placement and method of attachment.

Please confirm:
1) The required fence type and height at the retaining wall.
2) Whether it is to be installed on top, (on/through cap block), or in front/behind (in dirt)
3) Whether privacy slats are required at this location.
4) If mounted on top, confirm the anchorage method (core drilled w/ grout or integral with block wall)
5) If mounted on top, for tiered wall conditions, should the fence maintain a continuous top elevation (level line from highest point), or should it step with the wall?
RESPONSE: The black vinyl coated chain link fence height shall be a minimum 48 inches tall from grade. It shall be installed 6 inches behind the retaining wall (in the dirt side) with a concrete footer . No privacy slats are required.

11. There appears to be a duplication or inconsistency in the unit price descriptions for electrical outlets:
    a. In Spec. 010260, both Item #24 & #26 are labeled as: "Electrical – Duplex Power Outlet in Wall (120V)"
        - In Attachment A – Unit Price Proposal Form:
            * Item 24 reads: "Electrical – Duplex Power Outlet in Wall (120V)"
            * Item 26 reads: "Electrical – Power Outlet in Wall (120V)"

    Please confirm whether these are intended to represent two separate items, and if so, provide clarification on how they differ, or if this is a duplicate that should be consolidated or removed.
    RESPONSE: Item 24 is to be a Double Duplex Outlet . Item 26 is to be a Single Duplex Outlet. Change Item 24 and 26 as follows:
    - **Item 24: "Electrical – Duplex Power Outlet in Wall (120V)" – "Double Duplex Outlet"**
    - **Item 26: "Electrical – Power Outlet in Wall (120V)" –" Single Duplex Outlet"**

    b. Also, unit Price Item No. 30 in Section 01 0260 is labeled as "Exterior Window Type 2", but the description states: "Provide and install Exterior Type 3 Window…"

Please confirm whether this unit price is intended for Window Type 2 or Window Type 3, and revise accordingly to ensure accurate pricing and scope.
RESPONSE: Change No. 30 to the following, "Exterior Window Type 2" shall "Provide and install Exterior Type 2 Window…"

12. Please see the attached product data for Mule-Hide and confirm whether this manufacturer will be accepted as an approved equal.
RESPONSE: No. The substitution review time has passed.

13. Can you please send out the architect approved design from manufacturer for the premanufactured millwork system. There is note that states that the "Premanufactured millwork system is show for pictorial use only."
RESPONSE: Please price what is shown in the bid documents.

14. Are the owner furnished W4 windows clean and free of caulk and other debris? If windows need cleaning, will this be performed prior to GC taking ownership?
RESPONSE: Add a $30,000 Existing Window Allowance. Revised Allowance Addendum No. 7 is attached.

15. With #16 in Addendum 5 stating "All exterior guardrails and handrails shall be anodized aluminum, this will require the contractor to have the rails be sent for coating, etc thus creating price increases. Can a powder coat be used?
RESPONSE: Provide anodized aluminum.

16. Roofing spec list Sarnafil G410 feltback as basis of design which has fiberglass reinforcement and 9oz felt backing. Is this required as the other listed manufacturers use polyester scrim and 3.8oz felt in their PVC? Please advise which is correct.
RESPONSE: The backing shall be a minimum of 3.8 oz.

17. Per addendum 6 note 55 – Azuria and Solexia are not stock items. We would need at least 600/sf of each to be able to quote. Also, Pacifica has been discontinued. We will not be able to quote these. Please advise.
RESPONSE: Provide Solarban 70 Solarblue and Solarban 60 Clear hurricane insulating impact glazing per Structural wind loads on S0.0 . Window Type W1 is to have (2) Solarban 70 Solarblue glazing panels and (2) Solarban 60 Clear glazing panels. Window Type W2 is to have (2) Solarban 70 Solarblue glazing panels and (2) Solarban 60 Clear glazing panels.
Refer to revised Architectural Sheet A6.03 Glazing Systems Schedules and Details.

18. Please send soils report.
Response: Attachment A Geotechnical Report is found in the back of the Specifications Project Manual.

AD7-2 ISSUED SPECIFICATIONS:

19. Section 01 2100 Allowance:

A. Replace Specification Section 01 2100 Allowance Addendum 6 with Section 01 2100 Allowance Addendum No. 7 dated 07/28/2025 in its entirety.

20. Section 01 2300 Alternates:
    A. Replace Specification Section 01 2300 Alternates (Addendum No. 5) with the attached Section 01 2300 Alternates Addendum No. 7 dated 07/28/2025 in its entirety.

21. Add Section 31 1000.00 - Site Clearing Addendum No. 7 in its entirety.

22. Add Section 31 2316.13 – Trenching Addendum No. 7 in its entirety.

23. Add Section 31 2500.00 - Erosion and Sedimentation Controls Addendum No. 7.

24. Add Section 33 1200.00 - Water Utility Distribution Addendum No. 7 in its entirety.

25. Add Section 33 3000.00 - Sanitary Sewerage Addendum No. 7 in its entirety.

26. Add Section 31 2000 Earthwork Addendum No. 7 in its entirety.

AD7-3 ISSUED DRAWINGS:

27. **Civil SHEET C-001 General Notes:**
    A. Add the following Utility Plan Notes in its entirety to sheet:

"UTILITY PLAN NOTES

1. THE CONTRACTOR SHALL NOTIFY GOODWYN, MILLS, AND CAWOOD CONSTRUCTION SURVEILLANCE REPRESENTATIVE AND LOCAL JURISDICTIONAL INSPECTOR 48 HOURS BEFORE THE BEGINNING OF EACH PHASE OF CONSTRUCTION.

2. ALL WORK SHALL COMPLY WITH APPLICABLE STATE, FEDERAL, AND LOCAL CODES, AND ALL NECESSARY LICENSES AND PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT HIS EXPENSE UNLESS PREVIOUSLY OBTAINED BY THE OWNER/DEVELOPER.

3. THE CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER OF ANY DISCREPANCIES OR ERRORS HE DISCOVERS IN THE PLAN.

4. DEVIATION FROM THESE PLANS AND NOTES WITHOUT THE PRIOR CONSENT OF THE OWNER OR HIS REPRESENTATIVE OR THE ENGINEER MAY BE CAUSE FOR THE WORK TO BE UNACCEPTABLE.

5. THE CONTRACTOR IS REQUIRED TO USE THE ONE-CALL CENTER TELEPHONE NUMBER FOR THE PURPOSE OF COORDINATING THE MARKING OF UNDERGROUND UTILITIES.

6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES AND TO TAKE WHATEVER STEPS ARE NECESSARY TO PROVIDE FOR THEIR PROTECTION. THE ENGINEER HAS DILIGENTLY ATTEMPTED TO LOCATE AND INDICATE ALL EXISTING FACILITIES ON THESE PLANS, HOWEVER, THIS INFORMATION IS SHOWN FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS OF UTILITIES SHOWN OR NOT SHOWN. CONTRACTOR TO CONTACT THE UTILITY COMPANIES FOR EXACT LOCATION OF THEIR UTILITIES PRIOR TO STARTING CONSTRUCTION. ANY AND ALL DAMAGE MADE TO UTILITIES BY THE CONTRACTOR SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND REPLACE.

7. THE CONTRACTOR SHALL COORDINATE LOCATION AND INSTALLATION OF ALL UNDERGROUND UTILITIES AND APPURTENANCES TO MINIMIZE DISTURBING CURBING, PAVING AND COMPACTED SUBGRADE.

8. UTILITY COORDINATION SHALL BE INCLUDED IN THE PROJECT SCHEDULE AND IT IS THE EXPLICIT RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT THE PROJECT SCHEDULE INCLUDES THE NECESSARY RELOCATION. THE CONTRACTOR SHOULD SEEK ASSISTANCE FROM ALL UTILITY COMPANIES TO LOCATE AND PROTECT THEIR FACILITIES.

9. FIRE HYDRANT AND WATER MAINS TO BE INSTALLED AND UNDER PRESSURE BEFORE ANY COMBUSTIBLE CONSTRUCTION IS STARTED.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE BY HIS EQUIPMENT TO EXISTING UTILITIES, CROSS-DRAIN PIPES AND HEADWALLS.

11. ALL WATER & SANITARY SEWER CONSTRUCTION METHODS & MATERIALS SHALL CONFORM TO RIVIERA UTILITIES STANDARD SPECIFICATIONS.

12. UNLESS DUCTILE IRON PIPE IS USED, MINIMUM COVER FOR SANITARY SEWER SHALL BE THREE(3) FEET.

13. ALL MANHOLES WITHIN THE 100-YEAR FLOOD PLAIN SHALL BE CONSTRUCTED THREE(3) FEET ABOVE GRADE OR WATERPROOF LIDS.

14. NEOPRENE COUPLINGS WITH STAINLESS STEEL BAND AND SHEAR RINGS ARE REQUIRED FOR JOINING DIFFERENT TYPES OF SANITARY SEWER PIPES.

15. THE CONTRACTOR SHALL EXCAVATE FOR NEW SEWER TO ELEVATIONS SHOWN ON PLANS. THE CONTRACTOR SHALL TAKE EVERY NECESSARY PRECAUTION TO PROTECT EXISTING SEWER DURING CONSTRUCTION OPERATIONS. ALL EXCAVATION, SHORING AND BRACING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

16. THE CONTRACTOR SHALL EXPLORE AHEAD 200 FEET SO ADJUSTMENTS CAN BE MADE IN THE ALIGNMENT OF THE PIPE IN CASE OF CONFLICTS WITH EXISTING OR PROPOSED STRUCTURES, UTILITIES AND PIPING. ANY CONFLICTS EXPERIENCED DUE TO NEGLECT OF THIS PROVISION SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.

17. ALL EXCESS MATERIAL FROM EXCAVATION SHALL BE DISPOSED OF BY THE CONTRACTOR. COST FOR THIS WORK SHALL BE INCLUDED IN OTHER ITEMS OF WORK.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING PIPE FROM FLOATING. IF PIPE FLOATS DURING CONSTRUCTION, THE CONTRACTOR SHALL RELAY PIPE TO GRADE AT HIS EXPENSE.

19. THE CONTRACTOR SHALL FIELD VERIFY LOCATION AND INVERT OF SANITARY SEWER FOR CONNECTION TO EXISTING OR PROPOSED SEWER SYSTEM.

20. THE WATER SYSTEM IN THE PUBLIC RIGHT-OF-WAY WILL BECOME THE PROPERTY OF THE LOCAL UTILITIES BOARD UPON COMPLETION ONLY AFTER ACCEPTANCE BY THE CITY UTILITIES.

21. BEDDING REQUIREMENTS SPECIFIED HEREIN ARE TO BE CONSIDERED AS MINIMUMS FOR RELATIVELY DRY, STABLE EARTH CONDITIONS. ADDITIONAL BEDDING SHALL BE REQUIRED FOR ROCK TRENCHED AND WET AREAS. THE CONTRACTOR SHALL HAVE THE RESPONSIBILITY TO PROVIDE SUCH ADDITIONAL BEDDING AS MAY BE REQUIRED TO PROPERLY CONSTRUCT THE WORK.

22. NATURAL GAS REQUIREMENTS SHALL BE PROVIDED TO THE UTILITIES DEPARTMENT ONE(1) MONTH PRIOR TO SERVICE REQUEST.

23. ALL TRAFFIC PLANS SHALL BE COORDINATED WITH THE CITY ENGINEERING DEPARTMENT.

24. ALL PROPERTY LINE MARKERS (IRON PINS, CONCRETE MONUMENTS, ETC.) DESTROYED DURING CONSTRUCTION SHALL BE REPLACED IN KIND BY THE CONTRACTOR. THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR REGISTERED IN THE STATE OF ALABAMA TO RESET PROPERTY MARKERS. THE COST FOR THIS WORK SHALL BE INCLUDED IN OTHER ITEMS OF WORK."

28. **Architectural Sheet A6.03 Glazing Systems Schedules and Details - Replace with A6.03 Glazing Systems Schedules and Details Addendum 7 in its entirety.**
    - **A. Revised Window Types for glazing locations.**
    - **B. Clarified window flashing by removing self-adhering flashing and annotated locations for liquid flashing compliment with fluid air barrier system , "INSTALL LIQUID FLASHING SYSTEM AROUND ROUGH OPENINGS TO WINDOW DRY LINE PER FLUID APPLIED AIR / WATER BARRIER AND WINDOW MANUFACTURER REQUIREMENTS."**
    - **C. Clarified flashing note , "PROVIDE NEW STAINLESS STEEL FLASHING WITH WELDED SIDE END DAMS AND HEMMED DRIP EDGE - PREFINISHED TO MATCH WINDOW - SET UNDERSIDE OF FLASHING IN BED OF SEALANT."**

29. **Architectural Sheet A8.01 Finish Legend.:**
    - **a. FC-3 Style is to be changed to "Shiplap" in lieu of "Square Channel" to match Sheet A5.23 Addendum Siding Sections.**

AD7-4 ATTACHMENTS:

A. Addendum Acknowledgment Response
B. 01 2100 - Allowance Addendum No. 7
C. 01 2300 - Alternates Addendum No. 7
D. 31 1000.00 - Site Clearing Addendum No. 7
E. 31 2316.13 – Trenching Addendum No. 7
F. 31 2500.00 - Erosion and Sedimentation Controls Addendum No. 7
G. 33 1200.00 - Water Utility Distribution Addendum No. 7
H. 33 3000.00 - Sanitary Sewerage Addendum No. 7
I. 31 2000 - Earthwork (002) Addendum No. 7
J. A6.03 Glazing Systems Schedules and Details Addendum 7

-END OF ADDENDUM-

PREPARED BY

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SECTION 01 2100

ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General Conditions and Division-1 Specification sections, apply to work of this section.

1. Coordinate allowance work with related work to ensure that it is completely integrated and interfaced with related work.
2. **Include in Base Bid.**

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions and Explanations: Certain requirements of the work related to each allowance are shown and specified in contract documents. The allowance has been established in lieu of additional requirements for that work, and further requirements thereof (if any) will be issued by change order.

B. Types of allowances scheduled herein for the work included the following:

1. Quantity allowances.
2. Lump sum allowances.

C. Selection and Purchase:

1. At earliest feasible date after award of Contract, advise Architect/Engineer of scheduled date when final selection and purchase of each product or system described by each allowance must be accomplished in order to avoid delays in performance of the work.
2. As requested by the Architect/Engineer, obtain and submit proposals for the work of each allowance for use in making final selections; include recommendations for selection which are relevant to the proper performance of the work.
3. Purchase products and systems as specified, and as selected (in writing) by the Architect/Engineer.
4. Submit proposals and recommendations, for purchase of products or systems of allowances, in form specified for change orders.

D. Change Order Data: Include in each change order proposal both the quantities of products being purchased and unit costs, along with total amount of purchases to be made. Where requested, furnish survey-of-requirements data to substantiate quantities. Indicate applicable taxes, delivery charges, amounts of applicable trade discounts, and other relevant details as requested by the Architect.

1. Each change order amount for allowances shall be based on the unit price difference between the actual purchase amount and the allowance, multiplied by the final measure or count of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins.
2. When requested, prepare explanations and documentation to substantiate the quantities, costs, and margins as claimed.

E. Change Order Mark-Up:

1. Except as otherwise indicated, comply with provisions of General Conditions. For each allowance, Contractor's claims for increased costs (for either purchase amount or Contractor's handling, labor, installation, overhead, and profit), because of a change in scope or nature of the allowance work as described in contract documents, must be submitted within 60 days of initial change order authorizing work to proceed on that allowance; otherwise, such claims will be rejected.
2. Where it is not economically feasible to return unused material to the manufacturer/supplier for credit, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

F. Time and Allowance Amounts:

1. Nothing in the Bid or Contract Documents shall be so constructed or interpreted as to provide a Contract time extension, due to use or non-use of any Allowance amount.
2. Nothing in the Bid or Contract Documents shall be so constructed or interpreted as to allow unused Allowances or any portion thereof, nor any overhead and profit therefor to be retained by or paid to the Contractor.

    a. Amount of unused allowances to be returned shall include unused amount plus 10% overhead and profit.

PART 2 - PRODUCT

Not Applicable.

PART 3 – EXECUTION

3.1 SCHEDULE OF ALLOWANCES - INCLUDE IN BASE BID:

A. Allowance No. 1: Owner Contingency Allowance:

1. Include the sum of $525,000 for additional work as directed by the Architect and Owner.

2. The allowance includes material cost, receiving, handling, and installation as applicable.

3. Include 10% overhead and profit in Base Bid, and not as part of Allowance.

B. Allowance No. 2 – EMERGENCY RESPONDER RADIO COVERAGE SYSTEM:

1. Allow a lump sum price of $90,000 for work associated with the purchase and installation of an Emergency Responder Radio Coverage System if found to be required after testing of the facility.

2. See Section 28 7800 - Emergency Radio Responder Coverage System for requirements. Costs associated with testing to identify if the system is required shall be included in the Base Bid, and NOT as part of Allowance.

3. Do NOT include overhead and profit in base bid. If the system is required, the General Contractor's overhead and profit shall be paid from the Allowance funds.

C. Allowance No. 3 – Specialty Lighting:

1. Allowance No. 3: Specialty Light Fixtures Fixture:
   a. The description as follows: Custom LED suspended fixture, 3500K, dimmable, not to exceed 50W. Provide $12,000 per each specialty fixture. There is a total of 5 specialty fixtures. Total Allowance shall be $60,000.00
2. Include 10% overhead and profit in Base Bid, and not as part of Allowance.

D. Allowance No. 4 – EGRESS STAIRS

1. Allow a lump sum price of $600,000 for work associated with the purchase and installation of the aluminum stairs and framing (2) locations, including all design, materials and labor for a complete and warrantable installation as described in the plans and specifications and in accordance with delegated design engineer calculations and requirements.

2. The purchase and installation of the aluminum perforated wall panels is an Alternate and shall not be included in the Allowance or Base Bid.

3. See Section 05 5100 – Aluminum Stairs

4. Include 10% overhead and profit in Base Bid, and not as part of Allowance.

E. Allowance No. 5 – EXISTING WINDOWS:

1. Allowance No. 5: Existing Windows:
   a. The description as follows: Provide a $30,000 lump sum for existing window cleaning, scrapping, missing parts, etc.

3. Include 10% overhead and profit in Base Bid, and not as part of Allowance.

END OF ALLOWANCES

SECTION 01 2300

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definition: An alternate is an amount proposed by Bidders and stated on the Bid Form that will be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in Contract Documents.

B. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.

C. Notification: Immediately following award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.

D. Schedule:

1. A “Schedule of Alternates” is included at the end of this section. Specification sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.

2. Include as part of each alternate, miscellaneous devices, appurtenances and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.

PART 2 - PRODUCTS

2.1 Not Applicable.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. **Alternate No. 1 –Machine Roomless Hydraulic Elevator:**

a. Provide and install a machine roomless hydraulic elevator system with an oil separator in lieu of an Electric Traction Elevator. Sump Pump is still required.

2. **Alternate No. 2 – Perforated Metal Wall Panels:**

a. Provide and install the delegated design exterior perforated metal wall panels. Refer to Section 07 42 00 Perforated Metal Wall Panels.

END OF ALTERNATES

SECTION 31 1000
SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY:

A. Furnish all labor, materials, equipment, and incidentals required and perform all clearing, grubbing, and stripping and stockpiling of topsoil for all pipelines and new structures as shown on the Drawings and as specified herein.

B. The cost for all clearing operations shall be included in the Contractor Bid

C. The Contractor shall restrict site clearing activities to within the project clearing limits.

1.2 RELATED REQUIREMENTS:

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

1.3 SUBMITTALS:

A. The Contractor shall inform the Engineer three (3) working days before the start of land disturbing activities:

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING:

A. Identify property lines, permanent and temporary construction easements, rights-of-way, and clearing limits as shown on the Drawings prior to clearing.

B. Install erosion control devices as shown on the Drawings and as specified in Section 31 2500.

C. Except as otherwise directed, cut, grub, remove, and dispose of all trees, stumps, rocks, brush, shrubs, roots, and any other extraneous material which occur within the project construction limits as necessary for construction of the proposed improvements and remove from the project site, except where protection of trees is shown on the Drawings or direct by the Engineer. Stumps need to be removed only within the area actually excavated. Root mats shall be left intact until just prior to actual excavation.

D. Trees in areas outside the easements/right-of-way shall be protected from damage. No equipment, materials, or excavation shall be allowed in areas outside the easements/right-of-way.

E. No stumps, trees, limbs, or brush shall be buried on site, in backfill, or in any fills or embankments.

F. Provide temporary seeding for all disturbed areas after clearing and grubbing until the subsequent construction work is performed within the following time schedule:

1. Within 10 working days or 14 calendar days of disturbance, whichever is lesser.

3.2 STRIPPING AND STOCKPILING TOPSOIL:

A. Strip topsoil from all areas to be excavated or filled. Avoid mixing topsoil with subsoil. Stockpile topsoil in areas within the easement as approved by the Engineer.

B. Topsoil shall be free from brush, trash, stones, and other extraneous materials and protected until it is placed.

3.3 DISPOSAL OF MATERIALS:

A. All tree trunks, limbs, roots, stumps, brush, foliage, other vegetation, rocks, and extraneous material shall be removed from the project site and disposed of in a manner meeting all applicable regulations.

B. Burning of cleared and grubbed materials will not be permitted without written permission from the Owner.

C. It will be the Contractor's responsibility to properly dispose of excavated materials unsuitable for conventional disposal.

3.4 PRESERVATION OF PUBLIC PROPERTY:

A. The Contractor shall exercise extreme care to avoid disturbance of private and public property along the route of the construction. Trees, shrubbery, gardens, lawns, and other landscaping which are inadvertently damaged outside the easements shall be replaced and established to the condition existing prior to construction and to the property owner's satisfaction at no additional cost to the Owner.

B. The Contractor shall temporarily restore the construction site within 14 days of pipe laying, and perform final restoration and cleanup of the site when all construction activities are complete.

C. Any commercial or roadway signs disturbed or removed shall be restored to their original condition within 24 hours.

D. All stone and other forms of access road stabilization shall be completely removed and all disturbed areas prepared, fertilized, and seeded per Section 32 9219.

