

Addendum No. 1
to
Plans, Specifications, and Contract Documents
for
T-Hangar and 2-Unit Box Hangar
Lumberton Regional Airport, Lumberton, North Carolina
Addendum Date: Friday, February 7, 2025

This Addendum is issued by
Talbert & Bright, Inc. 4810 Shelley Drive, Wilmington NC 28405,
Telephone 910-763-5350 / Fax 910-762-6281

THIS ADDENDUM DOES NOT CHANGE THE BID DATE/TIME.

BIDDERS MUST SIGN THIS ADDENDUM AND INCLUDE IT WITH THE BID.

Contractors and other interested parties are directed to make the following changes:

1. To the **SPECIFICATIONS**, Project Manual – Volume A and Project Manual – Volume B-1, 000110 Table of Contents, **REMOVE** Appendix “I” Recommended Schedule of Permit Fees.
2. To the **SPECIFICATIONS**, **REPLACE** Project Manual – Volume A, Appendix B “Proposal Requirements and Conditions” and “Bid Forms” with the revision attached to this addendum.
3. To the **SPECIFICATIONS**, **REPLACE** Project Manual – Volume A, Appendix D “Federal Requirements” with the revision attached to this addendum.
4. To the **SPECIFICATIONS**, **REPLACE** Project Manual – Volume A, Appendix H “Construction Safety and Phasing Plan (CSPP)” with the revision attached to this addendum.
5. To the **SPECIFICATIONS**, Project Manual – Volume A, Appendix I “Recommended Schedule of Permit Fees”, **REMOVE** in its entirety. Please see Section 003100 for City of Lumberton Permit Fee Schedule.
6. To the **SPECIFICATIONS**, Project Manual – Volume A, General Conditions, Section 30 Award and Execution of Contract, **REVISE** Section 30-02 “Award of Contract” first paragraph as follows.

“30-02 Award of Contract. The award of a contract, if it is to be awarded, shall be made within **60** calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.”

7. To the **SPECIFICATIONS**, Project Manual – Volume B-1, Item P-101, Preparation/Removal of Existing Pavements and Miscellaneous Items, **ADD** the following item under section 101-5.1 “Payment”.

“Item P-101.5.5 Asphaltic Pavement Removal – per Square Yard”

8. To the **SPECIFICATIONS**, Project Manual – Volume B-1, Item P-209, Crushed Aggregate Base Course, **ADD** the following under Method of Measurement.

“209-4.2 The quantity of Rework of Existing Aggregate Base will be determined by measurement of the number of square yards of materials reworked and accepted by the ENGINEER as complying with the plans and specifications. This shall include scarifying the existing aggregate base, adding any additional crushed aggregate base course material as required to meet grades, fine grading to 3” below final grade, moisture conditioning and compaction to specified density.”

9. To the **SPECIFICATIONS**, Project Manual – Volume B-1, Item P-209, Crushed Aggregate Base Course, **ADD** the following under Basis of Payment.

“209-5.2 Payment shall be made at the contract unity price per square yard for rework of existing aggregate base. The price shall be full compensation for furnishing all labor, equipment, tools, materials, and incidentals necessary to complete this item. Including but not limited to adhering to requirements of 209-3.5, 209-3.8 and 209-3.9.”

“Item P-209-5.2 Rework of Existing Aggregate Base – per Square Yard”

10. To the **SPECIFICATIONS**, Project Manual – Volume B-2, **ADD** to specifications in its entirety for the Water & Sewer Work.

11. To the **DRAWINGS**, **REPLACE** Sheets G-001, G-004, CA-101, CA-111, CA-121, CA-131, CA-140, CA-141, CA-221, CA-401, A-321, A-601, E-001 and E-501 in Schedule 1; Sheet G-101a in Schedule 2A; Sheet G-101b in Schedule 2B with the revision attached to this addendum.

12. To the **DRAWINGS**, **ADD** Sheets CA-160, CA-161, CA-560 and CA-561 in Schedule 1; Sheets CB-160, CB-161, CB-560, CB-561 and CB-562 in Schedule 2A; and Sheets CC-160, CC-161, CC-560, CC-561 and CC-562 in Schedule 2B with the drawings attached to this addendum for the Water & Sewer Work.

13. Pre-Bid Meeting. A Non-Mandatory Pre-Bid Meeting for the project was conducted on Thursday, January 30, 2025, at the Airport Terminal Building Conference Room. The Pre-Bid Meeting Minutes and Attendance List are attached at the end of this Addendum for information purposes.

14. Questions Submitted in Writing and Answers to Questions:

- There are no separate bid forms for Schedule 2A and 2B or a location to include Alternates and 012200 Unit Prices. Please clarify.

Answer: See the attached revision to Appendix B, Bid Forms for Schedule 1, Schedule 2A, Schedule 2B and Bid Alternates.

- Item #4 Allowances listed on Schedule 1 bid form for permits is \$15,000, but Section 012100 3.3 A.1 ALLOWANCES calls out for this to be \$50,000. Please clarify. Is this for all schedules of work or will each have their own allowance?

Answer: *The allowance for Permit, Plan Review, Tap and Miscellaneous Fees is \$50,000.00 for Schedule 1 and \$15,000.00 for Schedule 2A and Schedule 2B. See attached revision to Appendix B, Bid Forms.*

- General Conditions, Section 30-02 Award of Contract: Please consider reducing award time from bid from 120 days to 60 days due to volatility in market and supply chain.

Answer: *Contract award time revised to 60 days. See revision to Specifications, General Conditions, Section 30 Award and Execution of Contract above.*

- T-Hangar and T-Hangar doors – is there a specification for the bi-fold hangar doors shown on the T-Hangar plans? And is there a specification for the T-Hangar buildings? Please clarify.

Answer: *Please see Specifications in Project Manual – Volume B-1, PEB Pre-Engineered Building (T-Hangar). This specification is for the T-Hangar buildings and the T-Hangar bi-fold doors.*

- Please confirm no Davis Bacon wages are required.

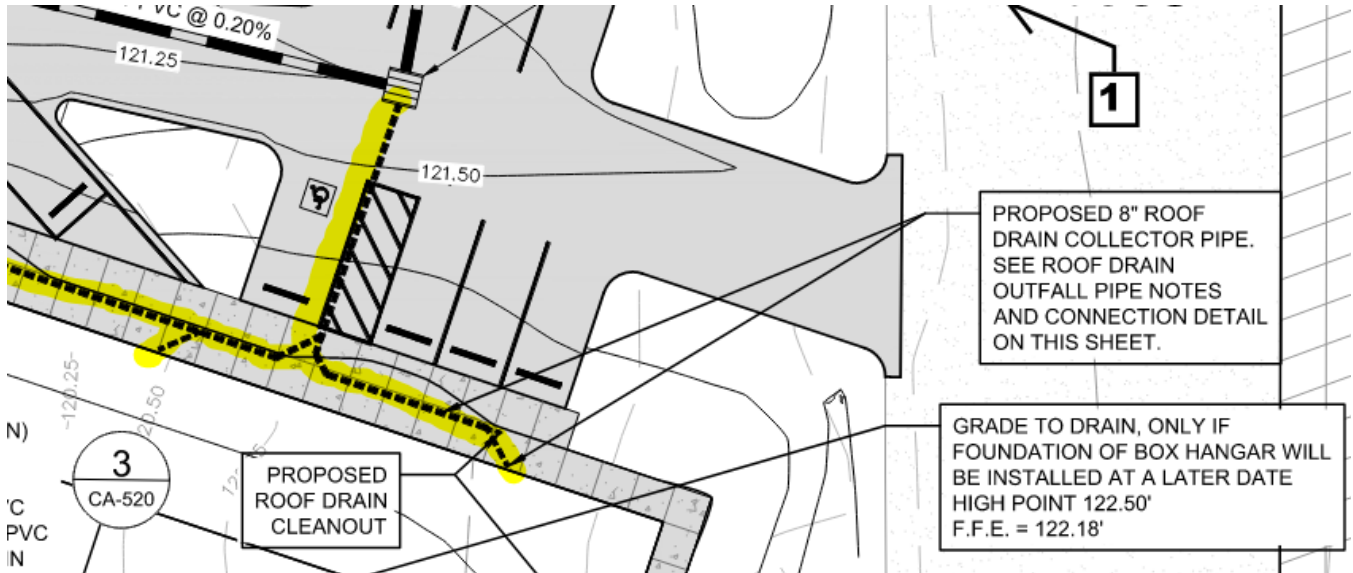
Answer: *Davis Bacon wages are not a requirement for this project. Contractor is responsible for complying with the Federal Fair Labor Standards Act (Federal Minimum Wage) – please see attached Appendix D.*

- Do not see an underground utility plan for any of the hangars, please provide.

Answer: *Please see attached drawing sheets CA-160, CA-161, CA-560, CA-561, CB-160, CB-161, CB-560, CB-561, CB-562, CC-160, CC-161, CC-560, CC-561 and CC-562 for the water and sewer work.*

- Are downspouts intended to daylight across sidewalks?

Answer: No. There is proposed 8" roof drain collector pipe as shown in the plans. The pipe highlighted below in yellow is some of this pipe.



ATTACHMENTS

- Specification Project Manual – Volume A, Appendix B, Proposal Requirements and Conditions and Bid Forms
- Specification Project Manual – Volume A, Appendix D, Federal Requirements
- Specification Project Manual – Volume A, Appendix H, Construction Safety and Phasing Plan (CSPP)
- Specification Project Manual – Volume B-2
- Schedule 1 Drawing Sheets G-001, G-004, CA-101, CA-111, CA-121, CA-131, CA-140, CA-141, CA-221, CA-401, CA-160, CA-161, CA-560, CA-561, A-321, A-601, E-001, and E-501
- Schedule 2A Drawing Sheets G-101a, CB-160, CB-161, CB-560, CB-561 and CB-562
- Schedule 2B Drawing Sheets G-101b, CC-160, CC-161, CC-560, CC-561 and CC-562
- Pre-Bid Meeting Minutes and Attendance List

END OF ADDENDUM NO. 1

Addendum acknowledged:

By: _____
Contractor

Date

Signature

Title of Signing Office

APPENDIX 'B'
PROPOSAL REQUIREMENTS
AND CONDITIONS

PROPOSAL REQUIREMENTS AND CONDITIONS

**T-HANGAR AND 2-UNIT BOX HANGAR
LUMBERTON REGIONAL AIRPORT**

**LUMBERTON AIRPORT COMMISSION
LUMBERTON, NORTH CAROLINA**

DATE: _____

In compliance with the Advertisement (Notice to Bidders), the undersigned hereby proposes to furnish the materials and perform the work for completion of all items, listed below in strict accordance with the Advertisement (Notice to Bidders), Plans, and General Provisions, Special Provisions of the Specifications, and all contract documents for the consideration of the price quoted in the following items and agrees, upon receipt of written notice of the acceptance of this Proposal, that within one hundred twenty (120) days after the date of the opening of the Proposals, that it will execute a contract in accordance with the Proposal as accepted, and give the required Performance and Payment Bond with good and sufficient surety or sureties, within fifteen (15) days after receipt of notice of formal award of contract and presentation of the prescribed forms.

Bidder shall complete all line items and total amount of Bid Schedule No. 1, Bid Schedule No. 2A, Bid Schedule 2B and Bid Add Alternates. Failure to submit prices and amount for each item shall be cause for rejection of Bid. The Owner reserves the right to reject any and all bids and to waive any and all technical defects in the execution and submission of any bid. It is the intent of the Owner to award one contract for all work depending on the availability of local, state, and federal funding.

Contract award will be made on the basis of the lowest responsive qualified bidder (at the time of initial award) for work in the best interest of the Owner and subject to the availability of local, state, and federal funding. The Owner reserves the right to reject any or all bids and to waive formalities and technicalities.

IMPORTANT NOTICE

Each bidder for this project shall be registered as a prequalified bidder with the NCDOT at the time of the bid opening.

The Contractor's attention is directed to the requirements of Appendix "C", Minority/Women Business Enterprise Program and the Equal Employment Opportunity Requirements in Appendix "D", **which must be submitted with the Proposal.**

The undersigned understands that the entirety of Section 20 and Appendix "C" and "D" of these specifications shall be considered a part of the Proposal, and that if

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we are notified by the ENGINEER that we are the low bidder(s), we shall submit the information required, hereinafter related to these requirements, within ten (10) days of such notification.

The Bidder is aware of subcontract requirements to obtain the goal of 5.0 % of **Minority/Women Business Enterprise participation** established for this contract; has completed and is submitting, along with the bid proposal, required information (see "Minority/Women Business Enterprise Program") describing actions taken in order to achieve such goals; and understands that meeting or exceeding the stated goals is a condition for being awarded this contract.

Failure to submit the above information may be grounds for rejection of our proposal.

It is understood that all workmanship and materials under all items of work are guaranteed for one year from the date of final acceptance, unless otherwise specified.

Wages not less than the minimum rates of wages, as predetermined for this project by the Secretary of Labor, were used in the preparation of this Proposal.

It is understood that the quantities of work to be done are approximate only and are intended principally to serve as a guide in evaluating Proposals.

The undersigned agrees that, if awarded the contract(s), it will commence work not later than the date set by the ENGINEER in the Notice(s) to Proceed, and that it will complete the work within the time specified above and in accordance with the Specifications.

Enclosed is security in the amount of 5% of the total base bid, consisting of (Cash, Certified Check, or Bid Bond) _____ payable to Lumberton Airport Commission.

Name of Bidder

BY: _____
(Signature)

(Name and Title of Signing Official) (Seal)

N.C. Contractor's License No. _____

For Corporation, provide Name and Post Office Address for the President,

Secretary, and Treasurer.

President

Name _____
Address _____

Secretary

Name _____
Address _____

Treasurer

Name _____
Address _____

For Partnership provide Name and Address for each Partner:

Name _____
Address _____

Name _____
Address _____

Name _____
Address _____

Name _____
Address _____

For Individual, provide Name and Post Office Address:

Name _____
Address _____

Note: Failure to complete blank spaces may be grounds for rejecting bid.

PROHIBITION OF SEGREGATED FACILITIES

- (a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.
- (b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.
- (c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

Signature of Contractor

Date

Title

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S. C. 1001.

(Reference: 2 CFR Part 200, Appendix II(C), 41 CFR Part 60-1)

TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

- 1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
- 2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
- 3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC § 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

- 1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or
- 2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
- 3) who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

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The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

Signature of Contractor

Date

Title

(Reference: 49 USC § 50104; 49 CFR part 30)

CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in the space following the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

- 1) The applicant represents that it is () is not () a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- 2) The applicant represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the Sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions

Felony conviction: Felony conviction means a conviction within the preceding twenty four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. Code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 USC § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

Signature of Contractor

Date

Title

(Reference: Section 8113 of the Consolidated Appropriations Act, 2022 (Public Law 117-103) and similar provisions in subsequent appropriations acts.

DOT Order 4200.6 – Appropriations Act Requirements for Procurement and Non-Procurement Regarding Tax Delinquency and Felony Convictions)

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”, must confirm each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: <http://www.sam.gov>.
2. Collecting a certification statement similar to the Certification of Offeror /Bidder Regarding Debarment, above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

Signature of Contractor

Date

Title

(Reference: 2 CFR Part 180 (Subpart B), 2 CFR Part 200, Appendix II(H), 2 CFR Part 1200, DOT Order 4200.5, Executive Orders 12549 and 12689)

LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Signature of Contractor

Date

Title

(Reference: 31 USC § 1352 – Byrd Anti-Lobbying Amendment; 2 CFR part 200, Appendix II(I); 49 CFR part 20, Appendix A)

CERTIFICATE OF COMPLIANCE WITH FAA BUY AMERICAN PREFERENCE – CONSTRUCTION PROJECTS

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
 - a) Only installing iron, steel and manufactured products produced in the United States.
 - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
 - b) To faithfully comply with providing U.S. domestic products.
 - c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
 - d) Certify that all construction materials used in the project are manufactured in the U.S.
-
- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
- b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
- e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including:
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “facility/project.” The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including:
- b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- d) Percentage of non-domestic component and subcomponent cost as compared to total “facility” component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) A completed Content Percentage Worksheet and Final Assembly Questionnaire form:
- b) At minimum two comparable equal bids and/or offers:
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component:
- d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

**CERTIFICATE OF COMPLIANCE WITH FAA BUY AMERICAN PREFERENCE –
EQUIPMENT/BUILDING PROJECTS**

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing steel and manufactured products produced in the United States:
 - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- a) To provide to the Airport Sponsor or FAA evidence that documents the source and origin of the steel and manufactured product.
 - b) To faithfully comply with providing U.S. domestic product.
 - c) To furnish U.S. domestic product for any waiver request that the FAA rejects.
 - d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
- b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including:
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “item”. The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including:
- b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108 (products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- d) Percentage of non-domestic component and subcomponent cost as compared to total “item” component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire form:
- b) At minimum two comparable equal bidders and/or offerors:
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component:
- d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date

Signature

Company Name

Title

(Reference: 49 USC § 50101; Executive Order 14005, Ensuring the Future is Made in All of America by All of America’s Workers; Bipartisan Infrastructure Law (Pub. L. No. 117-58), Build America, Buy America (BABA))

FORM OF NON-COLLUSION AFFIDAVIT
(This Affidavit is Part of the Proposal)

STATE OF _____

COUNTY OF _____

_____ being first duly sworn, deposes and says that he/she is

_____ *(Sole Owner, a partner, president, secretary, etc.)*

of _____ the party making the foregoing Proposal that such Proposal is genuine and not collusive or sham; that said Offeror has not colluded, conspired, connived, or agreed directly or indirectly, with any Offeror or person, to put in a sham Proposal, or that such other person shall refrain from submitting a proposal and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the proposal price of affiant or any other Offeror, or to fix any overhead, profit or cost element of said proposal price, or of that of any other Offeror or to secure any advantage against Owner any person interested in the proposed Contract; and that all statements in said Proposal are true; and further, that such Offeror has not, directly or indirectly submitted this proposal, or the contents thereof, or divulged information or data relative to any association or to any member or agent thereof.

Signature of Offeror

Sworn to and subscribed before me this _____ day of _____, 2023.

(Official Seal)

Official Signature of Notary

_____, Notary Public
Notary's Printed or Typed Name

My Commission expires _____, 20__.

**Listing of MBE/WBE Subcontractors
To Be Submitted With The Bid**

**Lumberton Regional Airport
T-Hangar and 2-Unit Box Hangar**

The Bidder hereby proposes the following MBE/WBE participation in accordance with Appendix C:

MBE Subcontractor or Supplier Name and Address	NCDOT Reporting Number	Cert. Type (MBE/WBE)	Work To Be Performed	Subcontract Amount	Amount Applicable to Goal
Total Applicable MBE/WBE Participation					
Bid Schedule 1 Amount					
MBE/WBE Participation Proposed (%)					
MBE/WBE Participation Goal (%)					5.0%

Bidder (Firm Name)	Signature	Date

Bidder must complete above "Listing of MBE/WBE Subcontractors" form and submit with bid. Letter of Intent, Page B-21 must be submitted by the apparent low bidder for all MBE Subcontractors no later than 2:00 pm of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday, or an official state holiday. In that situation, it is due in the office of the ENGINEER no later than 10:00 am on the next official state business day.

**Listing of MBE/WBE Subcontractors
To Be Submitted With The Bid**

**Lumberton Regional Airport
T-Hangar and 2-Unit Box Hangar**

The Bidder hereby proposes the following MBE/WBE participation in accordance with Appendix C:

MBE Subcontractor or Supplier Name and Address	NCDOT Reporting Number	Cert. Type (MBE/WBE)	Work To Be Performed	Subcontract Amount	Amount Applicable to Goal
Total Applicable MBE/WBE Participation					
Bid Schedule 2A Amount					
MBE/WBE Participation Proposed (%)					
MBE/WBE Participation Goal (%)					5.0%

Bidder (Firm Name)	Signature	Date

Bidder must complete above "Listing of MBE/WBE Subcontractors" form and submit with bid. Letter of Intent, Page B-21 must be submitted by the apparent low bidder for all MBE Subcontractors no later than 2:00 pm of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday, or an official state holiday. In that situation, it is due in the office of the ENGINEER no later than 10:00 am on the next official state business day.

**Listing of MBE/WBE Subcontractors
To Be Submitted With The Bid**

**Lumberton Regional Airport
T-Hangar and 2-Unit Box Hangar**

The Bidder hereby proposes the following MBE/WBE participation in accordance with Appendix C:

MBE Subcontractor or Supplier Name and Address	NCDOT Reporting Number	Cert. Type (MBE/WBE)	Work To Be Performed	Subcontract Amount	Amount Applicable to Goal
Total Applicable MBE/WBE Participation					
Bid Schedule 2B Amount					
MBE/WBE Participation Proposed (%)					
MBE/WBE Participation Goal (%)					5.0%

Bidder (Firm Name)	Signature	Date

Bidder must complete above "Listing of MBE/WBE Subcontractors" form and submit with bid. Letter of Intent, Page B-21 must be submitted by the apparent low bidder for all MBE Subcontractors no later than 2:00 pm of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday, or an official state holiday. In that situation, it is due in the office of the ENGINEER no later than 10:00 am on the next official state business day.



LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

CONTRACT:

NAME OF BIDDER:

The undersigned intends to perform work in connection with the above contract upon execution of the bid and subsequent award of contract by the Board of Transportation as:

Name of MBE/WBE/DBE Sub contractor _____

Address _____

City _____ State _____ Zip _____

Please check all that apply:

Minority Business Enterprise (MBE) ____

Women Business Enterprise (WBE) ____

Disadvantaged Business Enterprise (DBE) ____

The MBE /WBE /DBE status of the above named subcontractor is certified by the North Carolina Department of Transportation. The above named subcontractor is prepared to perform the described work listed on the attached MBE/WBE/DBE Commitment Items sheet, in connection with the above contract upon execution of the bid and subsequent award of contract by the Board of Transportation. The above named subcontractor is prepared to perform the described work at the estimated Commitment Total for Subcontractor Price identified on the MBE/WBE/DBE Commitment Items sheet and amount indicated below.

Commitment Total based on estimated Unit Prices and Quantities on the "attached" MBE/WBE/DBE Commitment Items sheet. Amount \$ _____

The above named bidder and subcontractor mutually accepts the Commitment Total estimated for the Unit Prices and Quantities. This commitment total is based on estimated quantities only and most likely will vary up or down as the project is completed. Final compensation will be based on actual quantities of work performed and accepted during the pursuance of work. The above listed amount represents the entire dollar amount quoted based on these estimated quantities. No conversations, verbal agreements, and/or other forms of non-written representations shall serve to add, delete, or modify the terms as stated.

This document shall not serve in any manner as an actual subcontract between the two parties. A separate subcontractor agreement will describe in detail the contractual obligations of the bidder and the MBE/WBE/DBE subcontractor.

Affirmation

The above named MBE/ WBE/ DBE subcontractor affirms that it will perform the portion(s) of the contract for the estimated dollar value as stated above.

Name of MBE/ WBE/ DBE Subcontractor

Name of Bidder

Signature / Title

Signature / Title

Date

Date

ATTACH

“EVIDENCE OF COMPETENCY”

and

“EVIDENCE OF FINANCIAL RESPONSIBILITY”

per

SECTION 20-02 OF THE GENERAL CONDITIONS

Talbert & Bright

Lumberton Regional Airport
 Schedule 1 - 2-Unit Box Hangar

TBI No. 3105-2401

Bidder: _____

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
1	Contract Docs	2-Unit Box Hangar to Include All Contract Items Not Indicated Elsewhere on the Bid Form		L.S.	1		
2	Contract Docs	Office Shell with Restrooms		L.S.	1		
3	Contract Docs	Emergency Responder Radio System Allowance		ALLOW	1	\$ 120,000.00	\$ 120,000.00
4	012100	Permit, Plan Review, Tap and Miscellaneous Fees		ALLOW	1	\$ 50,000.00	\$ 50,000.00
5	C-102	Temporary Seeding and Mulching		ACRE	1		
6	C-102	Temporary Construction Entrance		EACH	1		
7	C-102	Temporary Silt Fence Installation and Removal		L.F.	2,600		
8	C-102	Temporary Sod Inlet Protection		EACH	5		
9	C-102	Temporary Sediment Bag, Including Installation and Removal		EACH	1		
10	C-102	Concrete Washout Structure Installation and Removal		EACH	1		
11	C-105	Mobilization		L.S.	1		
12	C-105	Engineer's/RPR Field Office		MONTH	9		

Talbert & Bright

Lumberton Regional Airport
 Schedule 1 - 2-Unit Box Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
13	TCI	Temporary Construction Items		L.S.	1		
14	P-101	Asphaltic Pavement Removal		S.Y.	800		
15	P-101	Asphaltic Pavement Tie-In Milling, 1.5" Depth		S.Y.	90		
16	P-101	Drainage Demolition		L.S.	1		
17	P-152	Unclassified Excavation		C.Y.	700		
18	P-152	Undercut Excavation		C.Y.	250		
19	P-152	Borrow Embankment		C.Y.	1,800		
20	P-209	Crushed Aggregate Base Course		C.Y.	300		
21	P-209	Rework of Existing Aggregate Base		S.Y.	650		
22	PMBP	Bituminous Surface Course, NCDOT Type S-9.5B		TON	380		
23	PSP	6" NCDOT Portland Cement Concrete Pavement, Class Pavement		S.Y.	530		
24	PSP	Concrete Sidewalk - NCDOT Concrete, Class A		S.Y.	280		

Talbert & Bright

Lumberton Regional Airport
Schedule 1 - 2-Unit Box Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
25	P-602	Emulsified Asphalt Prime Coat		GALLON	660		
26	P-603	Emulsified Asphalt Tack Coat		GALLON	200		
27	P-620	Surface Preparation for Marking		S.F.	20		
28	P-620	Permanent Pavement Marking (First Application)		S.F.	360		
29	P-620	Permanent Pavement Marking (Final Application)		S.F.	360		
30	P-620	Parking Lot Marking (White and Symbols)		S.F.	150		
31	PSP	Accessible Parking Signs		L.S.	1		
32	PSP	Wheel Stop		EACH	11		
33	D-701	6-Inch PVC Pipe		L.F.	30		
34	D-701	15-Inch Corrugated PVC Pipe		L.F.	315		
35	D-701	18-Inch Corrugated PVC Pipe		L.F.	320		
36	D-701	Post Installation Pipe Inspection Video and Report		L.S.	1		

Talbert & Bright

Lumberton Regional Airport

Schedule 1 - 2-Unit Box Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
37	D-701	Concrete Reinforced Pipe Inlet/Outlet		EACH	5		
38	D-701	Concrete Roof Drain Splash Block		EACH	3		
39	D-751	PVC Drainage Inlet Basin		EACH	5		
40	D-751	Pre-Cast Concrete Drop Inlet		EACH	1		
41	PSP	8" Roof Drain Outfall Pipe		L.S.	1		
42	T-901	Seeding		ACRE	1.0		
43	T-901	Watering		1,000 GALLON	210		
44	T-908	Mulching		ACRE	1.0		
45	T-904	Sodding (Bermuda)		S.Y.	2,000		
46	T-905	3" of Topsoil (Furnished from Off the Site)		S.Y.	6,000		
47	PSP-41	SUE Investigation		L.S.	1		
48	Vol B-2 012050	Mobilization for Water & Sewer Extension		L.S.	1		

Talbert & Bright

Lumberton Regional Airport
 Schedule 1 - 2-Unit Box Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
49	Vol B-2 012050	Erosion Control, Implementation, Maintenance and Removal		L.S.	1		
50	Vol B-2 012050	Sewer Service, Cleanout, and Connection to Existing Plumbing		EACH	1		
51	Vol B-2 012050	6" PVC Sewer Lateral (Open Cut)		L.F.	370		
52	Vol B-2 012050	Additional Sewer Cleanout		EACH	7		
53	Vol B-2 012050	8" PVC SDR 21 Water Main (Open Cut)		L.F.	80		
54	Vol B-2 012050	1" SIDR 7 HDPE Water Service Line (Open Cut)		L.F.	330		
55	Vol B-2 012050	1" Water Service and Meter		EACH	1		
56	Vol B-2 012050	8" Gate Valve		EACH	1		
57	Vol B-2 012050	Connection to Existing Water Main		EACH	1		
58	Vol B-2 012050	2" Blow-Off Assembly		EACH	1		
59	Vol B-2 012050	Site Restoration for Water & Sewer Extension		L.S.	1		

Total - Bid Schedule 1

Contract Time: See Project Special Provisions

Liquidated Damages: See Project Special Provisions

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2A - 10-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
1	Contract Docs	10-Unit T-Hangars with Bi-Fold Doors		L.S.	1		
2	Contract Docs	Finished Bathroom, Including Plumbing, Mechanical, Fixtures and all Incidentals to Complete the Item		L.S.	1		
3	Contract Docs	Slab and Foundation for 10-Unit T-Hangar		L.S.	1		
4	Contract Docs	Electrical Service Installation for 10-Unit T-Hangar		L.S.	1		
5	Contract Docs	T-Hangar Electrical Installation for 10-Unit T-Hangar		L.S.	1		
6	Contract Docs	Emergency Responder Radio System Allowance		ALLOW	1	\$ 150,000.00	\$ 150,000.00
7	012100	Permit, Plan Review, Tap and Miscellaneous Fees		ALLOW	1	\$ 15,000.00	\$ 15,000.00
8	C-102	Temporary Seeding and Mulching		ACRE	1		
9	C-102	Temporary Silt Fence Installation and Removal		L.F.	770		
10	C-102	Temporary Sod Inlet Protection		EACH	4		
11	C-102	Temporary Sediment Bag, Including Installation and Removal		EACH	1		
12	C-102	Concrete Washout Structure Installation and Removal		EACH	1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2A - 10-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
13	C-105	Mobilization		L.S.	1		
14	TCI	Temporary Construction Items		L.S.	1		
15	P-101	Asphaltic Pavement Removal, Full-Depth		S.Y.	205		
16	P-101	Asphaltic Pavement Tie-In Milling, 1.5" Depth		S.Y.	75		
17	P-101	Drainage Demolition		L.S.	1		
18	P-152	Unclassified Excavation		C.Y.	180		
19	P-152	Undercut Excavation		C.Y.	250		
20	P-152	Borrow Embankment		C.Y.	3,300		
21	P-209	Crushed Aggregate Base Course		C.Y.	770		
22	PMBP	NCDOT Asphalt Pavement, S9.5B		TON	750		
23	PSP	Concrete Sidewalk - NCDOT Concrete, Class A		S.Y.	45		
24	P-602	Emulsified Asphalt Prime Coat		GALLON	1,300		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2A - 10-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
25	P-603	Emulsified Asphalt Tack Coat		GALLON	430		
26	P-620	Surface Preparation for Marking		S.F.	980		
27	P-620	Pavement Marking Removal		S.F.	280		
28	P-620	Permanent Pavement Marking (First Application)		S.F.	1,700		
29	P-620	Permanent Pavement Marking (Final Application)		S.F.	1,700		
30	D-701	15-Inch Corrugated PVC Pipe		L.F.	425		
31	D-701	18-Inch Corrugated PVC Pipe		L.F.	390		
32	D-701	24-Inch Corrugated PVC Pipe		L.F.	230		
33	D-701	Post Installation Pipe Inspection Video and Report		L.S.	1		
34	D-701	Pre-Cast Concrete Drop Inlet		EACH	2		
35	D-751	PVC Drainage Inlet Basin		EACH	3		
36	T-901	Seeding		ACRE	1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2A - 10-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
37	T-901	Watering		1,000 GALLON	150		
38	T-908	Mulching		ACRE	1		
39	T-904	Sodding (Bermuda)		S.Y.	3,820		
40	T-905	3" of Topsoil (Furnished from Off the Site)		S.Y.	8,600		
41	Vol B-2 012050	Mobilization for Water & Sewer Extension		L.S.	1		
42	Vol B-2 012050	Erosion Control, Implementation, Maintenance and Removal		L.S.	1		
43	Vol B-2 012050	Sewer Service, Cleanout, and Connection to Existing Plumbing		EACH	1		
44	Vol B-2 012050	6" PVC Sewer Lateral (Open Cut)		L.F.	170		
45	Vol B-2 012050	Additional Sewer Cleanout		EACH	3		
46	Vol B-2 012050	8" PVC SDR 21 Water Main Pipe (Open Cut)		L.F.	825		
47	Vol B-2 012050	3/4" Water Service and Meter		EACH	1		
48	Vol B-2 012050	8" Gate Valve		EACH	1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2A - 10-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
49	Vol B-2 012050	Fire Hydrant Assembly		EACH	1		
50	Vol B-2 012050	Connection to Existing Water Main		EACH	1		
51	Vol B-2 012050	2" Blow-Off Assembly		EACH	1		
52	Vol B-2 012050	Concrete Removal and Replacement		L.S.	1		
53	Vol B-2 012050	Site Restoration for Water & Sewer Extension		L.S.	1		

Total - Bid Schedule 2A

Contract Time: See Project Special Provisions

Liquidated Damages: See Project Special Provisions

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2B - 12-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
1	Contract Docs	12-Unit T-Hangars with Bi-Fold Doors		L.S.	1		
2	Contract Docs	Finished Bathroom, Including Plumbing, Mechanical, Fixtures and all Incidentals to Complete the Item		L.S.	1		
3	Contract Docs	Slab and Foundation for 12-Unit T-Hangar		L.S.	1		
4	Contract Docs	Electrical Service Installation for 12-Unit T-Hangar		L.S.	1		
5	Contract Docs	T-Hangar Electrical Installation for 12-Unit T-Hangar		L.S.	1		
6	Contract Docs	Emergency Responder Radio System Allowance		ALLOW	1	\$ 150,000.00	\$ 150,000.00
7	012100	Permit, Plan Review, Tap and Miscellaneous Fees		ALLOW	1	\$ 15,000.00	\$ 15,000.00
8	C-102	Temporary Seeding and Mulching		ACRE	1.1		
9	C-102	Temporary Silt Fence Installation and Removal		L.F.	770		
10	C-102	Temporary Sod Inlet Protection		EACH	4		
11	C-102	Temporary Sediment Bag, Including Installation and Removal		EACH	1		
12	C-102	Concrete Washout Structure Installation and Removal		EACH	1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2B - 12-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
13	C-105	Mobilization		L.S.	1		
14	TCI	Temporary Construction Items		L.S.	1		
15	P-101	Asphaltic Pavement Removal, Full-Depth		S.Y.	250		
16	P-101	Asphaltic Pavement Tie-In Milling, 1.5" Depth		S.Y.	90		
17	P-101	Drainage Demolition		L.S.	1		
18	P-152	Unclassified Excavation		C.Y.	200		
19	P-152	Undercut Excavation		C.Y.	250		
20	P-152	Borrow Embankment		C.Y.	3,500		
21	P-209	Crushed Aggregate Base Course		C.Y.	900		
22	PMBP	NCDOT Asphalt Pavement, S9.5B		TON	840		
23	PSP	Concrete Sidewalk - NCDOT Concrete, Class A		S.Y.	50		
24	P-602	Emulsified Asphalt Prime Coat		GALLON	1,500		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2B - 12-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
25	P-603	Emulsified Asphalt Tack Coat		GALLON	500		
26	P-101	Surface Preparation for Marking		S.F.	1,100		
27	P-101	Pavement Marking Removal		S.F.	300		
28	P-620	Permanent Pavement Marking (First Application)		S.F.	1,900		
29	P-620	Permanent Pavement Marking (Final Application)		S.F.	1,900		
30	D-701	15-Inch Corrugated PVC Pipe		L.F.	450		
31	D-701	18-Inch Corrugated PVC Pipe		L.F.	430		
32	D-701	24-Inch Corrugated PVC Pipe		L.F.	230		
33	D-701	Post Installation Pipe Inspection Video and Report		L.S.	1		
34	D-701	Pre-Cast Concrete Drop Inlet		EACH	2		
35	D-751	PVC Drainage Inlet Basin		EACH	3		
36	T-901	Seeding		ACRE	1.1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2B - 12-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
37	T-901	Watering		1,000 GALLON	160		
38	T-908	Mulching		ACRE	1.1		
39	T-904	Sodding (Bermuda)		S.Y.	4,000		
40	T-905	3" of Topsoil (Furnished from Off the Site)		S.Y.	9,500		
41	Vol B-2 012050	Mobilization for Water & Sewer Extension		L.S.	1		
42	Vol B-2 012050	Erosion Control, Implementation, Maintenance and Removal		L.S.	1		
43	Vol B-2 012050	Sewer Service, Cleanout, and Connection to Existing Plumbing		EACH	1		
44	Vol B-2 012050	6" PVC Sewer Lateral (Open Cut)		L.F.	170		
45	Vol B-2 012050	Additional Sewer Cleanout		EACH	3		
46	Vol B-2 012050	8" PVC SDR 21 Water Main Pipe (Open Cut)		L.F.	780		
47	Vol B-2 012050	3/4" Water Service and Meter		EACH	1		
48	Vol B-2 012050	8" Gate Valve		EACH	1		

Talbert & Bright

Lumberton Regional Airport

Bid Schedule 2B - 12-Unit T-Hangar

TBI No. 3105-2401

Bidder:

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
49	Vol B-2 012050	Fire Hydrant Assembly		EACH	1		
50	Vol B-2 012050	Connection to Existing Water Main		EACH	1		
51	Vol B-2 012050	2" Blow-Off Assembly		EACH	1		
52	Vol B-2 012050	Concrete Removal and Replacement		L.S.	1		
53	Vol B-2 012050	Site Restoration for Water & Sewer Extension		L.S.	1		

Total - Bid Schedule 2B

Contract Time: See Project Special Provisions

Liquidated Damages: See Project Special Provisions

Talbert & Bright

Lumberton Regional Airport

Building Bid Alternate Items

TBI No. 3105-2401

Bidder: _____

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
1		Schedule 1 - Office Upfit Alternate ALT-01		L.S.	1		
2		Schedule 1 - Office Upfit Alternate ALT-02		L.S.	1		
3	012300	Schedule 1 - Owner's Preferred Alternate for Hangar Door ALT-03		L.S.	1		
4		Schedule 1 - (3) Color Resinous Floor Coating in Hangar		L.S.	1		
5	12200	Schedule 1 - Add/Deduct for Concrete/Steel for Building Footings		C.Y.	N/A		
6	PEB	Schedule 2A - Urethane/Epoxy Floor Coating		L.S.	1		
7	PEB	Schedule 2A - Roof Insulation for 10-Unit T-Hangar		L.S.	1		
8	PEB	Schedule 2A - Add/Deduct for Concrete for Foundations and Slab		C.Y.	N/A		
9	PEB	Schedule 2B - Urethane/Epoxy Floor Coating		L.S.	1		
10	PEB	Schedule 2B - Roof Insulation for 10-Unit T-Hangar		L.S.	1		
11	PEB	Schedule 2B - Add/Deduct for Concrete for Foundations and Slab		C.Y.	N/A		

Talbert & Bright
 Lumberton Regional Airport
 Building Bid Alternate Items
 TBI No. 3105-2401

Bidder: _____

Item	Spec.	Description	Unit Price in Words	Unit	Quantity	Unit Price	Ext. Total
12	PSP-36	Cost for Additional Insured Party Coverage		L.S.	1		

Total - Building Bid Alternate Items _____

Contract Time: See Project Special Provisions

Liquidated Damages: See Project Special Provisions

APPENDIX 'D'

FEDERAL REQUIREMENTS

APPENDIX 'D'

FEDERAL CONTRACT PROVISIONS

GENERAL

The Contract Provisions contained herein have been developed from the FAA guidance document entitled “Contract Provision Guidelines for Obligated Sponsors and Airport Improvement Program Project,” dated May 24, 2023. These provisions shall apply to all work of this contract, and shall apply to all subcontracts and sub-agreements and amendments as follows:

- 1) The contractor and all subcontractors shall insert these contract provisions in each lower tier contract (e.g. subcontract or sub-agreement).
- 2) The contractor and all subcontractors shall incorporate the applicable requirements of these contract provisions by reference for work done under any purchase orders, rental agreements and other agreements for supplies or services.
- 3) The prime contractor shall be responsible for compliance with these contract provisions by any subcontractor, lower-tier subcontractor or service provider.

Failure to Comply with Provisions

Contractor failure to comply with the terms of these contract provisions may be sufficient grounds to:

- 1) Withhold progress payments or final payment;
- 2) Terminate the contract for cause;
- 3) Seek suspension/debarment; or
- 4) Take other action determined to be appropriate by the sponsor or the FAA.

The following Contract Clauses implement federal contracting requirements for Airport Improvement Program (AIP) and Obligated Sponsors and shall apply to this Contract.

GENERAL CIVIL RIGHTS PROVISIONS

In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

TITLE VI SOLICITATION NOTICE

The **City of Lumberton** and its **Lumberton Airport Commission**, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, select businesses, or disadvantaged business enterprises or airport concession disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and no businesses will be discriminated against on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin):
- 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964):
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects):
- Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance):
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq.*) (prohibits discrimination on the basis of age):
- Airport and Airway Improvement Act of 1982 (49 USC § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex):
- The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the

programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not):

- Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38:
- The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex):
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations):
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs [70 Fed. Reg. 74087 (2005)]:
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC § 1681, et seq).

Compliance with Nondiscrimination Requirements

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities,

including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.
4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
 - a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(Reference: 49 USC § 47123; FAA Order 1400.11)

DOMESTIC PREFERENCE FOR PROCUREMENTS

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

(Reference: **2 CFR § 200.322, 2 CFR Part 200 Appendix II(L)**)

FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

(Reference: 29 USC § 201, et seq., 2 CFR § 200.430)

OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (29 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

(Reference: 29 CFR part 1910)

**PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO
SURVEILLANCE SERVICES OR EQUIPMENT**

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

(Reference: 2 CFR § 200, Appendix II(K), 2 CFR § 200.216)

DOMESTIC STEEL AND IRON PRODUCTS (BUY AMERICA):

All steel and iron products which are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined project cost of the bid items involved does not exceed one-tenth of one percent (0.1 percent) of the total amount bid for the entire project or \$2,500.00, whichever is greater. This minimal amount of foreign produced steel and iron products permitted for use by this Special Provision is not applicable to fasteners. Domestically produced fasteners are required for this project.

All steel and iron products furnished as "domestic products" shall be melted, cast, formed, shaped, drawn, extruded, forged, fabricated, produced, or otherwise processed and manufactured in the United States. Raw materials including pig iron and processed pelletized and reduced iron ore used in manufacturing "domestic" steel products may be imported; however, all manufacturing processes to produce the products, including coatings, must occur in the United States.

Before each steel or iron product is incorporated into this project or included for partial payment on a monthly estimate, the Contractor shall furnish the Resident Engineer a notarized certification certifying that the product conforms to the above requirements of this Special Provision. The Resident Engineer will forward a copy of each certification to the Materials and Tests Unit.

Each purchase order issued by the Contractor or a subcontractor for steel and iron products to be permanently incorporated into this project shall contain in bold print a statement advising the supplier that all manufacturing processes to produce the steel or iron shall have occurred in the United States. The Contractor and all affected subcontractors shall maintain a separate file for steel products permanently incorporated into this project so that verification of the Contractor's efforts to purchase "domestic" steel and iron products can readily be verified by an authorized representative of the Department or the Federal Highway Administration.

(Reference: SP1 G97)

APPENDIX 'H'
CONSTRUCTION SAFETY AND
PHASING PLAN (CSPP)

**CONSTRUCTION SAFETY AND
PHASING PLAN (CSPP)**

FOR

**T-HANGAR AND
2-UNIT BOX HANGAR**

**LUMBERTON REGIONAL AIRPORT
LUMBERTON, NORTH CAROLINA**

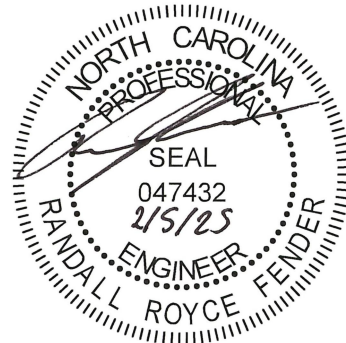
STATE GRANT NO. 36244.42.16.1

**PREPARED FOR:
CITY OF LUMBERTON, NORTH CAROLINA
AND
LUMBERTON AIRPORT COMMISSION**

**IN COOPERATION WITH:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
and
FEDERAL AVIATION ADMINISTRATION**

**Engineer:
TALBERT & BRIGHT, INC.
Engineering and Planning Consultants
4810 Shelley Drive
Wilmington NC 28405
(910) 763-5350**

**January 2025
TBI No. 3105-2401
NC Engineering License No. C-0713**



Construction Safety and Phasing Plan (CSPP)
T-Hangar and 2-Unit Box Hangar
Lumberton Regional Airport (LBT)

January 2025

INTRODUCTION

The project involves construction of a 2-Unit Box Hangar with parking and taxiway pavement, and T-Hangar and associated taxilane. The project will install a new 2-Unit Box Hangar and either a 10-Unit or 12-Unit T-Hangar. This project will be bid with three bid schedules and a building add alternate items: Bid Schedule No. 1 is the 2-Unit Box Hangar construction, Bid Schedule No. 2A is the 10-Unit T-Hangar construction, Bid Schedule No. 2B is the 12-Unit T-Hangar construction, and Building Bid Alternate Items is building bid alternate items for Schedule 1, Schedule 2A and Schedule 2B.

The project will be completed in one phase with various work areas identified. Work Area 1A through 1E includes all work for Schedule 1 construction, and Work Areas 1F through 1H includes all work for Bid Schedule 2B. The Work Area limits for Bid Schedule 2A would be similar to that of Bid Schedule 2B. Information on each work area can be found on plan sheet GA-101.

All work is intended to be worked on concurrently in coordination with the Engineer and Airport.

Schedule 1 work is within Work Areas 1A through 1E and Schedule 2A & 2B work is within Work Areas 1F through 1G. Work Area 1B and 1C require partial closure of Taxilane N2. Work Area 1D requires the partial closure of T-Hangar Taxilane W, and Work Area 1E requires partial closure of Taxilane N1. Work Area 1G requires partial closure of T-Hangar Taxilane E. Work Area 1H requires the closure of the TLC Hangar Apron.

This Construction Safety and Phasing Plans has been prepared in accordance with FAA Advisory Circular (AC) 150/5370-2G, Operational Safety on Airports During Construction. The Plan is organized into 19 chapters corresponding to article 2.4 of Chapter 2 of the Advisory Circular.

Chapter 1 - COORDINATION

- A. Pre-Bid Conference.** A pre-bid conference for the project will be held prior to the bid opening date. The conference will be attended by the Owner, Engineer, and the construction community.
- B. Pre-Construction Conference.** A pre-construction conference will be held following contract award and prior to Notice-to-Proceed. Invitees will include representatives of the Owner, Engineer, Contractor, key sub-contractors and suppliers, NCDOT Division of Aviation, and other interested parties.
- C. Construction Progress Meetings.** Progress meetings with representatives of the Owner and Engineer will be held throughout the project. These meetings will generally be conducted weekly, but may be more frequent during critical phases of work throughout the project. The purpose of these meetings will be scheduling and coordination of the work activities and discussion of operational safety and security matters. The Contractor will be required to have a qualified representative with knowledge of the Airport, Plans, and Safety Measures at each of these meetings. Safety, security, schedule, and local coordination (Airport/NOTAMs, etc.) will be standing agenda items.
- D. Scope or Schedule Changes.** Any work scope changes contemplated will be discussed and coordinated at progress meetings and formally approved as appropriate prior to implementation. The contractor is required to prepare, submit, and regularly update a detailed construction progress schedule for the project. The schedule, and any contemplated changes, will be discussed at the pre-construction conference and all progress meetings.
- E. FAA Coordination.** This project will not involve any closures of the Runway 5-23 and Runway 13-31. Partial closures of Taxiway N1, Taxiway N2, T-Hangar Taxiway W and T-Hangar Taxiway E, and closure of the TLC hangar apron will be required at various times during construction. See the Construction Safety and Phasing Plan (GA-001 & GA-101) for additional information. The Airport will issue the appropriate NOTAMs for these closures.

Chapter 2 - PHASING

- A. **Phase Elements.** The Construction Phasing Plan (Sheet GA-101) shows detailed information about barricade locations and airfield closures. This drawing is included in Appendix 'A' for information purposes. The areas of operations affected by the construction activity and mitigation of the effects for each schedule are listed in Chapter 3: Areas of Operations Affected by the Construction.

The work will be constructed in one phase to minimize impacts to Airport operations. See the project phasing plans sheets for detailed descriptions and layout/limits of the work areas and phases. The unit of Contract Time for this project is the calendar day. The Contractor will be required to schedule construction operations to minimize the time frame of the required closures. The Table below details the closures required for each schedule of work, work area, and construction phase and the allowable closure period for each. Failure to complete work in any of the specified work areas within the specified contract time shall result in the assessment of liquidated damages. The total contract time for the project will be 282 calendar days including the 30-day Mobilization/Shop Drawings Phase. If Schedule 1 Bid Alternates – Item #1 – Office Upfit Alt-01 & Item #2 – Office Upfit Alt-02 are awarded, then each of these Bid Alternates would add 30 additional consecutive calendar days – for a maximum of 60 consecutive calendar days. If Schedule 1 and Schedule 2A or Schedule 1 and 2B are awarded the Total Construction duration shall be 252 consecutive calendar days with the only possible additional calendar days being as noted above if bid alternates for the Schedule 1 2-Unit Box Hangar are awarded. Therefore a total maximum construction contract time is 312 calendar days, and a maximum total contract time of 342 calendar days including the 30-day Mobilization/Shop Drawings Phase.

Liquidated Damages for failure to complete the work within the specified contract time will be assessed in the amount of \$1,500 per calendar day for Construction – Phase 1 work.

Schedule 1 – 2-Unit Box Hangar		
Work Phase	Contract Time	Airfield Closures
Mobilization/ Shop Drawings Phase	30 Calendar Days	None
Construction – Phase 1	252 Calendar Days*	-
Work Area 1A		None
Work Area 1B		Partial Closure Taxilane N2
Work Area 1C		Additional Partial Closure Taxilane N2
Work Area 1D		Partial Closure T-Hangar Taxilane W
Work Area 1E		Partial Closure Taxilane N1
Total Contract Time	282 Calendar Days*	-

Schedule 2A – 10-Unit T-Hangar / Schedule 2B – 12-Unit T-Hangar		
Work Phase	Contract Time	Airfield Closures
Mobilization/ Shop Drawings Phase	30 Calendar Days	None
Construction – Phase 1	252 Calendar Days*	-
Work Area 1F		None
Work Area 1G		Partial Closure T-Hangar Taxilane E
Work Area 1H		Closure TLC Hangar Apron
Total Contract Time	282 Calendar Days*	-

* Schedule 1 Bid Alternates – Item #1 – Office Upfit Alt-01 & Item #2 – Office Upfit Alt-02. Each Bid Alternates would add 30 additional consecutive calendar days if awarded – for a maximum of 60 consecutive calendar days. ***If Schedule 1 and Schedule 2A or Schedule 1 and 2B are awarded the Total Construction duration shall be 252 consecutive calendar days with the only possible additional calendar days being as notice above if bid alternates for the Schedule 1 2-Unit Box Hangar are awarded. Therefore a total maximum***

construction contract time is 312 calendar days, and a maximum total contract time of 342 calendar days including the 30-day Mobilization/Shop Drawings Phase.

- B. **Construction Safety Drawings.** The project safety plan, notes, and details are included on Sheets GA-001 and in Appendix 'A'. Drawings detailing the sequence of construction and notes for all work areas, are located on Plan Sheet GA-101 and is also included in Appendix 'A'.

Chapter 3 - AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY

A. Identification of Affected Areas. The Schedule 1 project site is located between Taxilane N1 and Taxilane N2 and bordered by T-Hangar Taxilane W. Portions of Taxilane N1, Taxilane N2, and T-Hangar Taxilane W will be temporarily closed at various times during the construction of the project. The Schedule 2A & Schedule 2B project site is located along T-Hangar Taxilane E. Portions of T-Hangar Taxilane E and full closure of the TLC Hangar Apron will be temporarily closed at various times during the construction of the project. No runway closures are required for this project.

The project is divided into one phase with eight (8) work areas. Phase 1 is work is associated with Schedule 1 and Schedule 2A/Schedule 2B. This phase will require various closures for the different work areas. Schedule 1 work is within Work Areas 1A through 1E and Schedule 2A & 2B work is within Work Areas 1F through 1G. Work Area 1B and 1C require partial closure of Taxilane N2. Work Area 1D requires the partial closure of T-Hangar Taxilane W, and Work Area 1E requires partial closure of Taxilane N1. Work Area 1G requires partial closure of T-Hangar Taxilane E. Work Area 1H requires the closure of the TLC Hangar Apron. Information for each Work Area and closures is provided on GA-101.

The affected areas, impacted airfield pavements, and contractor material stockpile and equipment staging areas are identified on the safety and construction phasing plans included in Appendix 'A'. All impacts are located in the hangar complex and hanger taxilane network north of Taxiway D.

B. Mitigation of Effects. Temporary lighted low-profile barricades will be installed as shown on the Phasing Plans. The required closures are not expected to result in traffic capacity issues at the Lumberton Regional Airport. The various taxilane closures indicated above will pose minor inconveniences to the Airport users and tenants.

Closures will be coordinated a minimum of 72 hours in advance with the Airport to ensure impacts to the Airport and tenants are minimal.

Mitigation of impacts during all areas of construction will also be provided by careful scheduling and coordination of the sequence of the work.

As the work progresses and especially prior to any closures, the Contractor will be required to communicate, coordinate, and cooperate with the Engineer, Resident Project Representative (RPR), and Airport Management regarding the work schedule and status. The Contractor will be required to temporarily clear, clean and re-open

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taxilane areas to accommodate tenant aircraft movements in close coordination with the Owner.

Chapter 4 - PROTECTION OF NAVIGATION AIDS (NAVAIDs)

No NAVAIDs will be affected during construction of this project.

The requirements for protection of existing facilities are presented in Sections PSP-17, PSP-18, and PSP-19 of the Project Special Provisions.

Chapter 5 - CONTRACTOR ACCESS

A. Location of Stockpiled Construction Materials. All stockpiles of materials or equipment shall be located in the contractor staging areas as shown on the plans or as coordinated with the airport. The staging area is shown on the plans. Excess material stockpiled shall not exceed 8 feet in height. All loose items within the staging areas shall be secured at all times. Prior to leaving work each day, the Contractor shall return all construction materials and equipment to the staging areas. No stockpiles will be permitted within the TOFA as part of this project. If the contractor opts to not install the temporary haul route, then the contractor will be permitted to have a stockpile within the closed Taxilane N2 TLOFA – this must remain outside of the T-Hangar Taxilane W TLOFA.

B. Vehicle and Pedestrian Operations

- 1) **Construction site parking.** Personal cars shall be parked outside of secured airfield areas.
- 2) **Construction equipment parking.** Prior to leaving work each day, Contractor shall return all equipment to the staging areas or Work Areas 1A or 1F (Outside the TLOFA). For locations of staging areas, see Plan Sheets GA-001 and GA-101 in Appendix 'A'.
- 3) **Access and haul roads.** Access roads to be used under this Contract shall be those shown on Plan Sheets GA-001 and GA-101. The Contractor shall confine his equipment and hauling where practical to existing roads and taxilanes and/or the Contractor optional haul road on the Airport. If existing pavement or road surface is damaged by the Contractor's operations, it shall be repaired to its original condition. Metal track vehicles will not be permitted to operate on or across existing pavement without protective matting to prevent marring of the pavement surface.

The Contractor shall conduct his operations in such a manner as to assure that such operations do not impede access to any area of the airfield at any time by the emergency vehicles. Emergency vehicle access shall be a standing agenda item for all progress meetings. The Contractor shall cooperate fully and immediately with any directives issued by Airport Management relative to emergency access.

A Contractor optional temporary haul road is depicted on the plans.

- 4) **Marking and lighting of vehicles.** All vehicles operating in the AOA shall be lighted or flagged in accordance with FAA Advisory Circular 150/5210-5D,

“Painting, Marking, and Lighting of Vehicles Used on an Airport”. Copies of the Advisory Circular will be made available upon request.

- 5) **Description of proper vehicle operations.** All construction vehicles must be cleared for access by the Airport Management.
- 6) **Required escorts.** All Contractor personnel, including but not limited to, general laborers, subcontractors, drivers, and journeymen working within active air operations areas must at all times remain within visual and voice range of contractor supervisory personnel. For the purposes of this project, the air operations areas (AOA) refer to all areas within the airport security fence.
- 7) **Situational awareness.** Men, equipment, or other construction-related material are not allowed within the TSA of an open taxiway at any time.

Movement of construction vehicles will be restricted to construction areas by lighted barricades. See Project Phasing Plans for barricade locations.

Contractor will be required to ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the Air Operations Areas (AOA) from the construction site unless authorized.

During construction, adjacent aprons, taxilanes, taxiways, and runways will be open to aircraft unless otherwise noted. Aircraft will have the right of way at all times. Contractor shall be aware of aircraft movements and the jet-blast and/or prop-wash associated with these aircraft. The Contractor shall secure loose items on a daily basis.

C. Two-Way Radio Communications

- 1) **General.** The Contractor shall provide a minimum of one (1) two-way radio and shall also provide an additional number of radios for escort vehicles and/or flagmen. The Contractor shall also supply a cell phone for contact with the Engineer and Airport Management.

The Contractor shall be responsible for all required maintenance included battery replacement if needed. If a radio will be out of service for any period of time, a substitute shall be provided.

- 2) **Areas Requiring Two-way Radio Communication with the ATCT.** Not Applicable.

- 3) **Frequencies to be Used.** Communication with the Airport Management shall be by phone, (910) 739-6480.

The Contractor flagmen shall monitor aircraft traffic by UNICOM frequency 122.8 when construction vehicles and/or equipment are entering or crossing the Taxiway Object Free Area (TOFA).

- 4) **Proper Radio Usage, Including Read Back Requirements will be Covered in Driver's Training Course by PSO.** Not Applicable.
- 5) **Proper Phraseology, Including the International Phonetic Alphabet will be Covered in Driver's Training Course by PSO.** Not Applicable.
- 6) **Light Gun Signs.** Not Applicable.

D. Airport Security

- 1) **Fencing and automatic gates.** The Contractor shall coordinate ingress-egress requirements with the Airport Management. All open gates to secured airport areas shall be monitored continuously by Contractor's personnel to control access to secured area or shall be closed and locked. Contractor personnel shall not allow any unauthorized personnel or animals to enter through the construction gate. The Contractor shall be responsible for securing all gates when not in use and at the end of each day's operations. The primary access gate is electrically operated using access keycards.

Prior to entering the secured AOA of the airport each day, the Contractor shall check in with the Airport. Close coordination for access to work areas and schedules between the Contractor, other Contractors working in the project area, and Airport will be required throughout the project. Contractor shall provide a list of all keycard holders for access to the airfield seven days prior to construction (See PSP-11).

- 2) **Fencing and manual gates.** If the Contractor is authorized to use manually locked gates for access, the following provisions shall apply. The Contractor shall coordinate ingress-egress requirements with the Airport Management. All open gates to secured airport areas shall be monitored continuously by Contractor's personnel to control access to secured area or shall be closed and locked. Contractor personnel shall not allow any unauthorized personnel or animals to enter through the construction gate. The Contractor shall be responsible for securing and locking all gates when not in use and at the end of each day's operations.

Prior to entering the secured AOA of the airport each day, the Contractor shall check in with the Airport. Close coordination for access to work areas and schedules between the Contractor, other Contractors working in the project area, and Airport will be required throughout the project. Contractor shall provide a list of all key holders for Contractor's locks seven days prior to construction.

- 3)** Airports subject to 49 CFR Part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. Badging Requirements are not applicable.

Chapter 6 - WILDLIFE MANAGEMENT

- A. Trash.** The Contractor shall clean all construction areas of litter, loose papers, debris, etc. on a daily basis, or as directed by the Engineer/Airport. Food scraps must be collected and properly disposed of by construction personnel immediately. Prior to the close of daily operations, Contractor shall inspect all active Air Operations Areas and construction areas for litter. All debris shall be cleaned up and properly disposed of prior to release of crews from each shift.
- B. Standing Water.** If wet conditions are encountered during construction, Contractor is responsible for dewatering areas to remove standing water.
- C. Tall Grass and Seeds.** All seeding shall comply with the Seeding Specifications (T-901) to avoid seed mixtures that will attract wildlife. The Contractor shall protect seeded areas against traffic. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.
- D. Poorly Maintained Fencing and Gates.** The airport perimeter fencing and gates shall be carefully protected by the Contractor. Any facilities damaged by the Contractor will be repaired immediately and restored to original condition at Contractor's cost
- E. Disruption of Existing Wildlife Habitat.** The airport actively manages wildlife. This project is not expected to disrupt any existing wildlife habitat.

Contractor shall notify Airport Management and Engineer immediately of any wildlife encounters and/or sightings.

Chapter 7 - FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

- 1.** Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. During construction operations, Contractor is responsible for monitoring and controlling FOD to the satisfaction of Airport Management and the Engineer. Prior to the close of daily operations, Contractor shall inspect all construction areas and active air operation areas adjacent to the construction site to ensure that they are clear of FOD.
- 2.** Prior to reopening any construction work area, Contractor must perform a walk through with Airport Management and the Engineer to confirm that the areas are free of FOD or other hazards.
- 3.** When crossing active taxiways, Contractor must inspect and clean area for FOD after each pass of construction equipment and/or vehicles by use of a sweeper truck or other means acceptable to Airport Management and the Engineer.