3.5 WORK ON PRIVATE PROPERTY:

A. Where portions of the work are constructed in easements through private properties, the Contractor shall confine his operation within the limits of the permanent and temporary construction easements as shown on the drawings.

B. The Contractor shall further comply with all special provisions and Owner stipulations of the easements as noted on the Drawings.

C. In the event that, for the convenience of the Contractor, obtaining a further temporary construction easement is necessary or desirable, it shall be the sole responsibility of the Contractor to obtain such easement from the owner of the property. If such an easement is obtained, the agreement shall contain provisions to hold the Project Owner harmless from any operations of the Contractor within the easement limits.

D. The Contractor shall not enter upon or occupy any private land outside of the limits of the permanent and temporary construction easements unless a copy of the written easement agreement with the property owner is filed with the Engineer.

E. Upon completion of any work on each private property the Contractor shall restore the property, including all fences, gates or other structures disturbed by his operations, to an equal or better condition than that in which he found it.

F. No material shall be used on or removed from private property without the approval of the Engineer. A written, signed release form each property owner shall be obtained by the Contractor and a copy submitted to the Engineer.

END OF SITE CLEARING

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SECTION 31 2316.13
TRENCHING

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Excavating trenches for utilities
2. Compacted fill from top of utility bedding
3. Backfilling and compaction

B. Related work specified elsewhere includes:

1. 31 1000 – Site Clearing
2. 33 3000 – Sanitary Sewerage
3. 331416 – Water Service Piping
4. 334211 – Storm Drainage

1.2 REFERENCE STANDARDS:

A. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

B. ASTM D2487 – Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

C. ASTM D488 – Standard Sizes of Coarse Aggregate

D. 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))

E. AASHTO T 99 – Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in) Drop

F. AWWA C600 – Installation of Ductile-Iron Mains and Their Appurtenances

G. 29 CFR PART 1926 (OSHA) – Safety and Health Regulations for Construction

H. CITY OF AUBURN STANDARD DETAILS

1.3 SUBMITTALS:

A. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. The plan shall be stamped by a qualified professional engineer registered in the State of Alabama.

B. Method of dewatering including type of systems, equipment, material, and other pertinent data of dewatering system. The system shall be designed by a qualified professional engineer registered in the state of Alabama

C. Product Data:

1. Geotextile fabric.
2. Bedding materials.
3. Restoration materials.

D. Materials Source: Name and location of imported fill materials suppliers.

E. Classification of imported materials by Laboratory analysis or other certification.

F. Submit information found from test boring and pits.

1.4 QUALITY ASSURANCE:

A. Perform Work according latest requirements of OSHA excavation safety standards and all applicable state and local requirements.

B. Design of excavation support and stabilization systems shall be performed by a professional engineer, registered in the State of Alabama, with at least five (5) years of experience in design of similar excavation support systems.

C. Design of the dewatering system shall be performed by a professional engineer, registered in the State of Alabama with at least five (5) years of experience in design of similar dewatering systems.

1.5 FIELD MEASUREMENTS:

A. Prior to construction, the Contractor shall be responsible for taking sufficient measurements, horizontal and vertical, to ensure that all existing facilities, which includes but is not limited to; pavements, curbs, gutters, drainage facilities, fences, gates, mailboxes, signs, guardrails, markers, and monuments are restored to their original lines and grades.

1.6 COORDINATION:

A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

B. The Contractor shall comply with the requirements of all encroachment permits obtained for the work, if applicable. If the Contractor wishes to deviate from the permit requirements he shall obtain a revision to the permit at no additional cost to the Owner.

C. If applicable, any additional Permit applications from State or County Highway Departments, Municipal Street Departments, Railroads, and Utility Companies shall be prepared by the Contractor. Permit applications shall be prepared by the Contractor even though the permanent contract agreement is made between the Controlling Authority and the Owner.

D. If any encroachment permits are required, the Contractor will be required under the terms of this contract to furnish the performance bond, insurance coverage, and any other security required by the Controlling Authority, either directly from him or indirectly from the Owner.

E. If any encroachment permits are required, the Contractor shall include in the total amount bid all costs related to field staking, measurements and surveys, sketches and drawings, and permit application form completion, bonds and insurance as required by the Controlling Authority. The Contractor shall also pay the cost of any supervision by an Inspector of the Controlling Authority if such is stipulated in the permit.

PART 2 - PRODUCTS

2.1 GENERAL:

A. All excavation shall be “unclassified” unless described elsewhere in these specifications.

B. Soils type shall be based upon ASTM D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

C. Stone or Coarse Aggregate type shall be based upon ASTM D488, Standard Sizes for Coarse Aggregates.

D. Rip rap type shall be in accordance with the latest edition of the ALDOT Standard Specifications for Highway Construction.

2.2 MATERIALS:

A. Structural backfill shall be imported or excavated trench material meeting the requirements of the geotechnical report. if no report is provided, structural backfill shall meet the following requirements:

1. Class I through III per ASTM D2321
2. Free of clay lumps, roots, debris, rubbish, frozen material, and stones larger than one inch in diameter, have ‹ 35% fines, and capable of being compacted to 95% density per AASHTO T-99.

B. Common backfill material shall consist of excavated materials meeting the following requirements:

1. Class I through IV per ASTM D2321
2. Highly organic silts, clays and Class V materials shall not be used.
3. Materials shall be free roots, stumps, debris, rubbish, frozen material, and stones larger than one inch in capable of being compacted to 85% density per AASHTO T-99.
4. Contain no stone blocks, broken concrete, masonry rubble, or other similar materials.
5. Physical properties such that it can be readily spread and compacted during filling.
6. Snow, ice, and frozen soil will not be permitted.

C. Crushed Stone:

1. Crushed stone for pipe bedding, structure bases, and other used indicated on the Drawings shall be angular, clean-washed, crushed stone graded in accordance with size #67 or #57 in ASTM D488 (ALDOT #67 or #57).

D. Foundation Conditioning Material: Crusher-run rock, conforming to ASTM D448.

E. Geotextile Fabric shall be used as directed by the Engineer or as indicated on the Drawings and shall conform to the following requirements:

1. Geotextile fabric shall be non-woven Mirafi, Type HP570, Type 140N; Dupont, Type PAR, Style 3401; as required by the drawings, or approved equal.

F. Trench Plugs:

1. Trench plugs shall be concrete filled sacks, Bentonite Clay or material having a “GC” soil rating per ASTM D2487 and shall have a coefficient of permeability no greater than 0.001 cm/sec per ASTM D2434.
2. If excavated material is to be used the Contractor shall submit verification and test results from a qualified laboratory that the material meets the classification and permeability specification above.

PART 3 - EXECUTION

3.1 LINES AND GRADES:

A. Lay pipes to lines and grades indicated.

1. The Engineer may make changes in lines, grades, and depths of utilities when changes are required for Project conditions

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION:

A. Ensure sediment and erosion control measures are installed per the Drawings and Section 31 2500 prior to performing any disturbing activity.

B. Complete site clearing operations per the Drawings and Section 31 1000.

C. Contact local utility line information service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

D. Identify required lines, levels, contours, and datum locations.

E. All trees, telephone and power line poles along the line of the work must be protected, and at night a sufficient number of barricades and lights to prevent accidents shall be provided. Where pipelines are laid between the curb and the sidewalk or in other places where shrubbery and grass lawns are encountered, the Contractor shall carefully remove and replace the shrubbery and cut the grass sod in sections, laying it to the side and replacing it after the trench has been backfilled and allowed to settle.

F. Unless otherwise indicated on the Drawings, protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

G. Maintain and protect above and below grade utilities indicated to remain.

H. Establish temporary traffic control and detours when trenching is performed in public rights-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.3 SHEETING AND SHORING:

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. All sheeting and shoring shall furnished and placed in accordance with the requirements of OSHA Standards, Subpart P, Part 1926, of the Code of Federal Regulations.

C. Design sheeting and shoring to be left in place as part of completed Work, cut off minimum of 6" above the top of pipe and 18 inches below finished grade.

D. No sheeting installed closer than one (1) pipe diameter or 2 feet (whichever is greater) from the outside edge of the pipe shall be withdrawn if driven below mid-diameter of any pipe. Any sheeting beyond these limits which is withdrawn shall be done in a manner in which the sheeting slides smoothly out of position without any disturbance of adjacent bedding. The remaining hole shall immediately be filled by hand with sand.

E. If trench sloping is substituted for shoring, the slope shall be in accordance with all OSHA requirements. Sloping of the pipe trench shall only be allowed at depths of 10 feet or less below existing grade. The sloping of the trench wall shall terminate twelve inches above the top of the pipe and, from that point to the trench bottom, the trench wall shall be vertical.

F. All excavations deeper than 10 feet below grade shall have appropriate excavation support systems from the bottom of the excavation to within a minimum of 10 feet from the top of the excavation.

G. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing at no additional cost to the Owner.

H. The Contractor may, at his option, use movable earth retaining devices (trench boxes) to stabilize excavations for pipes where these devices can be effectively used. Trench boxes shall not be considered as a substitute for sheeting systems specifically called out on the drawings. Trench boxes shall not be used for tunnel launch and exit shafts.

I. Where movable earth retaining devices such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and backfill.

J. Trench box systems shall be designed by a professional engineer registered in the State of Alabama. Design drawings and computations for non-commercial trench boxes shall be submitted to the Engineer for information prior to construction.

3.4 DEWATERING:

A. The Contractor shall, at all times during construction, provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work and shall keep said excavation and work dry until the structures to be built therein are completed, or until the Engineers direct the Contractor to discontinue dewatering operations. Wherever judged necessary by the Engineer, the Contractor shall employ well points to insure a dry excavation. No claims for an amount of money in excess of the bid price for the work will be entertained or

allowed on account of the character of the ground in which the trench or other excavations are made.

B. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the sub-grade soils at the proposed bottom of the excavation. Groundwater shall be lowered to at least 2 feet below the excavation level at all times.

C. The Contractor shall provide for the disposal of the water removed from the excavation in such a manner as not to cause erosion, siltation, or turbidity increases in any water course; injury to public health; degradation or damage to private or public property, to any portion of the work completed or in progress, or to roads or streets; or cause any impediment to the reasonable use of the site by others.

3.5 EXCAVATION & TRENCHING:

A. Underpin adjacent structures which may be damaged by excavation work.

B. Trenches and excavations shall be open cut to proper depth and alignment for the installation of pipe, structures, and appurtenances as shown on the plans.

C. The minimum trench width shall be at least the nominal pipe diameter plus 24 inches or as shown in the table below, whichever is greater:

Trench Width Table			
Pipe Diameter	Depth ‹ 6’	6’ ‹ Depth ‹ 12’	12’ ‹ Depth
3”	2.4’	4.4’	6.4’
4”	2.4’	4.4’	6.4’
6”	2.6’	4.6’	6.6’
8”	2.7’	4.7’	6.7’
10”	2.9’	4.9’	6.9’
12”	3.1’	5.1’	7.1’
14”	3.3’	5.3’	7.3’
16”	3.4’	5.4’	7.4’
18”	3.6’	5.6’	7.6’
20”	3.8’	5.8’	7.8’
24”	4.1’	6.1’	8.1’

D. Remove lumped subsoil, boulders, and rock up of 6 feet in diameter.

E. Slope banks with machine to angle of repose or less until shored.

F. Grade top perimeter of excavations to prevent surface water from draining into excavation.

G. Excavated material shall be stockpiled within the construction easement or other location(s) approved by the Engineer.

1. The excavated material shall be piled on the side of the trench at least 4 feet (horizontally) extending away from the top of the excavated trench so that a clear walkway will be maintained at the edge. Excavated material shall be kept clear of the sidewalks except where unusual conditions prevent this being done. All driveways shall be backfilled as soon as the pipe is laid and no driveway shall remain inaccessible at the end of the day's work.

2. Excavated material which has suitable characteristics for backfill shall be stockpiled in such a manner that it will not collect either surface water or rainwater. The stockpile top surface shall be sloped to drain away from the excavation site and graded smooth and compacted to drain rainwater rapidly. It shall be the Contractor's responsibility to control or adjust the moisture content of excavated materials to the requirements for common fill before such materials may be used for backfill at no additional cost to the Owner.

H. Excess excavation shall be disposed of offsite by the Contractor. All handling, hauling, and disposal costs shall be considered incidental to the work. Disposal shall be in compliance with all applicable regulations. Excess excavation shall be as described below:

1. All rocks, stumps, roots, and organic muck, clay, or silt lenses removed in the preparation of the excavation for common fill.

2. Soils which cannot qualify as common fill after preparation such as muck soils, high organic soil, or non-granular soil high in silt and clay content.

3. Excavated material remaining at the end of the work after all stockpiles, and prepared backfill has been utilized as needed.

I. Do not advance open trench more than 60 feet ahead of the pipe laying unless prior approval is given by the Engineer

J. Excavate trenches to the bottom elevation of the bedding for structures and pipes. The width shall be at least 2 feet beyond the neat lines of structure footings and as shown on the Drawings for sewer pipes. Over-excavation that is not directed in writing by the Engineer shall be backfilled with structural fill at no additional cost to the Owner.

K. Do not interfere with 45-degree bearing splay of foundations.

L. When subsurface materials at bottom of trench are loose or soft, excavate to; a depth of no more than 2 feet below the trench bottom, unless additional depth is authorized by Engineer, or until suitable material is encountered. Backfill with foundation conditioning material to the original trench bottom compacted to 95% maximum density.

M. Underlay foundation conditioning material with geotextile overlapping each seam by a minimum 18 inches.

3.6 FOUNDATION, BEDDING AND EMBEDMENT:

A. Foundation stone for structures and pipe shall be #57 or #67 stone placed to the minimum excavation widths as shown on the Drawings, and shall be at least 6 inches deep below the bottom of footings, base slabs, and to a depth as shown on the Drawings below the bottoms of pipe.

B. Foundation stone shall be placed only on dry, stable, compacted subgrade or on rock.

C. Loose earth in the sub-grade shall not be acceptable. Where required, sub-grade compaction shall be with a vibratory type mechanical compactor.

D. Trim excavation. Hand trim for bell and spigot pipe joints.

E. No foundation contamination with earth shall be allowed. Immediately remove any earth mat that falls into the foundation during placement or compaction.

3.7 TRENCH PLUGS:

A. An impervious clay ditch check or trench plug shall be required on the downstream side of all stream crossings, on both sides of all wetland crossings, where shown on the Drawings or as directed by the Engineer.

B. The trench plug shall be constructed for a length of 3 feet as measured along the centerlines of the pipe and the full width of the trench excavation from the trench bottom to 6 inches above the top of the pipe.

3.8 BACKFILLING:

A. All trenches and excavations shall be backfilled immediately after the pipe has been laid and inspected. Backfill material shall be approved in all cases by the Engineer and shall be free of objectionable debris. Backfilling shall include the refilling and compacting the fills in the trenches or excavation to the existing ground surface or to the existing road subgrade.

B. Following the laying of the pipe, the pipe shall be centered in the trench, adjusted to line and grade and the initial bedding material shall be carefully placed on both sides of the pipe so as not to disturb the alignment and grade of the pipeline. The bedding material shall be sliced under the haunches of the pipe and compacted to fill all voids.

C. Backfill structures carefully, bringing the fill up evenly on all sides.

D. Bedding material shall consist of #57 or #67 stone and extend from the foundation stone to 6-inches above the top of the pipe or as shown on the plans.

E. Backfill material shall consist of crushed stone, structural, or common backfill depending upon location as detailed on the Drawings.

F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with common backfill and compact to density equal to or greater than requirements for subsequent backfill material.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Do not leave the trench or excavation open at end of working day.

3.9 COMPACTION:

A. Foundation and bedding stone shall be installed in maximum 6-inch lifts, as placed, and compacted with suitable compaction equipment to at least 85% of maximum dry density or as required by pipe manufacturers. Lift thickness shall be reduced to 4 inches in confined areas accessible only to hand-guided compaction equipment.

B. Structural backfill shall be placed in maximum 6-inch level layers and compacted to at least 95% of maximum dry density as determined by ASTM D698, or as detailed in the geotechnical report.

C. Common backfill shall be placed in maximum 12-inch layers and compacted to at least 85% of maximum dry density or as shown on the Drawings.

D. Trench Plugs shall be placed in maximum 6 inch lifts and compacted to 95% density per ASTM D698.

E. Compaction shall be by a vibratory-type mechanical compactor adjacent to structures and including between the pipe and trench sides, sheeting or trench box. Larger compaction equipment may be used as desired after backfill has reached at least two feet above the top of the pipe. For structures, the mechanical compactor shall be used between the structures and sheeting until the elevation at which sheeting is withdrawn, at which elevation the entire excavated area may be compacted with larger equipment if desired.

3.10 PROTECTION OF UTILITIES:

A. The Contractor shall locate and protect all utilities which could be affected by the Work including but not limited to; overhead cables, poles, buried cables, duct banks, wastewater pipes, gas pipes, water pipes, and drainage pipes and appurtenances. Before working in any area the Contractor shall contact the local utility locating service to mark the locations of underground utilities. Any underground utilities that could interfere with the work shall be staked and flagged.

B. Underground pipes and cables which cross the excavations shall be carefully exposed and temporarily supported by the Contractor to the satisfaction of the utility owner. The utility shall be carefully incorporated in the backfill with full support and protection. Length of utility support shall be based on actual field conditions.

C. Utility relocation shall be discussed at a meeting with the Engineer and utility owner.

D. Before operating any equipment near a buried or overhead electric cable, the contractor shall contact the owner of the cable to arrange for protection of the cable and the Contractor's personnel and equipment.

E. At least 48 hours prior to operating any equipment near a buried gas pipe line, the Contractor shall contact the owner of the line and inform them of the work.

F. Compliance with the conditions of the Owner of an electric or gas utility shall be considered a subsidiary obligation under the Contract.

G. The Engineer shall be invited to attend all meetings between the Contractor and utility owner for information only.

3.11 FIELD QUALITY CONTROL:

A. The Contractor will have compaction tests performed by the Engineer on the compacted backfill to verify compliance with these specifications.

B. Perform laboratory material tests according to ASTM D698, or AASHTO T 99 Method A.

C. Perform in place compaction tests according ASTM D2167 for density and ASTM D3017 for moisture content.

D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

E. Frequency of Tests:

1. Trenches: One location every 500 feet.
2. Structures (Manholes): Two locations around each manhole in separate lifts.
3. Structures: At least two-density tests shall be made beneath each structure, or as directed by the Engineer.

3.12 MAINTENANCE:

A. The Contractor shall maintain all project areas during the specified warranty period. Maintenance shall include the following:

1. Immediately filling and reseeding any eroded areas.
2. Reseeding any areas where a full stand of grass does not develop.
3. Removal and replacement of any trees which die or show distress.
4. Refilling and reseeding any backfilled areas which settle and develop depressions.

END OF SECTION TRENCHING

SECTION 31 2500
EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section covers the installation and maintenance of erosion control measures for the project.

B. All necessary precautions to prevent erosion and siltation, as required by the Alabama Department of Environment Management (ADEM). Storm Water Best Management Practices shall be followed, including items specified herein, and other items as required by the Permit.

C. The Contractor shall maintain all erosion control measures installed on a regular basis. The Contractor shall repair or replace damaged measures at the direction of the Engineer at no additional cost to the Owner.

1.2 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 32 9219 – Seeding and Restoration

C. Sedimentation and erosion control measures shall conform to the requirements of the most current edition of the following:

1. Alabama NPDES Construction General Permit
2. ADEM
3. Alabama Department of Transportation Standard Specifications for Highway Construction (ALDOT), Current Edition.
4. *Alabama Handbook for Erosion Control, Sediment Control, and Storm Water Management on Construction Sites and Urban Areas*
5. Town of Dauphin Island Standard Details for Erosion Control

D. An approved project BMP Plan hereby incorporated by reference has been developed for this project. The Contractor will receive a copy of the BMP Plan at the mandatory pre-construction meeting. The Contractor shall become the day to day operator of the BMP Plan and assume responsibility for the requirements of the BMP Plan including inspections and record keeping.

1.3 SUBMITTALS:

A. The Contractor shall keep on-site an updated copy of the BMP Plan in accordance with NDPES permit requirements.

1.4 QUALITY ASSURANCE:

A. All NPDES permit required inspections shall be performed by the Owner's QCI certified inspector (Inspector).

B. Any cost incurred by the Contractor for inspection due to delays in construction or overrun of the contract time shall be paid for by the Contractor and shall not be the responsibility of the Owner or Engineer.

C. Contractor shall be responsible for compliance with the storm water permit, including the BMP Plan. Any fines incurred by the Owner stemming from the storm water permit shall be paid by the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Furnish Stone and Aggregate materials per current ALDOT standards.

B. Stone for Check Dam: Stone conforming to Division 800 of the current ALDOT Standard Specifications. Size range from 2-inches to 10-inches equally distributed.

C. Stone for Rip Rap: Class 2 rip rap conforming to Section 814 of the current ALDOT Standard Specifications. Sizes ranging from 10 pounds to 200 pounds equally distributed.

D. Aggregate for Construction Entrance: Coarse aggregate, with size range of 1.5-inches to 3.5-inches, conforming to Division 800 of the current ALDOT Standard Specifications.

E. All rolled erosion control products (RECPs) including Temporary Erosion Control Blankets (ECB), and Turf Reinforcement Mat (TRM) shall meet the requirements of Section 860 of the current ALDOT Standard Specifications.

1. Excelsior matting (ECB) shall be installed on all seeded drainage swales, ditches, slopes of 3:1 or steeper, or as directed by the Engineer.

a. Provide Curlex® III Long-Term Erosion Control Blanket as manufactured by American Excelsior Company or approved equivalent. The ECB shall provide seed and topsoil protection for up to 36 months.

F. Non-Woven Geotextile Fabric underlaying construction entrances and rock ditch checks shall meet the requirements of the current ALDOT Standard Specifications.

2.2 SILT FENCE:

A. The height of silt fence shall not exceed 36 inches (0.9 m). Storage height and ponding height shall never exceed 18 inches (0.5 m).

B. The standard-strength filter fabric shall be stapled or wired to the fence, and 6 inches (0.2 m) of the fabric shall extend into the trench.