Chapter 8 - HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT

1. Contractor shall be responsible for oil management and for expeditious containment and clean-up of spills on the Airport property resulting from fuel, lubricant, or hydraulic fluid leaks from construction vehicles and/or equipment.
2. The Contractor shall furnish to the Engineer and Airport maintenance and safety staff, MSDS sheets for all chemicals used during construction, including but not limited to lime products.
3. Transport and handling of other hazardous materials on an Airport also requires special procedures. See AC 150/5320-15A, Management of Airport Industrial Waste.

Chapter 9 - NOTIFICATION OF CONSTRUCTION ACTIVITIES

A. Maintenance of a List of Responsible Representatives/Points of Contact

- 1)** The Contractor and all subcontractors shall designate a representative and alternate to contact on a 24-hour basis should problems arise. The point of contact provided must be able to coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. The Contractor shall provide a listing of all contact persons of all supervisory personnel and all subcontractors.
- 2)** The Contractor must also provide a safety/construction inspector familiar with airport safety to monitor construction activities.
- 3)** The Contractor shall coordinate with FAA-system support and airport management when working in areas containing FAA or airfield lighting cable.

Airport Contact: Lumberton Regional Airport
 Mr. Gary Lewis
 Airport Manager (910) 739-6480

B. Notices to Airmen (NOTAM). The Owner will issue the necessary NOTAMS to reflect hazardous and operational conditions. The Contractor shall work with the Engineer and Airport to schedule NOTAM issuance and Airport Operations Area (AOA) closures and shall provide the Owner and Engineer with advance notice of the need to issue or close a NOTAM. It is important that NOTAMS be kept current and reflect the actual conditions with respect to construction situations. Active NOTAMS shall be reviewed periodically and revised to reflect the current conditions.

The Contractor shall not begin work unless and until 72 hours prior notice has been given to the Engineer and Airport Management. Crossing of taxiways is allowed only if the taxiway is closed. Contractor is prohibited from entering the runway safety areas and NAVAID critical areas at any time unless the runway is closed, or Contractor is under radio control (See Section 5. (c)(2)).

C. Emergency Notification Procedures. In an emergency situation, the Contractor is to call 911 and notify the Airport Management immediately.

D. Coordination with Emergency Response Personnel. Emergency access routes will be coordinated with Airport Management and modified to work around proposed construction areas. See Plan Sheet GA-101 for construction work areas. The airport

safety staff will be invited to all project meetings for coordination of safety and security matters.

E. Notification to the FAA

- 1) **Part 77.** If Contractor utilizes cranes, bucket trucks, or other equipment exceeding 30 feet in height and separately 75 feet in height for crane work, Contractor is responsible for filing a “Notice of Proposed Construction or Alteration” (FAA Form 7460) with FAA prior to erecting equipment. Contractor should allow at least 45 business days for FAA review. Detailed instructions can be found on the FAA website:
<https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

Talbert & Bright will submit FAA Form 7460 for this project.

Chapter 10 - INSPECTION REQUIREMENTS

A. Daily Inspections

- 1) A daily inspection will be performed by the RPR and coordinated with the Contractor and Airport Management. The checklist will be followed throughout the project. This checklist shall include, but not be limited to, barricades, haul routes, securing of access gates, clean up, etc., The Contractor's site supervisor and labor crew shall not leave the work site until the daily checklist is completed.
- 2) Frequent inspections will be made by the Airport Management during critical phases of the work to ensure that the Contractor is following the recommended airfield safety procedures.

B. Final Inspections

- 1) Prior to reopening the Taxilanes, Contractor must perform a walkthrough of the construction area with Airport Management and the RPR/Engineer to confirm that the taxilane safety areas are free of FOD or other hazards.
- 2) Contractor shall be required to remedy any deficiencies immediately, whether caused by negligence, oversight, or project scope change to the satisfaction of Airport Management and the Engineer.

Chapter 11 - UNDERGROUND UTILITIES

1. Underground utilities are known to be located in the project areas. Existing underground utilities including but not limited to underground runway and taxiway lighting and ground systems, underground primary and secondary electrical utility lines, water lines, and other utilities may be in the path of construction. Locations of utilities if shown on the Plans are approximate only. All utilities and facilities are not necessarily indicated on Plans. It shall be the Contractor's responsibility to locate and protect existing utilities and facilities from damage. Utility contact information is listed in Section 9.(a)(3).
2. All existing facilities will be carefully protected by the Contractor. Any facilities damaged by the Contractor will be repaired immediately and restored to original condition at the Contractor's expense. All runway lights, taxiway lights, signs, and surfaces to remain shall be protected by suitable means. If damaged by the Contractor, these and any other above or below ground facilities shall be repaired at the Contractor's expense, to the satisfaction of the Engineer and the Owner.
3. Special attention is directed to the presence of existing airfield lighting circuits, NAVAIDs and the associated power and control cables within the project area. Other facilities in the area include but are not limited to storm drainage. The Contractor shall be solely responsible for location and protecting all existing above and underground facilities and shall bear all associated costs within the Item "Mobilization". The Contractor shall employ a private utility locator service or shall obtain and utilize cable locating equipment in order to field locate existing cable runs not to be disturbed/replaced by this project.
4. It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of his/her responsibility to protect such existing features from damage or unscheduled interruption of service.
5. Should the Contractor damage or interrupt the operations of a utility service or facility outside the project limits by accident or otherwise, he shall immediately notify the proper authority and the Engineer and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

6. The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to his/her operations whether or not due to negligence or accident. The Contract Owner reserves the right to deduct such costs from any monies due or which may become due to the Contractor.

Chapter 12 - PENALTIES

1. Crossing or entering active Air Operations Area without prior approval from Airport will subject Contractor personnel loss of privilege of moving across active Air Operations Areas and will be subject to Contractor being fined a minimum of \$10,000 per incursion.

Chapter 13 - SPECIAL CONDITIONS

1. The Contractor's supervisory personnel are expected to become knowledgeable regarding the Airport's operational, safety and security requirements, actively participate in project meetings, establish effective communications with the RPR, Airport Management and safety personnel, and other personnel. The Contractor shall cooperate with the Airport and FAA in operational matters and during emergency response situations.
2. The Lumberton Regional Airport does not have an Airport Traffic Control Tower (ATCT). Aircraft pilots operating on the airfield must rely on NOTAMs, markings, barricades, etc. to navigate safely around construction zones. This perspective should be considered when implementing closures and work phase transitions.
3. The Contractor and Engineer will coordinate with Airport Management staff to disseminate active taxi route information to all tenants/operators.

Chapter 14 - RUNWAY AND TAXIWAY VISUAL AIDS

- A. General.** Runway and taxiway visual aids include marking, lighting, and signs. The runway and taxiway visual aids ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including but not limited to closed runways and taxiways. Throughout the duration of the construction project, the Contractor shall verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual aids remain in place and are operational. All must be secured in place to prevent movement by prop wash, jet blast, and other wind currents and be constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. For requirements, see Sheet GA-001 in the Plans.
- B. Markings.** Markings must be in compliance with the standards of AC 150/5340-1M, Standards for Airport Markings.
- 1) **Temporarily closed taxiways/taxilanes.** Temporary closed taxiways/taxilanes will be marked with low-profile lighted barricades.
- C. Lighting and Visual Aids.** Taxiway lighting must be de-energized or obscured on all closed airfield pavements.
- 1) **Temporarily closed taxiways/taxilanes.** If and as directed, contractor shall deactivate the taxiway lighting circuits. When deactivation is not possible (for example other sections of taxiways on the same circuit are to remain open), contractor shall cover the light fixture in such a way as to prevent light leakage, or provide a temporary jumper to maintain circuit in operation for the open area. Low profile lighted barricades (see detail on Sheet GA-101) shall be provided.
- D. Signs.** Signs must be in conformance with AC 150/5345-44K, Specification for Runway and Taxiway Signs and AC 150/5340-18G, Standard for Airport Sign Systems. Any time a sign does not serve its normal function it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed.

Chapter 15 - MARKING AND SIGNS FOR ACCESS ROUTES

- 1.** The access routes to be utilized by the Contractor are shown on Sheets GA-001 and GA-101 of the Plans. Access points and on-airport access routes shall be discussed at the Pre-construction Conference and at progress meetings to address construction needs and airport operational safety and security considerations. Access route physical conditions shall be regularly reviewed. The Contractor is expected to maintain the haul routes in safe, clean, orderly condition at all times. Many of the routes are also used for maintenance access, security checks and emergency response; these routes must be passable at all times and in all weather conditions.
- 2.** The Contractor shall provide signs and markings for access routes on the airport as needed to control and guide the construction traffic. All signs and markings shall be coordinated with the RPR and Airport staff and reviewed for aircraft safety, security and NAVAID interference considerations.

Chapter 16 - HAZARD MARKING AND LIGHTING

A. Purpose. The hazard marking and lighting prevents pilots from entering areas closed to aircraft and prevents construction personnel from entering areas open to aircraft. Hazard marking and lighting shall also identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast.

B. Equipment

- 1) **Lighted Barricades.** Low profile aviation barricades shall be manufactured low-profile aviation barricades. Spacing shall be a maximum of 4 feet apart or as directed by the Engineer. See detail on Sheets GA-101 of the plans for requirements.
- 2) **Lights Must be Red.** A steady burning red light shall be centered on each lighted barricade and must meet the luminance requirements of the State Highway Department. Lights must be securely mounted on barricades and spaced at no more than 10 feet. Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations.
- 3) **Air Operations Area - General.** Barricades are not permitted in any active safety area. Within runway or taxiway/taxilane object free areas, steady burning red lights mounted on barricades marked with diagonal, alternating orange and white stripes as noted above, shall be provided to separate all construction/maintenance areas from the movement area. All barricades adjacent to any open runway or taxiway / taxilane safety area must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches above the ground.
- 4) **Maintenance.** The Contractor must have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The Contractor must file the contact person's information with the airport operations.

Lighting should be checked for proper operation at least once per day, preferably at dusk.

Chapter 17 – WORK ZONE LIGHTING FOR NIGHTTIME CONSTRUCTION

1. If construction is to be performed during nighttime hours, lighting equipment shall adequately illuminate the work area. Minimum illumination levels must conform to AC 150/5370-2G for nighttime construction efforts.
2. All support equipment, with the exception of haul trucks, shall be equipped with lights to safely illuminate the immediate area.
3. All light towers shall be positioned and adjusted to aim away from active runways to prevent blinding effects. Shielding may be necessary to achieve this. Light towers shall be removed from the work area when reopened to aircraft operations.

Chapter 18 - PROTECTION

All the affected safety and object free areas are shown on Sheets GA-001 and GA-101 in the Plans. Dimensions, location, and protection of the RSA, ROFA, OFZ, TSA and TOFA areas of open facilities will be discussed at the pre-construction conference and progress meetings.

A. Runway Safety Area (RSA). Not Applicable

B. Runway Object Free Area (ROFA). Not Applicable

C. Taxiway Safety Area (TSA). A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway (See AC 150/5300-13A). The taxiway safety area width for the Lumberton Regional Airport is 79 feet wide for Taxiway F and Taxilane N1. Construction activities within the TSA are subject to the following conditions:

- 1) **No construction may occur within the existing TSA while the taxiway is open for aircraft operations.** TSA width may be adjusted if required and coordinated.
- 2) The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager, if applicable, and issue a NOTAM.
- 3) **Excavations.**
 - a) Open trenches or excavations are not permitted within the TSA while the taxiway is open. If possible, backfill trenches before the taxiway is opened. If the taxiway must be opened before excavations are backfilled, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
 - b) Contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.
- 4) **Erosion Control.** Soil erosion must be controlled to maintain TSA standards. The TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire-fighting equipment,

and the occasional passage of aircraft without causing structural damage to the aircraft.

D. Taxiway & Taxilane Object Free Area (TOFA/TLOFA). Unlike the Runway Object Free Area, aircraft wings regularly penetrate (*extend into*) the taxiway or taxilane object free area during normal operations. Thus, the restrictions are more stringent. Barricades and cones will be used to segregate construction zones from areas open to aircraft. The taxiway object free area width for Taxiway F is 124 feet wide. The taxilane object free area for Taxilane N1 is 110 feet wide. The taxilane object free area for Taxilane N2 is 89 feet wide, however for this project the Taxilane N2 object free area in front of the construction site is 77.46 feet wide to allow access to hangars 28C and 28D when not working in Work Area 1C as indicated on GA-101. The taxilane object free area for T-Hangar Taxilane E and T-Hangar Taxilane W is 79 feet wide. Construction activities within the TOFA/TLOFA are subject to the following conditions:

- 1) No construction may occur within the existing TOFA/TLOFA while the taxiway/taxilane is open for aircraft operations.** The TOFA/TLOFA dimensions may be temporarily adjusted. For this project, a five-foot clearance shall be maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft (Reference AC 150/5370-2G Section 2.22.4.3.5).
- 2) The airport operator must coordinate the adjustment of the TOFA/TLOFA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager, if applicable, and issue a NOTAM.**
- 3) Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang).** In these situations, flaggers must be used to direct construction equipment, and wing walkers will be necessary to guide aircraft. Wing walkers should be airport personnel rather than construction workers.

E. Obstacle Free Zone (OFZ). Not Applicable

F. Runway Approach/Departure Surfaces. Not Applicable

Chapter 19 - OTHER LIMITATIONS ON CONSTRUCTION

A. Prohibitions

- 1) **No Use of Tall Equipment.** If Contractor utilizes cranes, bucket trucks, concrete pumps or other equipment exceeding 30 feet in height and separately 75 feet in height for crane work, Contractor is responsible for filing a "Notice of Proposed Construction" (7460) with FAA prior to erecting equipment. Contractor should allow at least 60 days for FAA review. Detailed instructions can be found on the FAA website:

<https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

Talbert & Bright will submit FAA Form 7460 for this project.

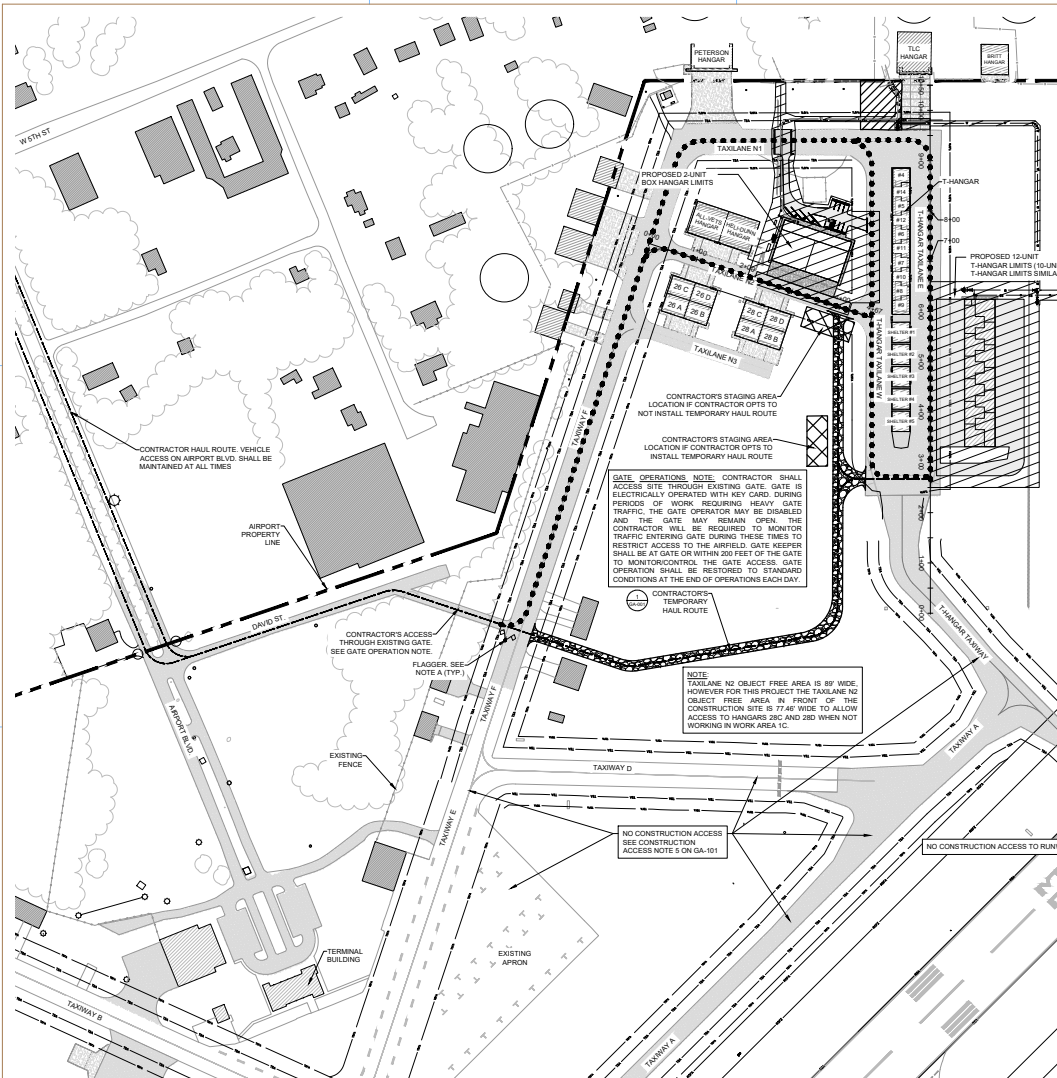
- 2) **No Use of Open Flame Welding or Torches.** Burning of material is not permitted. The Contractor shall be allowed to grind/chip debris from clearing operations but shall not be allowed to dispose of chipped material on site.
- 3) **No use of electrical blasting caps** on or within 1,000 feet of the airport property.
- 4) **No use of flare pots** within the AOA.

B. Restrictions

- 1) **Nighttime Construction.** Contractor may work nighttime hours. Nighttime paving operations will NOT be allowed, as indicated in the project special provisions. All equipment must be returned to the staging area at the end of each day's work.
- 2) **Construction Access.** Contractor is authorized to use the existing Airport Hangar Taxilanes north of Taxiway D (including Taxiway F) for rubber tired vehicle traffic for access to and between the access gate, work areas and staging areas. All construction traffic must yield the right of way (taxilane pavement and adjacent object free areas) at all times to moving aircraft. This includes fixed wing airplanes taxiing between Hangars, the terminal apron and/or the taxiway/runway environment and helicopters hover-taxiing along the taxilane network. Construction traffic must also yield to or readily accommodate non-construction vehicular traffic, including hangar tenant vehicles, airport vehicles and service vehicles. No construction access is allowed on Taxiways A, D and E, the runways, and the existing terminal building apron as indicated on GA-001.

APPENDIX A

Project Safety and Phasing Plans



- AIRPORT SAFETY PLAN REQUIREMENTS**
- THE INTENT OF THIS PLAN IS TO ESTABLISH CERTAIN SAFETY REQUIREMENTS RELATIVE TO AIRPORT OPERATIONS THAT MUST BE ADHERED TO BY THE CONTRACTOR DURING CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR IS FULLY AND SOLELY RESPONSIBLE FOR ALL CONSTRUCTION SAFETY MATTERS. IT IS THE INTENT THAT THE AIRPORT WILL REMAIN OPEN DURING THE DURATION OF THIS PROJECT.
- THE CONTRACTOR SHALL READ THE CONSTRUCTION SAFETY & PHASING PLAN (CSPP) THAT WAS PROVIDED WITH THE BID DOCUMENTS THAT FOLLOWS THE REQUIREMENTS IN FAA ADVISORY CIRCULAR 10070320, "OPERATIONAL SAFETY ON AIRPORTS" (OSPA). THE CONTRACTOR SHALL PREPARE AND SUBMIT A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD), TO SUPPLEMENT THE CSPP WITH CONTRACTOR SPECIFIC INFORMATION. THE CONTRACTOR SHALL COMPLY WITH THE PROJECT AIRFIELD SAFETY REQUIREMENTS AS SHOWN ON THE PLANS, PROJECT SPECIFICATIONS, THE CSPP AND SPCD, AND SHALL COORDINATE WITH THE OWNER AND ENGINEER ANY CHANGES THAT MAY ARISE OUT OF THE COURSE OF THE PROJECT.
- PARTIAL CLOSURE OF HANGAR ACCESS TAXILINES WILL BE REQUIRED AS PART OF THIS PROJECT.
 - THE CONTRACTOR SHALL HAVE NO ACCESS TO RUNWAYS WITH THIS PROJECT. ALL WORK IS TO BE ACCOMPLISHED OUTSIDE THE RUNWAY OBJECT FREE AREA (ROFA).
 - THE CONTRACTOR SHALL COORDINATE INGRESS/EGRESS REQUIREMENTS WITH THE AIRPORT MANAGEMENT AND RESIDENT PROJECT REPRESENTATIVE.
 - THE CONTRACTOR SHALL ACCESS THE PROJECT SITE USING EXISTING ROADWAYS.
 - ALL CONSTRUCTION VEHICLES, INCLUDING PERSONAL CARS, MUST BE CLEARED FOR ACCESS BY THE AIRPORT MANAGEMENT AND RESIDENT PROJECT REPRESENTATIVE. PERSONAL CARS SHALL BE PARKED OUTSIDE OF THE SECURED AIRFIELD AREAS IN DESIGNATED AREAS.
 - THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL DESIGNATE A LOCAL REPRESENTATIVE AND ALTERNATE TO CONTACT ON A 24 HOUR BASIS IN CASE OF EMERGENCY. IN THE EVENT OF AN EMERGENCY DURING CONSTRUCTION, THE CONTRACTOR SHALL CALL 911 FOR EMERGENCY RESPONSE PERSONNEL. THE CONTRACTOR SHALL ALSO NOTIFY THE AIRPORT MANAGER ONLY AFTER 911 HAS BEEN CALLED. THE AIRPORT MANAGER CAN BE REACHED BY TELEPHONE AT 919-739-6480.
 - EQUIPMENT AND MATERIALS SHALL NOT BE LEFT IMMEDIATELY ALONG AIRPORT BLVD.
 - PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES WITHIN PROJECT WORK AREAS. THIS EFFORT SHALL INCLUDE COORDINATING WITH LOCAL UTILITY CONTACTS. THE CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR THE IMMEDIATE RESOLUTION OF ANY UTILITY FACILITIES DAMAGED IN THE COURSE OF CONTRACTOR'S OPERATIONS.
 - THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS IN REGARD TO CONSTRUCTION NOISE AND EROSION CONTROL DURING CONSTRUCTION.
 - THE CONTRACTOR SHALL KEEP AIRPORT BLVD. AND DAVID STREET CLEAR OF ALL DEBRIS, STONES, ETC. DURING CONSTRUCTION. ALL PAVEMENTS SHALL BE CLEANED OF CONSTRUCTION DEBRIS AND SPILLAGE IMMEDIATELY. CONTRACTOR SHALL CONTINUALLY INSPECT PAVEMENT CROSSES BY VEHICLES DURING CONSTRUCTION OPERATIONS. CONTRACTOR SHALL MAINTAIN SUITABLE EQUIPMENT FOR CLEANING PAVEMENT ON SITE. CONTRACTOR SHALL CLEAN ALL AFFECTED TAXILANE CROSSINGS AND TRAVEL AREAS AS NEEDED OR AS DIRECTED TO KEEP THE PAVEMENT CLEAN OF DEBRIS.
 - THE CONTRACTOR SHALL CLEAN ALL CONSTRUCTION AREAS OF LITTER, LOOSE PAPERS, DEBRIS, ETC. ON A DAILY BASIS, OR AS DIRECTED BY THE ENGINEER. ALL SPILLAGE ON PAVED AREAS SHALL BE CLEANED UP IMMEDIATELY.
 - THE CONTRACTOR SHALL COORDINATE ALL ACCESS ROUTES TO ALL CONSTRUCTION AREAS WITH RESIDENT PROJECT REPRESENTATIVE AND AIRPORT MANAGEMENT PRIOR TO BEGINNING WORK.
 - INSPECTION - FREQUENT INSPECTIONS MAY BE MADE BY AIRPORT MANAGEMENT DURING CRITICAL PHASES OF THE WORK TO ENSURE THAT THE CONTRACTOR IS FOLLOWING RECOMMENDED SAFETY PLAN PROCEDURES. THE CONTRACTOR WILL BE REQUIRED TO IMMEDIATELY CORRECT ANY NOTED DEFICIENCIES.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING THE OPTIONAL TEMPORARY HAUL ROUTE, AND REMOVAL AND RESTORATION TO EXISTING SITE CONDITIONS. PAYMENT FOR MEETING THESE REQUIREMENTS ARE CONSIDERED TO BE INCLUDED IN THE CONTRACT ITEM FOR "TEMPORARY CONSTRUCTION ITEMS" AND NO ADDITIONAL PAYMENT WILL BE MADE.

- CONSTRUCTION CONTRACTORS RESPONSIBILITIES**
- CONTRACTOR SHALL SUBMIT SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) TO THE AIRPORT OPERATOR ON HOW CONTRACTOR SHALL COMPLY WITH THE SAFETY PLAN REQUIREMENTS OF THE PROJECT.
 - CONTRACTOR SHALL HAVE AVAILABLE A COPY OF THE PROJECT AIRPORT SAFETY PLAN ON SITE AT ALL TIMES.
 - CONTRACTOR SHALL COMPLY WITH THE AIRPORT SAFETY PLAN ASSOCIATED WITH THE CONSTRUCTION PROJECT AND ENSURE THAT CONSTRUCTION PERSONNEL ARE FAMILIAR WITH SAFETY PROCEDURES AND REGULATIONS ON THE AIRPORT.
 - CONTRACTOR SHALL PROVIDE A POINT OF CONTACT WHO WILL COORDINATE AN IMMEDIATE RESPONSE TO CORRECT ANY CONSTRUCTION RELATED ACTIVITY THAT MAY ADVERSELY AFFECT THE OPERATIONAL SAFETY OF THE AIRPORT.
 - CONTRACTOR SHALL PROVIDE A SAFETY CONSTRUCTION INSPECTOR FAMILIAR WITH AIRPORT SAFETY TO MONITOR CONSTRUCTION ACTIVITIES.
 - CONTRACTOR SHALL RESTRICT MOVEMENT OF CONSTRUCTION VEHICLES TO CONSTRUCTION AREAS BY FLAGGING AND BARRICADING, INCLUDING TEMPORARY FLAGGING OR PROVIDING FLAGMEN OR ESCORTS AS APPROPRIATE.
 - CONTRACTOR SHALL ENSURE THAT NO CONSTRUCTION EMPLOYEES, EMPLOYEES OF SUBCONTRACTORS OR SUPPLIERS, OR OTHER PERSONS ENTER ANY PART OF THE AIR OPERATIONS AREAS (AOA) UNLESS AUTHORIZED.
 - ANYTIME SUBCONTRACTORS ARE WORKING ON SITE, PRIME CONTRACTOR SHALL HAVE SUPERVISORY PERSONNEL ON SITE.

- STAGING AND STOCKPILE NOTES**
- CONTRACTOR SHALL SET UP STAGING AREAS IN LOCATIONS SHOWN ON THIS SHEET OR AS AUTHORIZED BY THE ENGINEER AND AIRPORT MANAGEMENT. NO ADDITIONAL CLEARING WILL BE ALLOWED FOR STAGING OR STOCKPILING EXCEPT AS SPECIFICALLY AUTHORIZED.
 - THE CONTRACTOR SHALL STOCKPILE TOPSOIL SEPARATELY FROM SUBSOIL MATERIALS SUITABLE FOR EMBANKMENT CONSTRUCTION. TOPSOIL SHALL BE RE-SPREAD ON DISTURBED AREAS NOT PAVED, OR OTHERWISE STABILIZED. ALL SURPLUS TOPSOIL AND SUBSOIL MATERIALS EXCAVATED ON THE PROJECT SHALL BE PROPERLY DISPOSED OF OFFSITE. AIRPORT MANAGEMENT SHALL APPROVE LOCATION OF PROPOSED STOCKPILES.

NOTE A:
CONTRACTOR WILL BE REQUIRED TO UTILIZE FLAGMEN AT TAXILANE CROSSINGS DURING CONSTRUCTION. FLAGMEN SHALL HAVE ALL CONSTRUCTION TRAFFIC STOP PRIOR TO ENTERING OR CROSSING TAXIWAYS/TAXILANES OBJECT FREE AREAS AS SHOWN ON THE PLANS. CONTRACTOR SHALL VISUALLY MONITOR AIR TRAFFIC PRIOR TO VEHICLES ENTERING OR CROSSING ACTIVE TAXIWAYS/TAXILANES. DURING HEAVY HAULING OPERATIONS A FLAGGER WILL BE REQUIRED.

ACTIVE AIR OPERATIONS AREA:
ALL AIRFIELD AREAS SHALL BE CONSIDERED ACTIVE UNLESS SPECIFICALLY CLOSED AND BARRICADED IN ACCORDANCE WITH THE SAFETY & PHASING PLAN. ALL CROSSINGS OF ACTIVE AREAS SHALL BE COMPLETED UNDER ROAD CONTROL WITH AIRPORT MANAGEMENT. IN ALL CASES AIRCRAFT SHALL HAVE THE RIGHT OF WAY. ALL CONSTRUCTION TRAFFIC SHALL STOP CLEAR OF ACTIVE AREAS AND ALLOW AIRCRAFT TO PASS UNIMPURED. THE CONTRACTOR SHALL USE EXTREME CAUTION IN ACTIVE AIR AREAS. ANY SPILLAGE/DEBRIS ON PAVEMENTS SHALL BE CLEANED UP IMMEDIATELY AFTER EACH CROSSING.

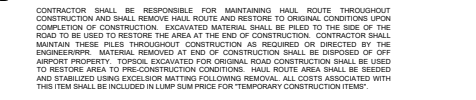
CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT ANY EXISTING PAVEMENT THAT CONSTRUCTION EQUIPMENT CROSSES OR TRAVELS ON. CONTRACTOR SHALL REPAIR ANY DAMAGE FROM HIS OPERATIONS IN ACCORDANCE WITH SPECIFICATIONS.

CONTRACTOR SHALL BE AWARE OF HELICOPTER TRAFFIC TO AND FROM PETERSON HANGAR.

CONTRACTOR SHALL BE AWARE OF AGRICULTURE CHEMICALS IN SHELTER 4 & 5.

CONSTRUCTION ACCESS ALONG EXISTING TAXIWAY - CONSTRUCTION EQUIPMENT CROSSES OR TRAVELS ON TAXIWAY AND NON-CONSTRUCTION TRAFFIC ACCESS MUST REMAIN CLEAN AND FREE OF ANY FOD AT ALL TIMES.

1. PROPOSED TEMPORARY HAUL ROUTE TYPICAL SECTION (CONTRACTOR OPTION)
SCALE: NOT TO SCALE



CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING HAUL ROUTE THROUGHOUT CONSTRUCTION AND SHALL REMOVE HAUL ROUTE AND RESTORE TO ORIGINAL CONDITIONS UPON COMPLETION OF CONSTRUCTION. EXCAVATED MATERIAL SHALL BE PILED TO THE SIDE OF THE ROAD TO BE USED TO RESTORE THE AREA AT THE END OF CONSTRUCTION. CONTRACTOR SHALL MAINTAIN THESE PILES THROUGHOUT CONSTRUCTION AS REQUIRED OR DIRECTED BY THE ENGINEER. MATERIAL REMOVED AT END OF CONSTRUCTION SHALL BE DISPOSED OF OFF AIRPORT PROPERTY. TOPSOIL EXCAVATED FOR ORIGINAL ROAD CONSTRUCTION SHALL BE USED TO RESTORE AREA TO PRE-CONSTRUCTION CONDITIONS. HAUL ROUTE AREA SHALL BE SEEDED AND STABILIZED USING EXCELLENT MATING FODDER REMOVAL. ALL COSTS ASSOCIATED WITH THIS ITEM SHALL BE INCLUDED IN LUMP SUM PRICE FOR "TEMPORARY CONSTRUCTION ITEMS".

LEGEND

- CONTRACTOR'S ACCESS ROUTE WITH TEMPORARY HAUL ROUTE OPTION
- CONTRACTOR'S ACCESS ROUTE WITHOUT TEMPORARY HAUL ROUTE OPTION
- WORK AREA LIMITS
- CONTRACTOR'S STAGING AREA
- AIRPORT PROPERTY LINE
- TOFA/LOFA - TAXIWAY/TAXILANE OBJECT FREE AREA

SCALE IN FEET
1" = 100'

City of LUMBERTON
North Carolina

Schedule 1:
2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358

SEAL
047433
07/23
NORTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 12/31/2025
NO. 51148

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WALMINGTON, NC 28405
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WATER & SEWER ENGINEER
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219 STATION ROAD, SUITE 101
WALMINGTON, NC 28405
PHONE: 910-256-9277 LICENSE NO. E-1473

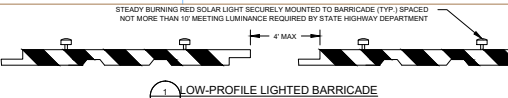
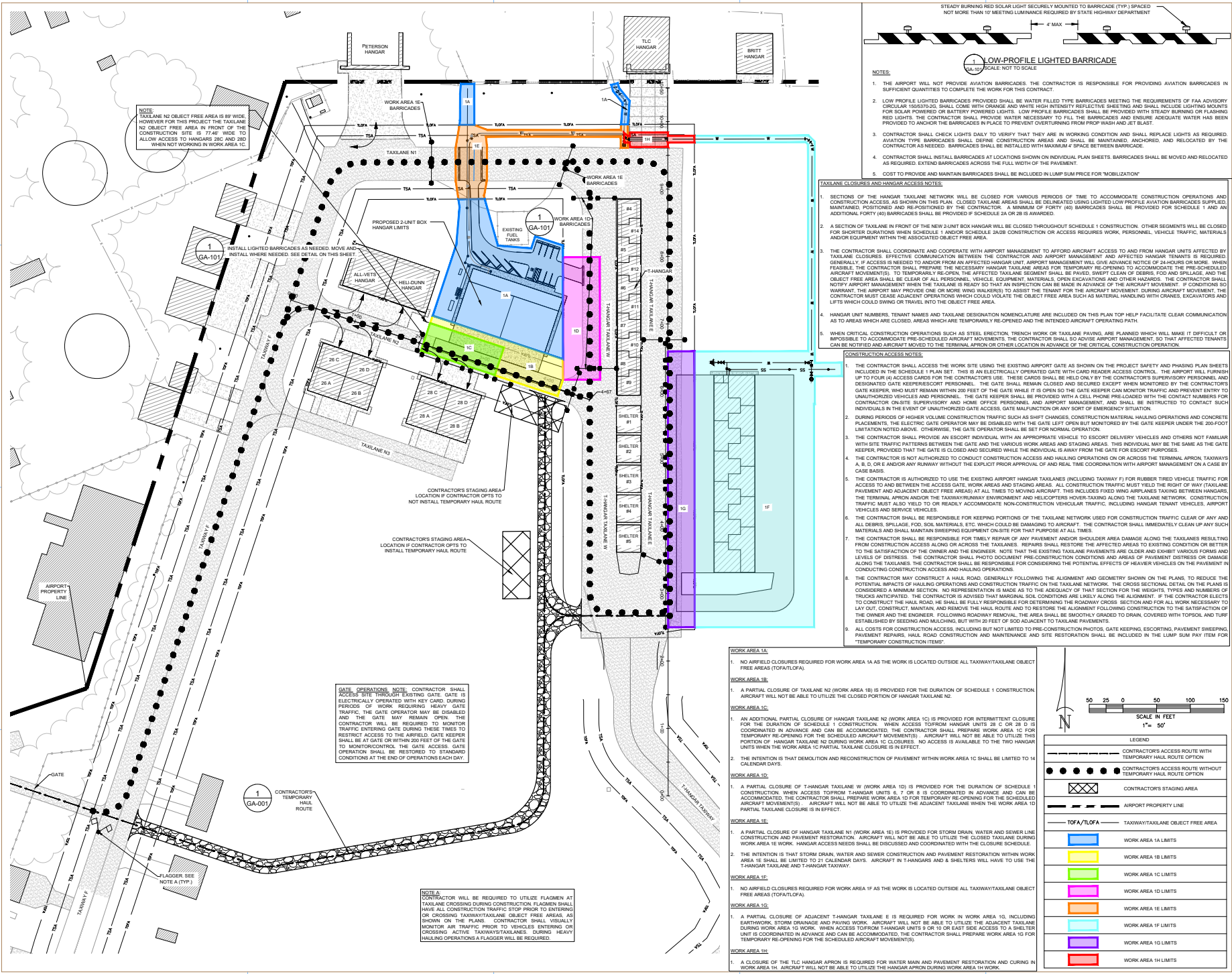
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REVISIONS

DATE: JANUARY 2025
PROJECT NUMBER: 3105-2401
SHEET TITLE: CONSTRUCTION SAFETY PLAN (ALL SCHEDULES)

SHEET NUMBER
GA-001



- NOTES:**
1. THE AIRPORT WILL NOT PROVIDE AVIATION BARRICADES. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AVIATION BARRICADES IN SUFFICIENT QUANTITIES TO COMPLETE THE WORK FOR THIS CONTRACT.
 2. LOW PROFILE LIGHTED BARRICADES SHALL BE WATER FILLED TYPE BARRICADES MEETING THE REQUIREMENTS OF FAA ADVISORY CIRCULAR 150/370-2D. SHALL COME WITH ORANGE AND WHITE HIGH INTENSITY REFLECTIVE SHEETING AND SHALL INCLUDE LIGHTING MOUNTS FOR SOLAR POWERED OR BATTERY POWERED LIGHTS. LOW PROFILE BARRICADES SHALL BE PROVIDED WITH STEADY BURNING OR FLASHING RED LIGHTS. THE CONTRACTOR SHALL PROVIDE WATER NECESSARY TO FILL THE BARRICADES AND ENSURE ADEQUATE WATER HAS BEEN PROVIDED TO ANCHOR THE BARRICADES TO PREVENT OVERSAMPLING TO PREVENT OVERSAMPLING TO PREVENT OVERSAMPLING TO PREVENT OVERSAMPLING.
 3. CONTRACTOR SHALL CHECK LIGHTS DAILY TO VERIFY THAT THEY ARE IN WORKING CONDITION AND SHALL REPLACE LIGHTS AS REQUIRED. AVIATION TYPE BARRICADES SHALL DEFINE CONSTRUCTION AREAS AND SHALL BE MAINTAINED, ANCHORED, AND RELOCATED BY THE CONTRACTOR AS NEEDED. BARRICADES SHALL BE INSTALLED WITH MAXIMUM 4' SPACE BETWEEN BARRICADE.
 4. CONTRACTOR SHALL INSTALL BARRICADES AT LOCATIONS SHOWN ON INDIVIDUAL PLAN SHEETS. BARRICADES SHALL BE MOVED AND RELOCATED AS REQUIRED. EXTEND BARRICADES ACROSS THE FULL WIDTH OF THE PAVEMENT.
 5. COST TO PROVIDE AND MAINTAIN BARRICADES SHALL BE INCLUDED IN LUMP SUM PRICE FOR "MOBILIZATION"

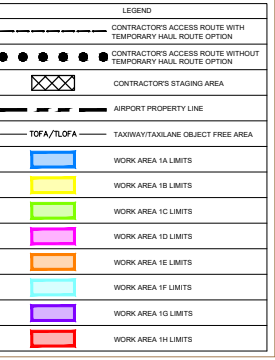
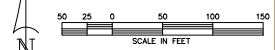
TAXILANE CLOSURES AND HANGAR ACCESS NOTES:

1. SECTIONS OF THE HANGAR TAXILANE NETWORK WILL BE CLOSED FOR VARIOUS PERIODS OF TIME TO ACCOMMODATE CONSTRUCTION OPERATIONS AND CONSTRUCTION ACCESS AS SHOWN ON THIS PLAN. CLOSED TAXILANE AREAS SHALL BE DELINEATED USING LIGHTED LOW PROFILE AVIATION BARRICADES SUPPLIED, MAINTAINED, POSITIONED AND RE-POSITIONED BY THE CONTRACTOR. A MINIMUM OF FORTY (40) BARRICADES SHALL BE PROVIDED FOR SCHEDULE 1 AND AN ADDITIONAL FORTY (40) BARRICADES SHALL BE PROVIDED IF SCHEDULE 2A OR 2B IS AWARDED.
2. A SECTION OF TAXILANE IN FRONT OF THE NEW 2-UNIT BOX HANGAR WILL BE CLOSED THROUGHOUT SCHEDULE 1 CONSTRUCTION. OTHER SEGMENTS WILL BE CLOSED FOR SHORTER DURATIONS WHEN SCHEDULE 1 AND/OR SCHEDULE 2A/2B CONSTRUCTION OR ACCESS REQUIRES WORK, PERSONNEL, VEHICLE TRAFFIC, MATERIALS AND/OR EQUIPMENT WITHIN THE ASSOCIATED OBJECT FREE AREA.
3. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH AIRPORT MANAGEMENT TO AFFORD AIRCRAFT ACCESS TO AND FROM HANGAR UNITS AFFECTED BY TAXILANE CLOSURES. EFFECTIVE COMMUNICATION BETWEEN THE CONTRACTOR AND AIRPORT MANAGEMENT AND AFFECTED HANGAR TENANTS IS REQUIRED. GENERALLY, ACCESS IS REQUIRED TO AND FROM HANGAR UNITS. THE CONTRACTOR SHALL ADVISE AIRPORT MANAGEMENT IN ADVANCE OF ANY CLOSURE OR MORE. WHEN FEASIBLE, THE CONTRACTOR SHALL PREPARE THE NECESSARY HANGAR TAXILANE AREAS FOR TEMPORARY RE-OPENING TO ACCOMMODATE THE PRE-SCHEDULED AIRCRAFT MOVEMENTS. IT IS REQUIRED TO RE-OPEN THE AFFECTED TAXILANE AREAS TO ALLOW CLEARANCE OF THE AIRCRAFT MOVEMENTS. IF CONDITIONS SO WARRANT, THE AIRPORT MAY PROVIDE ONE OR MORE WING WALKERS TO ASSIST THE TENANT FOR THE AIRCRAFT MOVEMENT. DURING AIRCRAFT MOVEMENT, THE CONTRACTOR MUST CEASE ADJACENT OPERATIONS WHICH COULD VIOLATE THE OBJECT FREE AREA SUCH AS MATERIAL HANDLING WITH CRANES, EXCAVATORS AND LIFTS WHICH COULD VIOLATE THE OBJECT FREE AREA OR TRAVEL INTO THE OBJECT FREE AREA.
4. HANGAR UNIT NUMBERS, TENANT NAMES AND TAXILANE DESIGNATION NOMENCLATURE ARE INCLUDED ON THIS PLAN TOP HELP FACILITATE CLEAR COMMUNICATION AS TO AREAS WHICH ARE CLOSED, AREAS WHICH ARE TEMPORARILY RE-OPENED AND THE INTENDED AIRCRAFT OPERATING PATH.
5. WHEN CRITICAL CONSTRUCTION OPERATIONS SUCH AS STEEL ERECTION, TRENCH WORK OR TAXILANE PAVING, ARE PLANNED WHICH WILL MAKE IT DIFFICULT OR IMPOSSIBLE TO ACCOMMODATE PRE-SCHEDULED AIRCRAFT MOVEMENTS, THE CONTRACTOR SHALL SO ADVISE AIRPORT MANAGEMENT, SO THAT AFFECTED TENANTS CAN BE NOTICED AND AIRCRAFT MOVED TO THE TERMINAL APRON OR OTHER LOCATION IN ADVANCE OF THE CRITICAL CONSTRUCTION OPERATION.

CONSTRUCTION ACCESS NOTES:

1. THE CONTRACTOR SHALL ACCESS THE WORK SITE USING THE EXISTING AIRPORT GATE AS SHOWN ON THE PROJECT SAFETY AND PHASING PLAN SHEETS INCLUDED IN THE SCHEDULE 1 PLAN SET. THIS IS AN ELECTRICALLY OPERATED GATE WITH CARD READER ACCESS CONTROL. THE AIRPORT WILL FURNISH UP TO FOUR (4) ACCESS CARDS FOR THE CONTRACTORS USE. THESE CARDS SHALL BE HELD ONLY BY THE CONTRACTORS SUPERVISORY PERSONNEL AND DESIGNATED GATE KEEPER/ESCORT PERSONNEL. THE GATE SHALL REMAIN CLOSED AND SECURED EXCEPT WHEN MONITORED BY THE CONTRACTORS GATE KEEPER AND MUST REMAIN WITHIN 200 FEET OF THE GATE WHILE IT IS OPEN SO THE GATE KEEPER CAN MONITOR TRAFFIC AND PREVENT ENTRY TO UNAUTHORIZED VEHICLES AND PERSONNEL. THE GATE KEEPER SHALL BE PROVIDED WITH A CELL PHONE PRE-LOADED WITH THE CONTACT NUMBERS FOR AIRPORT MANAGEMENT AND SUPERVISORY PERSONNEL. THE GATE KEEPER SHALL BE INSTRUCTED TO CONTACT SUCH NUMBERS FOR INDIVIDUALS IN THE EVENT OF UNAUTHORIZED GATE ACCESS, GATE MALFUNCTION OR ANY SORT OF EMERGENCY SITUATION.
2. DURING PERIODS OF HIGHER VOLUME CONSTRUCTION TRAFFIC SUCH AS SHIFT CHANGES, CONSTRUCTION MATERIAL HAULING OPERATIONS AND CONCRETE PLACEMENTS, THE ELECTRIC GATE OPERATOR MAY BE DISABLED WITH THE GATE LEFT OPEN BUT MONITORED BY THE GATE KEEPER UNDER THE 200-FOOT LIMITATION NOTED ABOVE. OTHERWISE, THE GATE OPERATOR SHALL BE SET FOR NORMAL OPERATION.
3. THE CONTRACTOR SHALL PROVIDE AN ESCORT INDIVIDUAL WITH AN APPROPRIATE VEHICLE TO ESCORT DELIVERY VEHICLES AND OTHERS NOT FAMILIAR WITH SITE TRAFFIC PATTERNS BETWEEN THE GATE AND THE VARIOUS WORK AREAS AND STAGING AREAS. THIS INDIVIDUAL MAY BE THE SAME AS THE GATE KEEPER PROVIDED THAT THE GATE IS CLOSED AND SECURED WHILE THE INDIVIDUAL IS AWAY FROM THE GATE FOR ESCORT PURPOSES.
4. THE CONTRACTOR IS NOT AUTHORIZED TO CONDUCT CONSTRUCTION ACCESS AND HAULING OPERATIONS ON OR ACROSS THE TERMINAL APRON, TAXIWAYS A, B, D, OR E AND/OR ANY RUNWAY WITHOUT THE EXPLICIT WRITTEN APPROVAL OF AND REAL TIME COORDINATION WITH AIRPORT MANAGEMENT ON A CASE BY CASE BASIS.
5. THE CONTRACTOR IS AUTHORIZED TO USE THE EXISTING AIRPORT HANGAR TAXILANES (INCLUDING TAXIWAY F) FOR RUBBER TIED VEHICLE TRAFFIC FOR ACCESS TO AND BETWEEN THE ACCESS GATE, WORK AREAS AND STAGING AREAS. ALL CONSTRUCTION TRAFFIC MUST YIELD THE RIGHT OF WAY (TAXILANE PAVEMENT AND ADJACENT OBJECT FREE AREAS) AT ALL TIMES TO MOVING AIRCRAFT. THIS INCLUDES FIXED WING AIRPLANES TAXIING BETWEEN HANGARS. THE TERMINAL APRON AND/OR THE TAXIWAYS AND HELICOPTERS HOWER TAXIING ALONG THE TAXILANE NETWORK. CONSTRUCTION TRAFFIC MUST ALSO YIELD TO OR READILY ACCOMMODATE NON-CONSTRUCTION VEHICULAR TRAFFIC, INCLUDING HANGAR TENANT VEHICLES, AIRPORT VEHICLES AND SERVICE VEHICLES.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING PORTIONS OF THE TAXILANE NETWORK USED FOR CONSTRUCTION TRAFFIC CLEAR OF ANY AND ALL DEBRIS, SPILLAGE, FOD, SOIL MATERIALS, ETC. WHICH COULD BE DAMAGING TO AIRCRAFT. THE CONTRACTOR SHALL IMMEDIATELY CLEAN UP ANY SUCH MATERIALS AND SHALL MAINTAIN SWEEPING EQUIPMENT ON SITE FOR THAT PURPOSE AT ALL TIMES.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TIMELY REPAIR OF ANY PAVEMENT AND/OR SHOULDER AREA DAMAGE ALONG THE TAXILANES RESULTING FROM CONSTRUCTION ACCESS ALONG OR ACROSS THE TAXILANES. REPAIRS SHALL RESTORE THE AFFECTED AREAS TO EXISTING CONDITION OR BETTER TO THE SATISFACTION OF THE OWNER AND THE ENGINEER. NOTE THAT EXISTING TAXILANE PAVEMENTS ARE CLASSIFIED AND EXHIBIT VARIOUS FORMS AND LEVELS OF DISTRESS. THE CONTRACTOR SHALL PHOTO DOCUMENT PRE-CONSTRUCTION CONDITIONS AND AREAS OF PAVEMENT DISTRESS OR DAMAGE ALONG THE TAXILANES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSIDERING THE POTENTIAL EFFECTS OF HEAVY VEHICLES ON THE PAVEMENT IN CONDUCTING CONSTRUCTION ACCESS AND HAULING OPERATIONS.
8. THE CONTRACTOR MAY CONSTRUCT A HAUL ROAD, GENERALLY FOLLOWING THE ALIGNMENT AND GEOMETRY SHOWN ON THE PLANS, TO REDUCE THE OPERATIONAL IMPACTS OF HAULING OPERATIONS AND CONSTRUCTION TRAFFIC ON THE TAXILANE NETWORK. THE CROSS SECTIONS SHOWN ON THE PLANS BE CONSIDERED A MINIMUM SECTION. NO REPRESENTATION IS MADE AS TO THE ADEQUACY OF THAT SECTION FOR THE WEIGHTS, TYPES AND NUMBERS OF TRUCKS ANTICIPATED. THE CONTRACTOR IS ADVISED THAT MARGINAL SOIL CONDITIONS ARE LIKELY ALONG THE ALIGNMENT. IF THE CONTRACTOR ELECTS TO CONSTRUCT THE HAUL ROAD, HE SHALL BE FULLY RESPONSIBLE FOR DETERMINING THE ROADWAY CROSS SECTION AND FOR ALL WORK NECESSARY TO LAY OUT, CONSTRUCT, MAINTAIN, AND REMOVE THE HAUL ROUTE AND TO RESTORE THE ALIGNMENT FOLLOWING CONSTRUCTION TO THE SATISFACTION OF THE OWNER AND THE ENGINEER. FOLLOWING ROADWAY REMOVAL, THE AREA SHALL BE SMOOTHLY GRADED TO DRAIN, COVERED WITH TOPSOIL, AND FURF ESTABLISHED BY SEEDING AND MULCHING, BUT WITH 20 FEET OF SOD ADJACENT TO TAXILANE PAVEMENTS.
9. ALL COSTS FOR CONSTRUCTION ACCESS, INCLUDING BUT NOT LIMITED TO PRE-CONSTRUCTION PHOTOS, GATE KEEPING, ESCORTING, PAVEMENT SWEEPING, PAVEMENT REPAIRS, HAUL ROAD CONSTRUCTION AND MAINTENANCE AND SITE RESTORATION SHALL BE INCLUDED IN THE LUMP SUM PAY ITEM FOR "TEMPORARY CONSTRUCTION ITEMS".

- WORK AREA 1A:**
1. NO AIRFIELD CLOSURES REQUIRED FOR WORK AREA 1A AS THE WORK IS LOCATED OUTSIDE ALL TAXIWAY/TAXILANE OBJECT FREE AREAS (TOFA/TLOFA).
- WORK AREA 1B:**
1. A PARTIAL CLOSURE OF TAXILANE N2 (WORK AREA 1B) IS PROVIDED FOR THE DURATION OF SCHEDULE 1 CONSTRUCTION. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THE CLOSED PORTION OF HANGAR TAXILANE N2.
- WORK AREA 1C:**
1. AN ADDITIONAL PARTIAL CLOSURE OF HANGAR TAXILANE N2 (WORK AREA 1C) IS PROVIDED FOR INTERMITTENT CLOSURE FOR HANGAR UNITS 2C OR 2B IS COORDINATED IN ADVANCE AND CAN BE ACCOMMODATED. THE CONTRACTOR SHALL PREPARE WORK AREA 1C FOR TEMPORARY RE-OPENING FOR THE SCHEDULED AIRCRAFT MOVEMENTS. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THIS PORTION OF HANGAR TAXILANE N2 DURING WORK AREA 1C CLOSURES. NO ACCESS IS AVAILABLE TO THE TWO HANGAR UNITS WHEN THE WORK AREA 1C PARTIAL TAXILANE CLOSURE IS IN EFFECT.
 2. THE INTENTION IS THAT DEMOLITION AND RECONSTRUCTION OF PAVEMENT WITHIN WORK AREA 1C SHALL BE LIMITED TO 14 CALENDAR DAYS.
- WORK AREA 1D:**
1. A PARTIAL CLOSURE OF T-HANGAR TAXILANE W (WORK AREA 1D) IS PROVIDED FOR THE DURATION OF SCHEDULE 1 CONSTRUCTION. WHEN ACCESS THROUGH HANGAR UNITS 8, 7 OR 8 IS COORDINATED IN ADVANCE AND CAN BE ACCOMMODATED, THE CONTRACTOR SHALL PREPARE WORK AREA 1D FOR TEMPORARY RE-OPENING FOR THE SCHEDULED AIRCRAFT MOVEMENTS. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THE ADJACENT TAXILANE WHEN THE WORK AREA 1D PARTIAL TAXILANE CLOSURE IS IN EFFECT.
- WORK AREA 1E:**
1. A PARTIAL CLOSURE OF HANGAR TAXILANE N1 (WORK AREA 1E) IS PROVIDED FOR STORM DRAIN, WATER AND SEWER LINE CONSTRUCTION AND PAVEMENT RESTORATION. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THE CLOSED TAXILANE DURING WORK AREA 1E WORK. HANGAR ACCESS NEEDS SHALL BE DISCUSSED AND COORDINATED WITH THE CLOSURE SCHEDULE.
 2. THE INTENTION IS THAT STORM DRAIN, WATER AND SEWER CONSTRUCTION AND PAVEMENT RESTORATION WITHIN WORK AREA 1E SHALL BE LIMITED TO 21 CALENDAR DAYS. AIRCRAFT IN T-HANGARS AND SHELTERS WILL HAVE TO USE THE T-HANGAR TAXILANE AND T-HANGAR TAXIWAY.
- WORK AREA 1F:**
1. NO AIRFIELD CLOSURES REQUIRED FOR WORK AREA 1F AS THE WORK IS LOCATED OUTSIDE ALL TAXIWAY/TAXILANE OBJECT FREE AREAS (TOFA/TLOFA).
- WORK AREA 1G:**
1. A PARTIAL CLOSURE OF ADJACENT HANGAR TAXILANE E IS REQUIRED FOR WORK IN WORK AREA 1G, INCLUDING EARTHWORK, STORM DRAINAGE AND PAVING WORK. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THE ADJACENT TAXILANE DURING WORK AREA 1G WORK. WHEN ACCESS THROUGH HANGAR UNITS 9 OR 8 OR 8A OR 8B IS COORDINATED IN ADVANCE AND CAN BE ACCOMMODATED, THE CONTRACTOR SHALL PREPARE WORK AREA 1G FOR TEMPORARY RE-OPENING FOR THE SCHEDULED AIRCRAFT MOVEMENTS.
- WORK AREA 1H:**
1. A CLOSURE OF THE TLC HANGAR APRON IS REQUIRED FOR WATER MAIN AND PAVEMENT RESTORATION AND CURING IN WORK AREA 1H. AIRCRAFT WILL NOT BE ABLE TO UTILIZE THE HANGAR APRON DURING WORK AREA 1H WORK.



NOTE:
TAXILANE NO OBJECT FREE AREA IS BY WIDE. HOWEVER FOR THIS PROJECT THE TAXILANE NO OBJECT FREE AREA IN FRONT OF THE CONSTRUCTION SITE IS 75' WIDE TO ALLOW ACCESS TO HANGARS 28C AND 28D WHEN NOT WORKING IN WORK AREA 1C.

1
INSTALL LIGHTED BARRICADES AS NEEDED. MOVE AND INSTALL WHERE NEEDED. SEE DETAIL ON THIS SHEET.

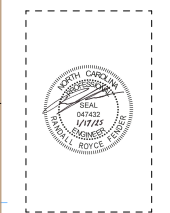
GATE OPERATIONS NOTE: CONTRACTOR SHALL ACCESS SITE THROUGH EXISTING GATE. GATE IS ELECTRICALLY OPERATED WITH KEY CARD. DURING PERIODS OF WORK REQUIRING HEAVY GATE TRAFFIC THE GATE OPERATOR MAY BE DISABLED AND THE GATE MAY REMAIN OPEN. THE CONTRACTOR WILL BE REQUIRED TO MONITOR TRAFFIC ENTERING GATE DURING THESE TIMES TO RESTRICT ACCESS TO THE AIRFIELD. GATE KEEPER SHALL BE AT GATE OR WITHIN 200 FEET OF THE GATE TO MONITOR/CONTROL THE GATE ACCESS. GATE OPERATION SHALL BE RESTORED TO STANDARD CONDITIONS AT THE END OF OPERATIONS EACH DAY.

1
CONTRACTOR'S TEMPORARY HAUL ROUTE

NOTE:
CONTRACTOR WILL BE REQUIRED TO UTILIZE FLAGMEN AT TAXILANE CROSSING DURING CONSTRUCTION. FLAGMEN SHALL HAVE ALL CONSTRUCTION TRAFFIC STOP PRIOR TO ENTERING OR CROSSING TAXIWAY/TAXILANE OBJECT FREE AREAS, AS SHOWN ON THE PLANS. CONTRACTOR SHALL VISUALLY MONITOR AIR TRAFFIC PRIOR TO VEHICLES ENTERING OR CROSSING ACTIVE TAXIWAY/TAXILANES. DURING HEAVY HAULING OPERATIONS A FLAGGER WILL BE REQUIRED.



Schedule 1:
2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358



PO BOX 5510
CHARLOTTE, NC 28290
(704) 366-7870
www.wilsongroup.com
NC Lic. No. 511492

PROJECT MANAGER / CIVIL ENGINEER
TALBERT & BRIGHT, INC.
4015 BELLEVUE DRIVE
WALTON, NC 28465
PHONE: 910-344-4210
EMAIL: TB@TB&B.COM

STRUCTURAL ENGINEER
STEWART, P.A.
204 EASTWOOD ROAD
WALTON, NC 28465
PHONE: 910-444-7596

CONSULTING ENGINEER
CHEATHAM & ASSOCIATES, P.A.
3420 ENCLOSURE DRIVE
WALTON, NC 28465
PHONE: 910-444-4210
EMAIL: OFFICE@CHEATHAMPA.COM

WATER & SEWER ENGINEER
WITHERS/RAVENEL
219 STATION ROAD, SUITE 101
WALTON, NC 28465
PHONE: 910-256-9277 LICENSE NO. F-1473

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REVISIONS

DATE: JANUARY 2025
PROJECT NUMBER: 3105-2401
SHEET TITLE:

CONSTRUCTION PHASING PLAN (ALL SCHEDULES)

SHEET NUMBER
GA-101

Talbert & Bright: 3105-2401
The Wilson Group: 2410-000

LBT T-Hangar and 2-Unit Box Hangar
Addendum No. 1

**LUMBERTON REGIONAL AIRPORT (LBT)
T-HANGAR AND 2-UNIT BOX HANGAR
163 AIRPORT BOULEVARD
LUMBERTON, NC 28358**

**PROJECT MANUAL – VOLUME B-2
ADDENDUM NO. 1**



PROJECT MANUAL

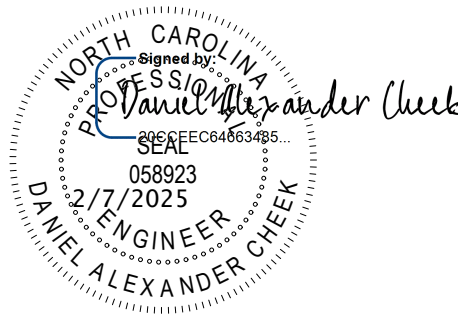
for the

City of Lumberton

LBT T-Hangar and 2-Unit Box Hangar-Water and Sewer Extension

January-2025

WithersRavenel Project No. 24-0497



Daniel Alexander Cheek, P.E.

WithersRavenel

219 Station Road, Suite 101 | Wilmington, NC 28405

Office: 910.256.9277 | Fax: 919.467.6008 | www.withersravenel.com | License No. F-1479

Asheville | Cary | Charlotte | Greensboro | Pittsboro | Raleigh | Southern Pines | Wilmington

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SECTION 01 01 00
SUMMARY OF WORK

PART 1 GENERAL

1.01. LOCATION OF WORK

- A. Lumberton Regional Airport, Lumberton, NC 28358

1.02. WORK TO BE DONE

- A. This project entails the construction of new water and sanitary sewer infrastructure to service new development at the Lumberton Regional Airport in Lumberton, NC. Schedule 1 of this installation will include approximately 75 LF of 8" water main to connect to the existing water main, 310 LF of 1" water line to service the new hangar, and all associated valves, services, and appurtenances. Approximately 352 LF of 6" sanitary sewer lateral will be installed to connect the new hangar to the existing 8" sewer main.
- B. Schedules 2A and 2B consist of constructing water and sewer infrastructure to serve a separate 10-unit hangar (2A) or 12-unit hangar (2B). Both schedules will include the installation of approximately 789 LF of 8" water main and all associated valves, hydrants, services, and appurtenances as well as approximately 162 LF of 6" sanitary sewer lateral to connect the new hangar to existing 8" sewer main. However, the configurations of Schedule 2A and 2B are to be installed as shown on the Construction Drawings.
- C. Provide all labor, materials, equipment, tools, services and incidentals necessary to complete all work required by the Contract Documents to furnish and install all work as shown on the Drawings and specified herein.
- D. Complete the Work, in place, tested, and ready for continuous service. Perform or provide repairs, replacements, and restoration required as a result of damages resulting from construction operations.
- E. Furnish and install all materials, equipment, and incidentals, which are reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Contract Documents, or not.