C. When standard-strength filter fabric is used, a 4"x4" 12-x12-gauge steel wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1-inch (25.4 mm) long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2-inches (51 mm) and shall not extend more than 36-inches (0.9 m) above the original ground surface.

D. When extra-strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts.

2.3 INLET FILTER:

A. A filter shall be used at any storm water inlet during construction to filter runoff where soils have been disturbed.

B. The filter shall be a weighted sediment tube filter with a diameter of 9.5-inches at the ends and tapering to 5 inches in the center. Lengths shall be 6 to 9 feet with a build-in triangular overflow for relief during high-intensity storm events.

C. Unit Weight: 13 lbs/ft

D. Interior Filter

1. Materials: Shredded, recycled tire rubber particles with less than 2% metal and the rubber shall be washed during manufacturing.
2. Particle Size: ½ inch to ¾ inch particle size

E. The geotextile bag shall have

1. Percent Open Area: 8%
2. Apparent Opening Size: 30 U.S. Sieve
3. Grab Tensile Strength: 400 lbs
4. Flow Rate: 115 gal/min/ft^2
5. Puncture Strength: 125 lbs

2.4 TURBIDITY CURTAINS:

A. Turbidity Curtains shall be placed at locations shown on the Drawings or as deemed necessary by the Engineer.

B. Curtains shall be Type I DOT with 6" or 8" square foam filled floats. The fabric shall be 18 oz. PVC, as manufactured by GEI Works or approved equivalent.

2.5 SEDIMENT TUBES:

A. Sediment tubes shall conform to the requirements of the current ALDOT specifications.

1. Sediment tubes shall be composed of compacted geotextile, curled excelsior wood fiber, natural coconut fiber, hardwood mulch, growing media or a mixture of these materials enclosed by a flexible netting material and utilize an outer netting that consists of seamless high-density polyethylene, photodegradable material treated with ultraviolet stabilizers or a seamless, high-density polyethylene, non-degradable material.
2. Straw, straw fiber, straw bales, pine needles and/or leaf mulch shall not be used.
3. Curled excelsior wood fiber or natural coconut fiber RECPs rolled up to create a sediment tube device shall not be used.
4. Anchor posts shall be steel posts minimum of 48" long
5. Sediment tube diameter shall be between 18" and 24". The mass per unit length shall be 3-lb/ft for 18" tubes and 4-lb/ft for 24" tubes with a 10% margin of error.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install all Erosion and Sediment Control BMPs in accordance with BMP Handbook, the project BMP Plan, and local requirements.

B. Check Dam

1. Determine length required for ditch or depression slope and excavate, backfill, and compact foundation area to firm, even surface.
2. Install filter fabric prior to rock installation.
3. Place Class B erosion control stone in an even distribution of rock pieces with minimum voids to the indicated shape, height, and slope.

C. Temporary Construction Entrances

1. Install construction entrances per the details shown on Drawings. Minimum thickness is 6 inches.

2. Mound aggregate near intersection with public road to prevent site runoff entering road.
3. Periodically dress entrances with 2-inch thick course aggregate when aggregate becomes clogged with soil.

D. Silt and Turbidity Curtain

1. Install per manufacturer's recommendations.

E. Erosion Control Blanket

1. Install per manufacturer's recommendations.

F. Turf Reinforcement Mat

1. Install per manufacturer's recommendations.

G. Silt Fence

1. The fence line shall follow the contour as closely as possible.
2. If possible, the filter fabric shall be cut from a continuous roll to avoid the use of joints. When joints are necessary, filter cloth shall be spliced only at a support post, with a minimum 6 inch (0.2 m) overlap and both ends securely fastened to the post.
3. Posts shall be spaced a maximum of 10 feet (3.1 m) apart and driven securely into the ground (minimum of 12 inches (0.3 m)). When extra-strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet (1.8 m).
4. Turn the ends of the fence uphill.
5. A trench shall be excavated approximately 4 inches (101 mm) wide and 6 inches (0.2 m) deep along the line of posts and upslope from the barrier.
6. The trench shall be backfilled and the soil compacted over the toe of the filter fabric.
7. Silt fences placed at the toe of a slope shall be set at least 6 feet (1.8 m) from the toe in order to increase ponding volume.
8. Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized and any sediment stored behind the silt fence has been removed.
9. Silt fences and filter barriers shall be inspected weekly after each significant storm (1 inch (25.4 mm) in 24 hour). Any required repairs shall be made immediately.
10. Sediment should be removed when it reaches 1/3 height of the fence or 9 inches (0.3 m) maximum.
11. The removed sediment shall conform to the existing grade and be vegetated or otherwise stabilized.

3.2 CLEANING:

A. When sediment accumulation in sedimentation structures has reached a point one-half depth of sediment structure or device, remove and dispose of sediment.

B. Do not damage structure or device during cleaning operations.

C. Do not permit sediment to erode into construction or site areas or natural waterways.

D. Clean channels when depth of sediment reaches approximately one-half channel depth.

3.3 INSPECTION AND MAINTENANCE:

A. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

B. It is the Contractor's responsibility to perform all required inspections in accordance with all Authorities having Jurisdiction.

C. Contractor is responsible for continually maintaining all temporary erosion control measures until permanent measures are properly installed and performing as required.

3.4 TEMPORARY AND PERMANENT SEEDING:

A. Apply temporary or permanent seeding to restrain erosion on all disturbed areas as soon as practical but in no case longer than 14 calendar days following temporary or permanent cessation of construction whether or not the area is being used for construction access.

3.5 REMOVAL AND FINAL CLEANUP:

A. Soil and erosion measures are to be maintained and remain in place until the disturbed area is stabilized and inspected by the Owner.

B. Once the Notice of Termination has been submitted by the Engineer, the Contractor shall remove and dispose offsite all erosion and sediment control device and other remaining items. Dispose of all silt and waste materials offsite in a proper manner. Complete final restoration activities.

END OF SECTION EROSION AND SEDIMENTATION CONTROLS

SECTION 33 1200
WATER UTILITY DISTRIBUTION

PART 1 – GENERAL

1.1 SUMMARY:

A. This Section includes:

1. Pipes, valves, fittings and accessories for water distribution system.

1.2 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 31 2000 – Excavation & Grading
2. Section 32 9219 – Seeding and Restoration

C. Gulf Shores Utilities Standard Specifications

1.3 SUBMITTALS:

A. Contractor shall submit to the Engineer for approval:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's certifications and laboratory test reports required.
4. Shop drawings, prepared in accordance with pertinent provisions of these specifications.
5. Product warranties

PART 2 – PRODUCTS

2.1 DUCTILE IRON PIPE:

A. Ductile iron pipe shall be Pressure Class 350 unless otherwise noted in the Bid Proposal, and shall be manufactured and marked in accordance with AWWA C151. Unless otherwise noted in the Proposal, the pipe shall have single gasket push on joints manufactured in accordance with AWWA C111, an interior cement mortar lining manufactured in accordance with AWWA C104, and an exterior asphaltic coating of not less than 1 mil thickness. Flanged pipe shall conform to AWWA C115.

2.2 PVC PIPE:

A. PVC pipe shall be supplied in 20 foot lengths unless otherwise specified and shall be furnished with integral bell and spigot push-on joints. Gaskets shall be locked in. The pipe and the coupling must both be manufactured by the same company. The pipe shall comply with ASTM D 1784 for PVC compounds, and ASTM D 3139 and ASTM F 477 for Joints using Flexible Elastomeric Seals. Potable Water Pipe shall also comply with NSF Standard 61 for Drinking Water systems Components – Health Effects.

B. **PVC pipe shall be AWWA C900, DR18 CL 235 Pipe, BLUE in color**, unless otherwise specified.

ASTM D 2241 (IPS)	AWWA C900 (CIOD)	AWWA C905 (IPS/CIOD)
PR 160 psi – SDR 26	PC 165 psi – DR 25	PR 165 psi – DR 25
PR 200 psi – SDR 21	PC 235 psi – DR 18	PR 200 psi – DR 21
PR 250 psi – SDR 17	PC 250 psi – DR 17	PR 235 psi – DR 18
PR 315 psi – SDR 13.5	PC 305 psi – DR 14	PR 305 psi – DR 14
Pipe size 1/8" – 36"	Pipe size 4" – 12"	Pipe size 14" – 30"

C. Marker wire shall be installed on all PVC, Fusible PVC and Polyethylene pipe and service tubing. The wire shall be 10 gauge THHN insulated solid copper, installed with electrically continuous joints. The marker wire shall be brought up into all valve and meter boxes so as to be readily accessible to water system operators. All wire splices and connections shall be made with an underground splice with resin, such as 3M Scotchcast Inline Splice Kits, or approved equal. **Marker wire shall be extended up into all valve boxes.**

D. Blue Metallic Marker Tape shall be used for marking all new water main pipe installed by open cut. The Marker Tape shall have a minimum thickness of 5 mil, shall be marked "CAUTION WATER MAIN BURIED BELOW", and shall be buried 1.0 to 1.5 feet above the crown of the carrier pipe. All costs associated with the Marker Tape shall be included in the total price bid.

2.3 HIGH DENSITY POLYETHYLENE PIPE:

A. General: Materials used for the manufacturing of polyethylene pipe and fittings shall be 4710 High Density Polyethylene (HDPE) meeting the ASTM D3350 cell classification of 445474C.

1. High Density Polyethylene Pipe (HDPE) and fittings will be used in accordance with the materials specifications. All additional appurtenances such as tees, gaskets, flange adaptors, etc. will meet the material specifications. The Contractor will supply the pipe and fittings and will include its price in the bid. All pipe installed by guided boring will be joined by an approved butt fusion or electrofusion technique according to the manufacturers specifications.

2. HDPE pipe shall be produced from resins with a material designation PE4710, and a cell classification PE445474C as specified within ASTM D3350, and dimensions and workmanship as specified by ASTM F714. It will also meet the requirements of AWWA ASTM D3350. Pipe will be legibly marked at intervals of no more than five

feet with the manufacturer's name, trademark, pipe size, HDPE cell classification, appropriate legend such as SDR 9, ASTM D3035, AWWA C901 or C906, date of manufacture and point of origin. Pipe not marked as indicated above will be rejected.

3. The material used in the production of potable water pipe shall be approved by the National Sanitation Foundation (NSF).

B. Pipe Thickness: The material shall have a minimum Hydrostatic Design Basis (HDB) of 1600 psi at 73°F when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe and fitting manufacturer in PPI TR-4.

Polyethylene pipe shall be manufactured in accordance with AWWA C906 for sizes 4" through 54".

Permanent identification of piping service shall be provided by co-extruding longitudinal blue stripes into the pipes outside surface. The striping material shall be the same material as the pipe material except for color.

C. Joints: Butt fusion or Electrofusion welded in accordance with ASTM D3261.

D. Marking: The net weight, pressure class or nominal thickness, sampling period and manufacturer shall be marked on each pipe.

2.4 FLEXIBLE JOINT PIPE:

A. Flexible joint pipe shall be cast of 60-42-10 ductile iron and shall conform with ANSI A21.51 Class 8. The joint shall be of the ball and socket type with the sockets either cast or screwed on the pipe and may be either bolted or keyed. If of the bolted type, the bolts and nuts shall be made of either stainless steel or low alloy steel conforming to ANSI 21.11.

B. The joint shall be capable of a full 15° free turning deflection with no reduction in the flow.

2.5 RESTRAINED JOINTS:

A. Where restrained joint pipe is required, the pipe shall be single gasket push-on joints as required in Paragraph 1.1 of this section. The joints shall be restrained using a "Gripper" style gasket. All restrained joints shall be suitable for a 350 psig working pressure.

B. Restrained joints gaskets shall be US Pipe Field Lok 350®, American Fast-Grip®, or other pre-approved equivalent. Mechanical joints with Megalug 2000PV assemblies, or pre-approved equivalent, will also be approved where restrained joint fittings are required.

2.6 CASING PIPE:

A. Where water mains are to be installed under railroad tracks, etc. and in some cases where they are to be installed under paved highways, they shall be laid inside a casing pipe of the size shown on the plans and listed in the Bid Proposal. As a general rule, the

locations and approximate lengths of the encasements are indicated on the plans for the information of bidders, but the precise location, length of the encasement will be specified in the permit issued by the Railroad or Highway Department involved.

B. The casing pipe shall be new and made of steel in accordance with API 5L standard weight line pipe and be provided with continuous welded joints. The casing pipe shall be jacked through a hole of the proper size that has been previously bored for the purpose, or be installed by excavating and installing liner plates as the hole is advanced. It may also be installed by the continuous boring and jacking method.

C. The wall thickness of the steel casing pipe shall be 0.25" for all sizes 24" and smaller, 0.375 for sizes 26" through 36" and shall conform to ALDOT Section 862 for larger diameter.

D. The casing pipe shall be complete with stainless steel spacers behind each pipe bell and at 10 foot intervals inside the casing pipe. Spacers shall be provided with ribbed EPDM/PVC/PE lining with a minimum thickness of 0.1" and shall prevent electrical contact between the carrier pipe and the metal spacer.

E. The ends of each casing pipe shall be sealed with a flexible synthetic rubber seal, PSI Model S or approved equivalent.

2.7 FITTINGS:

A. Ductile iron fittings with mechanical joint retainer glands shall be provided. Ductile iron fittings 12" and smaller shall be rated for 250 psi working pressure, and fittings larger than 12" shall be rated for 150 psi working pressure. Fittings shall be manufactured in accordance with AWWA C153 and provided with mechanical joints. All fittings shall be provided with a thin cement lining in accordance with AWWA C104.

B. All mechanical joint retainer glands shall be MEGALUG 2000PV as manufactured by Ebaa Iron, Inc.

C. All fittings shall be wrapped in 6 mil polyethylene encasement extending 6" beyond connection in accordance with AWWA C105.

D. Thrust restraints shall be 2500 psi concrete poured in place against undisturbed soil unless otherwise approved by the Engineer. In addition to restrained joints and thrust blocks, all fittings shall have a vertical piece of 4" diameter galvanized pipe driven 4ft into the ground behind the fitting for extra support.

2.8 VALVES:

A. All valves shall be furnished with a valve box and shall be furnished with a concrete collar in accordance with Paragraph 9. The Owner shall also be furnished with one (1) adjustable valve wrench for every five (5) valves installed.

B. Valves for use with ductile iron pipe shall have mechanical joint end connections unless otherwise shown. Valves used with PVC pipe shall be equipped with end connections and transition gaskets especially made for this type of pipe.

C. Gate valves shall be iron body, brass mounted, epoxy coated interior and exterior, and be of the resilient seat type. Gate valves shall have a non-rising stem, "O ring" stem seal, a 2" square operating nut and shall open by turning counterclockwise. Gate valves thru 12" diameter shall be manufactured in accordance with AWWA C509. Gate valves 12" and smaller shall be suitable for a working pressure of 200 psig and shall be tested to 400 psig.

D. Gate valves larger than 12" diameter shall conform to AWWA C500 and C504. Gate valves larger than 12" shall be suitable for a working pressure of 150 psig and shall be tested to 300 psig.

E. Butterfly valves shall be manufactured and tested in accordance with AWWA C504, Class 150 B. Butterfly valves shall be provided with operators suitable for underground service that meet all AWWA standards.

F. Where the contract involves extensions to an existing system the Contractor shall verify the direction of opening of existing valves and if this is opposite to the direction specified herein he shall confer with the Owner and the Engineer regarding the direction of opening to be provided on the valves furnished under this contract.

G. Tapping valves and sleeves may be of the mechanical joint or hub end type, Mueller H-615 and H-667, or pre-approved equivalent. Tapping valves shall be non-rising stem. Working pressure for 2"-12" valves shall be 200 psi with 400 psi test pressure. For valves greater than 12", the working pressure shall be 150 psi with test pressure of 300 psi. Valves and sleeves shall be cast tapping SCV's and valves shall be air tested for duration of 5 minute and 50 PSI.

H. Valves shall be manufactured by Mueller, Clow or M&H.

I. Air Release Valves (ARV) shall be 1" ball type valves to be field located at high points in the water main. The valve shall operate through a compound lever system and shall have a 5/64" orifice with valve sealing faces of an adjustable BUNA-N rubber valve and stainless steel or PVC and shall operate at 150 psig. The valve shall be 1" NPT screwed of ANSI Class (125,250) flanged inlet connection and shall be cast iron body, top and inlet flange (where required), stainless steel float and trim. Valves which use a needle valve to seal the orifice will not be acceptable. The valve shall be CRISPIN Model AR10, Pressure Air Valve, Type N (PVC seat and BUNA-N rubber valve), APCO Model 50, or approved equivalent.

2.9 VALVE BOXES:

A. Valve boxes shall be made of cast iron and be of the two (2) piece adjustable heavy roadway type. They shall have an inside diameter not less than 5 1/4" and be of the screwed type. They shall be provided with a cast iron cover on which the word

"WATER" is embossed and shall be suitable for installation on mains laid at the depths specified elsewhere in these specifications.

B. Valve boxes shall be set vertically over the valve and centered about the operating nut. The cover shall be flush with the street or ground surface unless otherwise directed by the Engineer. Backfill shall be carefully tamped around the box to prevent it from being moved out of position. The bottom flared edge of the box shall not rest directly on the valves or pipe. A concrete block shall be installed under the box. Where the standard depth valve box is not high enough to make the cover flush with the ground surface the Contractor shall provide and install, without additional compensation, valve box riser sections of the required length to achieve this result.

C. After the valve box has been set correctly, a square or round concrete collar shall be poured around the top of the valve box. The concrete shall be neatly formed to 18" square or diameter, poured 4" thick with the surface finished parallel to the surrounding ground surfaces. The concrete shall be Class C 2500 pound mix.

2.10 FIRE HYDRANTS:

A. Fire hydrants shall be manufactured in accordance with AWWA C502. The main valve shall open against the water pressure and all operating threads shall be isolated from the water. **Hydrants shall be Mueller Super Centurion (A423), and shipped Red in color.** Fire hydrants shall include a security lock on the operating unit.

B. Hydrants shall have a main valve opening of not less than 5-1/4", two 2-1/2" hose connections and one 4-1/2" pumper connection. Hydrants shall be provided with a permanent lubricating device and "O-ring" packing seals. Hydrants shall open by turning counterclockwise. Operating nuts shall be of the National Standard pentagon type, 1-1/2" point to flat. Hydrants shall be provided with a 6" mechanical joint shoe and shall be equipped with a retainer gland follower.

C. Fire hydrants shall be sized to connect with pipelines laid with a minimum cover of 36". In cases where the standard length of hydrant is not sufficient to leave a distance of at least 18" between the ground surface and the bottom of the lowest connection, the Contractor shall provide and install an extension section of the proper length.

D. Hose and pumper connections shall be furnished with Underwriters National Standard threads in the case of hydrants to be installed in new systems. Hydrants furnished for extensions to existing systems shall be furnished with threading similar to the existing hydrants except in cases where an effort at standardization of the use of National Standard threading is being made. In these cases, the Contractor and his material supplier are required to investigate the existing conditions and to furnish hydrants equipped with the direction of opening and the type of threads desired by the Owner. Where the contract covers a new water works system, two operating wrenches and a main valve assembly wrench shall be furnished with the hydrants. These items shall be delivered to the Owner.

E. Hydrants shall be set perfectly plumb on the precast slab, using a spirit level on two sides of the barrel. The gravel shall be placed around the base to permit drainage from the waste opening.

F. Fire hydrants shall be factory painted in the color **(Red)** chosen by the Owner.

2.11 BLOW-OFF HYDRANTS:

A. Blow-off Hydrants shall be Dry Barrel Type Hydrants. The Main valve shall be open against water pressure and all operating threads shall be isolated from the water. Post Type Hydrants shall be M&H Style 33 or an approved equal and Flush Type Hydrants shall be Eclipse #85 or an approved equal.

B. Blow-off Hydrants shall have a main valve opening of not less than 2-1/4", with one 2-1/2" hose connection. Hydrants shall be provided with a permanent lubricating device and "O-ring" packing seals. Hydrants shall open by turning counterclockwise. Operating nuts shall be of the National Standard pentagon type, 1-1/2" point to flat. Hydrants shall be provided with a 3" mechanical joint shoe and shall be equipped with a retainer gland follower.

C. Blow-off Hydrants shall be sized to connect with pipelines laid with a minimum cover of 36". In cases where the standard length of Post Type Hydrant is not sufficient to leave a distance of at least 16" between the ground surface and the bottom of the lowest connection, the Contractor shall provide and install an extension section of the proper length. Flush Type Hydrants shall be furnished with a high strength cast iron box and cover. The location of the Flush Type Hydrants shall be marked with a water valve marker.

D. Hose connections shall be furnished with Underwriters National Standard threads in the case of hydrants to be installed in new systems. Hydrants furnished for extensions to existing systems shall be furnished with threading similar to the existing hydrants except in cases where an effort at standardization of the use of National Standard threading is being made. In these cases, the Contractor and his material supplier are required to investigate the existing conditions and to furnish hydrants equipped with the direction of opening and the type of threads desired by the Owner.

E. The hydrant lead to post type hydrants shall be made with ductile iron pipe extending from the cast iron anchoring tee installed in the main to the hydrant shoe regardless of the type of pipe used in the construction of the main to which the hydrant is connected.

F. Mechanical joint shoe on flush type hydrants shall be connected to one section of ductile iron pipe regardless of the type of pipe used in construction of the main to which the hydrant is connected.

G. Hydrants shall be perfectly plumb on the precast slab, using a spirit level on two sides of the barrel. Gravel shall be placed around the base to permit drainage from the waste opening.

2.12 SERVICE CONNECTIONS:

A. Corporation stops shall be 3/4" size unless otherwise noted and shall comply with AWWA C800-66, Ford, Mueller, or approved equal. Corporation stops shall be compatible with type of service pipe specified.

B. Curb stops shall be 3/4" size unless otherwise noted and shall comply with AWWA C800, Ford B-43-232W complete with lock out wing, or other approved equal. A full 3/4" opening curb stop shall be provided.

C. Service clamps shall be used when connecting to PVC mains, "Mueller Bronze Service Clamp" or approved equal, especially designed for use on PVC pipe and provided with a corporation cock thread.