1.03. DRAWINGS AND SPECIFICATIONS FURNISHED TO THE CONTRACTOR FOR CONSTRUCTION

- A. A total of **(three)** sets of Drawings and **(three)** sets of Specifications shall be furnished to the CONTRACTOR for construction at no charge. Additional sets may be purchased at the cost of reproduction.

1.04. ABBREVIATIONS AND REFERENCES

- A. Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even if reference has been made to an earlier standard. Where standards, specifications or codes of the various technical societies, organizations or bodies have been referred to throughout the Specifications, the referenced standard, specification or code is hereby made a part of the Contract the same as if herein repeated in full.

- B. In the event of any conflict between any of these specifications, standards, codes or tentative specifications, and the Specifications, the latter shall govern.
- C. Reference to a technical society, organization, or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society at Mechanical Engineers
ASTM	American Society of Testing Materials
AWS	American Welding Society
AWWA	American Water Works Association
DIPRA	Ductile Iron Pipe Research Association
EPA	Environmental Protection Agency
FED.SPEC.	Federal Specifications
IEEE	Institute of Electrical and Electronic Engineers
NCDOT	North Carolina Department of Transportation
NCDENR	North Carolina Department of Environment and Natural Resources
NEMA	National Electrical Manufacturers Association
OSHA	Occupational Safety and Health Administration

- D. When no reference is made to a code, standard, or specification, the standard specifications of the ASTM, the ANSI, the ASME, the IEEE, or the NEMA shall govern.

1.05. LOCATION OF UNDERGROUND FACILITIES

- A. CONTRACTOR is responsible for the location of all underground utilities. Known existing utilities have been located from the information available. It is the CONTRACTOR's responsibility to accurately locate both horizontally and vertically all existing utilities prior to start of construction. CONTRACTOR is responsible for contacting the NC One Call Center at 800.632.4949. All costs associated with any damage to known or unknown existing utilities resulting from the CONTRACTOR's failure to adequately protect the existing utilities during construction shall be borne solely by the CONTRACTOR.

1.06. CONSTRUCTION SEQUENCE

- A. Notify the OWNER and ENGINEER at least one week prior to starting construction activities.
- B. Notify the OWNER and ENGINEER at least 48 hours prior to starting excavation work.
- C. Install all erosion control measures prior to beginning land disturbing activities.

END OF SECTION

SECTION 01 02 50
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. All contract prices shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary to complete the Work as shown on the Drawings and specified in the Contract Documents to be performed under this Contract.
- B. The items listed below refer to and are the same pay items listed in the Bid Form. They constitute all the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory work, services, job signs, sanitary requirements, testing, safety devices, surveying, field engineering, record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, and all other requirements of the Contract Documents.
- C. Each lump sum and unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for the Project.
- D. Excavation, trenching, backfill, and compaction are not separate bid items but are an integral part of the work under the contract, unless otherwise noted in the measurement and payment and bid schedule line items, and the Contract Bid Price shall include this work. Rock excavation removal and disposal, unsuitable soils excavation and disposal and select backfill replacement are considered UNCLASSIFIED EXCAVATION; and to be included in the Contract Bid Price unless otherwise noted in the measurement and payment and the bid schedule line items.
- E. Progress Payment for any item for which certifying surveys are required shall be made based on estimated quantities verified by the ENGINEER.
- F. Certifying surveys will be required for payment greater than 75% of the estimated total amount of that bid item.
- G. No Final Payment will be made for any item for which required certifying surveys have not been submitted and approved by the ENGINEER.
- H. Pay Items
 - 1. Mobilization
 - a. Measurement
 - 1) There shall be no measurement for Mobilization.
 - b. Payment
 - 1) The lump sum price bid for Mobilization to be paid for shall be full compensation related to preparing for work and associated operations, including but not limited to the necessary movement of personnel, equipment, supplies, and incidentals to or near the project site; for establishing offices and facilities as may be required for the work; and the subsequent removal of personnel, equipment, supplies, and incidentals from

the work site at the completion of the work; and all other costs which the CONTRACTOR may incur for the work which are excluded from other bid items.

- 2) Payment for Mobilization shall be evenly distributed over the first three monthly pay requests, provided the lump sum bid for Mobilization is equal to or less than 3% of the total contract price. When the lump sum bid for Mobilization exceeds 3% of the total contract price, any and all amount in excess of 3% of the total contract price shall be payable on the final monthly pay request. Retainage shall be applied in all instances as provided in the Contract Documents.
2. Erosion Control, Implementation, Maintenance and Removal
 - a. Measurement
 - 1) There will be no direct measurement of this lump sum item.
 - b. Payment
 - 1) The lump sum price for this item shall be full compensation for all labor, materials, tools, equipment, & supervision necessary to install erosion control measures and tree protection fence as shown and described in the Contract Documents as well as the maintenance, removal and disposal of these erosion control measures upon the disturbed areas having been reestablished. Payment shall be allowed for 50% of the lump sum bid price upon the installation of erosion control measures. The remaining 50% of the lump sum bid price shall be paid in equal monthly installments based on the time remaining to achieve substantial completion.
 - 2) No payment will be made for areas which have not been submitted to and approved by the OWNER.
 3. Sewer Service, Cleanout, and Connection to Existing Plumbing
 - a. Measurement
 - 1) The number of sewer laterals, cleanouts, and connections to existing plumbing which will be paid for under this Item will be the number in place, tested, and accepted by the ENGINEER.
 - b. Payment
 - 1) The unit price bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and/or install all sewer laterals and cleanouts including but not limited to service lateral piping, wyes, bends, plugs, one cleanout at the R/W or easement line, and the connection to the existing sewer main as shown on the Drawings and specified herein.
 4. 6" PVC Sewer Lateral (Open Cut)
 - a. Measurement

- 1) The length of 6" PVC sewer lateral to be paid for under this Item will be the actual linear feet of 6" PVC sewer lateral in place measured horizontally along the centerline of the installed pipe, tested, and accepted by the ENGINEER.
- b. Payment
 - 1) The unit price bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and/or install all sewer laterals from the cleanout at the R/W or easement line to the building connection including but not limited to service lateral piping, wyes, bends, and plugs as shown on the Drawings and specified herein.
 - 2) For Schedule 1, this line item will include connection to the 4" outlet of the oil interceptor to be installed by others.
5. Additional Sewer Cleanout
 - a. Measurement
 - 1) The number of cleanouts on the 6" PVC service lateral, excluding the cleanout installed near the R/W or easement line, in place, tested, and accepted by the ENGINEER.
 - b. Payment
 - 1) The unit price bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and install service lateral cleanouts including but not limited to service piping and fittings, all as shown on the Drawings and specified herein.
6. 8" PVC SDR 21 Water Main (Open Cut)
 - a. Measurement
 - 1) The length of pipe to be paid for under this item will be the actual number of linear feet of pipe in place measured horizontally along the centerline of the installed pipe categorized by the pipe size and material.
 - b. Payment
 - 1) The unit price for this item will be full compensation for furnishing and installing designated pipe including restrained joints as specified, fittings, and bends; as shown on the Drawings and specified herein, including but not limited to excavating, bedding stone, tracer wire, backfill and compaction, testing and disinfection, maintaining, providing temporary support and restoring all parallel and intersecting utilities; thrust blocking; clearing and site preparation; drainage and dewatering; traffic control; sheeting and bracing; grading; disposal of excess excavated materials; site restoration, removal and restoration of fences, guardrails, signs, mailboxes, cables, poles, etc.; test pits to verify location and depth of existing buried utilities and other facilities; care and protection of existing utilities and structures; conformance to all NCDOT and OWNER standards and requirements; and all other work required or incidental to the satisfactory completion of all Work under this contract for which payment is not provided under other items in the bid form

7. 1" SIDR 7 HDPE Water Service Line (open cut) (Schedule 1 Only)
 - a. Measurement
 - 1) The length of pipe to be paid for under this item will be the actual number of linear feet of pipe in place measured horizontally along the centerline of the installed pipe categorized by the pipe size and material.
 - b. Payment
 - 1) The unit price for this item will be full compensation for furnishing and installing designated pipe from the proposed 8" main to the meter, including restrained joints as specified, fittings, and bends; as shown on the Drawings and specified herein, including but not limited to excavating, bedding stone, tracer wire, backfill and compaction, testing and disinfection, maintaining, providing temporary support and restoring all parallel and intersecting utilities; thrust blocking; clearing and site preparation; drainage and dewatering; traffic control; sheeting and bracing; grading; disposal of excess excavated materials; site restoration, removal and restoration of fences, guardrails, signs, mailboxes, cables, poles, etc.; test pits to verify location and depth of existing buried utilities and other facilities; care and protection of existing utilities and structures; conformance to all OWNER standards and requirements; connection to and all other work required or incidental to the satisfactory completion of all Work under this contract for which payment is not provided under other items in the bid form
8. ¾" Water Service and Meter (Schedule 2A and 2B Only)
 - a. Measurement
 - 1) The number of water services from the new water lines and meters which will be paid for under this Item will be the number in place, tested, and accepted by the ENGINEER
 - b. Payment
 - 1) The unit price for this Item will be full compensation for furnishing and installing designated ¾" water service pipe connection, as shown on the Drawings and specified herein, including but not limited to connecting proposed meter to new service line to run from the new water main, necessary fittings, service line to new meter, service line from new meter to the hangar, tapping saddle, corporation stop, boring of service line (long side service), and all other incidentals necessary to install the new water service and meter while adhering to connection detail shown on Drawings.
 - 2) The proposed meter shall be Diehl Hydrus ultrasonic meter, unless otherwise directed by the Owner.
9. 1" Water Service and Meter (Schedule 1 Only)
 - a. Measurement
 - 1) The number of water services from the new meter to the hangar which will be paid for under this Item will be the number in place, tested, and accepted by the ENGINEER

b. Payment

- 1) The unit price for this Item will be full compensation for furnishing and installing designated water service pipe from the meter location to the hangar, as shown on the Drawings and specified herein, including but not limited to connecting proposed meter to new service line run from the new water main, necessary fittings, service line, and all other incidentals necessary to install the new water service and meter while adhering to connection detail shown on Drawings.
- 2) The 1" service line from the proposed 8" main to the meter location shall be paid for under a separate pay item - 1" SIDR 7 HDPE Water Service Line (open cut) (Schedule 1 Only).
- 3) The proposed meter shall be Diehl Hydrus ultrasonic meter, unless otherwise directed by the Owner.

10. 8" Gate Valve

a. Measurement

- 1) The number of gate valves and valve box assemblies which will be paid for under this item, will be the number in place, tested, and accepted by the OWNER categorized by size.

b. Payment

- 1) The unit price bid for this item will be full compensation for all labor, material, tools, equipment, supervision, and incidentals, required to furnish and install the associated gate valves including the valve, valve box, concrete blocking as shown on the Drawings and specified herein.

11. Fire Hydrant Assembly (Schedule 2A and 2B Only)

a. Measurement

- 1) The number of fire hydrant assemblies which will be paid for under this item, will be the number in place, tested, and accepted by the ENGINEER.

b. Payment

- 1) The unit price bid for this item will be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to furnish and install the fire hydrant assembly including the main line diameter x 6-inch tee as needed, 6-inch diameter pipe from the main, 6-inch valve and valve box, fire hydrant and thrust blocking or restraining as shown on the Drawings and specified herein. Fittings shall be included in the price of the fire hydrant assembly and will not be paid for under a separate item.

12. Connection to Existing Water Main

a. Measurement

- 1) The number of connections to existing water mains which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

- b. Payment
 - 1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to connect the new water main to the existing water main including closing valve, removing concrete blocking, removing cap, and joining the pipe.
13. 2" Blow-Off Assembly
- a. Measurement
 - 1) The number of blow-off assemblies which will be paid for under this item, will be the number in place, tested, and accepted by the OWNER.
 - b. Payment
 - 1) The unit price bid for this item will be full compensation for all labor, material, tools, equipment, supervision, erosion & sediment control measures, traffic control, safety, site restoration, etc. as per the Drawings and specified herein and incidentals, required to install 2" blow-off assemblies including but not limited to thrust collars, end caps, valves and valve boxes, 2" piping, and blow-offs.
14. Concrete Removal and Replacement (Schedule 2A and 2B Only)
- a. Measurement
 - 1) There will be no direct measurement of this item.
 - b. Payment
 - 1) The unit prices bid for this Item will be full compensation for all labor, materials, tools, equipment, concrete washout basin, supervision, and incidentals required to repair all concrete as shown on the Drawings and specified herein, including but not limited to the aggregate base course (P-209)
15. SUE Investigation
- a. Measurement
 - 1) There will be no direct measurement of this item.
 - b. Payment
 - 1) The unit prices bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to perform subsurface utility investigation for all bid schedules as shown on the Drawings, specified herein, and specified in the Project Special Provisions Section PSP-41.
16. Site Restoration
- a. Measurement
 - 1) There will be no direct measurement of this item.
 - b. Payment

- 1) The lump sum price shall include all final grading, temporary seeding and mulching, final seeding and mulching of the disturbed area within the construction corridor, and removal of temporary erosion control measures after cover has been established, and shall be full compensation for all labor, materials, and equipment required to the site as shown on the Drawings and as described in the Specifications and accepted by NCDOT, local erosion control officer, OWNER, the ENGINEER.

END OF SECTION

SECTION 01 04 00
CONSTRUCTION SURVEYING

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. Provide construction surveying required in execution of the Project.
- B. Provide surveying to be used for documenting construction and for the preparation of Record Drawings.
- C. The CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of North Carolina to perform all surveying.

1.02. SUBMITTALS

- A. Submit name and address of registered land surveyor to be used on this project to the ENGINEER within 5 days of the Notice to Proceed.
- B. On request of the ENGINEER, submit documentation to verify accuracy of surveying work.
- C. Hard Copy of Construction Record
 - 1. Submit construction record of items required to be surveyed. The Drawing must be sealed by a registered land surveyor.
- D. Electronic Documents
 - 1. An electronic file, compatible with the DXF (Drawing Exchange Format) format, containing survey points of both horizontal (X, Y) and vertical (tops and inverts, or Z) information shall be provided on a CD.

1.03. DATUM

- A. The CONTRACTOR shall be responsible for correctly locating all lines and grades and for performing all measuring as required for the construction and completion of the Work from established reference points and information is shown on the Contract Drawings.
- B. All horizontal data shall be tied to North Carolina State Plane Coordinate System, **NAD 83**. These drawings shall constitute the project record documents.
- C. All vertical data shall be tied to North Carolina State Plane Coordinate System, **NAVD 88** coordinates.

1.04. SURVEY REFERENCE POINTS

- A. Only such primary control lines, monuments, and bench marks (if any) will be set by the OWNER as the OWNER determines to be necessary to control establishment of the lines and grades required for completion of the Work. In general, these will consist of the primary horizontal and vertical control points indicated on the Contract Drawings. All other stakes or markers required to establish the lines and grades required for the completion of the Work shall be the responsibility of the CONTRACTOR.
- B. Primary control monuments set by the OWNER shall be carefully preserved by the CONTRACTOR. In case such monuments are destroyed or damaged, they will be replaced at the CONTRACTOR's expense.

1.05. SURVEYS FOR LAYOUT AND PERFORMANCE

A. Surveying Requirements

1. Perform all surveys for layout and performance of the Work, reduce the field notes, and make all calculations and drawings necessary to carry out such work. The CONTRACTOR shall check the relative positions of all monuments and benchmarks to be used and shall report any damaged or out-of-position monuments to the ENGINEER at once. The CONTRACTOR shall check such relative positions each time the CONTRACTOR uses such monument or benchmark.

B. Equipment and Personnel

1. The CONTRACTOR's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times. Perform all surveys under the direct supervision of a professional land surveyor or ENGINEER currently licensed or registered in the State of North Carolina.

C. Field Notes and Records

1. Furnish the original pages of all survey records to the ENGINEER at intervals required by the ENGINEER. Furnish each field notebook to the ENGINEER when filled or completed.

D. Use by the ENGINEER

1. The ENGINEER may at any time use line and grade points and markers established by the CONTRACTOR. The CONTRACTOR's surveys are a part of the work and may be checked by the ENGINEER at any time. The CONTRACTOR shall be responsible for any lines, grades, or measurements which do not comply with specified or proper tolerances, or which are otherwise defective, and for any resultant defects in the work. The CONTRACTOR shall conduct resurveys or check surveys to correct errors indicated by review of the field notebooks or by check surveys performed by the ENGINEER.

1.06. SURVEYING FOR PREPARATION OF RECORD DRAWINGS

- A. The following items are required to be surveyed by a registered land surveyor to be used in the preparation of Record Drawings.

1. Valves
2. Hydrants
3. Blow-offs
4. Meters
5. Pipe Fittings
6. Air Release Valves
7. Sewer Service Cleanouts
8. Structures Including Rim, Pipe Inverts, and Vent Elevations
9. Equipment Foundation Pads

10. Final Grade

1.07. SURVEYING ACCURACY AND TOLERANCES IN SETTING SURVEY STAKES

A. Surveying Accuracy

1. Control

- a. Control traverse field surveys and computations, including surveys of main control lines to determine horizontal and vertical alignment of major structure components, shall meet the accuracy requirements for Second Order, Class I Surveys as specified by the National Oceanic and Atmospheric Administration (NOAA).

2. Staking

- a. Staking for construction or equipment installations shall meet the accuracy requirements for Second Order, Class II Surveys as specified by NOAA.

3. Record Drawing Documentation

- a. Surveying to be used for the preparation of Record Documents shall meet the accuracy requirements for Second Order, Class I Surveys as specified by the National Oceanic and Atmospheric Administration (NOAA).

B. Tolerances

- 1. The tolerances generally applicable in setting survey stakes shall be as set forth above. Such tolerances shall not supersede stricter tolerances required by the Contract Drawings or Specifications, and shall not otherwise relieve the CONTRACTOR of responsibility for measurements in compliance therewith.

END OF SECTION

SECTION 01 05 50

RESPONSIBILITIES OF RESIDENT PROJECT REPRESENTATIVE

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. The Resident Project Representative (RPR) will be ENGINEER's representative at the Site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding RPR's actions.

1.02. DUTIES AND RESPONSIBILITIES

A. General

1. RPR's dealings in matters pertaining to the Work in general shall be with ENGINEER and CONTRACTOR. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of CONTRACTOR. RPR shall generally communicate with OWNER only with the knowledge of and under the direction of ENGINEER.

B. Schedules

1. Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.

C. Conferences and Meetings

1. Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.

D. Liaison

1. Serve as ENGINEER's liaison with CONTRACTOR. Working principally through CONTRACTOR's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
2. Assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's onsite operations.
3. Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.

E. Interpretation of Contract Documents

1. Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to CONTRACTOR clarifications and interpretations as issued by ENGINEER.

F. Shop Drawings and Samples

1. Record date of receipt of Samples and CONTRACTOR-approved Shop Drawings.
2. Receive Samples which are furnished at the Site by CONTRACTOR and notify ENGINEER of availability of Samples for examination.

3. Advise ENGINEER and CONTRACTOR of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by ENGINEER.
- G. Modifications
1. Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to ENGINEER. Transmit to CONTRACTOR in writing decisions as issued by ENGINEER.
- H. Review of Work and Rejection of Defective Work
1. Conduct on-Site observations of CONTRACTOR's work in progress to assist ENGINEER in determining if the Work is in general proceeding in accordance with the Contract Documents.
 2. Report to ENGINEER whenever RPR believes that any part of CONTRACTOR's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise ENGINEER of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
- I. Inspections, Tests, and System Start-ups
1. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate OWNER's personnel, and that CONTRACTOR maintains adequate records thereof.
 2. Observe, record, and report to ENGINEER appropriate details relative to the test procedures and systems start-ups.
- J. Records
1. Prepare a daily report or keep a diary or log book, recording CONTRACTOR's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to ENGINEER.
 2. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
 3. Maintain records for use in preparing Project documentation.
- K. Reports
1. Furnish to ENGINEER periodic reports as required of progress of the Work and of CONTRACTOR's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.

2. Draft and recommend to ENGINEER proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from CONTRACTOR.
3. Immediately notify ENGINEER of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

L. Payment Requests

1. Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

M. Certificates, Operation and Maintenance Manuals

1. During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by CONTRACTOR are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to ENGINEER for review and forwarding to OWNER prior to payment for that part of the Work.

N. Completion

1. Participate in ENGINEER's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
2. Participate in ENGINEER's final visit to the Site to determine completion of the Work, in the company of OWNER and CONTRACTOR, and prepare a final punch list of items to be completed and deficiencies to be remedied.
3. Observe whether all items on the final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the notice of acceptability of the work.

1.03. LIMITATIONS OF AUTHORITY

A. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
2. Exceed limitations of ENGINEER's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of CONTRACTOR, Subcontractors, or Suppliers.
4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of CONTRACTOR's work.
5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of OWNER or CONTRACTOR.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by ENGINEER.
7. Accept Shop Drawing or Sample submittals from anyone other than CONTRACTOR.
8. Authorize OWNER to occupy the Project in whole or in part.

END OF SECTION

SECTION 01 30 00

SUBMITTALS

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. Except as otherwise stated elsewhere in the Contract, the OWNER, ENGINEER, and CONTRACTOR may transmit, and shall accept, Project related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.
- C. Submittal Format
 - 1. Except for samples, only electronic submittals shall be allowed. Manufacturer's original electronic files or legible, clear scans of printed material may be accepted. If the information is originally provided in color, the electronic copy shall reproduce such colors in sufficient detail to convey the original meaning of the information. For submittals where a color choice is to be made, the submittal shall faithfully reproduce the original colors. If a color choice is revised by the OWNER, on the basis that colors were not faithfully reproduced in the submittal, the CONTRACTOR shall bear all costs associated with the color change. Such color changes, even if they are required after the equipment is delivered, shall be in full accordance with the manufacturer's recommendations.
 - 2. All electronic files shall be provided in pdf format unless otherwise approved or requested by the ENGINEER.
 - 3. Naming convention for electronic submittals shall be YYMMDD – PROJECT NUMBER - TRADE – SPECIFICATION SECTION – SUBMITTAL NAME – REVISION NUMBER.pdf (for example, 140526 – 061345 – Mechanical – 02510 – Water Distribution System, Ductile Iron Pipe – Revision 0).
- D. Progress Schedule
 - 1. Within fifteen days after issuance of the Notice to Proceed, the CONTRACTOR shall prepare and submit an electronic copy of his proposed progress schedule to the ENGINEER for review and approval.
 - 2. If so required, the schedule shall be revised until it is approved by the ENGINEER.
 - 3. Schedule shall be updated monthly, depicting progress to the last day of the month.
 - 4. An electronic copy of the updated schedule shall be submitted to the ENGINEER not later than the fifth day of the month with the application for progress payment.
 - 5. The application for progress payment shall be considered incomplete until the updated schedule is received.

6. Schedule shall be prepared in the form of a horizontal bar chart showing the proposed sequence of the work in sufficient detail and identifying construction activities consistent with the CONTRACTOR's schedule of values in the application for progress payment.
 7. Schedule shall be time scaled, identifying the first day of each week, with the estimated start and complete date of each stage of the work in order to complete the Project within the Contract time.
 8. Updated schedule shall show all changes since the previous schedule.
 9. All revisions to the schedule must have the prior approval of the ENGINEER.
- E. Submittal Register
1. CONTRACTOR shall prepare and submit an electronic copy of his schedule of submittals or submittal register to the ENGINEER for review and approval. The submittal register shall include all items and information that the CONTRACTOR is required to submit for the ENGINEER to review throughout the course of the project. This shall include all equipment and materials for the project, required CONTRACTOR, subcontractor, or manufacturer qualifications, warranty submittals, etc.
 2. If so required, the schedule shall be revised until it is approved by the ENGINEER.
 3. Schedule shall be updated monthly.
 4. CONTRACTOR shall prepare and submit an electronic copy of the updated schedule to the ENGINEER not later than the fifth day of every month with the application for progress payment.
 5. The application for progress payment shall be considered incomplete until the updated schedule is received.
 6. The updated schedule shall be based on the Progress Schedule developed under the requirements of Paragraph 1.01(B) of this Section.
 7. Schedule shall be in tabular form with appropriate spaces to insert the following information for principal items of equipment and materials:
 - a. Dates on which Shop Drawings and other information are requested and received from the manufacturer or other appropriate source
 - b. Dates on which certification/information is received from the manufacturer or other appropriate source and transmitted to the ENGINEER
 - c. Dates on which Shop Drawings and other information are submitted to the ENGINEER and returned by the ENGINEER for revision
 - d. Dates on which Shop Drawings and other information are revised by manufacturer and resubmitted to the ENGINEER
 - e. Date on which Shop Drawings and other information are returned by ENGINEER annotated either "No Exceptions Taken" or "Correct as Noted"
 - f. Date on which accepted Shop Drawings and other information are transmitted to manufacturer or other appropriate recipient
 - g. Date of manufacturer's scheduled delivery

h. Date on which delivery is actually made

F. Working Drawings

1. Within thirty days after the Notice to Proceed, the CONTRACTOR shall prepare and submit an electronic copy of his preliminary schedule of Working Drawing submittals to the ENGINEER for review and approval.
2. If so required, the schedule shall be revised until it is approved by the ENGINEER.
3. Working Drawings include, but are not limited to, Shop Drawings, layout drawings in plan and elevation, installation drawings, elementary wiring diagrams, interconnecting wiring diagrams, manufacturer's data, etc.
4. CONTRACTOR shall be responsible for securing all of the information, details, dimensions, Drawings, etc., necessary to prepare the Working Drawings required and necessary under this Contract and to fulfill all other requirements of his Contract.
5. CONTRACTOR shall secure such information, details, Drawings, etc., from all possible sources including the Drawings, Working Drawings prepared by subcontractors, Engineer's, suppliers, etc.
6. Working Drawings shall accurately and clearly present the following:
 - a. All working and installation dimensions
 - b. Arrangement and sectional views
 - c. Units of equipment in the proposed positions for installation, details of required attachments and connections, and dimensioned locations between units and in relation to the structures.
 - d. Necessary details and information for making connections between the various trades including, but not limited to, power supplies and interconnecting wiring between units, accessories, appurtenances, etc.
7. In the event that the ENGINEER is required to provide additional engineering services as a result of a substitution of materials or equipment proposed by the CONTRACTOR, the additional engineering services will be provided in accordance with Section 00 07 00 – General Conditions.
8. All changes indicated necessary to accommodate the equipment and appurtenances shall be incorporated into the Working Drawings submitted to the ENGINEER.
9. Working Drawings specifically prepared for this Project shall be submitted electronically and prepared on sheets of the same size as the Drawings.
10. Working Drawings shall conform to recognized drafting standards and be neat, legible, and drawn to a large enough scale to show in detail the required information.
11. The Contract Drawings are used for engineering and general arrangement purposes only and are not to be used for Working Drawings.
12. Professionally Sealed Drawings
 - a. Submittals involving engineering design services shall bear the signature and seal of a professional ENGINEER currently licensed in the State of North Carolina for the discipline involved.

13. Shop Drawings

- a. CONTRACTOR shall submit Shop Drawings for review by the ENGINEER.
- b. Shop Drawings shall be furnished for all fabricated work and for all manufactured items required to be furnished by the Contract Documents.
- c. Structural and all other layout Drawings prepared specifically for the Project shall have a plan scale of not less than ¼-inch = 1 foot.
- d. Where manufacturer's publications in the form of catalogs, brochures, illustrations or other data sheets are submitted in lieu of prepared Shop Drawings, such submittals shall specifically indicate the item for which approval is requested.
- e. Identification of items shall be made in ink, and submittals showing only general information are not acceptable.
- f. Only manufacturer's original literature shall be accepted as submittals.

14. Layout and Installation Drawings

- a. CONTRACTOR shall prepare and submit for review by the ENGINEER layout and installation drawings for all pipes, valves, fittings, sewers, drains, heating and ventilation ducts, all electrical, heating, ventilating and other conduits, plumbing lines, electrical cable trays, lighting fixture layouts and circuiting, instrumentation, interconnection wiring diagrams, communications, power supply, alarm circuits, etc., under this Contract.
- b. The final dimensions, elevation, location, etc., of pipe, valves, fittings, sewers, ducts, conduits, electrical cable trays, equipment, etc., may depend upon the dimensions of equipment and valves to be furnished by the CONTRACTOR.
- c. Layout and installation drawings are required for both interior and exterior piping, valves, fittings, sewers, drains, heating and ventilation ducts, conduits, plumbing lines, electrical cable trays, etc.
- d. Layout and installation Drawings shall show connections to structures, equipment, sleeves, valves, fittings, etc.
- e. Drawings shall show the location and type of all supports, hangers, foundations, etc., and the required clearances to operate valves, equipment, etc.
- f. The Drawings for pipes, ducts, conduits, etc., shall show all 3-inch and larger electrical conduits and pressure piping, electrical cable trays, heating and ventilation ducts or pipes, structure, manholes or any other feature within four feet (measured as the clear dimension) from the pipe duct, conduit, etc., for which the profile is drawn.

15. CONTRACTOR Responsibilities

- a. All submittals from subcontractors, manufacturers or suppliers shall be sent directly to the CONTRACTOR for checking. CONTRACTOR shall thoroughly check all Drawings for accuracy and conformance to the intent of the Contract Documents.

- b. Drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors, manufacturers, or suppliers by the CONTRACTOR for correction before submitting to the ENGINEER.
- c. All submittals shall be organized, dated, properly labeled, and consecutively numbered.
- d. Information on the label shall indicate Specification Section; Drawing number; subcontractor's, manufacturer's, or supplier's name; and the name or type of item the submittal covers.
- e. Each part of a submittal shall be marked and tabulated.
- f. Working Drawings shall be submitted as a single complete package including all associated drawings relating to a complete assembly of the various parts necessary for a complete unit or system.
- g. Shop Drawings shall be submitted as a single complete package for any operating system and shall include all items of equipment and any mechanical units involved or necessary for the functioning of such system.
- h. Where applicable, the submittal shall include elementary wiring diagrams showing circuit functioning and necessary interconnection wiring diagrams for construction.
- i. All submittals shall be checked by the CONTRACTOR for accuracy and conformance to the intent of the contract documents before submitting to the ENGINEER.
- j. Each submittal shall bear the CONTRACTOR's stamp of approval certifying that they have been so checked.
- k. Submittals without the CONTRACTOR's stamp of approval will not be reviewed by the ENGINEER and will be returned to the CONTRACTOR.
- l. If the submittals contain any departures from the Contract Documents, specific mention thereof shall be made in the CONTRACTOR's letter of transmittal and depicted within the submittal.
- m. Otherwise, the review of such submittals shall not constitute approval of the departure.
- n. No materials or equipment shall be ordered, fabricated, or shipped or any work performed until the ENGINEER returns to the CONTRACTOR the submittals, herein required and annotated either "No Exceptions Taken" or "Correct as Noted."
- o. Where errors, deviations, and/or omissions are discovered at a later date in any of the submittals, the ENGINEER's prior review of the submittals does not relieve the CONTRACTOR of the responsibility for correcting all errors, deviations, and/or omissions.

16. Procedure for Review

- a. Submittals shall be transmitted in sufficient time to allow the ENGINEER at least fifteen (15) working days for review and processing.

- b. Illegible copies or copies with colors not conforming to 1.01.A.1. will not be accepted as submittals. They will be returned stamped "**Revise and Resubmit**".
- c. Submittal shall be accompanied by a letter of transmittal, in duplicate, containing date, project title, CONTRACTOR's name, number, and titles of submittals, notification of departures, and any other pertinent data to facilitate review.
- d. Submittals will be annotated by the ENGINEER in one of the following ways:
 - 1) "No Exceptions Taken"
 - 2) "**Correct as Noted/Resubmittal Not Required**" - minor corrections are noted and shall be made.
 - 3) "**Revise and Resubmit**" - major corrections are noted and a resubmittal is required or based on the information submitted, the submission is not in conformance with the Contract Documents. The deviations from the Contract Documents are too numerous to list and a completely revised submission of the proposed equipment or a submission of other equipment is required.
- e. If a submittal is satisfactory to the ENGINEER, the ENGINEER will annotate the submittal "**No Exceptions Taken**" or "**Correct as Noted**" and return an electronic copy to the CONTRACTOR.
- f. If a resubmittal is required, the ENGINEER will annotate the submittal "**Revise and Resubmit**" and transmit an electronic copy to the CONTRACTOR for appropriate action.
- g. If reproducible, transparencies are submitted, the ENGINEER will retain the copies and return the reproducible transparencies to the CONTRACTOR.
- h. CONTRACTOR shall revise and resubmit submittals as required by the ENGINEER until submittals are acceptable to the ENGINEER.
- i. It is understood by the CONTRACTOR that the OWNER may charge the CONTRACTOR for the ENGINEER's charges for review in the event a submittal is not approved ("**Revise and Resubmit**") by the third submittal for a system or piece of equipment.
- j. These charges shall be for all costs associated with engineering review, meetings with the CONTRACTOR or manufacturer, etc., commencing with the fourth submittal of a system or type of equipment submitted for a particular Specification Section.
- k. Acceptance of a Working Drawing by the ENGINEER will constitute acceptance of the subject matter for which the Drawing was submitted and not for any other structure, material, equipment, or appurtenances indicated or shown.

17. ENGINEER's Review

- a. ENGINEER's review of the CONTRACTOR's submittals shall in no way relieve the CONTRACTOR of any of his responsibilities under the Contract.
- b. An acceptance of a submittal shall be interpreted to mean that the ENGINEER has no specific objections to the submitted material, subject to conformance with the Contract Drawings and Specifications.

- c. ENGINEER's review will be confined to general arrangement and compliance with the Contract Drawings and Specifications only, and will not be for the purpose of checking dimensions, weights, clearances, fittings, tolerances, interferences, coordination of trades, etc.

18. Record Working Drawings

- a. Prior to final payment, the CONTRACTOR shall furnish the ENGINEER one complete electronic set of all accepted Working Drawings.
- b. Manufacturer's publications, submitted in lieu of prepared Shop Drawings, will not be required in reproducible form.
- c. Original manufacturer's publications, in color, shall be provided in place of black and white copies.
- d. Working Drawings furnished shall be corrected to include any departures from previously accepted Drawings.

G. Operation and Maintenance Manuals

1. The CONTRACTOR shall submit an electronic copy of Operation and Maintenance Manuals prepared specifically for this Project for each item of equipment furnished under this Contract at the time it is installed.
 - a.
2. Manuals shall contain complete information in connection with assembly, operation, lubrication, adjustment, wiring diagrams and schematics, maintenance, and repair, including detailed parts lists with drawings or photographs identifying the parts.
3. Once approved, three printed copies of the approved manuals shall be assembled and bound in separate volumes by major equipment items or trades and properly indexed to facilitate locating required information. All parts, sections, drawings, and other information in the approved, final Operation and Maintenance Manuals shall also be supplied in digital format on a compact disk. All O&M Manuals may be provided on one disk, size permitting.
4. ENGINEER and the OWNER shall be the sole judge of the acceptability and completeness of the manuals and may reject any submittal for insufficient information including incorrect references and/or the manner in which the material is assembled.
5. For pumps, the Operation and Maintenance manual cover sheets shall include the following:
 - a. Manufacturer
 - b. Manufacturer's local representative with address and telephone number
 - c. Source of spare parts with address and telephone number
 - d. Operating conditions, i.e., rated capacity and TDH
 - e. Model number, serial number, and impeller diameter
6. The approved sets of operation and maintenance manuals shall be furnished prior to final acceptance.

H. Certified Shop Test Reports

1. Each piece of equipment for which pressure, head, capacity, rating, efficiency, performance, function, or special requirements are specified or implied shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and applicable test codes and standards.
2. The CONTRACTOR shall secure from the manufacturers legible electronic copies of the actual test data, the interpreted results and a complete description of the testing facilities and testing setup, all accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and notarized.
3. These reports shall be forwarded to the ENGINEER for review.
4. In the event any equipment fails to meet the test requirements, the manufacturer shall make all necessary changes, adjustments or replacements and the tests shall be repeated, at no additional cost to the OWNER or ENGINEER, until the equipment test requirements are acceptable to the ENGINEER.
5. No equipment shall be shipped to the Project until the ENGINEER notifies the CONTRACTOR, in writing, that the shop test reports are acceptable.
6. Copies of certified test data shall be incorporated into the Record Working Drawings.

I. Samples

1. CONTRACTOR shall furnish for review all samples as required by the Contract Documents or requested by the ENGINEER.
2. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, and range of color, finish, or texture.
3. Samples shall be properly labeled to show the nature of the material, trade name of manufacturer and location of the work where the material represented by the sample will be used.
4. Samples shall be checked by the CONTRACTOR for conformance to the Contract Documents before submitting to the ENGINEER.
5. Samples, or CONTRACTOR's letter of transmittal accompanying the samples, shall bear the CONTRACTOR's stamp of approval certifying that they have been so checked.
6. Transportation charges on samples submitted to the ENGINEER shall be prepaid by the CONTRACTOR.
7. ENGINEER's review will be for compliance with the Contract Documents, and his comments will be transmitted to the CONTRACTOR with reasonable promptness.
8. Accepted samples will establish the standards by which the completed work will be judged.

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. Furnish, install and maintain temporary utilities required for construction and remove on completion of work.

1.02. REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and local codes and regulations and with utility company requirements.
- C. Comply with North Carolina Department of Transportation Regulations.

1.03. MATERIALS

- A. Materials may be new or used but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate the requirements of applicable codes and standards.

1.04. TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used in construction and testing.
- B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available as required for construction using construction-type power cords.

1.05. TEMPORARY VENTILATION

- A. Provide temporary ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work to meet specified OSHA requirements.
- B. Provide temporary ventilation, if necessary, to protect materials from damage due to temperature or humidity.

1.06. TEMPORARY WATER

- A. Make all necessary arrangements for obtaining water for construction purposes.

1.07. TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean, and maintain facilities and enclosures.

1.08. TEMPORARY PUMPS

- A. Provide temporary pumps for removal of water from the excavation when required by the Work to maintain proper conditions for construction.

1.09. EXECUTION

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

1.10. REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore permanent facilities used for temporary services to original or better condition for specified use.

END OF SECTION

SECTION 01 55 00
SITE ACCESS AND STORAGE

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Access Roads

1. The CONTRACTOR shall construct and maintain such temporary access roads required to perform the work of this Contract.
2. Access roads shall be located within the easements of the OWNER unless the CONTRACTOR independently secures easements for his use and convenience.
 - a. CONTRACTOR shall submit written documentation to the ENGINEER for any easements secured by the CONTRACTOR across private property.
 - b. The easement agreement shall specify terms and conditions of use and provisions for site restoration.
 - c. A written release from the property OWNER, certifying that all terms of the easement agreement have been complied with by the CONTRACTOR, shall be furnished to the ENGINEER prior to final payment.

B. Parking Areas

1. The CONTRACTOR shall provide suitable parking areas for his construction personnel on the project site where approved by the ENGINEER and the OWNER.
2. The CONTRACTOR shall not permit his construction personnel to park along public streets or roads within the project area.

C. Restoration

1. At the completion of the work, the surfaces of land used for access roads and parking areas shall be restored by the CONTRACTOR to their original condition as determined by the ENGINEER.
 - a. Restoration shall include establishment of a permanent ground cover, where a ground cover existed, adequate to restrain erosion for all disturbed areas.

D. Traffic Regulations

1. CONTRACTOR shall obey all traffic laws and comply with all the requirements, rules, and regulations of the OWNER, the North Carolina Department of Transportation, and other local authorities having jurisdiction to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways.

E. Storage of Equipment and Materials

1. CONTRACTOR shall arrange for and store his equipment and materials at the job site in accordance with the requirements of the General Conditions, the Supplemental Conditions, and as hereinafter specified.
 - a. All materials shall be stored in accordance with manufacturer's recommendations, as directed by the OWNER or ENGINEER, and in conformity to

applicable statutes, ordinances, regulations, and rulings of the public authority having jurisdiction.

2. CONTRACTOR shall enforce the instructions of OWNER and ENGINEER regarding the posting of regulatory signs for fire safety and smoking areas.
3. CONTRACTOR shall not store materials upon private property without the written consent of the owners of such property.
4. CONTRACTOR shall not store unnecessary materials or equipment on the job site and shall take care to prevent any structure from being loaded with a weight which will endanger its security or the safety of persons.
5. Materials shall not be placed within 10-feet of fire hydrants.
6. Gutters, drainage channels, and inlets shall be kept unobstructed at all times.
7. CONTRACTOR shall provide adequate temporary storage buildings/facilities, if required, to protect materials or equipment on the job site.

END OF SECTION

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.02 FINAL INSPECTION

- A. When CONTRACTOR considers the Work is complete, he shall submit written certification that:
1. Contract Documents have been reviewed.
 2. Work has been inspected for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.
 4. Equipment and systems have been tested in the presence of the OWNER's representative and are operational.
 5. Work is completed and ready for final inspection.
- B. The ENGINEER will inspect to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should the ENGINEER consider that the Work is incomplete or defective:
1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.
 2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies and send a second written certification to the ENGINEER that the Work is complete.
 3. The ENGINEER will reinspect the Work.
- D. When the ENGINEER finds that the Work is acceptable under the Contract Documents, he shall request the CONTRACTOR to make closeout submittals.

1.03 REINSPECTION FEES

- A. Should the ENGINEER perform reinspection due to failure of the Work to comply with the claims of status of completion made by the CONTRACTOR:
1. OWNER will compensate the ENGINEER for such additional services.
 2. The OWNER will deduct the amount of such compensation from the final payment to the CONTRACTOR.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities.

- B. Project Record Documents: To requirements of Specification Section 01 72 00 - Project Record Documents.
- C. Contractor to provide electronic copies of all shop drawings, O&M manuals, RFIs, Change Orders, etc. prior to final payment through either a file share site or continued full access to Contractor's construction management software.
- D. Warranties and Bonds: To requirements of Specification Section 01 74 00 - Warranties and Bonds.
- E. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

1.05 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the ENGINEER.
- B. Statement shall reflect the following:
 - 1. All adjustments to the Contract Sum
 - 2. The original Contract Sum
 - 3. Additions and deductions resulting from the following:
 - a. Previous Change Orders
 - b. Allowances
 - c. Unit Prices
 - d. Deductions for uncorrected Work
 - e. Deductions for liquidated damages
 - f. Deductions for reinspection payments
 - g. Other adjustments
 - 4. Total Contract Sum, as adjusted
 - 5. Previous payments
 - 6. Sum remaining due
- C. The ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

- A. CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the General Conditions of the Contract.

END OF SECTION

SECTION 01 72 00
PROJECT RECORD DOCUMENTS

Part 1 General

- 1.01. The requirement
- A. Maintain at the site for the OWNER one record copy of the following:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other Modifications to the Contract
 - 5. Engineer's Field Orders or written instructions
 - 6. Approved Shop Drawings, Working Drawings, and Samples
 - 7. Field Test records
 - 8. Construction photographs
 - 9. All other construction related permits
- 1.02. Maintenance of Documents and Samples
- A. Store documents and samples in CONTRACTOR'S field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide locked cabinet or secure storage space for storage of samples.
 - B. File documents and samples in accordance with CSI format.
 - C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
 - D. Make documents and samples available at all times for inspection by the ENGINEER.
 - E. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the currently updated "Project Record Documents" and survey data in accordance with Specification Section 01 30 00 – Submittals for review by the ENGINEER and OWNER.
- 1.03. Marking Devices
- A. Provide felt tip marking pens for recording information in the color code designated by the ENGINEER.
- 1.04. Recording
- A. Label each document "PROJECT RECORD" in neat large printed letters.
 - B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
 - C. Record Drawings
 - 1. Surveying Requirements
 - a. Provide surveying in accordance with Specification Section 01 04 00 – Construction Surveying.
 - 2. Provide the following information on the Record Drawings.

- a. Location of pipes and conduits with changes from the approved design noted
 - b. Location of valves
 - c. Location of hydrants
 - d. Location of blow-offs
 - e. Location of meters
 - f. Location of pipe fittings
 - g. Location of air release valves
 - h. Location of sewer service cleanouts
 - i. Location and elevation of structures including rim, pipe inverts, and vent elevations
 - j. Location and elevation of equipment foundation pads
 - k. Final grade including contours at one foot intervals
3. Maintain Record Drawings of all work and subcontracts, continuously as the job progresses. A separate set of prints, for this purpose only, shall be kept at the CONTRACTOR's field office at all times.
 4. These drawings shall be kept up-to-date and are required to be so certified by the ENGINEER at the time invoices are submitted for progress payments. The ENGINEER may withhold progress payments if Record Drawings are not kept current.
 5. The OWNER will furnish the CONTRACTOR a complete set of full-size copies of the Contract Drawings for the purpose of making prints for Record Drawings.
 6. Deviations from the drawings, utilities and services, mechanical and electrical lines, details, and other work shall be incorporated on the Record Drawing prints in red ink; neat and clearly legible.
 7. No work shall be permanently concealed until the required information has been recorded.
 8. Where the Contract Drawings are not of sufficient size, scale, or detail, the CONTRACTOR shall furnish its own drawings for incorporation of details and dimensions.
 9. Change Orders
 - a. Changes to the Contract Drawings as the result of Change Orders shall be incorporated on the prints, and these changes shall be identified by Change Order number and effective date.
 - b. When revised Contract Drawings are issued as the basis of, or along with, Change Orders, these revised drawings shall be incorporated into the Record Drawing set with appropriate annotation. Drawings deleted by Change Order will not be part of the Record Drawing set. The OWNER will furnish the CONTRACTOR with reproductions of such revised OWNER-furnished Contract Drawings.
 - c. The final submittal of Record Drawings shall be stamped "Project Record ", signed and dated in blue ink by the CONTRACTOR, and shall be delivered to the ENGINEER prior to the final inspection as specified in Specification Section 01 70 00 - Contract Closeout.
- D. Specifications and Addenda; legibly mark each Section to record the following
1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed

2. Changes made by Work Change Directive, Field Order or Change Order
- E. Shop Drawings (after final review and approval)
 1. CONTRACTOR shall submit three sets of record drawings for each process equipment, piping, electrical system and instrumentation system.
- 1.05. Submittals
 - A. At Contract close-out, deliver Record Documents to the ENGINEER for the OWNER.
 - B. Contractor to provide electronic copies of all shop drawings, O&M manuals, RFIs, Change Orders, etc. prior to final payment through either a file share site or continued full access to Contractor's construction management software.
 - C. Final payment will not be released without delivery of the Record Documents to the ENGINEER.
 - D. Accompany submittal with transmittal letter in duplicate, containing:
 1. Date
 2. PROJECT title and number
 3. CONTRACTOR's name and address
 4. Title and number of each Record Document
 5. Signature of CONTRACTOR or his authorized representative

END OF SECTION

SECTION 01 73 00
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01. SCOPE OF WORK

- A. This section includes procedural requirements for compiling and submitting operation and maintenance data require to complete the project.

1.02. SERVICES OF MANUFACTURER'S REPRESENTATIVE

- A. Equipment, when furnished, shall include the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment, and testing of the equipment and to instruct the Owner's operating personnel on operation and maintenance.
- B. This supervision may be divided into two or more time periods as required by the installation program or as directed by the ENGINEER.
- C. See the detailed Specifications for additional requirements for furnishing the services of manufacturer's representatives.
- D. A certificate in the form attached to this Section, from the manufacturer and signed by Owner's representative stating that the installation of the equipment is satisfactory, that the unit has been satisfactorily tested, is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit shall be submitted for each piece of equipment indicated above.
- E. For equipment furnished under other Divisions, the CONTRACTOR shall furnish the services of accredited representatives of the manufacturer only when some evident malfunction or over-heating makes such services necessary in the opinion of the ENGINEER.

1.03. OPERATING MANUALS

- A. The CONTRACTOR shall submit an electronic copy of Operation and Maintenance Manuals prepared specifically for this Project prior to Substantial Completion.
- B. Once approved CONTRACTOR shall submit **three** complete sets of operation and maintenance instructions covering all equipment furnished to the ENGINEER prior to Final Completion.
1. The manual for each piece of equipment shall be a separate document with the following specific requirements:
 - a. Contents
 - 1) Table of contents and index
 - 2) Brief description of each system and components
 - 3) Starting and stopping procedures
 - 4) Special operating instructions
 - 5) Routine maintenance procedures

- 6) Manufacturer's printed operating and maintenance instructions, parts list, illustrations, and diagrams
 - 7) One copy of each wiring diagram
 - 8) One copy of each approved shop drawing and each Contractor's coordination and layout drawing
 - 9) List of spare parts, manufacturer's price, and recommended quantity
 - 10) Name, address, and telephone numbers of local service representatives
- b. Material
- 1) Loose leaf on 60 pound, punched paper
 - 2) Holes reinforced with plastic cloth or metal
 - 3) Page size, 8-1/2-in by 11-in
 - 4) Diagrams, illustrations, and attached foldouts as required, of original quality, reproduced by dry copy method
 - 5) Covers: oil, moisture and wear resistant 9 x 12 size

1.04. CONTENTS

A. Table of Contents

1. Provide title of Project, names, addresses, and telephone numbers of ENGINEER, subconsultants, and CONTRACTOR with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System

1. List names, addresses and telephone numbers of Subcontractors and suppliers; including local source of supplies and replacement parts.

C. Product Data

1. Mark each sheet to clearly identify specific products and component parts, and data applicable to installation.
2. Delete inapplicable information.

D. Drawings

1. Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
2. Do not use Project Record Documents as maintenance drawings.

E. Type Text

1. As required to supplement product data.
2. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.

F. Warranties and Bonds are as specified in Section 01 74 00 - Warranties and Bonds.

1.05. MANUAL FOR EQUIPMENT AND SYSTEMS

A. For each Item of Equipment and Each System provide the following:

1. Overview of System and description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.
4. Panelboard Circuit Directories including electrical service characteristics, controls and communications, and color-coded wiring diagrams as installed.
5. Operating Procedures
 - a. Include start-up, break-in, and routine normal operating instructions and sequences; regulation, control, stopping, shut-down, and emergency instructions; and summer, winter, and any special operating instructions.
6. Maintenance Requirements
 - a. Routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - b. Servicing and lubrication schedule, and list of lubricants required.
 - c. Manufacturer's printed operation and maintenance instructions.
 - d. Sequence of operation by controls manufacturer.
 - e. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
7. Control diagrams by controls manufacturer as installed.
8. CONTRACTOR's coordination drawings, with color coded piping diagrams as installed.
9. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
10. List of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
11. Test and balancing reports as specified.
12. Additional Requirements:
 - a. As specified in individual product specification Sections.

1.06. INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon time.
- B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

- C. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

END OF SECTION

SECTION 01 74 00
WARRANTIES AND BONDS

PART 1 GENERAL

1.01. SCOPE OF WORK

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.

1.02. DEFINITIONS

- A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the OWNER.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the OWNER.

1.03. SUBMITTALS

- A. Submit written warranties to the OWNER prior to the date fixed by the ENGINEER for Substantial Completion.
- B. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the OWNER.
- C. When a designated portion of the Work is completed and occupied or used by the OWNER, by separate agreement with the CONTRACTOR during the construction period, submit properly executed warranties to the OWNER within fifteen days of completion of that designated portion of the Work.
- D. When a special warranty is required to be executed by the CONTRACTOR, or the CONTRACTOR and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.
- E. Submit a draft to the OWNER for approval prior to final execution.
- F. Refer to individual Sections of Divisions 2 through 50 for specific content requirements, and particular requirements for submittal of special warranties.

1.04. WARRANTY REQUIREMENT

- A. Related Damages and Losses
 - 1. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty
 - 1. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.

2. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost

1. Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents.
2. The CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether the OWNER has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse

1. Written warranties made to the OWNER are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the OWNER can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties

1. The OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.

F. The OWNER reserves the right to refuse to accept Work for the PROJECT where a special warranty, certification, or similar commitment is required on such Work or part of the Work until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Disclaimers and Limitations

1. Manufacturer's disclaimers and limitations on product warranties do not relieve the CONTRACTOR of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the CONTRACTOR.

H. Separate Prime Contracts

1. Each Prime CONTRACTOR is responsible for warranties related to its own Contract.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete clearing site of incidental paving and curbs, debris, grass, trees, and other plant life in accordance with the plans. All materials and procedures shall be of the type specified herein.

B. Section Includes:

1. Removing surface debris.
2. Removing designated paving, curbs, and other above- and below-grade site improvements.
3. Removing designated trees, shrubs, and other plant life.
4. Removing abandoned utilities.
5. Protecting existing vegetation to remain.
6. Excavating and stockpiling topsoil.

1.02. SUBMITTALS

A. Section 01 30 00 – Submittals/Electronic Submittals.

B. Product Data: Submit data for herbicide and tree wound paint. Indicate compliance with applicable codes for environmental protection.

C. Existing Conditions: Submit documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

D. Record Drawings: Identify and accurately show locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.03. DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil. Includes the zone where plant roots grow.

- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, as indicated on Drawings or as designated by the ENGINEER.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04. QUALITY ASSURANCE

- A. Conform to applicable codes for environmental requirements, disposal of debris, burning debris on site, and use of herbicides.
- B. Perform all work and provide materials in accordance with the requirements of federal, state, and local authorities having jurisdiction.
 - 1. Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on CONTRACTOR's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work.

PART 2 PRODUCTS

2.01. MATERIALS

- A. Herbicide: Approved by authority having jurisdiction.
- B. Tree wound paint: Bituminous based paint of standard manufacture specially formulated for tree wounds.
- C. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb./ft. remaining flexible from minus 60 to plus 200 degree F inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.
 - a. Height: 4 feet.
 - b. Color: High-visibility orange, nonfading.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- B. Identify waste area and salvage area for placing removed materials.
- C. Work on adjoining property will be not permitted without the written consent of the property OWNER and the ENGINEER. This includes, but is not limited to, temporary access to the Work, storage of materials, and any ground disturbing activities.

3.02. PREPARATION

- A. Call NC811 utility locating service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. The ENGINEER will designate all areas of growth or individual trees which are to be preserved due to their desirability for landscape or erosion control purposes.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control and plant/tree protection measures are in place as specified.
- D. Carefully remove items indicated to be salvaged.
 1. Disassemble and/or remove indicated items as necessary to permit construction, and safely store items on OWNER's premises to prevent harm to the materials.
 2. Following construction, reassemble in the original location (or other onsite area designated by OWNER) in a manner that matches the assembly prior to its removal. If the salvaged item(s) are to be utilized by the OWNER offsite, the CONTRACTOR shall disassemble and store the items and coordinate with OWNER regarding the OWNER's transportation and reuse of these materials offsite.
- E. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.
 2. Keep roads and walks free of dirt and debris at all times unless otherwise permitted by OWNER or authorities having jurisdiction. When permitted, dirt and debris shall be cleaned, swept, and removed at the end of each work day.
 3. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.

3.03. PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.
 1. Notify the ENGINEER immediately of damage to or an encounter with an unknown existing utility line. Repair damage to existing utility lines that are indicated or made known to the CONTRACTOR prior to start of clearing and grubbing operations at no additional cost to the OWNER.
- B. Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify ENGINEER not less than three (3) days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without ENGINEER's written permission.
- C. Protect trees, plant growth (including root structure), and features designated to remain, as final landscaping.
 1. Trim all branches of trees to remain to such heights and in such manner as may be necessary to prevent interference with construction operations. Cut smoothly and

- neatly close to the whole of the tree or to main branches without splitting or crushing. Paint the cuts with an approved tree wound paint.
2. Encircle the drip line of trees or groups of trees which are to remain adjacent to the work with plastic protection-zone fencing as may be necessary to protect them from piled material, equipment, or equipment operation.
 3. Chip removed tree branches and stockpile in approved areas, if approved by ENGINEER, or dispose of off-site.
 4. Protect all cultivated hedges, shrubs, and plants that might be injured by project operations. Promptly heel in any trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is reestablished.
- D. Remove trees, cultivated hedges, shrubs, plants and other landscape features injured by equipment operations to such a degree as to affect their growth or diminish their beauty or usefulness, and replace with equivalent, undamaged trees and landscape features.
1. Obtain ENGINEER's approval before replacement.
- E. Protect bench marks, survey control points, and existing structures from damage or displacement.
- F. Protect existing site improvements to remain from damage during construction.
1. Restore damaged improvements to their original condition, as acceptable to OWNER.
- G. The following practices are prohibited within plant protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
 8. Heat sources, flames, ignition sources, and smoking.
- H. Do not direct vehicle or equipment exhaust towards protection zones.

3.04. CLEARING

- A. Clearing consists of the felling and cutting up, or the trimming of trees and the satisfactory disposal of the trees and other vegetation together with the down timber, snags, brush, and rubbish occurring within the areas to be cleared. Trees and other vegetation, except such individual trees, groups of trees, and vegetation, as indicated on the plans to be left standing, shall be cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared.

- B. Perform clearing only within the limits established by the plans, specifications, or the ENGINEER.
- C. Prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction. When such damages occur, repair, remove, or otherwise resolve all damaged areas, utilizing generally accepted practices at no additional cost to the OWNER.
- D. Remove trees and shrubs within marked areas and where indicated. Remove stumps, main root ball, root system, logs, organic and metallic debris, brush, and refuse to depth of not less than 18 inches below the original soil surface in areas indicated to be grubbed and in areas indicated as construction areas under this contract.
 - 1. Use only hand methods for grubbing within protection zones.
 - 2. In embankment areas, when the depth of embankment exceeds 42 inches in height, sound stumps shall be cut off not more than 6 inches above the existing ground level and not grubbed. Unsound or decayed stumps shall be removed to a depth of approximately 2 feet below the natural ground surface.
 - 3. Fill depressions made by grubbing with suitable material and compact as specified to make the new surface conform with the existing adjacent surface of the ground.
- E. Clear undergrowth and deadwood, without disturbing subsoil.
- F. Apply herbicide in accordance with the manufacturer's label to remaining stumps to inhibit growth.

3.05. REMOVAL

- A. Remove debris, rock, demolished materials, extracted plant life, and waste materials, and legally dispose of them off site.
- B. Remove paving, curbs, slabs, gutters and, aggregate base as indicated on Drawings.
 - 1. Unless existing, full-depth joints coincide with line of demolition, neatly saw-cut along the line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.
- E. CONTRACTOR shall coordinate clearing activities or removal of any unwanted debris with property owner during the course of the project.
- F. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

- G. Burn or bury materials on site only when permitted by the ENGINEER. Leave site in clean condition.
 - 1. Deposit all combustible matter at locations approved by authorities having jurisdiction. Combustible matter may be burned (with written approval of Fire Marshall or other authorities having jurisdiction) or disposed of as stated above. Adhere to all limitations and conditions set forth in the permit.
 - 2. Burning shall be done at such time and in such a manner as to prevent fire from spreading and to prevent any damage to adjacent cover and shall further be subject to all requirements of agencies having jurisdiction pertaining to the burning. Keep burning under constant attendance until all fires have burned out or have been extinguished.

3.06. TOPSOIL EXCAVATION

- A. Remove sod and grass before stripping topsoil.
- B. Excavate topsoil to a depth of 6 inches from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.
 - 1. Remove subsoil and non-soil materials, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Do not excavate wet topsoil. Handle topsoil only when the topsoil is dry or slightly moist.
- D. Stockpile topsoil without intermixing with subsoil in area designated on site to depth not exceeding 6 feet and protect from erosion.
 - 1. Stockpile surplus topsoil to allow for respreading deeper topsoil.
 - 2. Grade and shape stockpiles to drain surface water
 - 3. Do not stockpile topsoil within protection zones.
 - 4. Cover to prevent windblown dust and erosion by water.
 - 5. Stockpile material until disposal.
- E. Remove excess topsoil not intended for reuse and unsuitable topsoil from site.

END OF SECTION

SECTION 31 15 05

EXCAVATION, BACKFILL, AND COMPACTION

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. Furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, compaction, and grading required completing the work shown on the Drawings and specified herein.
- B. The work shall include, but not necessarily be limited to excavation, backfilling, grading, compaction, disposal of waste and surplus materials, placing crushed stone, construction of berms, and all related work such as sheeting, bracing and dewatering.
 - 1. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards 29 CFR Part 1926.650 Subpart P and State requirements.
 - a. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
 - 2. Excavated topsoil and excess cut material will be stockpiled in locations approved by the ENGINEER.