D. Meters shall conform to AWWA C700-90, shall be a first line meter and shall have an hermetically sealed and magnetically driven register. All meters shall be manufactured and assembled in the United States, shall be provided with all bronze case, and shall be of the positive displacement type. Each meter shall be provided with a leak detector separate from the sweep hand, and shall be calibrated in gallons unless otherwise noted in the Special Specifications.

E. Meters shall be Neptune T-10 or Sensus SR, both with ALL BRONZE cases unless otherwise specified in the Special Specifications.

F. Backflow preventors shall be 3/4" Ford Model HHS-31-323, Watts No. 7 dual check valve, rated for 150 psig, or other approved equal, as required by the latest ADEM regulations.

G. Meter boxes shall be approximately 12" x 17" x 12" deep, rectangular in shape, complete with plastic top and metal hinged reading lid. The plastic shall be of the fiber reinforced polyolefin type. The box and cover shall be Carson Brooks, or approved equal.

H. Water meters shall be located as specified by the Owner.

I. Service pipe used in making service connections and service transfers will be paid for separately on a unit price basis and is not included in the price of the service connection assembly or the unit price for a service transfer.

J. When the service pipe is connected to ductile iron pipe 3" and larger, the connection at the main shall consist of a 3/4" tap in the main and a corporation cock. When connected to mains smaller than 3", the connection at the main shall consist of a 3/4" hole drilled in the main, a single strap service clamp and a corporation cock.

K. Where taps larger than 1" diameter are to be installed on ductile iron pipe, a split tapping sleeve or tapping saddle shall be provided and a disc shall be cut from the pipe wall by a special tapping machine.

L. When copper or plastic service tubing is used, it may be connected directly to the corporation cock.

M. The tap or drilled hole in the main shall be made at an angle of not more than 30 degrees to the horizontal in order to keep service pipe adjacent to the main at the required depth.

N. The curb stop shall be installed inside the meter box immediately adjacent to the inlet side of the meter and under general conditions the box shall be set with the top flush with the ground surface.

O. Where service taps are installed on ductile iron pipe, the price bid shall include wrapping the brass corporation stop and not less than three feet of connected copper service tubing with two wraps of Tapecoat dielectric insulating tape to prevent corrosion.

P. When the furnishing of a meter larger than 1" is called for in the Proposal, the price bid shall include a cutoff valve with handwheel of the same size as the meter inlet, and a meter box, Carson Brooks, or equal. The box shall be 15" by 20" and equipped with a rectangular hinged reading lid set in the cover.

2.13 SERVICE PIPE:

A. The types of service pipe to be used are specified in the Proposal.

B. Copper tubing shall conform to Federal Specifications WW-T-799, Type K. Unless otherwise noted in the Proposal, service pipe shall be 3/4" in diameter. The cost of fittings shall be included in the price of the pipe.

C. Plastic service pipe in 3/4" through 2" shall be high density (HDPE) polyethylene SDR 9 Copper Tubing Size suitable for maximum 200 psig working pressure, Charter Plastics 'Blue Ice' or approved equivalent. HDPE tubing shall comply with all applicable requirements of ASTM standards D-1248, D-2239, D-2737, D-3350, AWWA C-901, and shall be extruded from compounds of the Type III Grade PE 34, Class C, PE 3408 very high molecular weight polyethylene plastic material as specified in ASTM D-1248, cell classification 355434C as per ASTM D-3350, and marked in accordance with ASTM D-2737, and shall also be sealed by NSF. Inserts shall be used at all fittings.

D. Service pipe shall be laid with a cover not less than 24", and the requirements for trenching and backfilling shall be the same as specified for mains. Where the service pipe crosses a paved street or sidewalk it shall be laid by means of pushing or boring. The cutting of pavements or sidewalks will not be permitted. The requirement for a cover of 24" over the pipe shall be maintained under side ditches and at the high point of the curve in the pipe where it connects to the main. On Highway rights-of-way the minimum cover shall be as specified by the Highway Department but in no case less than 30".

2.14 VALVE & PIPELINE MARKERS:

A. The location of water main pipe and valves shall be marked with concrete marker posts. The marker posts shall be 4" square concrete set to stand approximately 40" above ground. The markers shall be inscribed "WATER VALVE" or "WATER LINE" as appropriate, and include an aluminum disc on top for stamping the distance to the valve (line). Markers shall be installed for all type valves including isolation valves, air release valves, electric control valves, etc. Markers shall also be set at all locations where pipeline crosses streets and highways.

2.15 FLANGES:

A. Flanges shall conform to the dimensions shown in Table 10.14 of AWWA C110, and shall be adequate for a working pressure of 250 pounds. The bolt circle and bolt holes of these flanges shall match those of the Class 125 flanges shown in ANSI B161. Gaskets shall be of 1/8" thick rubber. Machine bolts shall be of high strength steel and shall have hexagon heads and nuts.

2.16 CONSTRUCTION EQUIPMENT:

A. The Contractor shall be responsible for any damage done to paved surfaces or lawns, whether at the site of the work or when moving the equipment from one place to another.

2.17 SAFETY PRECAUTIONS:

A. During the prosecution of this contract the Contractor shall at all time employ all necessary safety precautions to ensure the complete protection of both lives and property of his own forces as well as those of the general public. Flagmen shall be placed along public streets and highways as work is being installed along them and the necessary warning barricades and blinking lights shall be set out each night to clearly mark the areas under construction.

B. All ditches shall be shored and braced where necessary and the excavated material shall be kept a safe distance away from the ditch. Safety precautions instituted along State Highway rights-of-way shall conform to the requirements of the State Highway Department at all times and such additional flagmen or other precautions as may be deemed necessary will also be provided by the Contractor.

C. The Contractor, and he alone, shall be solely responsible for the adoption of all necessary safety standards and precautions, and for the implementation institution, maintenance, supervision of and payment for all devices and arrangements required to carry out the requirements of such standards. He shall hold and save harmless the Owner, the Engineer, or any employees thereof against all actions or suits filed in connection with any accidents or damage to property caused by inadequate or insufficient safety precautions being placed in effect by him to ensure the complete

safety of all construction, inspection or supervisory forces employed around the project, or of the general public.

2.18 PERMITS AND BONDS:

A. In the event of the Department of Transportation requires a bond or certified check to guarantee the replacement of highway paving the Contractor shall furnish this security at his own expense.

2.19 MILL CERTIFICATES:

A. When required by the Owner, mill certificates showing the results of hydrostatic pressure tests made on all types of pipe as required by the manufacturer's specifications shall be furnished.

PART 3 - EXECUTION

3.1 EXCAVATION AND TRENCHING:

A. All excavation and trenching shall be bid on an unclassified basis.

B. Trenches for the mains shall be excavated in the locations indicated on the plans or as directed by the Engineer. All trees, telephone and power line poles along the line of the work must be protected, and at night a sufficient number of barricades and lights to prevent accidents shall be provided. Where mains are laid between the curb and sidewalk or in other places where shrubbery and grass lawns are encountered the Contractor shall carefully remove and replace the shrubbery and cut the grass sod in sections, laying it to the side and replacing it after the compacted trench has been backfilled.

C. In general, the excavated material shall be kept clear of the sidewalks except where unusual conditions prevent this being done. Unless otherwise approved by the Engineer, all pipe shall be installed under driveways by boring and jacking, but where the driveway is cut it shall be backfilled as soon as the pipe is laid. No driveway shall remain inaccessible at the end of the day's work and all street crossings shall be backfilled and opened to traffic before work is stopped for the night.

D. On paved streets, wherever possible, the mains will be located between the curb and the sidewalk, and in all cases the mains will be located so as to keep cutting and replacing pavement to a minimum.

E. The width of the trenches shall be in accordance with the manufacturer’s recommended installation procedures. The depth of the trenches shall be such that all pipe will have a cover of at least 36". When underground obstructions occur on other than State or County highway rights-of-way, the Contractor will be permitted to lay ductile iron pipe over the obstruction if a minimum cover of 24" over the top of the pipe may be obtained after providing a cushion at least 3" thick between the bottom

of the pipe and the top of the obstruction. Where this minimum cover cannot be obtained the pipe shall be laid under the obstruction without additional compensation.

F. Unless approved by the Engineer, all trenches shall be closed at the end of the work day.

G. All signs shall be re-erected in a manner satisfactory to the Engineer at the end of each work day. Signs shall be permanently re-installed back to the original condition at the end of the project.

H. All travelways shall be kept clean of mud, dust, dirt, or other debris. This requires a daily cleaning of travelways to the extent that dust is not a nuisance and roadways do not become hazardous. The amount of cleaning required is strictly left to the direction of the Engineer. No additional compensation shall be allowed for any cleaning required.

3.2 INSTALLING PIPE:

A. All pipe shall be laid in accordance with procedures outlined by the Ductile Iron Pipe Research Association or Uni-Bell PVC Pipe Association. A copy of these procedures shall be kept by the Contractor on the job site at all times that pipe laying operations are occurring.

B. Before the pipe is lowered into place, the bottom of the trench shall be uniformly graded so that the pipe will have a bearing on earth for its full length. Where the excavation is in rock or other hard material, sufficient loose earth shall be shoveled into the trench to form a bed for the pipe. Each section of pipe shall be carefully examined for defects and the inside cleaned with a swab to remove all dirt and mud before it is installed.

C. At each joint shall be excavated a hole sufficient large to receive the bell or coupling so that the pipe barrel will rest uniformly in its bed of loose earth. Where pipe equipped with joints of the push on type utilizing a rubber ring is used, the bell shall be wiped clean before the ring is fitted in position, following which the spigot shall be coated with a thin film of lubricant, if so required by the manufacturer, and then pushed home.

D. On iron pipe equipped with mechanical type joints, before the section of pipe is pushed home the bell into which it fits shall be wiped clean, the end of the pipe being placed shall be wiped with a soapy water solution and the cast iron gland and rubber ring slipped on. After the section of pipe is in its final position, the rubber ring and gland shall be slid up to the joint, bolts inserted and the nuts tightened uniformly so that the bolts, particularly on the underside, shall be provided. In the case of pipe smaller than 4" in diameter being laid in a wet or muddy ditch bottom, the Contractor will be permitted to joint not more than 100 feet together on the ditch bank provided

that the pipe is then carefully lowered into position with one man at each joint to preserve the alignment.

E. Where pipe laying is suspended at the lunch hour, at night, during inclement weather or at any other time, the open end of the pipeline shall be provided with a plug in order to prevent the entrance of dirt, mud and animals.

F. All fittings installed in the mains and the ends of all dead end lines shall be restrained by pouring a concrete block as shown on the drawings at the point where it will resist the pressure. Thrust blocks will be sized in accordance with the Uni-Bell Handbook of PVC Pipe: Design & Construction. or Thrust Restraint Design for DUCTILE IRON PIPE published by Ductile Iron Pipe Research Association.

3.3 INSTALLING APPURTENANCES:

A. Valves, fittings, hydrants and other appurtenances shall be placed in the locations shown on the plans or in the manner designated by the Engineer. Any omission of these appurtenances shall be corrected by the Contractor without additional cost to the Owner. All valves and hydrants shall be carefully examined to see that the working parts are in good order and that no grit or dirt is present in the valve seats before they are placed in position.

B. Over each valve less than 16" in size shall be placed a valve box, and over valves 16" and larger shall be provided a valve box both for the main valve and the bypass valve. Valve boxes shall be set concentrically around the valve operating nut and the top of the box shall be level with the ground surface.

3.4 GRAVEL ROADS:

A. Surfaces of all gravel roads where water lines are laid shall be brought back to their original condition. If necessary, additional base material as specified by the Alabama Department of Transportation shall be spread, smoothed and compacted to the satisfaction of the Engineer.

3.5 SERVICE TRANSFERS:

A. Where an item for service transfer is provided in the Proposal, the Contractor will be required to disconnect the service pipe from the existing main, make a tap in the new main, insert a corporation cock, install sufficient service pipe to reach the existing, new or relocated meter and make the connection. The unit price bid shall include all labor, material and equipment needed with the exception of the service pipe which will be paid for as a separate item.

3.6 SURFACE OBSTRUCTIONS:

A. Each building, wall, fence, pole, bridge, railroad, driveway or other property or improvement encountered is to be carefully protected from all injury, and in the event

that any of the foregoing are damaged or removed during the progress of the work the same shall be repaired or replaced within a reasonable time, and before final acceptance of the work shall be returned to as good condition as before the work started. Special care must be exercised in trenching under or near railroads in order to avoid or minimize delays and the danger of injury resulting therefrom, and the Contractor must use care in all phases of the construction work, for he will be held liable for damages caused by carelessness.

3.7 SUBSURFACE OBSTRUCTIONS:

A. In excavating, backfilling and laying pipe care must be taken not to remove, disturb or injure any water or sewer pipes or other conduits or structures. If necessary, the Contractor, at his own expense, shall sling, shore up and maintain such structures in operation. Before final acceptance of the work, he shall return all such structures to as good condition as before the work started.

B. When necessary, the Contractor shall give sufficient notice to the interested utility of his intention to remove or disturb any pipes, conduits, etc., and shall abide by their regulations governing such work. In the event that any subsurface structure becomes broken or damaged in the prosecution of the work, the Contractor shall immediately notify the proper authorities, and shall be responsible for all damage to persons or property caused by such breaks. Failure of the Contractor to promptly notify the affected authorities shall make him liable for any needless loss or for interference with the normal operation of the utility.

C. When pipes or conduits are broken during the progress of the work, the Contractor shall repair them at once at his own expense, or if required by the utility involved, shall pay the utility the proper charges for having such repairs made by the utility's own forces. Delays, such as would result in buildings being without service overnight or for a needlessly long period during the day, will not be tolerated, and the Owner reserves the right to make repairs at the contractor's expense without prior notice. Should it become necessary to move the position of pipe, conduit or structure it will be done by the Contractor in strict accordance with the instructions given by the Engineer or utility involved.

D. The Owner or the Engineer will not be liable for any claim made by the Contractor based on underground obstructions being different to that indicated in these contract documents or plans. Where ordered by the Engineer, the Contractor shall uncover subsurface obstructions in advance of construction so that the method of avoiding them may be determined before pipe laying reaches the obstruction. Furthermore, the Contractor shall notify all utility companies involved of his intention to excavate in the locations specified and request that any underground cables be located in advance of construction work.

3.8 DEWATERING:

A. The Contractor shall, at all times during construction, provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work and shall keep said excavation and work dry until the structures to be built therein are completed, or until the Engineers direct the Contractor to discontinue de-watering operations. Wherever judged necessary by the Engineer, the Contractor shall employ well points to insure a dry excavation. No claims for an amount of money in excess of the bid price for the work will be entertained or allowed on account of the character of the ground in which the trench or other excavations are made.

B. The trench shall be so drained that workmen can work safely and efficiently therein. The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property owners. It is essential that the discharge from trench pumps be led to natural drainage channels.

3.9 ROCK EXCAVATION:

A. Rock is defined as hard material which cannot be removed by conventional excavating equipment, including a tracked excavator.

B. Where rock is encountered in trenches, the excavation shall be carried to a depth of 6-inches below the barrel of the pipe; and the excavation shall be backfilled with approved firmly compacted bedding material. In no case shall any rock be left nearer than 6-inches from the outside of the pipe.

C. Where rock is encountered the Contractor shall "mattress" the trench during blasting operations and shall use all precautions necessary to protect adjacent property against damage resulting from his operations. Rock excavation in proximity to other pipes or structures shall be conducted with the utmost care to prevent damage to the existing structures, and any such damage caused shall be promptly repaired by the Contractor at his expense. Blasting operations shall not be conducted within 24-feet of installed pipe; and rock excavation shall be completed at least 24-feet ahead of pipe laying.

D. The Contractor shall be fully responsible for the protection of lines and property from any harm or damage as would result from exposure to the construction work. The Contractor shall, in all his acts and work, comply with the safety and health regulations referred to hereinabove and with all local ordinances and regulations pertaining to the work. The area of the work shall be isolated by warning signs and barricades; guards shall be stationed to prevent entry into the area; and efficient and adequate signal system shall be employed to give warning before blasting; and it shall be the responsibility of the Contract to determine that the area is clear before the signal to fire is given. The handling, storing, loading, and firing of explosives shall be performed only by workmen experienced in blasting work. The Contractor hereby agrees to indemnify and save harmless the Owner and the Engineer against all claims, damages, and expense arising from or caused by, in any manner whatsoever, the handling, storage, or use of explosives on the work, or by any blasting on the work.

E. No extra payment will be made for removal of rock and other hard material will be made, and all costs for this type of work shall be included in the amounts bid in the Bid Form. The Contractor is required to inspect the area to his satisfaction prior to turning in a Bid.

3.10 BLASTING:

A. The Contractor or his insurer shall perform pre-blast surveys of all structures within 500 feet of the blasting areas to document and photograph the pre-existing conditions. The cost of this work is incidental and no specific payment will be made.

B. The Contractor shall employ the services of a registered engineer in the state of Alabama with a minimum of five years of experience in pipeline construction to design and approve all blasting procedures used in the removal of rock. All primary and secondary blasting shall be monitored by a registered blasting consultant to conduct daily blast noise, vibration and overpressure surveys during the progress of blasting operations. These surveys will be delivered to the Engineer daily. The cost of this work is incidental and no specific payment will be made.

C. The limit for each charge will be set to limit the effects to air concussion or air blast of 0.03 psi maximum (140 dBL), particle velocities shall be a maximum of 1.00 inch/second measured from locations directed by the blasting consultant.

D. The Contractor is reminded that he has sole and complete responsibility for the conditions on, in, or near the jobsite, including safety of all persons and property during performance of the work.

E. The required duty of the engineer to conduct construction review of the contractor's performance does not, and is not intended to, include review of the adequacy of the contractor's safety measures in, on, or near the construction site.

F. The observation of safety provisions of applicable laws and local building and construction codes shall be the responsibility of the Contractor. The blasting consultant shall be present and supervise all blasting design, loading and shot firing at all times.

3.11 PIPELINES UNDER PAVEMENT:

A. Where mains are to be laid under paved streets or parking lots, and the installation of casing pipe or the use of cast iron pipe inserted in a bored hole is not required or specified, the Contractor will be permitted to cut and replace this pavement. In the event that subsurface operations result in injury or damage to the pavement, the necessary repairs shall be made by the Contractor at no additional cost to the Owner. In the event of the pavement on either side of the pipeline trench cracking or otherwise becoming disturbed or broken due to the Contractor's operations he shall repair or replace same at his own expense and without additional compensation.

B. Paving replacement shall conform to the plans. No paving replacement shall be installed without first notifying the Owner at least eight hours in advance so his representative may be present while the work is performed.

C. All backfill under areas where paving will be replaced shall be mechanically tamped to the following densities as defined by AASHO T-99 Standard Proctor Density:

Backfill around pipe	- 95%
Remaining Subgrade	- 95%
Select Base Material	- 100%

D. In the price bid for paving replacement shall be included all costs related to a commercial testing laboratory approved by the engineer to perform all tests of materials, design job mixes, provide batching plant control, and perform tests and inspections of material producing and processing equipment as required by these specifications and in accordance with AHD Section 106.02. Two copies of the results of tests and inspections shall be submitted to the Engineer and the Owner in report form. The testing laboratory shall maintain an office within 100 miles of the construction site.

3.12 PIPELINES UNDER SIDEWALK:

A. Where pipelines are to be laid underneath paved sidewalks, the Contractor will be required to install them by means of a boring machine, auger or other suitable apparatus wherever possible, and where it becomes necessary to cut and replace the sidewalk it shall be replaced as soon as practicable after the trench has been backfilled and tamped. The replaced surface shall be 12 inches wider than the width of the trench, the excess width being equally distributed on both sides.

B. The Contractor will receive no additional compensation for laying pipe or fittings under sidewalks.

3.13 CONNECTIONS TO EXISTING MAINS:

A. Where “cut in” connection is indicated on the plans or directed by the Engineer, the Contractor shall connect the new mains to, and install valves in, the existing mains. These connections will normally be made in the afternoon, but where required to do so the Contractor shall be prepared to make them at night. Before any existing mains are cut the Contractor will work out a plan of procedure with the Owner's superintendent, so that all customers who will be without water during the process will be notified and the valves to be closed will be located and uncovered.

B. The Contractor will not be permitted to cut the existing main until he has everything ready to make the connection. The Contractor shall be fully and properly equipped to do the work entirely with his own resources and under no conditions shall he place himself in the position of having to borrow any material, equipment or labor from the Owner. Failure to have everything in readiness to the satisfaction of the Owner may result in a postponement of the connection.

C. Where indicated on the plans, tapping sleeve and valves shall be used to make the connection. Where used, the tapping sleeve and valve shall be subjected to an air pressure test of 240 psi for 29 minutes.

3.14 PRESSURE TESTING:

A. Refer to Section 01 0300 – Special Project Provisions for testing requirements. If no requirements are given in Section 01 0300, then the requirements below shall apply.

B. After the mains and appurtenances have been installed, they shall be subjected to a hydrostatic pressure test. The pressure shall be applied by a motor driven test pump and an accurate recording pressure gauge shall be provided at a suitable point on the main. The test shall be conducted at 150% of the working pressure or a minimum of 100 psi, whichever is greater, but no more than the pressure rating of the pipe. The test pressure shall be applied for not less than three hours on uncovered pipe and for not less than eight hours on covered pipe. The test pressure must be maintained at a constant pressure and continuously recorded by a chart recorder.

C. The allowable leakage for water mains shall be measured in gallons per hour per one thousand feet of pipe. Allowable leakage shall not exceed the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$ when L = Allowable Leakage, GPH
S = Length of Pipeline Section, LF
D = Diameter of Pipe (Nominal), Inches
P = Average Test Pressure, psig

Hydrostatic testing allowance per 1,000 ft of pipeline*:

	Nominal Pipe Diameter – *in.*							
Avg. Test Pressure *psi*	3	4	6	8	10	12	14	16
300	0.35	0.47	0.70	0.94	1.17	1.40	1.64	1.87
275	0.34	0.45	0.67	0.90	1.12	1.34	1.57	1.79
250	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71
225	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62
200	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53
175	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43
150	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32
125	0.23	0.30	0.45	0.60	0.76	0.91	1.06	1.21
100	0.20	0.27	0.41	0.54	0.68	0.81	0.95	1.08

* If the pipeline under test contains sections of various diameters, the testing allowance will be the sum of the testing allowance for each size.