1.02. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the Specifications, all work herein shall conform to the applicable requirements of the following documents.
 - 1. North Carolina Department of Transportation Standard Specifications for Roads and Structures.
 - 2. ASTM C 127 - Test for Specific Gravity and Absorption of Coarse Aggregate
 - 3. ASTM C 136 -Test for Sieve Analysis of Fine and Coarse Aggregates
 - 4. ASTM D 422 - Particle Size Analysis of Soils
 - 5. ASTM D 423 - Test for Liquid Limit of Soils
 - 6. ASTM D 424 - Test for Plastic Limit and Plasticity Index of Soils
 - 7. ASTM C 535 - Test for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - 8. ASTM D 698 - Standard Method of Test for the Moisture - Density Relations of Soils Using a 5.5 lb. (2.5 kg) Rammer and a 12-inch (305 mm) Drop
 - 9. ASTM D1556 - Test for Density of Soil in Place by the Sand-Cone Method
 - 10. ASTM D1557 - Test for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lbs. (4.5 kg) Rammer and 18-inch (457 mm) Drop
 - 11. ASTM D2049 - Test Method for Relative Density of Cohesionless Soils
 - 12. ASTM D2167 - Test for Density of Soil in Place by the Rubber-Balloon Method

13. ASTM D2216 - Test for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures
14. ASTM D2487 - Test for Classification of Soils for Engineering Purposes
15. ASTM D2922 - Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.03. SUBMITTALS

- A. Excavation support designs shall be prepared by a licensed professional engineer, registered in the State of North Carolina, having a minimum of five years of professional experience in the design and construction of excavation support systems.
- B. Submit a sealed copy of the required Engineering Certification Form in accordance with Section 01 30 00 – Submittals prior to beginning work.

1.04. QUALITY ASSURANCE

- A. Codes and Standards
 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Services
 1. Provide access for testing agency to perform soil testing and inspection services for quality control during earthwork operations.
 2. A testing laboratory approved by the ENGINEER will be employed by the CONTRACTOR and paid by the CONTRACTOR. If included in the PROJECT BID SCHEDULE these costs shall be reimbursable from the Bid Allowance line item established for testing; otherwise these costs should be included in the price of the work to be completed.
 3. Allow testing agency to inspect and approve subgrades and fill layers before construction work is performed.
- C. Compaction Testing
 1. The testing agency shall be NCDOT certified.
 2. Tests will be performed in accordance with applicable NC DOT, ASTM, or AASHTO standard methods, unless otherwise specified.
 - a. The optimum moisture content and the maximum density of each type of material used for structural fill and backfill will be determined in accordance with ASTM D698 or AASHTO T-99.
 - b. The field moisture content of materials being compacted will be determined by ASTM D2216 - Laboratory Determination of Moisture Content of Soil.
 - c. The field density of compacted material will be determined by ASTM D1556 - Test for Density of Soil in Place by the Sand-Cone Method, or by other acceptable in-place density testing method.
 3. Testing Frequency

- a. Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. Frequency and location will be chosen by ENGINEER.
- b. Fill improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the OWNER.

1.05. JOB CONDITIONS

- A. Carefully maintain all reference points, property markers, right-of-way markers, benchmarks, etc., and accurately restore if disturbed.
- B. The presence of groundwater in the soil will not constitute a condition for which an increase in the contract price will be made.
- C. Existing Utilities
 1. CONTRACTOR is responsible for locating all utilities and protecting them from damage.
 2. Cooperate with OWNER and utility companies for maintaining services.
 3. Do not break utility connections without notifying utility or OWNER a minimum of 48 hours in advance and providing acceptable temporary services if required.
 4. CONTRACTOR shall repair damage to existing utilities as directed by utility company at no additional expense to the OWNER.

PART 2 PRODUCTS

2.01. SOIL

- A. Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability for this application:
 1. Class I Soil - Angular, 6 to 40 mm (1/4" to 1-1/2"), graded stone, including a number of fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.
 2. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm (1-1/2"), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.
 3. Class III Soil - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM, and SC are included in this class.
 4. Class IV Soil - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.
 5. Class V Soil - Includes the organic soils - types OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than 1-1/2 inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

2.02. FILL MATERIALS

- A. Materials for use as fill shall be as described below. The CONTRACTOR shall notify the ENGINEER of the source of each material.
- B. Materials shall be furnished as required from approved off-site sources and hauled to the site.
- C. Common Fill
 - 1. Common Fill shall consist of mineral soil free from organic materials, loam, wood, trash, and other objectionable materials which may be compressible or which cannot be properly compacted.
 - 2. Common fill shall not contain stones larger than 4 inches in largest dimension and shall have at least 60% passing the No. 4 sieve, a maximum of 60% passing the No. 200 Sieve, a maximum liquid limit of 60, and a maximum plasticity index of 25.
 - 3. Common Fill shall not contain granite blocks, broken concrete, masonry rubble, or other similar materials.
 - a. It shall have physical properties such that it can be readily spread and compacted during filling.
 - b. Snow, ice and frozen soil will not be permitted.
- D. Select Fill
 - 1. Select Fill shall be as specified above for Common Fill except that the material shall contain no stones larger than two inches in largest dimension, a maximum of 50% passing the No. 200 Sieve, a maximum liquid limit of 50 and a maximum plasticity index of 15.
- E. Structural Fill
 - 1. Structural Fill shall be as specified above for Select Fill except that the material shall have a maximum liquid limit of 40% and a maximum plasticity index of 10 percent.
 - 2. Structural Fill shall be used for roadway shoulder construction as indicated on the Drawings.
- F. The soils shall be wetted or dried as necessary so that the moisture content during compaction is within 3% of the optimum moisture content as determined by ASTM D698.
- G. Highly micaceous and elastic silts shall not be used for Common, Select Fill, or Structural Fill.

2.03. STONE FOR STABILIZATION OF FOUNDATION

- A. Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67 as contained the Standard Specifications for Roads & Structures as published by the NC Department of Transportation, latest edition.

2.04. CRUSHED STONE

- A. All crushed stone shall be silica material that is sound, hard, durable, resistant to weathering, as defined by ASTM D2488 and shall be free of overburden, spoil, shale, limestone, and organic material.
- B. The stone shall be free of deleterious materials such as flat, elongated, friable, decomposed, or micaceous pieces.
 - 1. Broken pieces of concrete, asphalt, or brick are not acceptable.
- C. Crushed stone shall be of the size and type shown on the drawings.

2.05. RIP-RAP

- A. Provide NCDOT, Class A, B, I or II Rip Rap as shown on the drawings.
- B. Rip Rap shall comply with NCDOT Standard Specifications Section 1042 - Riprap.

PART 3 EXECUTION

3.01. GENERAL EXCAVATION

- A. General excavation is expected to consist of removing unsuitable soils identified during proofrolling.
 - 1. The bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the ENGINEER.
- B. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils.
 - 1. Soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures, earthen or man-made, as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced as required by the ENGINEER at the CONTRACTOR's expense.
- C. Dewatering shall lower the groundwater to at least 1-foot below excavation subgrade and prevent "boiling" condition or detrimental under-seepage at the base of the excavation as specified herein.
- D. Excavation equipment shall be satisfactory for carrying out the work in accordance with the Specifications.
- E. Proof-roll exposed subgrades after stripping topsoil and organics with a minimum of two complete passes of a rubber tired heavy vehicle as approved by the ENGINEER.
 - 1. All proofrolling shall be conducted in the presence of the ENGINEER.
 - 2. The ENGINEER may require excavation and replacement or other remediation as necessary to provide a firm, stable subgrade in areas that appear to be rutting, pumping, or otherwise appear unstable while proofrolling.

3.02. TRENCH EXCAVATION

- A. Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Drawings and in such a manner and to such widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting the trench sides and for pumping and drainage facilities.

1. CONTRACTOR shall render the bottom of the excavations firm and stable and in all respects acceptable to the ENGINEER.
 2. The trench may be excavated by machinery to, or just below the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.
 3. Where pipe is to be installed in fill, fill shall be placed and compacted to at least 2 ft. above the top of the pipe (rough grade elevation) and then trenches re-excavated for pipe installation.
 4. After the trench has been excavated as required to assure the correct invert and a space has been excavated for the pipe bells, lower the pipe into the trench.
 5. The pipe shall be placed as near to the center of the trench allowing ample room for compaction on each side.
- B. PVC Pipe
1. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade. Excavated native material may be used if material conforms to this specification.
 2. After the joint has been made backfill to spring line of pipe with Class I, Class II, or No. 67 stone material.
 3. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.
 4. Pipe 3' to 14' of depth
 - a. Continue Class I, Class II, or No. 67 stone material to top of pipe in 8"-12" layers and compact.
 5. Pipe 14' to 20' of depth
 - a. Continue Class I, Class II, or No. 67 stone material to 6" above the top of pipe in 8"-12" layers and compact.
 6. Pipe greater than 20' of depth
 - a. Continue Class I backfill to 12" above the top of pipe in 8"-12" layers and compact.
 7. Backfilling to Grade
 - a. Backfill and compact from the top of embedment material to finished grade with satisfactory soil material, compacting to the density required for the area classification.
 - b. Place backfill in even 8" layers and compact to the density required for the area classification.
 - c. The finished grade shall conform to elevations, slopes, and contours as indicated on the drawings.
 - d. The CONTRACTOR shall be held responsible for settlement over all trenches, and he shall be required to add material and compact as directed if such settlements occur.

C. Ductile Iron Pipe

1. Pipe 3' to 14' of depth

- a. After excavation and the joint has been made, bed with 4" of Class I, II, III, or IV bedding material. This may be the native trench bottom if material conforms to this specification.
- b. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.

2. Pipe 14' to 20' of Depth

- a. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade.
- b. After the joint has been made backfill to spring line of pipe with Class I, Class II, or No. 67 stone material.
- c. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.

3. Pipe greater than 20' of depth

- a. After excavation is completed, place 6" of Class I bedding material.
- b. After the joint has been made, backfill with 4" to 6" of Class I bedding material.
- c. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.
- d. Continue Class I backfill to 6" above the top of pipe in 8"-12" layers and compact.

4. Backfilling to Grade

- a. Backfill and compact from the top of embedment material to finished grade with satisfactory soil material, compacting to the density required for the area classification.
- b. Place backfill in even 8" layers and compact to the density required for the area classification.
- c. The finished grade shall conform to elevations, slopes, and contours as indicated on the drawings.
- d. The CONTRACTOR shall be held responsible for settlement over all trenches, and he shall be required to add material and compact as directed if such settlements occur.

3.03. ROCK EXCAVATION

- A. Rock Excavation consists of blasting and removal of rock material for establishing the required subgrade elevation for pipe trenches, and shall include stockpiling excavated material and subsequent placement or disposal of it.

1. Trench Rock is defined as any material which cannot be practically excavated by a Caterpillar Model No. 330 hydraulic trackhoe, or equivalent, without the use of hoe-ramming or blasting. Practical excavation is defined as the ability to remove at least 10 cubic yards of material during one hour of continuous digging. This classification does not include material such as loose rock, concrete, or other materials that can be removed by means other than hoe-ramming or blasting, but which for reasons of economy in excavating, the CONTRACTOR chooses to remove by hoe-ramming or blasting.
 - B. Contractor shall excavate and remove rock a minimum of 4 inches below the bottom of the pipe and install appropriate bedding material as defined in these specifications.
 - C. If Rock is Classified:
 1. It is the responsibility of the CONTRACTOR to establish the top elevation of rock by test digging with an excavator at not greater than 50-foot intervals in the presence of the ENGINEER.
 2. The ENGINEER shall then establish the top elevation of the rock layer and compute the quantity of material to be classified as rock, and the CONTRACTOR shall be paid accordingly.
 3. There shall be no payment for rock excavated if the ENGINEER has not been notified to prepare measurements and confirm quantities in advance of such excavation.
- 3.04. BLASTING
- A. Blasting is not permitted on this project.
- 3.05. MISCELLANEOUS EXCAVATION
- A. The CONTRACTOR shall perform all excavations necessary for the placing of seeding and plants, for constructing roadways, and any other miscellaneous earth excavation required under this Contract.
- 3.06. PROTECTION
- A. Sheeting and Bracing (if required)
 1. Furnish, put in place, and maintain such sheeting and bracing as may be required by Federal, State and local safety requirements to support the sides of excavations; to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction; and to protect adjacent structures from undermining or other damage.
 2. If the ENGINEER is of the opinion that at any location sufficient or proper supports have not been provided, he/she may order additional supports put in, and compliance with such order shall not relieve or release the CONTRACTOR from his/her responsibility for the sufficiency of such supports.
 3. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
 4. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill.

5. All voids shall be filled to the satisfaction of the ENGINEER. Sheeting and Bracing shall be installed and maintained in accordance with latest OSHA requirements and regulations.
 6. Construct the sheeting outside the neat lines of the foundation, unless indicated otherwise, to the extent deemed desirable for the method of operation.
 7. Sheeting shall be plumb and securely braced and tied in position.
 8. Sheeting and bracing shall be adequate to withstand all pressures to which the structure or trench will be subjected.
 9. Any movement or bulging that may occur shall be corrected to provide the necessary clearances and dimensions.
 10. All sheeting and bracing shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property.
 11. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand, which must be approved by the ENGINEER, by ramming with tools especially adapted to that purpose, or otherwise as may be directed.
 12. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating any obligation on his/her part to issue such orders and his/her failure to exercise his/her right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
 13. No sheeting is to be withdrawn if driven below mid-diameter of any pipe and under no circumstances shall any sheeting be cut off at a level lower than 1-ft above the top of any pipe.
- B. Drainage and Dewatering
1. At all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water into the excavated areas.
 - a. Groundwater shall be lowered to at least 1 foot below the bottom of excavations.
 2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
 - a. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.
 3. Surface runoff shall be collected, drained to sumps, and pumped from the disposal unit to maintain an excavation bottom free from standing water.
 4. Take all additional precautions to prevent uplift of any structure during construction.
 5. Drainage shall be disposed of so that flow or seepage back into the excavated area will be prevented.

6. Flotation shall be prevented by maintaining a positive and continuous operation of the dewatering system. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure of this system.
7. Remove the dewatering equipment after the system is no longer required.
8. Take all necessary precautions to preclude the accidental discharge of fuel, oil, etc in order to prevent adverse effects on groundwater or surface water quality.

C. Slope Stability

1. The CONTRACTOR shall be solely responsible for the stability of embankments, unbalanced fills, stockpiles, and all other construction operations.

3.07. GENERAL BACKFILL

- A. Materials placed in fill areas shall be placed to the lines and grades shown on the Drawings.
 1. Unless otherwise specified, Common Fill shall be used for backfill.
- B. Fill shall be placed in accordance with the Contract Document.
- C. Material conforming to the requirements of Common Fill shall be placed in layers having a maximum compacted thickness of 8-inches measured before compaction and shall be compacted to at least 95% of its maximum density.
- D. Select Fill shall be used where specified. Select Fill shall be placed in layers having a maximum compacted thickness of 8-inches measured before compaction and shall be compacted to at least 98% of the maximum density.
- E. Structural Fill shall be used where specified and shown on the Drawings.
 1. Structural fill shall be placed in maximum compacted lift thickness of 6 inches and shall be compacted to at least 100% of its maximum density.
- F. The surfaces of filled areas shall be graded to smooth true lines, conforming to grades indicated on the grading plan and no soft spots or uncompacted areas will be allowed in the work.
- G. No compacting shall be done when the material is covered with frost or is frozen or is too wet either from rain or from excess application of water.
 1. At such times, work shall be suspended until the previously placed and new materials have thawed and/or dried sufficiently to permit proper compaction.
- H. All backfill shall be placed at a moisture content within 3% of Standard Proctor (ASTM D698) optimum moisture content

3.08. COMPACTION

- A. General
 1. Control soil compaction during construction providing minimum percentage of density specified for each area classification.
- B. Percentage of Maximum Density Requirements

1. Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with these specifications.
 - a. Structures
 - 1) Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum dry density.
 - b. Pipes and Related Structures
 - 1) Pipe bedding and embedment material to 90% maximum dry density.
 - 2) Backfill and compact trenches in uniform layers from top of bedding and embedment material to finish grade to 95% maximum dry density.
 - c. Unpaved Areas
 - 1) Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum dry density.
 - d. Pavements
 - 1) Compact top 12" of subbase and each layer of backfill or fill material at 98% maximum dry density.
 - e. Crushed Aggregate Base Course
 - 1) Compact top 12" of subgrade and each 6" layer of crushed aggregate base course material to 100% maximum dry density.
 - f. Embankment
 - 1) Compact to a density not less than 95% maximum dry density at moisture contents ranging from -3% to +4% of optimum.
 - g. Moisture Control
 - 1) 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, taking care to prevent free water appearing on surface during or subsequent to compaction operations.
 - 2) Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 3) Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry.
 - 4) Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by the soils testing agency.
 - 5) Payment for replacement of material that is too wet to compact will not be considered unless the material is still unsuitable after air-drying.
 - 6) The soils testing agency shall declare which materials are suitable or unsuitable.

3.09. ROAD SUBGRADE

- A. The road subgrade for bituminous, concrete, and crushed stone pavement areas in fill sections shall consist of a two-foot thick layer of Select Fill. The Select Fill shall be placed and compacted in accordance with the contract documents.
- B. The road subgrade for bituminous, concrete, and crushed stone pavement areas in cut sections shall consist of firm natural soils as approved by the ENGINEER.
- C. Road subgrades shall be proof-rolled.

3.10. HANDLING OF SURPLUS MATERIAL

- A. Excavated materials shall not be removed from the site except as specified by the ENGINEER.
 - 1. Materials shall be neatly stockpiled on-site at locations directed by the OWNER.
 - 2. Excess materials shall be compacted and stockpiled in accordance with the CONTRACTOR's fill placement plan.
 - 3. CONTRACTOR shall provide erosion and sedimentation control measures as shown on the drawings and specified in the Contract Documents.

END OF SECTION

SECTION 31 21 00
SITE PREPARATION

PART 1 GENERAL

1.01. SCOPE OF WORK

- A. Furnish all labor, materials, and equipment required and perform all clearing complete as shown on the Drawings and as specified herein.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01. SURVEY

- A. The CONTRACTOR shall stake out the limits of the clearing.

3.02. CLEARING

- A. Cut and remove timber, trees, stumps, brush, shrubs, roots, grass, weeds, rubbish, and any other objectionable material resting on or protruding through the surface of the ground.
- B. Trees and other vegetation designated on the Drawings or directed by the ENGINEER to remain shall be preserved and protected as specified.

3.03. DISPOSAL

- A. The CONTRACTOR shall dispose of all material and debris from the clearing operation at an approved location or as approved by the OWNER.
- B. Onsite disposal of cleared materials by burning is not allowed.

3.04. PROTECTION

- A. Trees and other vegetation designated on the Drawings or directed by the ENGINEER to remain shall be protected from damage by all construction operations by erecting suitable barriers, guards, and enclosures, or by other approved means.
- B. Clearing operations shall be conducted in a manner to prevent falling trees from damaging trees and vegetation designated to remain and to the work being constructed and so as to provide for the safety of employees and others.
- C. Protection shall be maintained until all work in the vicinity of the work being protected has been completed.
- D. Heavy equipment operation or stockpiling of materials shall not be permitted within the branch spread of existing trees.
- E. Any damage to existing tree crowns, trunks, or root systems shall be repaired immediately.
- F. Roots exposed and/or damaged during the work shall immediately be cut off cleanly inside the exposed or damaged area.
- G. Cut surfaces shall be treated with an acceptable tree wound paint and topsoil spread over the exposed root area.

- H. When work is completed, all dead and downed trees shall be removed.
- I. Live trees shall be trimmed of all dead and diseased limbs and branches.
- J. All cuts shall be cleanly made at their juncture with the trunk or preceding branch without injury to the trunk or remaining branches.
- K. Cuts over 1-in in diameter shall be treated with acceptable tree wound paint.
- L. Construction activities shall be restricted to those areas within the limits of construction designated on the Drawings, within public rights-of-way, and within easements provided by the OWNER.
- M. Adjacent properties and improvements thereon, public or private, which become damaged by construction operations shall be promptly restored to their original condition to the full satisfaction of the property owner.

END OF SECTION

SECTION 31 21 50
SHEETING AND BRACING

PART 1 GENERAL

1.01. SUMMARY OF WORK

- A. Where required to properly support the surfaces of the excavations to permit construction, to protect the construction work, adjacent work or workmen, adjacent pipelines, and roadways, provide sheeting, bracing, and shoring.
- B. If the ENGINEER is of the opinion that, at any point sufficient or proper supports have not been provided, he may order additional supports at the expense of the CONTRACTOR, but compliance with such orders shall not release the CONTRACTOR from responsibility for the sufficiency of such supports.
- C. The CONTRACTOR may be required, as directed by the ENGINEER, to leave sheeting and bracing in place for the purpose of preventing injury to persons or adjacent construction.
- D. Failure to sheet and brace trenches or other excavations shall be at the CONTRACTOR's risk, and he will be held responsible for caving, settlement, and all other damages or injuries resulting therefore.
- E. Sheeting and bracing are incidental, and the cost thereof shall be included in the appropriate lump sum or unit price bid for work under this contract.

1.02. QUALITY ASSURANCE

A. Codes and Standards

- 1. Department of Labor 29 CFR Part 1926, Occupational Safety and Health Standards Excavation.

PART 2 PRODUCTS

2.01. SHEETING AND BRACING MATERIALS

- A. Use timber or metal sheeting and bracing components as may be necessary to fulfill the requirements of this Section.

PART 3 EXECUTION

3.01. INSTALLATION

- A. Install sheeting and bracing by any method, subject to the approval of the ENGINEER.
- B. The ENGINEER's approval will be for the compatibility of the sheeting and bracing system with the ultimate performance of the pipe installation and not intended to imply that the sheeting and bracing fulfills any required or necessary safety requirements for construction.

3.02. REMOVAL

- A. In removing sheeting and bracing after the construction has been completed, take special care to prevent any collapse of the excavation and injury to the completed work or adjacent property.

- B. Trench or other excavation bracing, except that must be left in place, may be removed when the backfilling has reached the respective levels of such bracing.
- C. Remove sheeting, except that which has been ordered left in place, as the backfilling progresses.
- D. Take special care to fill and compact voids created by removal of bracing and sheeting.
- E. Sheeting, shoring, and bracing which is left in place shall be cut off or otherwise left not less than 2' below the established ground surface.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials, and incidentals necessary for dewatering systems to remove and dispose of all water entering excavations, trenches, or other parts of the work.

B. Section Includes:

1. Dewatering system.
2. Water disposal.

1.02. REFERENCE STANDARDS

A. OSHA

1. Safety and Health Regulations for Construction

B. 15A Subchapter 2C.

1.03. SUBMITTALS

A. Section 01 30 00 – Submittals/Electronic Submittals.

B. Dewatering Plan:

1. Dewatering system layout, well depths, well screen lengths, dewatering pump locations, pipe sizes and capacities, grades, filter sand gradations, surface water control devices, valves, and water disposal method and location. Indicate primary and standby power system location and capacity.

C. CONTRACTOR Excavation Protection Plans or NCDOT Positive Shoring Plans:

1. Provide sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.
2. If, due to site conditions or regulations, specific dewatering and/or shoring plans are required, CONTRACTOR shall provide, in accordance with relevant OSHA and NCDOT requirements, third party professional engineer designed sheeting/shoring and/or dewatering system plans. Such designs shall be submitted to the ENGINEER at least 10 days prior to installation.

1.04. QUALITY ASSURANCE

A. Comply with authorities having jurisdiction and review methods and procedures related to dewatering including, but not limited to, the following:

1. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
2. Geotechnical report, if one exists.
3. Existing utilities and subsurface conditions.

4. Coordination for interruption, shutoff, capping, and continuation of utility services.
5. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
6. Drilling and abandoning of wells used for dewatering systems.
7. Water discharge and disposal from pumping operations.
8. Testing and monitoring of dewatering system.

1.05. QUALIFICATIONS

A. Licensed Professionals:

1. Professional ENGINEER experienced in design of dewatering systems and licensed in State of North Carolina.
2. Professional land surveyor with minimum three years' experience and licensed in the state of North Carolina.

PART 2 PRODUCTS

2.01. PERFORMANCE AND DESIGN CRITERIA

A. Design:

1. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
2. Lower water table within areas of excavation to minimum one (1) foot below bottom of excavation to permit Work to be completed on dry and stable subgrade.
3. Relieve hydrostatic pressures in confined water bearing strata below excavation to eliminate risk of hydrostatic uplift of pipe or structures or other instability of excavation.
 - a. Prevent damage to adjacent properties, buildings, sidewalks, pavements, structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
 - b. Maintain piezometric water level a minimum of twenty-four (24) inches below surface of excavation.
4. Prevent loss of fines, quick condition, or softening of foundation subgrade.
 - a. Protect from undermining, washout, and damage by rain or water accumulation.
 - b. Soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures, earthen or man-made, as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced as required by the ENGINEER at the CONTRACTOR's expense.
5. Maintain stability of sides and bottoms of excavations and trenches.

6. Surface Water Control System: Collect and remove surface water and seepage entering excavation.
 - a. Prevent surface water from entering excavations by temporary grading, dikes, or other means.
 - b. Prevent surface water from accumulating in trenches and other excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
 - c. Do not use excavated trenches as temporary drainage ditches. Divert water from these areas without causing damage to adjacent property.

PART 3 EXECUTION

3.01. EXAMINATION

A. Utility Service Locator:

1. Call local utility service-line information at 811 not less than three working days before performing Work.
2. Request that underground utilities be located and marked within and immediately surrounding Site.
3. Identify required lines, levels, contours, and data.

3.02. DEWATERING SYSTEM

A. General Dewatering:

1. Grade and maintain all areas of the site to preclude surface runoff into excavations and prevent ponding of water.
2. Remove all soil softened or eroded by the presence of water and replace with suitable backfill material.
3. Provide and maintain drainage and dewatering equipment to remove and dispose of all surface water and ground water entering excavations, or other parts of the Work areas. Keep excavations dry during execution of Work, subgrade preparation, and continually thereafter until the pipeline or structure to be built therein is acceptable to ENGINEER and backfilling operations are completed and acceptable to ENGINEER.
4. Provide temporary drainage ditches and temporary dikes, and provide required temporary pumping and other work necessary for diverting or removing rainfall and all other accumulations of surface water from excavations and fill areas. Perform diversion and removal of surface water in manner that prevents accumulation of water behind permanent or temporary structures and at any other locations in the construction area where such accumulations may be detrimental.
5. Water used for working or processing, resulting from dewatering operations, or containing oils or sediments that will reduce the quality of the surface water or groundwater downstream of the point of discharge, shall not be directly discharged. Divert such waters through temporary settling basin or filter before discharging to surface water, groundwater, or drainage routes.

6. CONTRACTOR shall be responsible for condition of piping, conduits, and channels used for drainage and such piping, conduits, and channels shall be clean and free of sediment.

B. Temporary Dewatering Systems:

1. CONTRACTOR shall design, provide, and operate dewatering system to include sufficient trenches, sumps, pumps, hose, piping, well points, deep wells, and similar facilities, necessary to depress and maintain groundwater level below the base of each excavation during all stages of construction operations.
2. Design and operate dewatering system to avoid settlement and damage to existing structures and underground facilities.
3. Groundwater table shall be lowered in advance of excavation for a sufficient period of time to allow dewatering of fine grain soils.
4. Maintain groundwater level at excavations a minimum of 1-foot below lowest subgrade excavation until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural groundwater.
5. Operate dewatering system continuously, 24-hours per day, 7-days per week.
6. Provide standby pumping facilities and personnel to maintain the continued effectiveness of the system. Do not discontinue dewatering operations without first obtaining ENGINEER's acceptance for such discontinuation.
7. Locate elements of temporary dewatering system to allow continuous dewatering operation without interfering with the Work to the extent practicable.
8. Where portions of dewatering system are located in the area of permanent construction, submit to and obtain ENGINEER's acceptance of details of proposed methods of constructing the Work at such location. Control of ground water shall continue until the permanent construction provides sufficient dead load to withstand hydrostatic uplift of the normal groundwater, until concrete has attained sufficient strength to withstand earth and hydrostatic loads, and until waterproofing Work is completed.
9. Perform pumping of water from excavations in a manner that prevents carrying away of unsolidified concrete materials, and that avoids damaging the subgrade.

3.03. WATER DISPOSAL

- A. Dewatering system shall discharge in accordance with the NC Sedimentation Pollution Control Act, NCDEQ Erosion Control Permit, and NC Stormwater Permit for Construction Activities.
- B. Convey water from excavations in closed conduits. Do not use trench excavations as temporary drainage ditches.
- C. Dispose of water removed from excavations in a manner that does not endanger health and safety, property, the Work, and other portions of the Project.
- D. Dispose of water in manner that causes no inconvenience to OWNER, others involved in the Project, and adjacent and downstream properties.

3.04. SYSTEM REMOVAL

- A. Remove dewatering and surface water control systems after dewatering operations are no longer required.
- B. Abandon wells and piezometers when dewatering is completed in accordance with 15A Subchapter 2C.
- C. Repair damage caused by dewatering and surface water control systems or resulting from failure of systems to protect property.

3.05. FIELD QUALITY CONTROL

- A. Testing:
 - 1. After dewatering system is installed, perform pumping test to determine at what point selected pumping rate lowers water level in well below pump intake.
 - 2. Adjust pump speed, discharge volume, or both to ensure proper operation of each pump.
- B. Monitoring and Recording:
 - 1. Daily:
 - a. Note average discharge flow rate for dewatering system.
 - b. Observe and record elevation of ground water and piezometric water levels in observation wells.
 - 2. Sand Content:
 - a. Monitor ground water discharge for sand content.
 - b. Sample and test water from each well weekly for sand content.
 - c. Maximum Permitted Sand Content: 5 ppm.
 - d. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.
 - 3. Contaminants:
 - a. Monitor ground water discharge for contamination while performing pumping in vicinity of potentially contaminated sites.
 - 4. Existing Adjacent Buildings, Structures, and Improvements:
 - a. Observe weekly and maintain an accurate log of surveyed elevations during dewatering to detect movement in comparison to original elevations.
 - b. Notify ENGINEER immediately of measured movement or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION

SECTION 31 23 23.33

FLOWABLE FILL

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary for the installation of flowable fill in accordance with the plans. All materials, testing, and procedures shall be of the type specified herein.

B. Section Includes:

1. Flowable fill for:
 - a. Structure backfill.
 - b. Utility bedding.
 - c. Utility backfill.
 - d. Filling abandoned utilities.

1.02. DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, manhole, tank, or cable.
- B. Excavatable Flowable Fill: Lean cement concrete fill used where future excavation may be required, such as fill for utility trenches, bridge abutments, and culverts.
- C. Non-excavatable Flowable Fill: Lean cement concrete fill used where future excavation is not anticipated, such as fill below structure foundations and filling abandoned utilities.

1.03. REFERENCE STANDARDS

A. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
5. ASTM C403 - Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.
6. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
7. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
8. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
9. ASTM C1040 - Standard Test Methods for Density of Unhardened and Hardened Concrete in Place by Nuclear Methods.

1.04. SUBMITTALS

- A. Section 01 30 00 – Submittals/Electronic Submittals.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Field Quality-Control Submittals:
 - 1. Mix Design:
 - a. Furnish flowable fill mix design for each specified strength.
 - b. Furnish separate mix designs when admixtures are required for the following:
 - 1) Flowable fill Work during hot and cold weather.
 - 2) Air entrained flowable fill Work.
 - c. Identify design mix ingredients, proportions, properties, admixtures, and tests.
 - 2. Furnish test results to certify flowable fill mix design properties meet or exceed specified requirements.
- D. Delivery Tickets:
 - 1. Furnish duplicate delivery tickets indicating actual materials delivered to Project Site.
- E. Qualifications Statements:
 - 1. Submit qualifications for supplier.