D. The Contractor shall be responsible for maintaining accurate records of each pressure test. The date, time, length of line tested, a recording of the test pressure, the times and amounts of make-up water required, and a comparison of actual leakage versus allowable shall be compiled in a neat and organized format, certified by the inspector for the Owner, and delivered to the Engineer in triplicate. All pressure testing must be

witnessed by the Engineer or the Owner and recorded by a continuous automatic chart recorder.

D. The Contractor shall leave a hydrant nozzle or other connection open when the pressure is first applied in order to exhaust air from the line. If no connection near the high point of the section being tested is available, he shall tap the main and install a corporation cock through which to exhaust the air.

E. All breaks, leaks or defects in the main and appurtenances, dripping valve glands and hydrant gaskets shall be repaired, following which the test pressure shall be again applied. If the pressure gauge then remains steady the Contractor will notify the Engineer that the main is ready for inspection. The Contractor shall make the preliminary test and repair all defects before requesting an inspection by the Engineer.

F. In cases where the Contractor has elected to backfill the main prior to testing, it shall be his responsibility to fulfill the test requirements even if it becomes necessary to uncover any or all of the pipe in order to find the cause of a leak or other defect. Where practicable the mains shall be tested in sections not exceeding 1500 feet in length.

3.15 DISINFECTION:

A. After the pipelines, valves, fittings and appurtenances have been installed and tested, they shall be disinfected in accordance with the method set forth in the latest edition of AWWA C651, and all applicable ADEM regulations.

B. This procedure involves a preliminary flushing of the mains at a velocity of at least 2.5 feet per second, pumping a 50 ppm chlorine solution into the main through a corporation cock, filling the main slowly, allowing the chlorinated water to stand for 24 hours and then flushing out the main until the heavily chlorinated water has been discharged and a chlorine residual of 0.2 ppm has been achieved.

C. The cost of disinfecting the mains shall be included in the price bid, and the Contractor shall provide all required equipment and the chlorinating agent. He shall also make a tap in the main at the beginning of each section to be tested and shall provide the necessary corporation cocks. The responsibility of ensuring satisfactory bacteriological samples shall be the Contractor's and he shall if necessary repeat the disinfection procedure until satisfactory results are obtained.

D. When cross connections to existing mains have been made, there is a tendency for contaminated water to gather in the main between the cross or tee and the valve on the existing main. When the new main is flushed to remove the heavily chlorinated water the valves on the cross mains shall be partly opened to allow the pressure from the distribution system to force out any contaminated water that might have gathered in these sections of the mains.

E. Water samples shall be taken by the Contractor in the presence of the Engineer or Owner. All bacterial testing shall be done at an ADEM approved laboratory.

3.16 BACKFILLING AND CLEANUP:

A. All backfill under areas where paving will be replaced shall be mechanically tamped to the following densities as defined by AASHO T-99 Standard Proctor Density:

Backfill around pipe	- 95%
Remaining Subgrade	- 95%
Clay gravel base 4" thick	- 100%

B. After the pipe has been installed and tested, the trench shall be immediately backfilled. However, the Contractor may backfill the trenches prior to testing if he so desires but in this case he will comply with the requirements for testing the mains as specified elsewhere. Where pavement or sidewalk has not been cut to lay the pipe the backfill shall be tamped around and over the pipe to a depth of 12 inches over the top of the pipe. The remaining earth may be filled in and neatly mounded over the trench. Where the pavement or sidewalk has been cut to lay the pipe the backfill shall be thoroughly tamped in six-inch layers for the full depth of the trench.

C. Where the trench is excavated in rock or other hard material which remains in lumps or pieces after being excavated, dry earth shall be provided and tamped around and over the pipe to a height of 12" above the top of the pipe. No large chunks or fragments of rock shall be placed into the backfill of the ditch.

D. In places where the trench has been excavated along the side of a paved street not provided with curb and gutter or where construction operations or the weather have spread the excavated material over the surfaces of unpaved streets, the Contractor shall employ a heavy duty motor grader to clean out the side ditches, shape the shoulders and restore the smoothness of the street surface to as good a condition as existed before the work was started. In the event that excavations on the shoulders of streets indicate that washouts or collapse of the shoulder are liable to occur, the backfill shall be carefully tamped and any earth washed out prior to the date of final acceptance shall be replaced. The use of mechanical equipment for this work does not remove from the Contractor the obligation to employ hand labor for the final dressing up.

E. Before final acceptance of the work all surfaces shall be returned to as good condition as before the work started.

F. All excavated material shall be cleared from adjacent street surfaces, gutters, sidewalks, parkways, railroads, grass plots, etc., using hand labor where necessary to achieve a satisfactory result, and the whole left in a tidy and acceptable condition.

G. The Contractor shall at all times keep the backfilled trenches, particularly those across streets and driveways, filled to grade, and shall make a daily inspection to see that those needing additional fill are attended to. He shall maintain them in a good and safe condition and will be held responsible for any connection up to the date of final acceptance of the work by the Owner.

H. Where mains are laid across State or County highways or City streets and the pavement has been cut to make the installation, the Contractor shall backfill the section under the pavement with an acceptable backfill and tamped in 6" layers for the entire depth of the trench to the densities specified above.

3.17 INSPECTION OF VALVES:

A. After all work has been completed the Contractor shall make a careful inspection of all valves, either previously existing or new, which have been opened or closed during the course of the work, to make sure that all valves that should be opened are open and vice versa. No valve shall be opened or closed without the consent of the Owner.

B. At the same time all valve boxes shall be inspected to make sure that they are still plumb, centered over the operating nut, at the correct elevation and the cover in position.

3.18 GRASSING AND SEEDING:

A. Refer to Section 32 9219 – Seeding and Restoration for grassing and seeding requirements.

3.19 EROSION AND VEGETATION DAMAGE:

A. Wherever possible, topsoil shall be removed from all areas to be disturbed by construction, and stockpiled. Land exposure shall be minimized in terms of area and time. All exposed areas subject to erosion shall be covered as quickly as possible by the grassing and seeding specified elsewhere or by mulching or vegetation. Natural vegetation shall be retained whenever possible.

B. The Contractor shall prepare and implement a firm and accurate construction schedule with regard to land clearing and grading for each section of pipeline to be installed. If possible, clearing shall immediately precede construction activity.

C. The Contractor shall prepare and submit to the Engineer a list containing chronological completion dates for each measure for controlling erosion and sediment, the location, type and purpose for each measure, and dates when these measures will be removed or replaced.

D. Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

END OF SECTION 33 1200

SECTION 33 3000
SANITARY SEWERAGE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 03 3000 – Concrete
2. Section 31 2316.13 – Trenching
3. Section 33 3211 – Wastewater Pumping Stations

1.2 SUMMARY:

A. This Section includes sanitary sewerage system, piping and appurtenances.

1. In the event of conflict between this Section and Drawings, the more stringent requirements shall be provided

B. The extent of sanitary sewerage system is indicated on the Drawings, in this Section, and as otherwise required by authorities having jurisdiction.

C. All fees and charges for sanitary sewerage service, taps, connections, permits, impact fees, etc., shall be paid by the Contractor from their contract amount.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

1. Product data for sanitary sewer piping and specialties.
2. Shop drawings for precast concrete sanitary manholes, including frames and covers.

1.4 QUALITY ASSURANCE:

A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to sanitary sewerage systems.

B. Utility Compliance: Comply with local utility regulations and standards pertaining to sanitary sewerage systems.

C. Comply with requirements of authorities having jurisdiction, when more stringent than specified or otherwise indicated.

1.5 PROJECT CONDITIONS:

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that sanitary sewerage system piping may be installed in compliance with original design and referenced standards.

1.6 SEQUENCING AND SCHEDULING:

A. Coordinate any connection to public sewer with utility company.

B. Coordinate with other utility work.

PART 2 – PRODUCTS

2.1 PIPE AND FITTINGS:

A. General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated below, refer to drawings for locations of each one.

B. PVC Gravity Sewer and Force Main Pipe:

1. PVC (Polyvinyl Chloride) Gravity Sewer Pipe: ASTM D 3034, SDR 35, Green in color, unless otherwise indicated on the Drawings.
2. PVC Force Main Pipe: SDR 21, Class 200, plastic pipe, Green in color, unless otherwise indicated on the Drawings.
3. Solvent Cement: ASTM D 2564, for pipe smaller than 2-inches.
4. Gaskets: ASTM F 477, elastomeric seal, for pipe 2-inches and larger.

C. Couplings/Sleeves:

1. Couplings/Sleeves used for connecting to existing laterals shall be rubber or elastomeric sleeve and stainless steel band assembly with one band at each pipe insert.
2. Couplings/Sleeves used on gravity main and PVC force main shall be AWWA C153 Ductile Iron fittings with retainer glands and ceramic epoxy liner per Paragraph 2.1.D.5 below.

D. Ductile-Iron Gravity Sewer and Force Main Pipe and Fittings:

1. Pipe: ASTM A 746, for push-on joints.
2. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.

3. Compact Fittings: AWWA C153, for push-on joints.

4. Gaskets: AWWA C111, rubber.

5. Liner: Ceramic Epoxy liner shall be provided on all ductile iron sewer pipe. The liner shall be a two component modified polyamine ceramic epoxy applied to a dry film thickness of 40 mils minimum, and shall be Tnemec Series 431 Perma-Shield PL, or pre-approved equal. Epoxy linings shall be inspected for holidays using an electrical detector.

E. HDPE Gravity Sewer and Force Main Pipe: Provide pipe as noted below:

1. HDPE Gravity Sewer Pipe: PE 4710, DIPS, DR 13.5 as shown on the plans and provided with three (3) equally spaced pairs of green stripes. The pipe shall be grey in color to allow for televised inspection.

2. HDPE Force Main Pipe: PE 4710, DIPS, DR 9 as shown on the plans and provided with three (3) equally spaced pairs of green stripes. The pipe shall be black or grey in color.

F. PE Encasement for Water Main Crossing: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

2.2 MANHOLES:

A. Precast Concrete Manholes: Manufacturers must be certified by the National Precast Concrete Association (NPCA) for production of precast concrete manholes and precast concrete structures. Reinforced precast concrete manholes conforming to ASTM C 478, of depth indicated with provision for rubber gasket joints. All manhole covers shall be round.

1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.

2. Riser Sections: 4-inch minimum thickness; 48-inch diameter or as shown on plans, and lengths to provide depth indicated.

3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone to match grade rings. Minimum clear opening of 24 inches, or as indicated on the drawings.

4. Grade Rings: If necessary, provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness and match 24-inch diameter frame and cover.

5. Gaskets: ASTM C 443, rubber.

6. Steps: Reinforced plastic step with 1/2" Grade 60 steel reinforcement and polypropylene plastic exterior cast into base, riser, and top sections sidewall at 12-inch to 16-inch equally spaced intervals.

7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section. Approved connectors are listed below:

a. Kor-N-Seal 106/406 Series

b. A-Lok

c. Approved Equivalent

8. Channel and Bench: Concrete.

9. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

B. Cast-in-Place Manholes (if any): Reinforced concrete of dimensions and with appurtenances indicated. All manhole covers shall be round.

1. Bottom, Walls, and Top: Reinforced concrete.

2. Channel and Bench: Concrete.

3. Steps: Cast into sidewall at 12- to 16-inch intervals.

C. Concrete: Portland cement mix, 4000 psi.

1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

5. Refer to Section 03 3000 - "Concrete" for additional information and requirements.

6. Refer to Section 03 3010 – "Admixture for Water Retaining Structures" for additional information and requirements.

D. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.

2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

3. Refer to Section 03 3000 - "Concrete" for additional information and requirements.

E. Steps: Same as for precast concrete manholes.

2.3 CLEANOUTS:

A. General: Cleanouts in non-traffic areas shall be provided with a PVC, metal, or brass cleanout plug and a round concrete collar. Cleanouts located on the right-of-way shall be provided with a round, heavy duty cast iron access frame and cover. The frame and cover shall be a US Foundry Model 7631 handhole ring and cover, or approved equivalent. The cast iron cover shall have the letter 'S' for sewer.

2.4 IDENTIFICATION:

A. Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 3 inches wide by 5 mils thick, solid green in color with continuously printed caption in black letters "CAUTION - SEWER LINE BURIED BELOW." Tape shall be used for marking all installed sanitary sewer pipe and shall be buried no less than 18-inches above the carrier pipe.

B. Provide products by one of the following manufacturers:

1. Pro-Line Safety Products
2. Allen Systems, Inc.; Reef Industries, Inc.
3. Brady (W.H.) Co.; Signmark Div.
4. Calpico, Inc.
5. Carlton Industries, Inc.
6. EMEDCO, Inc.
7. Seton Name Plate Co.
8. Approved Equivalent

C. The cost for the marker tape is to be included in the amount bid for the pipe.

PART 3 - EXECUTION

3.1 PREPARATION OF FOUNDATION FOR BURIED SANITARY SEWERAGE SYSTEMS:

A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.

C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.2 PIPE APPLICATIONS FOR UNDERGROUND SANITARY SEWERS:

A. Refer to Paragraph 2.1 above.

3.3 PIPE & MANHOLE INSTALLATION:

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use

of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

C. Use manholes for changes in direction, except where a fitting is indicated. Use fittings for branch connections, except where direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

E. Install piping pitched down in direction of flow, at slopes indicated on the drawings.

F. Extend sanitary sewerage system piping to connect to building sanitary drains, of sizes and in locations indicated.

G. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.

3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION:

A. Join and install PVC pipe as indicated in Part 2 above, and the following:

1. Solvent cement joint pipe and fittings, joining with solvent cement in accordance with ASTM D 2855 and ASTM F 402.
2. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212, and for truss pipe ASTM D 2680, Appendix XI.
3. Installation in accordance with ASTM D 2321.

B. Join and install ductile iron pipe as indicated in Part 2 above.

3.5 MANHOLES:

A. General: Install manholes complete with accessories as indicated, or if not indicated, in compliance with project requirements and authorities having jurisdiction. Form continuous concrete or split pipe section channels and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.

1. Place precast concrete manhole sections as indicated, and install in accordance with ASTM C 891.
2. Construct cast-in-place manholes as indicated.
3. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
4. Install manhole steps as indicated.

3.6 CLEANOUTS:

A. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18" x 18" x 12" deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.

B. Install cleanouts with a maximum spacing of 100 feet on service laterals, or as otherwise indicated on the plans.

3.7 TAP CONNECTIONS:

A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.

B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap, with not less than 6 inches of 3000-psi 28-day compressive-strength concrete.

C. Make branch connections from side into existing 4- to 21-inch piping by removing section of existing pipe and installing wye fitting, into existing piping. Encase entire wye with not less than 6 inches of 3000-psi 28-day compressive-strength concrete.

1. Provide concrete that will attain minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.
2. Use epoxy bonding compound as interface between new and existing concrete and piping materials.

D. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

3.8 INSTALLATION OF PIPELINE IDENTIFICATION:

A. Install continuous plastic underground warning tape during back-filling of trench for underground sanitary sewer piping. Locate 12 inches directly above crown of pipe.

3.9 FIELD QUALITY CONTROL:

A. Air Testing: Perform testing of completed sewer piping in accordance with the procedures below:

1. All gravity sewers shall be tested using low pressure air as directed by the Engineer. The air test shall be conducted by the contractor, and the cost of the testing shall be included in the cost of the pipe.
2. The air tests shall be conducted after a section of line is completed and backfilled. The

equipment used for conducting the test shall be specifically designed for this purpose.

3. All pneumatic plugs shall be seal tested before used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 5 psig. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

4. After a manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize.

5. After the stabilization period (3.5 psig minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 3.0 psig (greater than the average back pressure of any groundwater that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

MINIMUM TIME FOR LENGTH SHOWN					
PIPE SIZE	100 FT	200 FT	300 FT	400 FT	SECONDS PER ADD'L LENGTH
4	1.53	1.53	1.53	1.53	0.190
6	2.50	2.50	2.50	2.51	0.427
8	3.47	3.47	3.48	5.04	0.760
10	4.43	4.43	5.56	7.54	1.187
12	5.40	5.42	8.33	11.24	1.709
15	7.05	8.54	13.21	18.48	2.673
18	8.30	12.49	19.14	25.38	3.846
21	9.55	17.27	26.11	34.54	5.235
24	11.24	22.48	34.11	45.35	6.837
27	14.25	28.51	43.16	57.42	8.653

MINIMUM PRESSURE SHALL BE 3.5 PSIG AND .4329 PSIG ADDED FOR EACH FOOT OF GROUNDWATER ABOVE THE PIPE INVERT. MAXIMUM PRESSURE SHALL BE 9.0 PSIG.

6. In areas where groundwater is known to exist, the Contractor shall install a one-half inch diameter capped pipe nipple, approximately 10" long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer

line is installed. Immediately prior to the performance of the Line Acceptance Test, the groundwater shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psig. This increases the 3.5 psig to 8.5 psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound and the timing remain the same.)

7. If any line section fails the pressure test, the Contractor shall at his expense, determine the cause of the failure, correct any defects, and retest the line section until a satisfactory test is accomplished.

B. Mandrel Testing:

1. A nine-armed mandrel shall be hand pulled through all PE and PVC gravity sewer pipe after the pipe has been backfilled for at least 60 days. The maximum allowable deflection of the pipe shall be not more than 5 percent of the base diameter. Any pipe that deflects in excess of 5 percent shall be corrected and relayed at the contractor's expense. All costs related to the mandrel testing and correcting any deficiencies found shall be included in the price bid for the pipe.

C. Manhole Testing: Perform testing of completed sewer manholes in accordance with one (1) of the procedures below:

1. Manhole Exfiltration Test. All manholes constructed shall be watertight and show no visible sign of infiltration, and shall be tested in accordance with this Specification. The test shall be conducted by the Contractor in coordination with and at the direction of the Engineer. All incoming and outgoing sewer lines shall be plugged and the manhole filled with water to a level above the highest section joint. If the water level drop exceeds 1/8" per vertical foot of manhole depth in 5 minutes, the manhole shall have failed the test.

2. Manhole Vacuum Test. The test shall be conducted by the Contractor in coordination with and at the direction of the Engineer. The manhole shall be tested, after assembly, as follows: All pipe opening shall be sealed by installing suitable plugs that completely isolate the manhole structure; any other openings, such as lifting holes, shall be permanently sealed. A suitable vacuum pump shall be connected to the manhole, and a vacuum of 10" of Hg drawn. The pump shall then be isolated from the manhole by valving, and the test period begun. The test shall be successful if the vacuum remains at 9" of Hg or greater according to the following table:

Manhole Diameter	Time minimum (sec)
48"	60
60"	75
72"	90
84"	105

96” 120

3. All manholes which fail the test or that have visible leaks, even if they pass the test, shall be repaired or replaced at the expense of the Contractor until the manholes pass the test, to the complete satisfaction of the Engineer. Manholes which have any visible leaks will not be accepted.

D. Force Main Testing:

1. The force main shall be hydrostatic tested at 150 psi for a minimum of 2 hours, with no allowable leakage. A chart recorder shall be used to track the pressure reading throughout the test.
2. Water for testing will be provided by the Owner at no cost to the Contractor.

E. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
3. Flush piping between manholes, if required by local authority, to remove collected debris.

F. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.
2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects correct such defects, and re-inspect.
3. Televised inspection shall be done on all installed gravity sewer lines, in accordance with Section 01 0300.

END OF SECTION 33 3000

SECTION 31 2000
EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related work specified elsewhere includes:

1. Section 311000 - "Site Clearing"
2. Owner's "Report of Geotechnical Exploration"

1.2 SUMMARY

A. This Section includes the following:

1. Preparing of subgrade for building slabs, walks, and pavements, earth building pad, and other features for planned and site improvements.

a. Cut and fill as required to achieve elevations indicated on the Grading Plan; removal of trees and stumps, and any additional earth, unsuitable existing materials and other existing material as required for the Work of this project to be properly completed, as specified and/or as required by actual project conditions, as further indicated on the Drawings and in the Owner's "Report of Geotechnical Exploration".

1) The work of this Section shall also include complete removal of any existing utilities and relocation where indicated; Refer to Drawings for additional information and requirements within the "controlled areas" and elsewhere on site.
2) Stripping of exposed grade shall extend at least 10-feet beyond the limits of construction cut and fill.

c. Comply with Owner's "Soil Survey & Material Report"; Refer also to Civil and Structural Drawings for additional information and requirements.

2. Drainage fill course (porous fill) for support of any building slabs shall be included; compacted in place.
3. Excavating and backfilling of trenches within building lines and "controlled areas".
4. Stripping and stockpiling of topsoil is specified in Section 311000 "Site Clearing."
5. The extent of earthwork is indicated on the Drawings.

6. Removal of existing improvements may also be further specified under Section 010300 "Special Project Provisions"

B. Excavating and Backfilling for Mechanical and Electrical Work (where applicable): Refer to those Divisions of the Project Manual for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances, not work of this Section.

1. However, construction materials and execution for Mechanical and Electrical work shall comply with requirements of this Section 312000, when the work and/or materials required are not indicated or only partially indicated in those Divisions.

C. Placement and compaction of at least 6-inches of topsoil up to finish grades in areas to be seeded or grassed.

1. Coordination with the work of other subcontractors is required.
2. Allow for thickness of 6-inches of topsoil, and where sod is indicated allow for thickness of sod.

1.3 DEFINITIONS

A. "Excavation" consists of removal of materials and existing improvements encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. "Unauthorized" excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.
2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. "Additional Excavation": When excavation has reached required subgrade elevations, notify Geotechnical Consultant and Civil Engineer who will review conditions. If it is determined that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Engineer.

1. The Contract Sum will be adjusted by Change Order, or as provided in General Conditions, for additional excavation and its replacement appropriately

authorized in writing prior to beginning the work, and for which the Contractor is due payment from the Owner.

D. "Subgrade": The undisturbed earth or the compacted soil layer immediately below pavement base course, drainage fill, or topsoil materials.

E. "Structure": Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. "Building Control Area" and/or "Controlled Area": Below and 10-feet beyond building footprint or exterior walls, and below roofs, to include covered porches and canopies, and below and 10-feet beyond all walks and pavements.

G. "Mud Footings" (or "mud mats", or "mud sills"; if any): The 2-inches to 4-inches of lean 2,500 psi (minimum) concrete placed in the bottom of footing and foundation trenches and excavations, which is required if permanent or structural concrete cannot be placed the same day they are excavated.

1. Unless mud footings are indicated on Structural Drawings, their depth shall be compensated for by over-excavation.
2. Mud footings (if any) shall be completely clean prior to placement of any reinforcing and/or permanent or structural concrete.
3. Refer to the Owner's "Report of Geotechnical Exploration", and Structural Drawings for additional information and requirements for other "mud footings" (or "mud mats", or "mud seals").

H. Rock (or similar existing concrete; if any): Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. (0.76 cu. m) for bulk excavation or 3/4 cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) wide, short-tip-radius rock bucket; rated at not less than 120-hp (89-kW) flywheel power with bucket-curling force of not less than 25,000 lbf (111 kN) and stick-crowd force of not less than 18,700 lbf (83 kN); measured according to SAE J-1179.
2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp (157-kW) flywheel power and developing a minimum of 45,000-lbf (200-kN) breakout force; measured according to SAE J-732.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Test results shall be reported in writing to Architect, Structural Engineer, Civil Engineer, Construction Manager and Contractor within one day of when tests are made.

1. Test reports on fill and borrow material; On-site as well as off-site materials.
2. Verification of suitability of each foundation, floor slab and subgrade condition and material, in accordance with specified requirements.
3. Field reports; and in-place soil density tests.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work on site and in right-of-ways in compliance with applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: All required soil testing and inspection services during earthwork operations shall be performed by a qualified independent geotechnical testing laboratory.

1. Refer to Division 01 Section “Special Conditions”, for additional information and requirements.

1.6 PROJECT CONDITIONS

A. Site Information: Refer to Division 311000 Section “Site Clearing”, and Civil Drawings, for additional information and recommendations.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations in the vicinity, and as may also be required for other construction work.

1. Notify the Alabama Line Location Center at 1-800-292-8525 at least 2-full working days (48 hours), excluding weekends and holidays, prior to any excavation work. This organization will contact its member utility companies to locate and mark all of their own underground facilities.

a. Notify non-member companies directly, for them to perform this service.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions and record locations on as-built record drawings. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

a. Provide minimum of 48-hour notice to Owner and copy Engineer, and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from the site any existing underground utilities indicated to be removed, and all existing underground utilities in "controlled areas". Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives: Use of explosives *is not* permitted.

D. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights.
2. Operate warning lights as recommended by authorities having jurisdiction.
3. Comply with requirements of current regulations of OSHA, applicable Codes, ordinances, and authorities having jurisdiction.
4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
5. Perform excavation by hand within 5'-0" of any existing buildings and structures to remain, and within dripline of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap. Paint root cuts of 1-1/2-inches and larger with emulsified asphalt tree paint.

   a. Do not under-mine or excavate below footings and/or foundations which are to remain.

6. **CAUTION**: Vibratory compaction equipment should not be used within 20-feet of any existing buildings.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS - DEFINITIONS

A. Satisfactory soil materials are defined as clean, non-saturated, non-organic sections of earth taken from on-site cuts (if allowed), and complying with ASTM D2487 soil classification groups included in recommendations of the Owner's "Soil Survey & Materials Report", or if not included, as directed at the time of earthwork operations and/or acceptance resulting from acceptable test results obtained on soil materials proposed by the Contractor and tested by the project Geotechnical Engineer, as required by the Bid and Contract Documents.

1. Note: On-site soils may be used as structural fill in any controlled areas after tested and found acceptable to the Project Geotechnical Engineer.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups other than those indicated above.

C. Drainage Fill (or "porous fill" or "drainage aggregate"): Clean, washed, evenly graded and free-draining pea gravel, coarse sand, or crushed stone, subject to approval by the project geotechnical engineer and testing laboratory, and as follows:

***"DRAINAGE / POROUS FILL"*:**
Passing No. 50 Sieve: Less than 50% Passing No. 200 Sieve: Less than 5% ——————————————— Compaction: 98% S.P.D. Minimum Completed Thickness: 4-inches.

D. Backfill and Fill Materials (Grassed areas only; Cuts and fills outside "controlled areas", during general grading): Satisfactory soil materials from on-site excavations, free of clay, rock or gravel larger than 2-inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

1. **All fill soils must be compatible with existing soils, so they can bond together.**

E. Offsite Borrow Material ***or*** Acceptable and Approved On-Site Cut Material ("Select Fill" and/or "Structural Fill"): Clean, non-saturated, non-organic, non-expansive clayey soils, of clayey sand (SC-SM) or clayey sand (SC) classification according to the "Unified Soil Classification System", acceptable to **Project Geotechnical Engineer and testing laboratory**, from an off-site borrow source, free of rocks larger than 3-inches, debris, organics, vegetation, and other deleterious matter, and at least as follows:

***"STRUCTURAL FILL" – FOR OFF-SITE BORROW*:**
Liquid Limit (LL): Less than 40% Plasticity Index (PI): 4 to 14 Maximum Dry Unit Weight (ASTM D-698): 100 pcf minimum Maximum Particle Size: 3" or less ——————————————— Compaction: 98% S.P.D.

1. All fill soils must be compatible with existing soils, so they can bond together.

F. Topsoil: Refer to Section 311000 Section "Site Clearing."

PART 3 - EXECUTION

3.1 PROOFROLLING

A. Areas throughout significant slopes and beneath and 5'-0" beyond any new walk and pavement areas (back-of-curb or other paving edge termination) shall be designated as "controlled areas." Prior to placement of fill earth and following removal of cut earth, the controlled areas shall be proofrolled. Areas to be filled shall be proofrolled prior to any fill placement; cut areas shall be proofrolled after they are brought to subgrade level. Proofrolling shall be performed with a partially loaded truck with a rear single axle weight of 8 to 10 tons, or similarly weighted construction equipment. The proofroller shall make at least two passes over each section in perpendicular directions over the "controlled areas". Soft, organic, or excessively wet soils found during the proofrolling operations shall be excavated and replaced with suitable compacted fill. The exposed subgrade must be well drained to prevent the accumulation of water.

1. Proofrolling shall be conducted in the presence of testing lab's Geotechnical Engineer.
2. Do not proofroll when the ground surface is wet or saturated with water.

3.2 EXCAVATION

A. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as structures, foundations, rock or unauthorized excavation.

B. Perform excavation by hand within 5'-0" of any existing buildings and structures to remain.

1. Do not under-mine or excavate below footings and/or foundations which are to remain.

C. Refer to "Definitions" paragraph above and Structural Drawings for any "mud footings" required.

3.3 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of

space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time excavations will be open. Extend shoring and bracing as excavation progresses.

3.4 DEWATERING

A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.5 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage. Install erosion control measures as necessary to prevent siltation onto adjacent properties or onto the project area.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
2. Dispose of clean excess excavated soil material by spreading at on-site location as directed by Owner;
3. Dispose of unsuitable materials and materials not wanted by the Owner and which are not acceptable for use as backfill by spreading beyond the limits of the Work of this contract, as directed by the Engineer and Owner;
4. Dispose of trees, stumps, trash and debris by removal and legal disposal off site.

3.6 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.8 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6-inches to 9-inches of clearance on both sides of pipe or conduit.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on minimum of 4-inches of compacted "select fill" bedding. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1. Backfill trenches with "select fill", compacted in place or as indicated on plans.

C. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage, etc.) so top of piping is not less than 2'-6" below finished grade and/or paving.

D. Unless specifically indicated otherwise, where rock or concrete is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel, prior to installation of pipe.

3.9 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.10 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

1. Under all areas, use satisfactory excavated material, or only where required and directed utilize approved off-site borrow material. Refer to Owner's "Report of Geotechnical Exploration", and this Section 312000 for minimum testing requirements.

2. Under building slabs, use drainage fill material of compacted and finished depth indicated, or if not indicated, at least 4-inches compacted and completed thickness. (Not included in this sitework contract)
3. Backfill trenches with concrete where trench excavations pass within 18-inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

    a. Concrete is specified in Division 320000
    b. Do not backfill trenches until inspections and any required testing have been made and backfilling is authorized by Engineer based on test results. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, etc.
2. Inspections, testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete formwork, if any.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

    a. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls, where necessary.

3.11 PLACEMENT AND COMPACTION

A. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1-vertical to 4-horizontal so that fill material will bond with existing surface.
2. When existing ground surface has a density less than that specified under “Compaction” for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
3. Refer to Division 1 Section “Unit Prices” for possible additional requirements.

B. Place backfill and fill materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.

1. CAUTION: Vibratory compaction equipment should not be used within 20-feet of any existing buildings or structures to remain, or of any basement and other below grade walls.

C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 698 A:

a. Under structures, building slabs and steps, sidewalks, pads, and in all "controlled areas", and 10-feet beyond, compact at least the top 8-inches of subgrade and each layer of backfill or fill material at 98-percent maximum density. Compact the top 6-inches of the exposed subgrade in both cut and fill areas to at least 98-percent maximum density.

1) Refer to Paragraph 1.2 above and Owner's "Report of Geotechnical Exploration", for areas where additional depth(s) of preparation and compaction of exposed subgrades are or may be required.

b. Under pavements and 5-feet beyond (measured from back-of-curb or edge of paving, where occurs), process and compact top 6-inches of subgrade and each layer of backfill or fill material at 100-percent maximum density; Refer to Civil and Structural Drawings and the Owner's "Report of Geotechnical Exploration" for additional information and requirements.

1) Modified roadbed and other base material indicated below vehicular asphalt and concrete pavements: 100-percent S.P.D. or Modified Proctor; Refer to Drawings for additional information and requirements.

2) Base material indicated below vehicular asphalt and concrete pavements: 100-percent S.P.D or Modified Proctor. Refer to Civil and Structural Drawings and the Owner's "Report of Geotechnical Exploration "for additional information and requirements.

c. Under lawn or unpaved areas beyond "controlled areas", compact each layer of backfill or fill material at 98-percent maximum density.
d. Fill at slopes beyond "controlled areas", compact each layer of backfill or fill material at 98-percent maximum density.
e. On-site Borrow (where allowed): 98-percent standard density.
f. Structural Fill (or "Select Fill"): 98-percent standard density.
g. Porous Fill (drainage course): 98-percent standard density.

2. Modified Roadbed (for any paving): Construction requirements shall comply with the Alabama Highway Department Specifications for the materials indicated, including in part, applicable portions of Article 230.03.

a. Compaction: 100% S.P.D or Modified Proctor.

3. Crushed Aggregate Base (for any paving): Construction requirements shall comply with the Alabama Highway Department Specifications for the materials indicated, including in part, applicable portions of Article 825 and Article 301.

a. Compaction: 100% S.P.D. or Modified Proctor.

3. Soil Aggregate Base (for any paving): Construction requirements shall comply with the Alabama Highway Department Specifications for the materials indicated, including in part, applicable portions of Article 823 and Article 301.

a. Compaction: 100% S.P.D. or Modified Proctor.

4. Moisture Control:

a. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
b. Remove and replace, or scarify and moisture condition, soil material that is too wet to permit compaction to specified density.
c. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist moisture conditioning by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.
d. At the time of placement and densification, the moisture content of "engineered fill", "structural fill", "select fill", and "retaining wall backfill" shall be within - 2% and + 3% of the materials' ASTM D-698 optimum

moisture content for native clay, "select fill", "structural fill", and "retaining wall backfill" (within 2% below paving).

e. Structural fill areas exposed to excessive wetting, drying or otherwise disturbed by the construction following acceptance for moisture and density should be retested followed by the correction of deficient areas just prior to the installation of additional fill or structures.

f. In no instance should placement of structural fill or ground supported structures be permitted if the ground surface soils contain a moisture content in excess of 3% of the materials optimum moisture content (2% below paving).

g. In no case shall porous drainage backfill (except as specifically indicated at foundation drains only) or masonry sand material be used adjacent to foundations or utility trenches. Care shall be taken to prevent masonry brick/block debris from falling or being pushed into foundation and/or trench excavations.

3.12 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10-foot above-or-below required subgrade elevations.
2. Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10-foot above-or-below required subgrade elevation.
3. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2-inch above or below required subgrade elevation.
4. Connection of Existing and New Work: Provide flush transition, unless specifically indicated otherwise.

C. Grading Surface of Fill under Building Slabs and "Building Control Areas": Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.13 BUILDING SLAB DRAINAGE COURSE

A. General: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs, sidewalks, pads, and below canopies and covered porches, and elsewhere as indicated.

1. Minimum Completed Thickness: 4-inches in office areas and 6-inches to 8-inches in warehouse or service spaces.

B. Placing: Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

1. When a compacted drainage course is indicated to be 6-inches thick or less, place material in a single layer. When indicated to be more than 6-inches thick, place material in equal layers, except no single layer more than 6-inches or less than 3-inches in thickness when compacted.

3.14 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction:

1. Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
2. Perform field density tests in accordance with ASTM D 698 (sand cone method), and/or hand-held penetration device (DCP), and/or acceptable nuclear testing method, as applicable.
3. New Footing Subgrade: For each strata of soil on which footings will be placed, perform at least one test per concrete pour (minimum) and one test per 50-feet of footing length, to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Architect.
4. New Paved Areas, New Building Slab and “Building Control Areas” Subgrade: Perform at least one field density test of subgrade for every 2,500-square feet of fill area (4,000-square feet in pavement areas) for each foot of vertical thickness of fill placed in “controlled areas”, with a minimum of four (4) tests per lift.
5. Foundation Wall Backfill: Perform at least 1-field density test for every 50-linear feet, at locations and elevations as directed, with a minimum of 2-field density tests for each retaining wall.
6. Trenches: Perform at least one field density test for every 50-linear feet for each 24-inches of vertical thickness of fill placed in utility or similar trenches, which extend through the “controlled areas”.

    a. Retaining walls, if any, same as for “Trenches”, as indicated above.

7. A laboratory soil particle size, Atterberg limit, and Proctor density test shall be performed on each different type of fill soil used in the "controlled areas".
8. If in opinion of Architect - based on Project Geotechnical Engineer's testing reports, inspection, and recommendations - subgrade or fills that have been placed are below specified density, perform additional earthwork, compaction, and/or other operations, and re-testing, until specified density is obtained.

3.15 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

3.16 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Repair edges of existing pavements, sidewalks, etc., and other existing and/or new improvements flush with and to match existing materials and thicknesses, subject to acceptance by Owner and Architect.

D. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

E. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF EXCESS AND WASTE MATERIALS

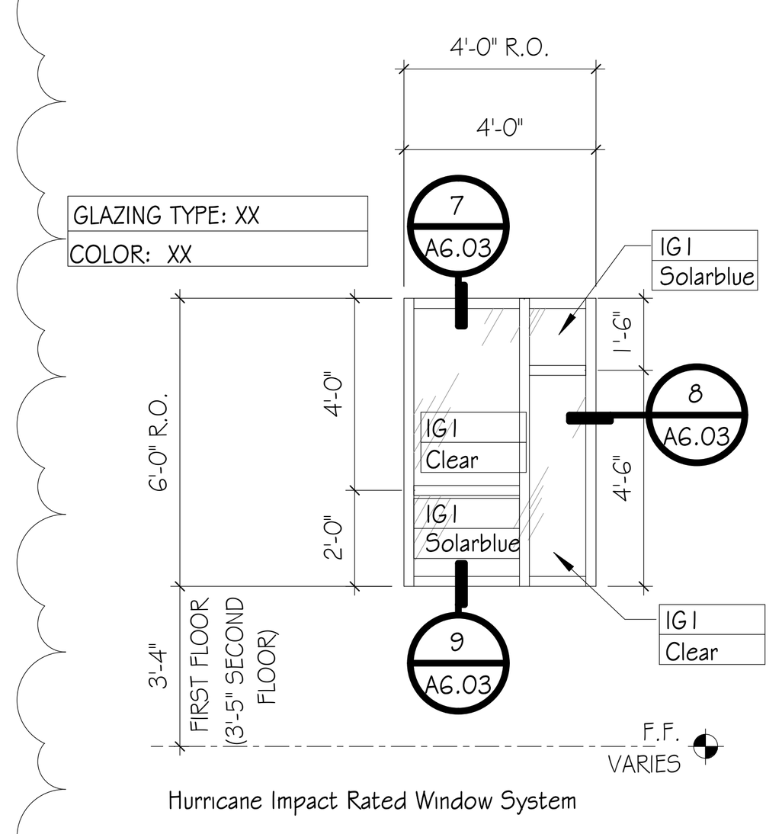
A. Burning on Owner's Property: Burning is not permitted on Owner's property.

B. Removal from Owner's Property: Remove unacceptable soils materials, waste materials, trash, and debris, and legally dispose of off Owner's property.

1. Clean excess soil material without any construction debris, trash, tree roots over 1-inch in diameter, stumps, etc., shall be neatly spread and graded on site or on adjacent site or a site on campus, as directed by the Architect and Owner.

2. Soil materials unsuitable for use in building and paving areas shall also be neatly spread and graded on site or on adjacent site, as directed by the Architect and Owner.
3. Excess soil materials unwanted by the Owner shall be removed from the project site and legally disposed of by the Contractor.

END OF SECTION EARTHWORK



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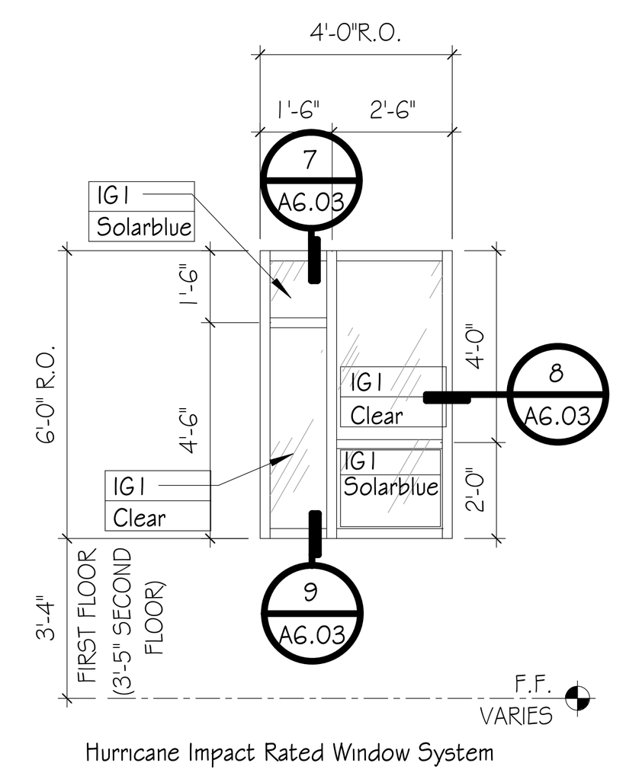

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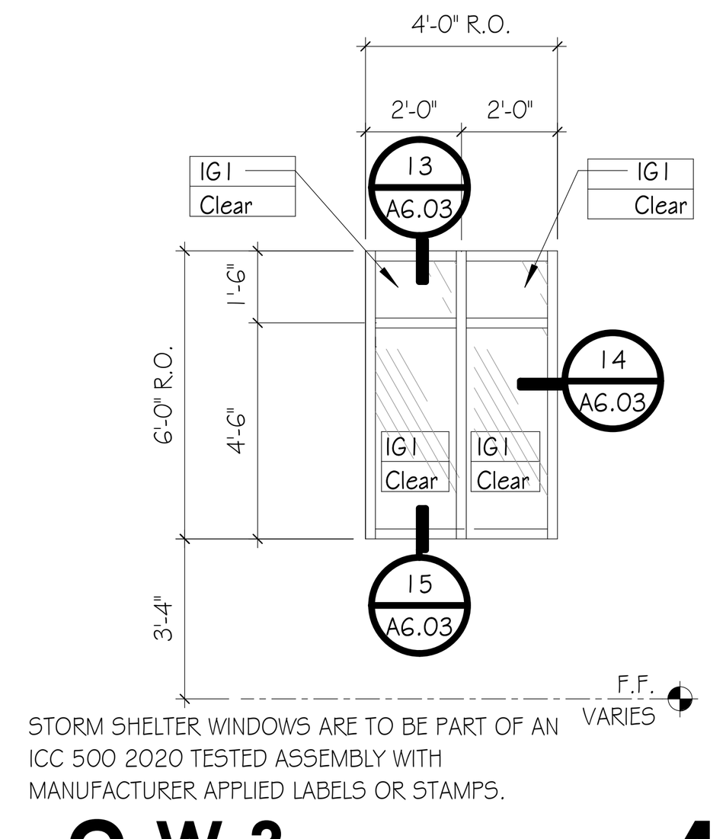

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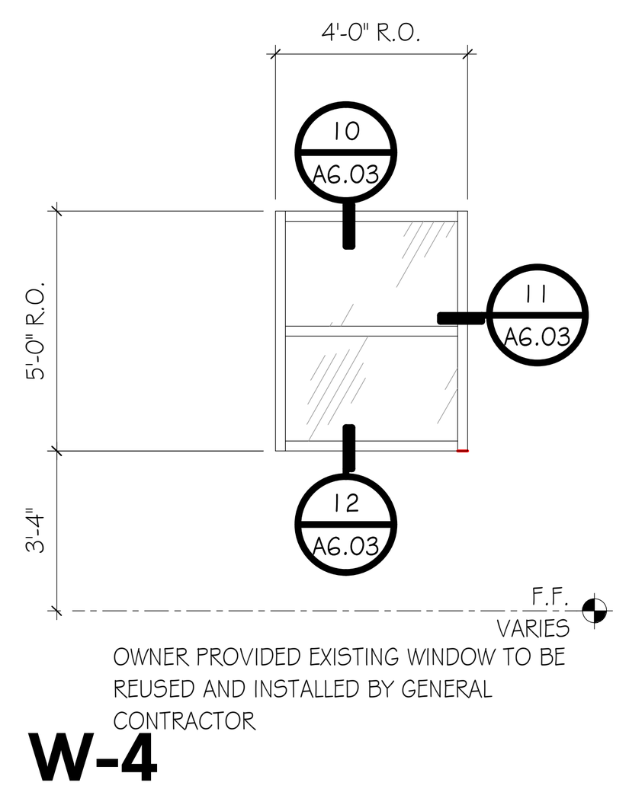

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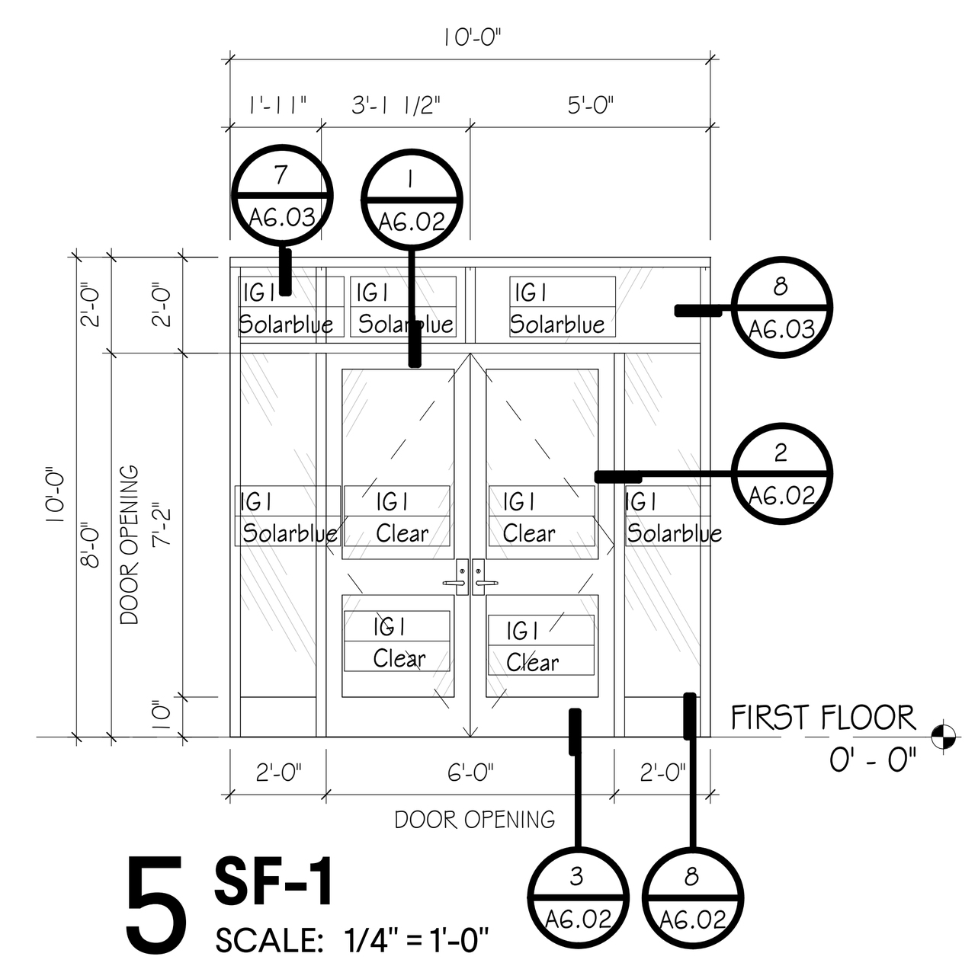

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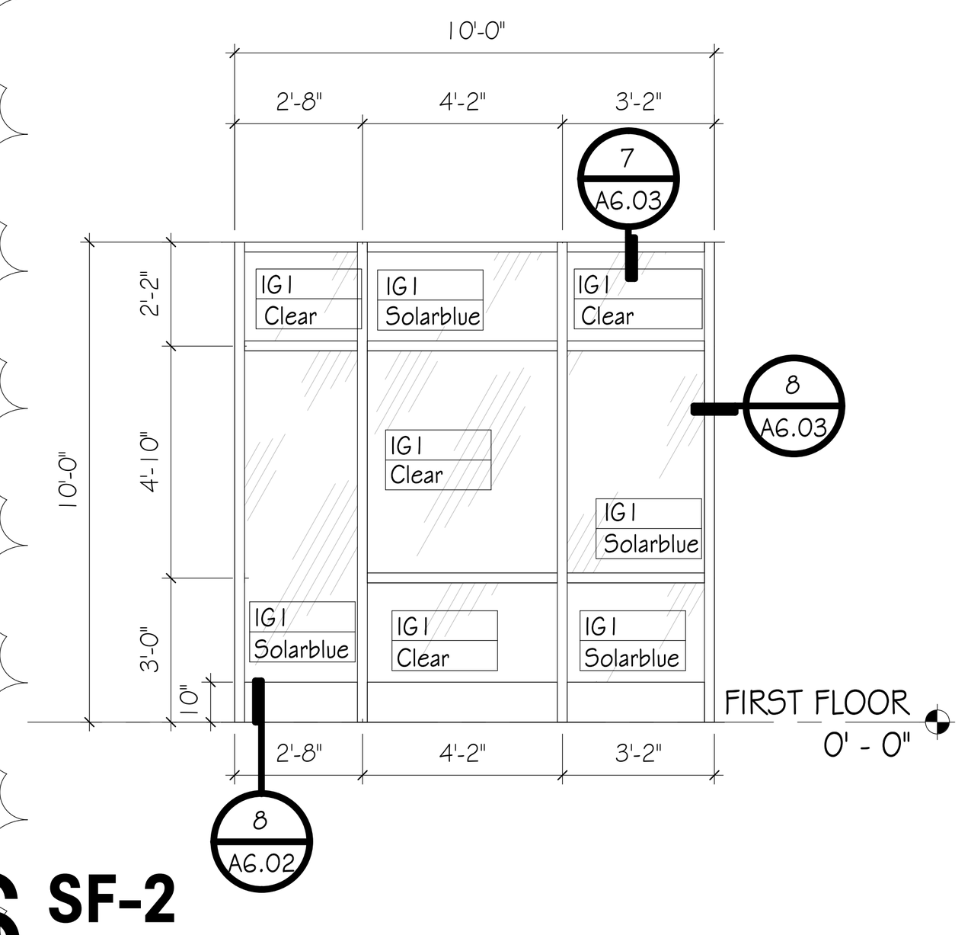

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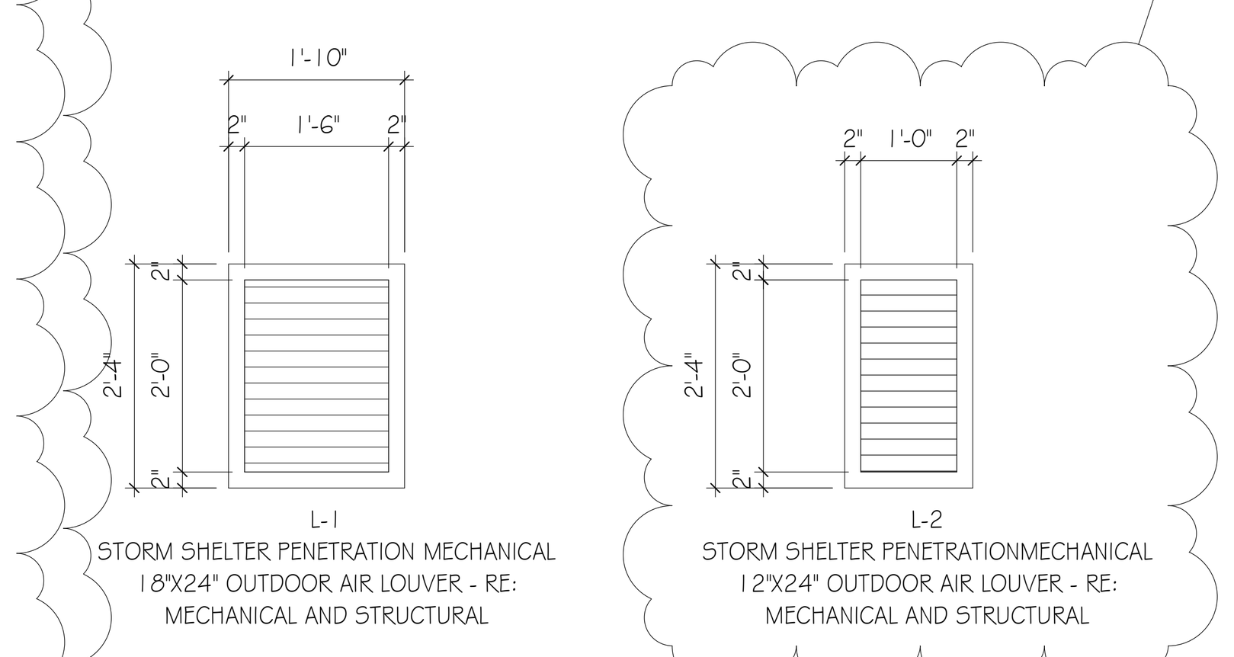

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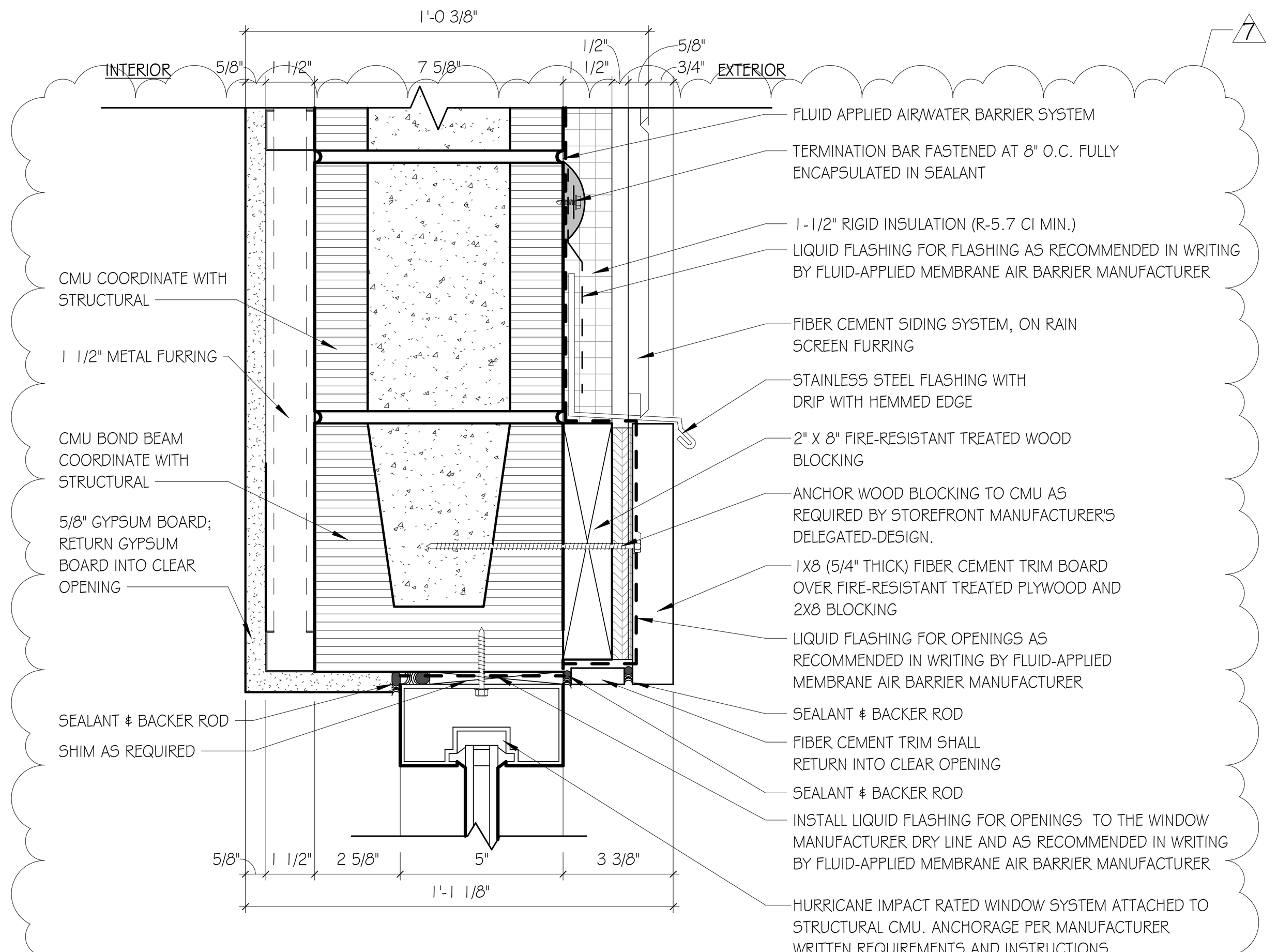

7 EXT. SF HEAD CMU & FIBER CEMENT SIDING W/ TRIM
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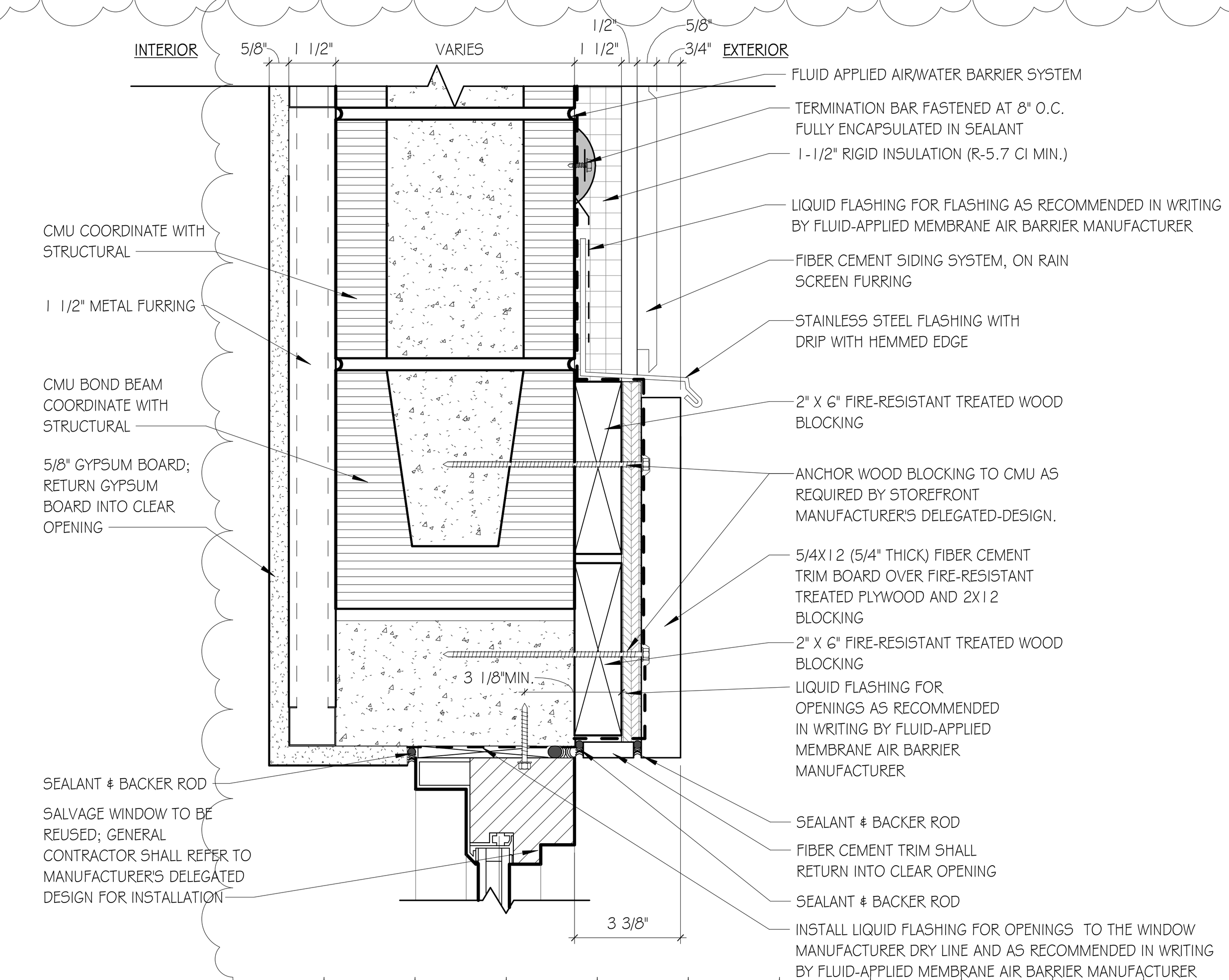

10 SALVAGE WINDOW HEAD @ CMU & FIBER CEMENT SIDING
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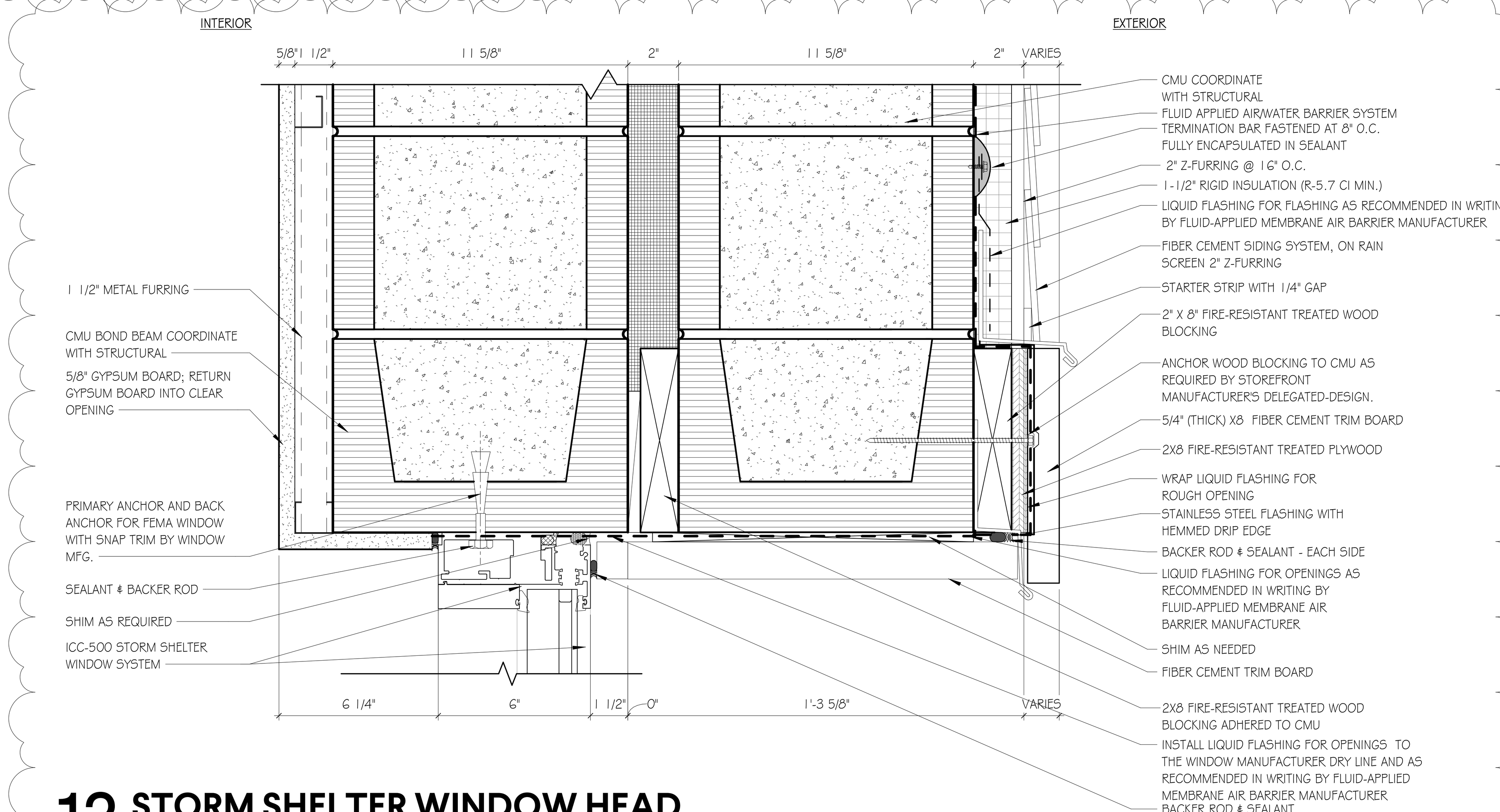

13 STORM SHELTER WINDOW HEAD
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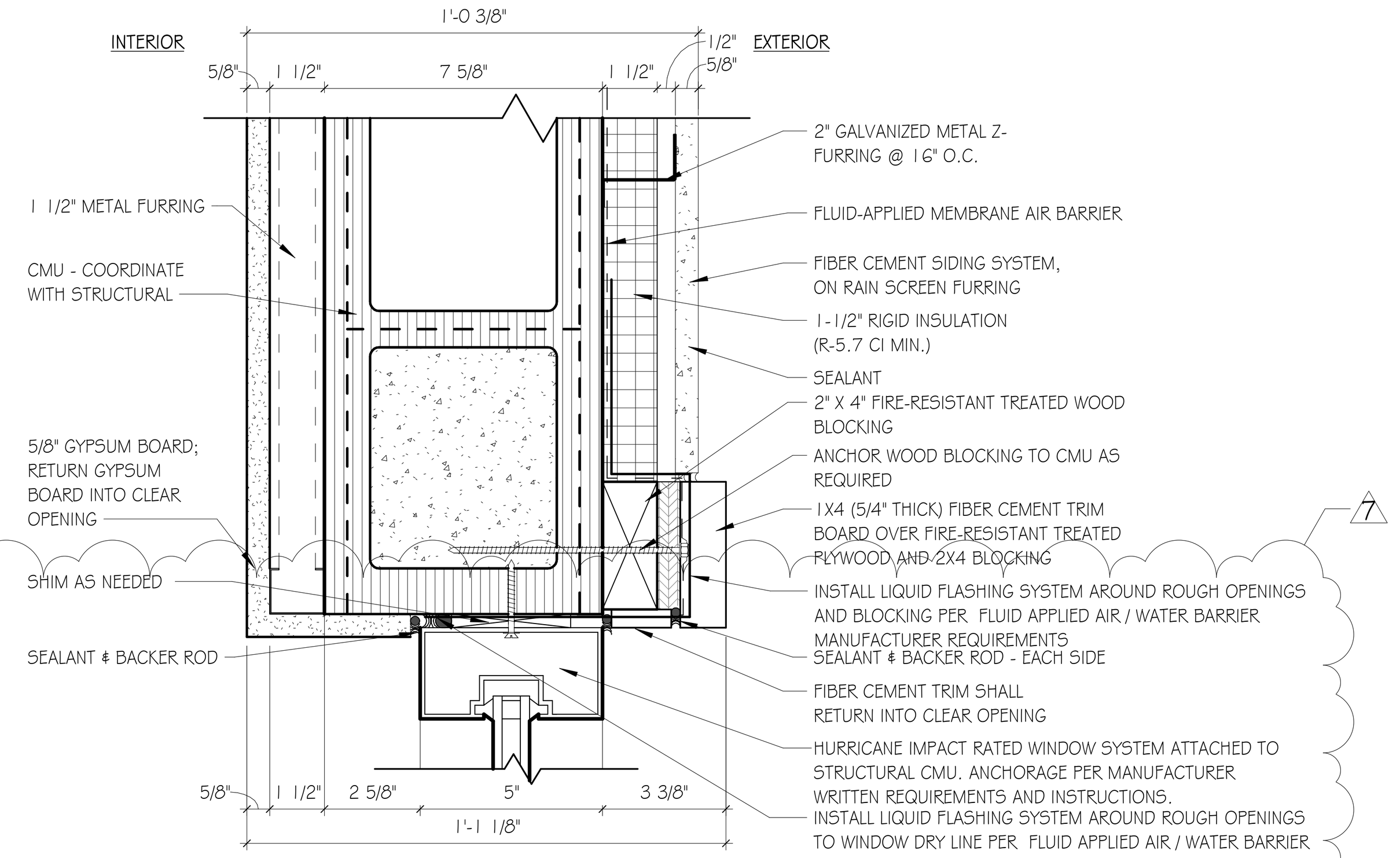

8 EXT. SF JAMB CMU & FIBER CEMENT SIDING W/ TRIM
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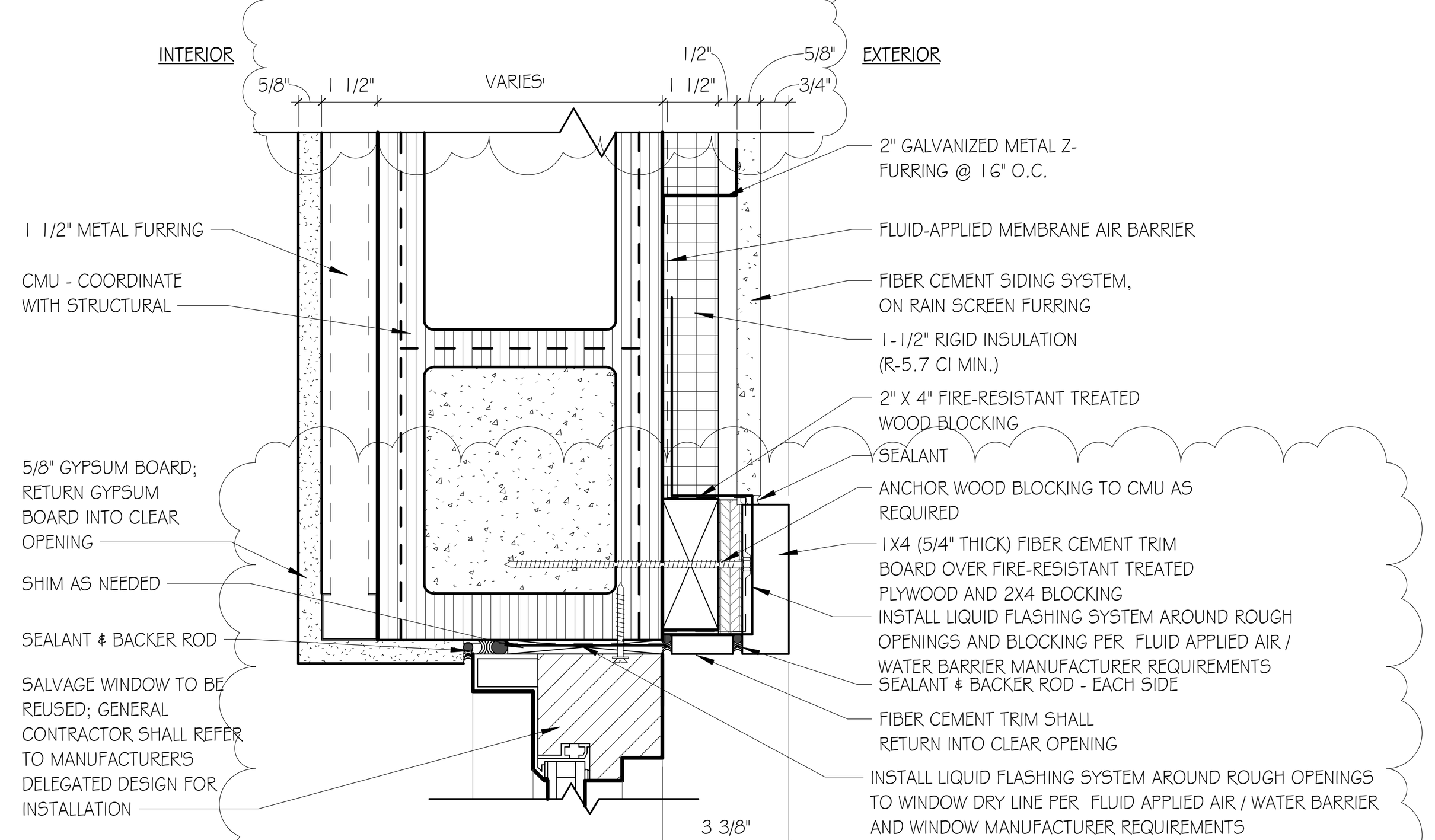

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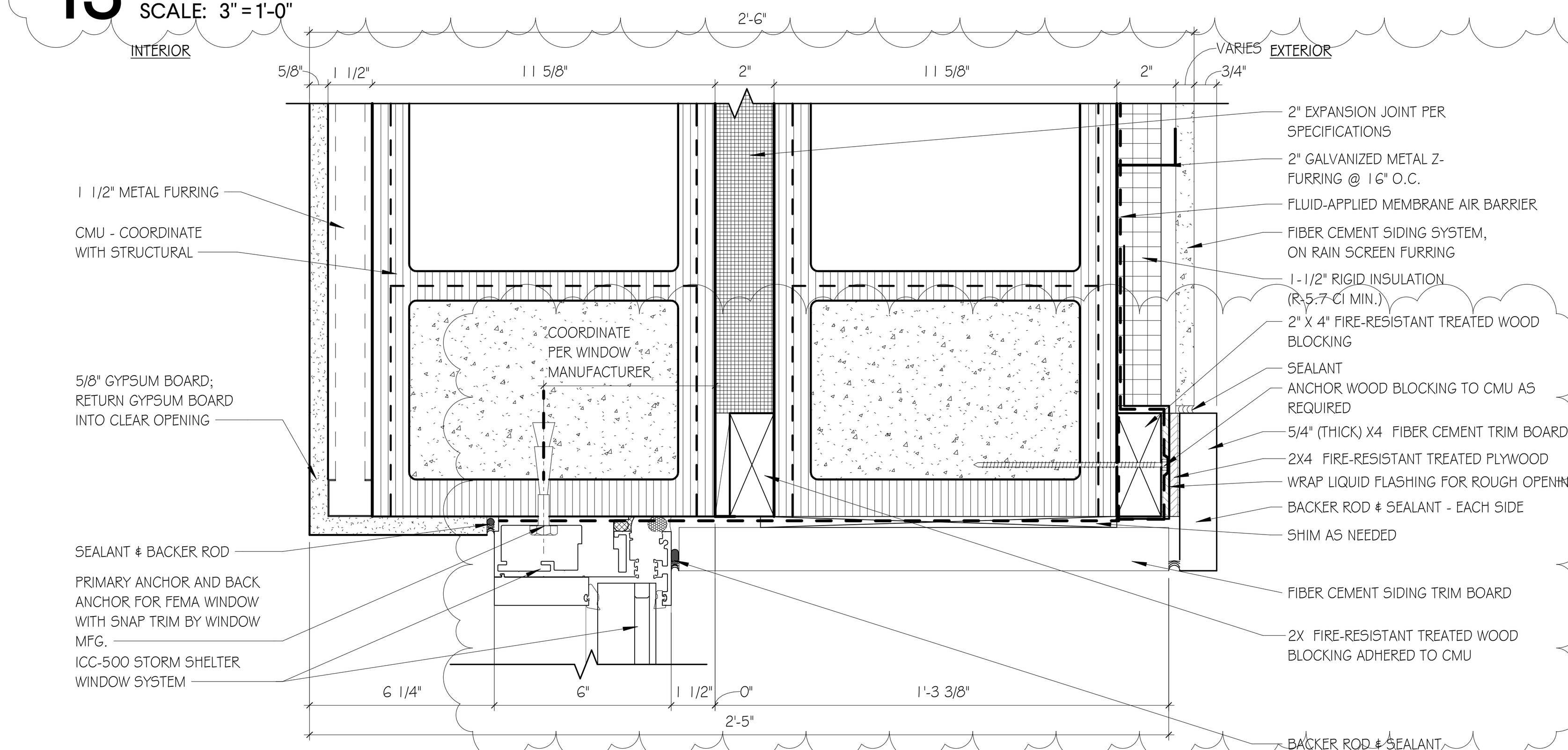

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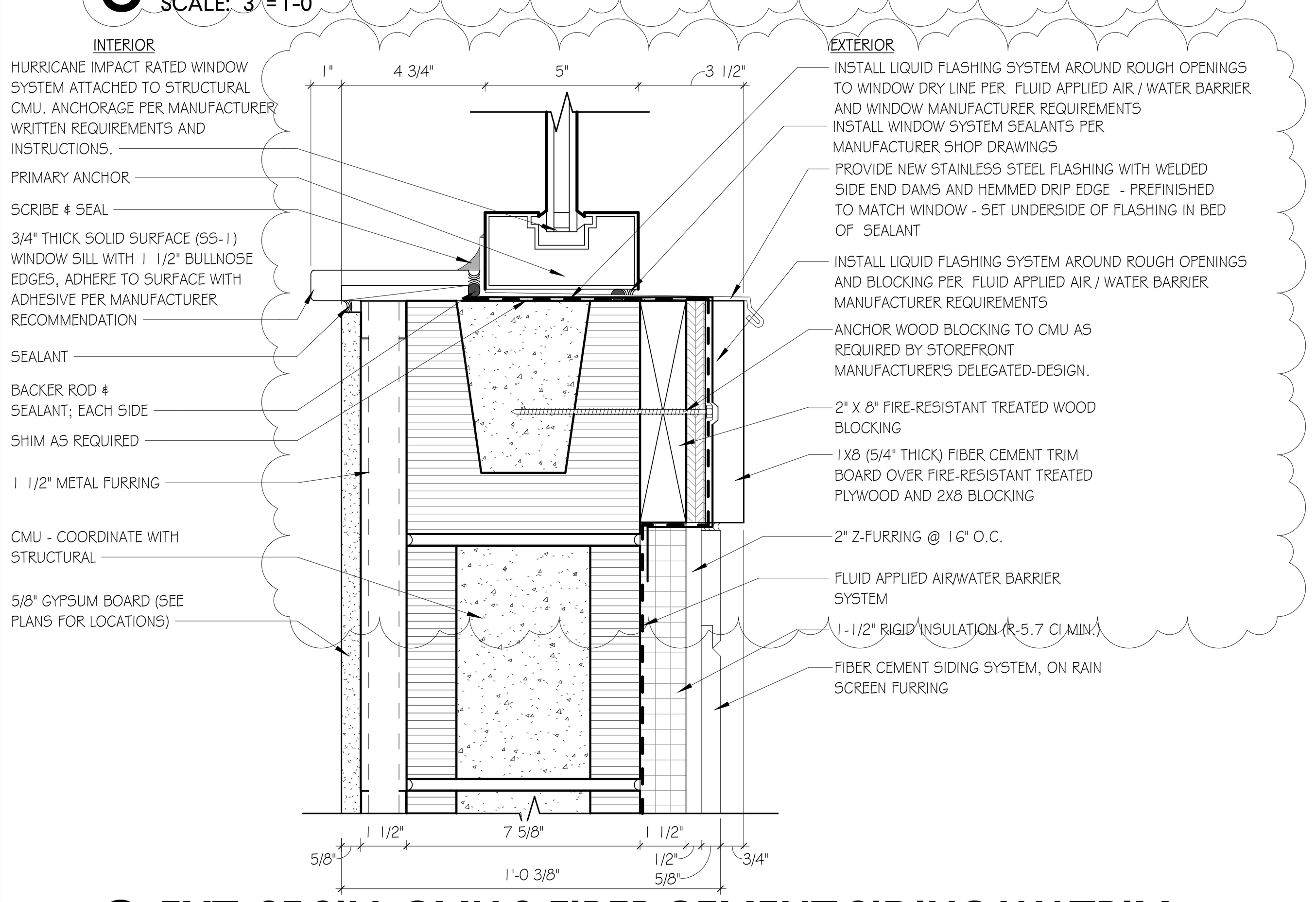

9 EXT. SF SILL CMU & FIBER CEMENT SIDING W/ TRIM
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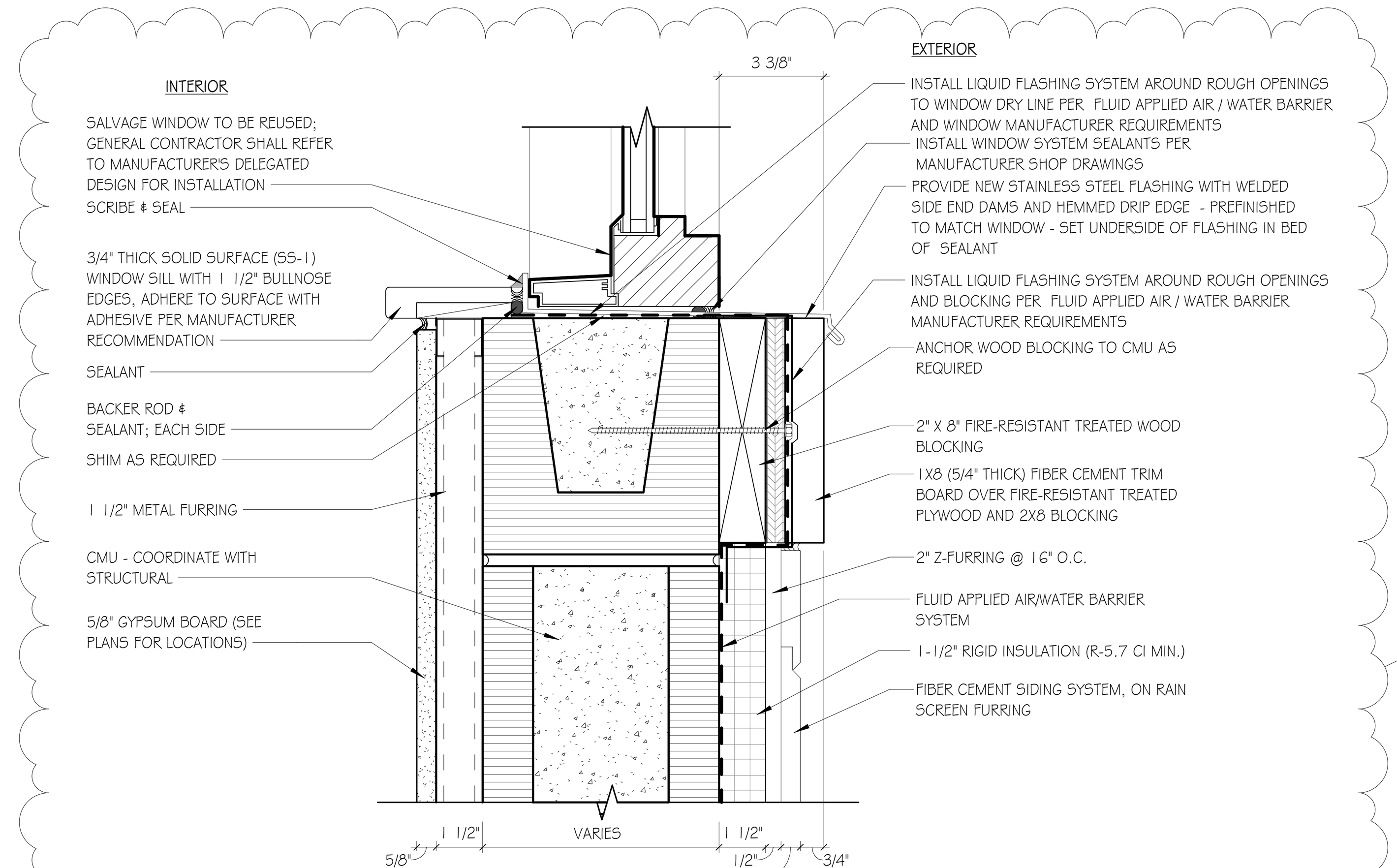

12 SALVAGE WINDOW SILL CMU & FIBER CEMENT SIDING
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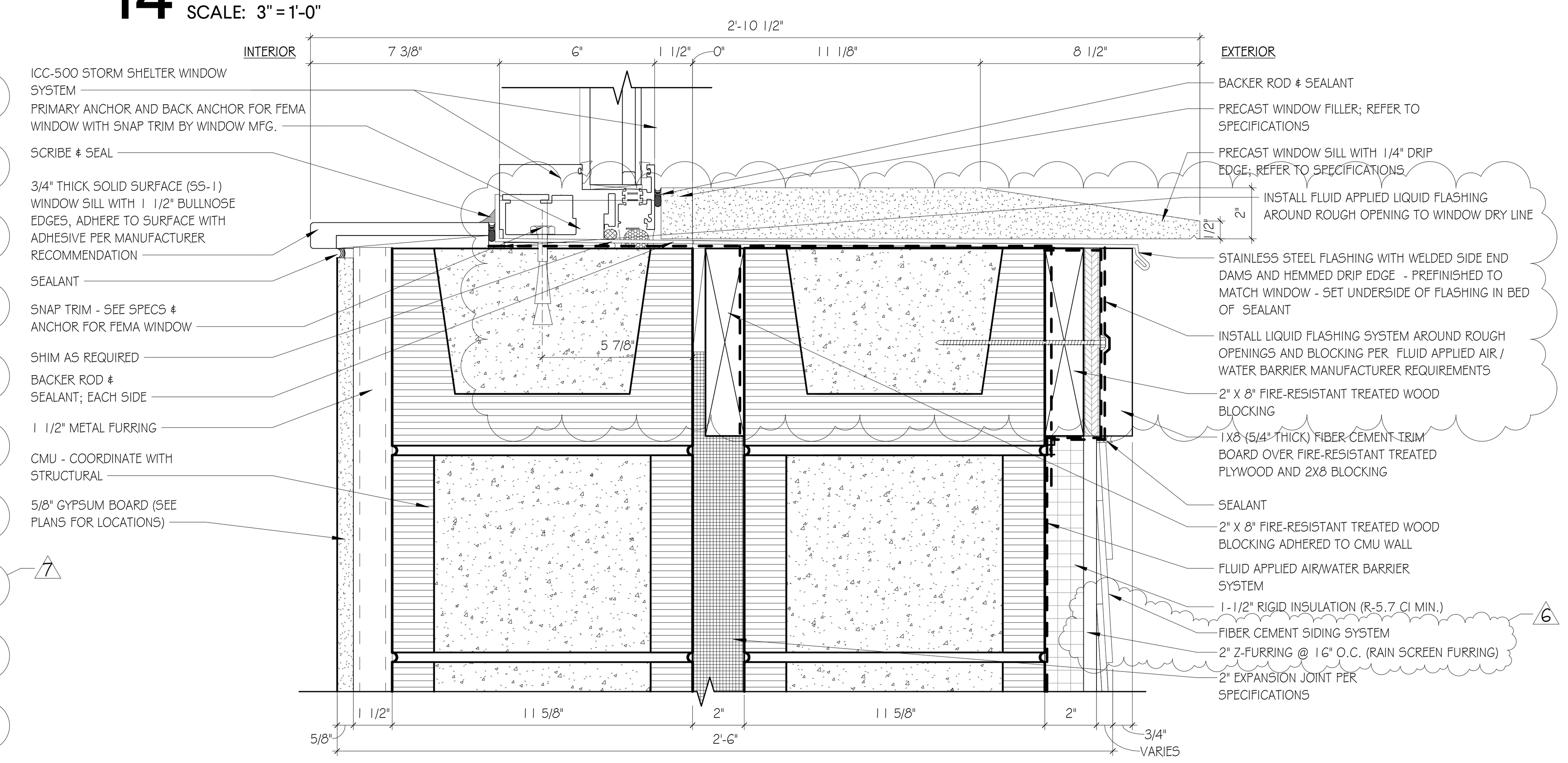

15 STORM SHELTER WINDOW SILL
SCALE: 3" = 1'-0"

GMC

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#	ISSUE	DATE
	ISSUE FOR BID	06/27/2025
4	ADDENDUM #04	07/16/2025
6	ADDENDUM #06	07/22/2025
7	ADDENDUM #07	07/28/2025

DRAWN BY: EH , VR
CHECKED BY: VR , JW

STATE OF ALABAMA — REGISTERED ARCHITECT — 5958 — James S. Waldo

NEW DORMITORY FOR DAUPHIN ISLAND SEA LAB CAMPUS
101 BIENVILLE BOULEVARD
DAUPHIN ISLAND, AL 36528

DCM# 20240427
GMC # AMOB230181

GLAZING SYSTEM SCHEDULES & DETAILS

A6.03

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