1.05. QUALIFICATIONS

- A. Supplier:
 - 1. Company specializing in supplying products specified in this Section with minimum three years' documented experience.
 - 2. Product source approved by authority having jurisdiction.

1.06. ENVIRONMENTAL REQUIREMENTS

- A. Minimum Conditions: Do not install flowable fill during inclement weather or when ambient temperature is less than 40 degrees F.

1.07. FIELD MEASUREMENTS

- A. Verify field measurements before installing flowable fill to establish quantities required to complete the Work.

PART 2 PRODUCTS

2.01. FLOWABLE FILL

- A. Where applicable, furnish materials according to State of North Carolina Department of Transportation Standard Specifications for Roads and Structures, (latest revision).

2.02. MATERIALS

- A. Portland Cement: ASTM C150 Type I - Normal; Edit the following Paragraph to suit local conditions and aggregate supply. Itemize gradation when special aggregates are required.
- B. Fine Aggregates: ASTM C33.

C. Water: ASTM C94. Clean and not detrimental to concrete.

2.03. ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical Admixture: ASTM C494.

C. Fly Ash: ASTM C618 Class C or F obtained from residue of electric generating plant using ground or powdered coal.

D. Plasticizing: ASTM C1017.

2.04. MIXES

A. Mix and deliver flowable fill according to ASTM C94, Option C.

B. Flowable Fill Design Mix:

1. Cement Content:

a. Excavatable: 75 to 100 lb/cu yd.

b. Non-Excavatable: 100 to 150 lb/cu yd.

2. Fly Ash Content:

a. Excavatable: None.

b. Non-Excavatable: 150-600 pcf.

3. Air Entrainment:

a. Excavatable: 5 to 35 percent.

b. Non-Excavatable: 5 to 15 percent.

4. 28-Day Compressive Strength:

a. Excavatable: Maximum 100 psi.

b. Non-Excavatable: Minimum 125 psi.

5. Density:

a. Excavatable: 80 to 110 pcf.

b. Non-Excavatable: 100 to 125 pcf.

6. Temperature, Minimum, at Point of Delivery:

a. Excavatable: 50 degrees F.

b. Non-Excavatable: 50 degrees F.

C. Provide water content in design mix to produce self-leveling, flowable fill material at time of placement.

D. Design mix air entrainment and unit mass are for laboratory design mix and source quality control only.

2.05. SOURCE QUALITY CONTROL

A. Test and analyze properties of flowable fill design mix and certify results for the following:

1. Design mix proportions by weight of each material.
 2. Aggregate: ASTM C33 for material properties and gradation.
 3. Properties of plastic flowable fill design mix including:
 - a. Temperature.
 - b. Slump.
 - c. Air entrainment.
 - d. Wet unit mass.
 - e. Yield.
 - f. Cement factor.
 4. Properties of hardened flowable fill design mix including:
 - a. Compressive strength at 1 day, 7 days, and 28 days. Report compressive strength of each specimen and average specimen compressive strength.
 - b. Unit mass for each specimen and average specimen unit mass at time of compressive strength testing.
- B. Prepare delivery tickets containing the following information:
1. Project designation.
 2. Date.
 3. Time.
 4. Class and quantity of flowable fill.
 5. Actual batch proportions.
 6. Free moisture content of aggregate.
 7. Quantity of water withheld.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify excavation or trenching is complete.
- B. Verify utility installation is complete and tested before placing flowable fill.
- C. Verify excavation is dry and dewatering system is operating, if necessary.

3.02. PREPARATION

- A. Support and restrain utilities to prevent movement and flotation during installation of flowable fill.
- B. Protect structures and utilities from damage caused by hydraulic pressure of flowable fill before fill hardens.
- C. Protect utilities and foundation drains to prevent intrusion of flowable fill.

3.03. INSTALLATION - FILL, BEDDING, AND BACKFILL

- A. Where indicated on Drawings or approved by ENGINEER, flowable fill may be used for bedding, fill, and backfill.
- B. Place flowable fill by chute, pumping or other methods approved by ENGINEER.
 - 1. When required, place flowable fill under water using tremie procedure.
 - 2. Do not place flowable fill through flowing water.
- C. Place flowable fill in lifts to prevent lateral pressures from exceeding structural capacity of structures and utilities.
- D. Place flowable fill evenly on both sides of utilities to maintain alignment.
- E. Place flowable fill in locations and to elevations indicated on Drawings without vibration or other means of compaction.

3.04. INSTALLATION - FILLING ABANDONED UTILITIES

- A. Utility pipes within the NCDOT ROW that meet the description in NCDOT Standard Specifications for Roads and Structures shall be abandoned as specified therein. Additionally, other pipes and conduits may be abandoned as follows when indicated on Drawings or when designated by ENGINEER.
- B. Verify pipes and conduits are not clogged and are sufficiently empty to permit gravity installation of flowable fill for entire length indicated to be filled.
- C. Seal lower end of pipes and conduits by method to contain flowable fill and to vent trapped air caused by filling operations.
- D. Place flowable fill using method to ensure there are no voids.
 - 1. Fill pipes and conduits from high end.
 - 2. Fill manholes, tanks, and other structures from grade level access points.
- E. After filling pipes and conduits seal both ends.

3.05. FIELD QUALITY CONTROL

- A. The OWNER may conduct inspection and testing according to ASTM C94. Allow access to site and all applicable materials for inspection and testing.
- B. The OWNER may conduct in-place penetration (density) tests using hand held penetrometer to measure penetration resistance of hardened flowable fill according to ASTM C403.
- C. The OWNER may conduct in-place density tests using nuclear test device according to ASTM C1040.
- D. Defective Flowable Fill: Fill failing to meet the following test requirements or fill delivered without the following documentation.
 - 1. Test Requirements:
 - a. Minimum temperature at point of delivery.
 - b. Compressive strength requirements for each type of fill.

2. Documentation: Duplicate delivery tickets.
3. Defective flowable fill shall not be incorporated into the project and will immediately be removed from the project site and replaced at no additional cost to the OWNER.

3.06. CLEANING

- A. Remove spilled and excess flowable fill from Project Site.
- B. Restore facilities and Site areas damaged or contaminated by flowable fill installation to existing condition before installation.

END OF SECTION

SECTION 31 29 10
MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01. SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to do the miscellaneous work not specified in other sections but obviously necessary for the proper completion of the work as shown on the Drawings.
- B. When applicable the CONTRACTOR shall perform the work in accordance with other sections of this Specification.
- C. When no applicable specification exists the CONTRACTOR shall perform the work in accordance with the best modern practice and/or as directed by the ENGINEER.
- D. The work of this Section includes, but is not limited to, the following:
 - 1. Crossing and relocating existing utilities
 - 2. Restoring of driveways and sidewalks
 - 3. Cleaning up
 - 4. Incidental work
 - 5. Job photographs
 - 6. Protection and/or removal and reinstallation of signs
 - 7. Restoration of and replacement of curbing
 - 8. Protection and bracing of utility poles
 - 9. Restoring easement and right-of-ways
- E. Temporary facilities

PART 2 PRODUCTS

2.01. MATERIALS

- A. Materials required for this Section shall be the same quality of materials that are to be restored.
- B. Where possible, the CONTRACTOR may re-use existing materials that are removed.

PART 3 EXECUTION

3.01. CROSSING AND RELOCATING EXISTING UTILITIES

- A. This Item includes any extra work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas, and water services, and other utilities.
- B. This work shall include but is not limited to the following: bracing, hand excavation and backfill (except screened gravel) and any other work required for crossing the utility or obstruction not included for payment in other items of this specification.

- C. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Drawings, the CONTRACTOR shall remove and relocate the utility as directed by the ENGINEER or cooperate with the Utility Companies concerned if they relocate their own utility.
- D. At pipe crossings and where designated by the ENGINEER, the CONTRACTOR shall furnish and place screened gravel bedding so that the existing utility or pipe is firmly supported for its entire exposed length.
- E. The bedding shall extend to the mid-diameter of the pipe crossed. Payment for screened gravel at pipe crossings shall be included as an incidental cost to the unit price for the proposed pipeline established in the Bid Form.

3.02. CLEANING UP DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at an approved facility.
- D. Upon approval of the OWNER, selected waste may be disposed at the active construction and demolition disposal area on the site.

3.03. FINAL CLEANING

- A. The CONTRACTOR shall remove all construction material, excess excavation, buildings, equipment, and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition.
- B. Prior to final completion, or OWNER occupancy, ENGINEER shall conduct an inspection of all work areas to verify that the entire work area is clean.

3.04. INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary to the proper completion of the Contract as specified and as shown on the Drawings.

3.05. TEMPORARY FACILITIES

- A. The CONTRACTOR shall furnish, install, maintain, and remove all temporary facilities required for construction or called for in the specifications.

END OF SECTION

SECTION 33 01 10.58

DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials and incidentals necessary to perform and complete the disinfection of potable water lines and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Disinfection of potable water distribution system.
2. Testing and reporting of results.

1.02. REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA B300-10 - Hypochlorites.
2. AWWA C651 - Disinfecting Water Mains.

B. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

1.03. SUBMITTALS

A. Section 01 30 00 – Submittals/Electronic Submittals.

B. Product Data: Submit manufacturer information for proposed chemicals.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04. CLOSEOUT SUBMITTALS

A. Disinfection Report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.
6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing [in ppm] for each outlet tested.

1.05. QUALITY ASSURANCE

A. Perform Work according to AWWA C651 and 15A NCAC 18C.

PART 2 PRODUCTS**2.01. DISINFECTION CHEMICALS****A. Chemicals:**

1. Sodium Hypochlorite: Comply with AWWA B300-10.

PART 3 EXECUTION**3.01. EXAMINATION**

- A. Verify that piping system has been cleaned, inspected, and pressure tested.
- B. Coordinate activity with OWNER and ENGINEER.

3.02. PROCEDURE

- A. Provide required equipment to perform Work of this Section.
 1. Taps shall be made at the extremities of the line for introducing sodium hypochlorite and for monitoring chlorine concentration and collecting samples.
- B. Flush lines to remove sediment and other foreign matter.
- C. Introduce sodium hypochlorite solution into piping system to provide a uniform distribution of chlorine throughout the piping system. Powdered hypochlorite and hypochlorite tablets shall not be added directly to piping systems.
 1. All pipe, valves, fittings, and appurtenances connected to and forming a part of a potable water supply shall be disinfected in accordance with the procedures described in AWWA C651 Section 4.4.3 (The Continuous Feed Method).
 2. A solution of water containing concentrated sodium hypochlorite with 5-15% available chlorine shall be introduced into the line by regulated pumping.
 - a. The solution shall be of such concentration that the line shall have a uniform minimum concentration of not less than 25 ppm total chlorine immediately after introduction.
 - b. The sodium hypochlorite solution shall be distributed in the piping system by manipulating the chemical feed pump, the introduction of potable water, hydrants and taps at the extremities of the line to produce an even distribution of chlorine throughout the piping system.
 - c. Pipelines may, at the option of the CONTRACTOR and in coordination with the OWNER and ENGINEER, be chlorinated in sections isolated by means of gate valves or other approved means.
 - d. All valves on the lines being disinfected shall be opened and closed several times during the disinfection contact period, except those used to isolate the pipe from the main system.
 - e. Disinfecting shall take place in the presence of the ENGINEER.
- D. The chlorine solution shall remain in contact with interior surfaces of the piping system for a period of 24 hours, minimum.
 1. Free residual chlorine after 24 hours shall be not less than 10 ppm.

2. Disinfecting shall be repeated as often as necessary and as directed by the ENGINEER and/or the OWNER until the minimum requirements are reached.
 3. The CONTRACTOR shall exercise extreme caution to ensure that the sodium hypochlorite solution does not enter active water mains.
- E. Disposal:
1. Neutralize disinfectant solution before disposal.
 2. Legally dispose of disinfection solution off Project Site.
- F. After final flushing and before the new main is connected to the distribution system two (2) consecutive samples, taken at least 16 hours apart, shall be collected.
1. After water mains have been disinfected and flushed, the CONTRACTOR shall collect samples for turbidity and bacteriological analysis. Payment for testing shall be borne by the CONTRACTOR.
 2. All sampling shall be done in the presence of the ENGINEER or a representative of a certified laboratory and shall follow proper chain of custody procedures.
 3. The requirements of AWWA C651 shall dictate the number and locations of samples to be collected and tested based on the length and configuration of the constructed system. No water samples shall be collected from a fire hydrant.
 4. Bacteriological tests shall be performed by a State Certified Laboratory.
 5. Test results shall be provided to the ENGINEER by the authorized testing agency/firm immediately upon completion of the testing procedure.
 6. If test results are unsatisfactory, the CONTRACTOR shall re-flush and re-sample the line at no additional cost to the OWNER. If check samples fail then the disinfection procedure shall be repeated until two (2) consecutive tests, taken at least 16 hours apart, provide acceptable results.
 7. If bacteriological tests of the samples indicate that the water quality is satisfactory, the OWNER may elect to place the water mains in service.
- G. Replace permanent system devices that were removed for disinfection.

END OF SECTION

SECTION 33 05 05.31
HYDROSTATIC TESTING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete hydrostatic testing of all piping in accordance with the plans. All testing materials and procedures shall be of the type specified herein.

1.02. REFERENCE STANDARDS

A. American Water Works Association

1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
2. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

B. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

1.03. DIRECTIVES TO THE CONTRACTOR

A. CONTRACTOR shall be familiar with and/or provide upon request the following:

1. Testing procedures
2. List of test equipment
3. Testing sequence schedule
4. Provisions for disposal of flushing and test water
5. Certification of test gage calibration

B. CONTRACTOR shall provide the results of all hydrostatic testing to the ENGINEER.

1.04. QUALITY ASSURANCE

A. Perform Work according to 15A NCAC 18C and AWWA standards.

PART 2 PRODUCTS

2.01. HYDROSTATIC TESTING

A. Equipment

1. Pressure pump
2. Pressure hose
3. Water meter
4. Test connections
5. Pressure relief valve
6. Pressure gage calibrated to 1.0 psi

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify that piping is ready for testing.
- B. Verify that trenches are backfilled.
- C. Verify that pressure piping thrust restraints have been installed.

3.02. FIELD QUALITY CONTROL

A. Testing

1. General

- a. All testing shall be performed in the presence of the OWNER, the ENGINEER, or other authorized representative.
- b. Prior to testing any segment of pressure main, care shall be taken to prevent the pipe from moving while under pressure.
- c. Water for testing purposes will be provided by the OWNER. CONTRACTOR shall follow all policies and procedures to obtain, measure, and pay for the use of testing water.
- d. Water used for testing pressure main installations shall be disposed of in a nearby sanitary sewer, as authorized by the local sewer authority, or in another location in accordance with state and federal laws and regulations.
- e. The pressure test may be performed concurrently or separately with the leakage test.
- f. The pressure test shall be performed after the pressure main has been backfilled and at least seven days after the pouring of the last thrust block.
- g. At no time shall more than 1,000 linear feet of main be tested except as approved by the OWNER or ENGINEER.
- h. Tests of insulated and concealed piping shall be made before the piping is covered or concealed. No leakage will be allowed under the above tests for piping under or in buildings.
- i. The CONTRACTOR shall notify the ENGINEER when the work is ready for testing with all testing done in the presence of the ENGINEER. All labor, equipment, water, and materials, including meters and gauges shall be furnished by the CONTRACTOR at his own expense.
- j. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

2. Pressure test piping system according to AWWA C600 (ductile iron pipe), C605 (PVC pipe), and following:

3. Test Pressure

- a. Not less than 150 psig, or not less than 1.25 times the working pressure of the pipe at the high point, or not less than 1.5 times the working pressure at the low point, whichever is greater.

- b. Conduct hydrostatic test for a minimum of two consecutive hours.
- c. Introduced water from a temporary connection made in the pressure main or as approved by ENGINEER and OWNER.
- d. Slowly fill (approximately one foot per second) section to be tested with water; expel air from piping at high points. Pressure shall be applied to the main by means of a hand pump for small lines or by use of a mechanical pump for larger lines.
- e. If permanent air vents are not located at all high points, the CONTRACTOR shall install corporation cocks at such points so the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied.
- f. Raise pressure to specified test pressure. Test duration shall be 2 hours minimum.
- g. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
- h. Compute maximum allowable leakage using following formula:

$$L = \frac{SD\sqrt{P}}{C}$$

L = testing allowance, gph.

S = length of pipe tested, feet.

D = nominal diameter of pipe, inches.

P = average test pressure during hydrostatic test, psig.

C = 148,000.

- i. If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
- j. Leakage:
 - 1) If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
 - 2) Correct visible leaks regardless of quantity of leakage.
 - 3) The allowable leakage for various pipe sizes and test pressures is graphically represented below:

Allowable Makeup Water per 1,000 Feet of Pipeline (Gallons/Hour)														
Test Pressure (P.S.I.)	Pipe Diameter													
	2	3	4	6	8	10	12	14	16	18	20	24	30	36
100	0.14	0.20	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43
125	0.15	0.23	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72
150	0.17	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98
175	0.18	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22
200	0.19	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44
225	0.20	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65
250	0.21	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85
275	0.22	0.34	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36	4.03
300	0.23	0.35	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21

4. Pressure test HDPE piping according the following:
 - a. Test Pressure: Not less than 150 psig based on the elevation of the highest point of the line or section under test.
 - b. The pressure testing of an HDPE line section shall be tested separately from the PVC and DIP line sections.
 - c. Maximum duration for pressure test, including initial and final phase of the test, shall not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section and then allow it to “relax” for at least eight (8) hours before bringing the test section up to test pressure again.
 - d. Introduce water from a temporary connection made in the pressure main or as approved by ENGINEER and OWNER. Bleed as much air as possible.
 - e. Slowly fill (approximately one foot per second) section to be tested with water; expel air from piping at high points. Pressure shall be applied to the main by means of a hand pump for small lines or by use of a mechanical pump for larger lines.
 - f. Initially, the pressure within the test section shall be raised to approximately 160 psi and then allowed to be idle (no additional make-up water to be injected) for approximately 3 hours. During this 3-hour period, the test section shall be allowed to stabilize and come to an equilibrium stage. No additional make-up water shall be injected to the test section during this 3-hour stabilization period unless the line pressure drops below 140 psi. In this case, make-up water shall only be injected to the test section to maintain a minimum of 140 psi (during the 3-hour stabilization period).

- g. The final phase of the pressure test shall involve injecting make-up water to achieve an "Initial test pressure" of 150 psi (minimum) / 155 psi (maximum). The test section is then allowed to be idle (no additional make-up water to be injected) for a period of 2 hours. After this 2-hour period, make-up water is injected to re-establish the "initial test pressure."
 - h. Maintain pressure within plus or minus 5 psi of test pressure.
 - i. Leakage is defined as the quantity of water necessary to maintain test pressure during period of test.
 - j. If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
 - k. Leakage:
 - 1) If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
 - 2) Correct visible leaks regardless of quantity of leakage.
 - 3) The allowable leakage for various pipe sizes is graphically represented below. If the actual make-up water quantity is equal to or less than the allowable amount, the pressure test passes. If the actual make-up water quantities are greater than the allowable amount, the pressure test fails.
5. Hydrostatic Pressure Testing of Gravity Lines
- a. Where indicated on the drawings, gravity lines shall conform to materials, testing methods, and acceptability standards meeting water main standards. A hydrostatic pressure test shall be conducted in accordance with the testing requirements except that the test pressure shall be as indicated on the drawings. The test shall be performed prior to the installation of any services.

Allowable Make-Up Amount (HDPE) Pipe	
Nominal Pipe Size (inches)	Make-up Water Allowance (U.S. Gallons /100 ft. of Pipe) 2-Hour Test
6	0.30
8	0.50
10	0.65
12	1.15
14	1.40
16	1.65
18	2.15
20	2.75
22	3.50
24	4.40
26	5.00
28	5.55
30	6.35
32	7.15
34	8.10
36	9.00
42	11.55
48	13.50
54	15.70

END OF SECTION

SECTION 33 05 07.70

BYPASS PUMPING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, and materials necessary to complete all work with a temporary bypass pumping system for the purpose of diverting flow around selected work areas and other related and incidental work as required to complete the work on the Drawings and specified herein.
2. The complete design, installation, operation, and maintenance of the temporary bypass pumping system shall be the CONTRACTOR's responsibility.
3. During all bypass pumping operations, protect the OWNER's pump station and/or sewer mains and all local sewer lines from damage inflicted by any equipment. The CONTRACTOR shall be responsible for all physical damage to the pumping station and main and all sewer lines caused by human or mechanical failure.

B. Section Includes:

1. Bypass pumping system

1.02. COORDINATION

- A. Do not commence construction work until the plan for temporary bypass pumping has been reviewed and approved.
- B. When bypass pumping from an existing valve vault or pump station, verify that all necessary components of the existing system are in good working condition. The OWNER shall be responsible for operating these valves during construction/upgrades at existing facilities. Coordinate with the OWNER's personnel regarding the operation of these facilities and provide a minimum of five (5) days' notice to the OWNER prior to conducting any verification or performing any construction operations.
- C. Confine all temporary bypass pumping operations to easements.
 1. Provide additional area where required.
- D. Do not install bypass pipelines in any saltmarsh/wetland areas. The bypass pipeline must be located off streets and sidewalks and on shoulders of the roads.
- E. Obtain any approvals for placement of the temporary pipeline within public ways from authorities having jurisdiction.

1.03. SUBMITTALS

- A. Section 01 30 00 – Submittals/Electronic Submittals.
- B. Bypass Pumping Plan: Prior to the start of the Work, prepare and submit a plan outlining locations of temporary bypass pumping operations. Allow 30 days for review of this plan.
 1. Provide planned schedule of operation at each location. Minimize the interruption and/or bypassing of wastewater flow during construction.

2. Include the use of a “High Water Alarm” in the manhole or structure used for bypass pumping. Include electrical schematics and control panel information for the pumps including start/stop and alarming configurations.
3. Include a detailed plan outlining all provisions and precautions to be taken demonstrating the handling of existing wastewater flow.
 - a. Provide elevations, capacities of equipment, and data on all equipment and materials including size.
 - b. Identify method of noise control for each pump and/or generator.
 - c. Provide route of pump suction and discharge lines including details of tie-ins to existing sewer lines and/or force mains. Identify staging areas for pumps.
 - d. Provide plan for proper operation and protection.
 - e. Provide contingency plan to demonstrate response plan in the event of an emergency.
 - f. Provide wastewater plugging method and types of plugs.
 - g. Provide a list of spare parts to be kept on-site during duration of temporary bypass pumping operations.
 - h. Provide description and details of the cellular telephone telemetry system to be employed as part of the bypass pumping monitoring.
 - i. Provide detailed description of operator duties and responsibilities while monitoring bypass pumping operations, to include frequency of inspection of total system.
- C. Provide a list of five references for bypass systems of projects of similar size and complexity to this project.

1.04. QUALITY ASSURANCE

- A. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

1.05. QUALIFICATIONS

- A. Employ a firm specializing in the design, installation, operation, and maintenance of temporary bypass pumping systems with no less than five references of projects of similar size and complexity as this project.
 1. Performed within the three-year period as the date of the bid opening.
 2. The firm shall have support facilities within a radius of not more than 60 miles from the project site.
- B. Licensed Professionals:
 1. Professional ENGINEER experienced in design of temporary bypass pumping systems and licensed in State of North Carolina. Plans shall bear the signature and seal of the professional ENGINEER.

PART 2 PRODUCTS

2.01. PERFORMANCE AND DESIGN CRITERIA

- A. Fully comply with all codes and regulatory agencies having jurisdiction.
- B. Provide a bypass pumping system with sufficient capacity to pump a peak flow equal to or greater than the capacity of the sewer line being bypassed throughout the duration of the project with the largest pump out of service.
- C. Do not stop or impede the flows in existing force mains.
- D. Maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding. Any sanitary sewer overflow that occurs due to a failure in the bypass system will be the responsibility of the CONTRACTOR. Any penalties issued by authorities having jurisdiction will be reimbursed to the OWNER by the CONTRACTOR.
- E. Size inside diameter of pipe for maximum velocities.
 - 1. Suction velocities shall be less than 12 feet per second.
 - 2. Discharge velocities shall be less than 5 feet per second.
- F. Protect water resources, wetlands, and other natural resources. Take all precautions necessary to prohibit any sewage or water from the bypass pumping operation from contacting the ground or entering any stream.

2.02. MATERIALS

- A. Piping: High-density polyethylene with an SDR rating equivalent for the application duty.
 - 1. Suction pipe shall have a wall thickness equivalent to an SDR 17 or thicker.
 - 2. Discharge pipe shall have an ADR rating equal to or greater than 1.5 times the designed operating pressure of the system. Discharge hose will only be allowed in short sections and as accepted by the OWNER.
- B. Joints: butt fusion welded.
 - 1. Provide flanges where necessary for connection of pumps, valves, and appurtenant equipment and materials.
- C. Pumps: centrifugal, end suction, fully automatic self-priming units that do not require the use of foot valves in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of sewer flows. The pumps shall not be hydraulic submersible type.
 - 1. The primary pump(s) shall be equipped with sound attenuation enclosures which reduce operating noise to 70 dB at 30 feet.
 - 2. The bypass pumping system shall include the necessary stop/start controls for the pumps.
- D. Provide spare parts for equipment and materials of the temporary bypass pumping system.
 - 1. Spare parts for pumps and piping shall be kept on site as required.

2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.
- E. Maintain adequate standby equipment ready for immediate operation and use in the event of an emergency or breakdown. Include a backup pump of size equal to the largest bypass pump. The backup pump shall be on-line, isolated from the primary system by a valve.
- F. Alarm System
 1. Provide alarm dialer in the event of system failure.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify location of all utilities, size of fittings, couplings and all other bypass requirements as previously noted.
- B. Locate any existing utilities in the area selected to locate the bypass pipelines. Place the bypass pipelines to minimize any disturbance to existing utilities and obtain approval of the pipeline locations from the OWNER. All costs associated with relocating utilities and obtaining all approvals shall be paid by the CONTRACTOR.

3.02. BYPASS PUMPING SYSTEM

- A. Place temporary bypass pumping system in operation not less than 24-hours prior to pipe laying operation and in advance of commencing any work necessitated by the system.
 1. Demonstrate in presence of OWNER and ENGINEER ability of temporary bypass pumping system to function as prescribed.
- B. Remove manhole section or sections to provide adequate suction conduit.
- C. Use primary and secondary plugging devices.
- D. Comply with OSHA requirements when working in presence of sewer gases, combustible or oxygen deficient atmospheres, and confined spaces.
- E. Where practicable, utilize open spaces beneath bridges to cross roadways.
- F. On roadways under the jurisdiction of NCDOT, bypass piping shall not be placed directly on or across pavement unless otherwise approved by NCDOT.
- G. On roadways that are not under the jurisdiction of NCDOT, bypass piping 4 inches or more in nominal diameter shall not be placed directly on or across pavement.
- H. On roadways that are not under the jurisdiction of NCDOT, bypass piping less than 4 inches in diameter may be laid across the road, provided adequate protective measures are put in place.
 1. Provide traffic warning signs.
 2. Provide ramps to carry vehicles safely over pipe.
- I. Operate bypass pumping systems 24 hours per day from the time the existing sewer line is removed from service until 72 hours after the new sewer line is put into service and has been determined to be Substantially Complete by the OWNER.

3.03. SYSTEM REMOVAL

- A. Keep temporary bypass pumping system operational for at least 72-hours following installation of piping system necessitated by the temporary bypass pumping operation.
- B. When authorized by the OWNER, remove temporary bypass pumping system in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
 - 1. Obtain written permission from OWNER.
 - 2. Restore all areas utilized for any part of the temporary bypass pumping operation.
- C. When disassembling bypass pumping pipe, ensure that any sewage remaining in the pipe is drained back to the sewer collection system. Report all spills to the OWNER and contain and clean up spills immediately.

3.04. FIELD QUALITY CONTROL

- A. Testing:
 - 1. Perform leakage and pressure tests on the new bypass pumping discharge piping using clean water prior to actual operation. Provide at least 24-hours' notice to the OWNER and ENGINEER prior to testing.
 - 2. The bypass pumping system shall be tested and operated successfully for 24 continuous hours, and the wet well shall be emptied, prior to start of work.
- B. Inspection:
 - 1. Monitor the bypass pumping operation at all times to ensure that the system is working correctly.
- C. If, at any time during construction, effluent from the existing sewer is not fully contained by the bypass system, restore gravity service by a temporary tie to the new construction and suspend work until the problem is resolved to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 33 14 13

PUBLIC WATER UTILITY DISTRIBUTION AND RAW WATER PIPING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials, and incidentals necessary to install and complete installation of potable water lines and appurtenances in accordance with the plans. All pipe and appurtenance material shall be of the type and class specified herein.
2. All pipeline and appurtenance excavation, bedding, pipe laying, jointing, and coupling of pipe joints shall be completed as described herein.

B. Section Includes:

1. Pipe materials and fittings for public water systems.
2. Tapping sleeves and valves.
3. Positive-displacement meters.
4. Pipe support systems.
5. Bedding and cover materials.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
3. ASTM A536 – Standard Specification for Ductile Iron Castings.
4. ASTM D882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
5. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
6. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
7. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

8. ASTM D2564 – Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
 9. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 10. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- D. American Water Works Association:
1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
 3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
 4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
 7. AWWA C153 - Ductile-Iron Compact Fittings.
 8. AWWA C206 - Field Welding of Steel Water Pipe.
 9. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
 10. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
 11. AWWA C606 - Grooved and Shouldered Joints.
 12. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In., for Water Transmission and Distribution.
 13. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In., for Water Transmission and Distribution.
 14. AWWA M23 – PVC Pipe – Design and Installation.
 15. AWWA M41 – Ductile Iron Pipe and Fittings.
- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
- F. North Carolina Administrative Code
1. 15A NCAC 18C – Rules Governing Public Water Systems
- G. North Carolina Department of Transportation:
1. Standard Specifications for Roads & Structures, latest edition.
- H. NSF International:
1. NSF 61 - Drinking Water System Components - Health Effects.
 2. NSF 372 - Drinking Water System Components - Lead Content.

1.03. COORDINATION

- A. Coordinate Work of this Section with utility OWNER and the ENGINEER.
- B. Do not interrupt service to facilities occupied by OWNER or others unless approved by the ENGINEER and OWNER no fewer than 72 hours in advance of proposed interruption and after arranging to provide temporary water distribution service and fire flow protection.

1.04. SUBMITTALS

- A. Product Data: Submit product technical information regarding pipe materials, pipe fittings, valves, hydrants, and other appurtenances.
- B. Product technical information shall be furnished to the ENGINEER for his review and approval prior to installation of any materials. The ENGINEER may augment the technical information or product or request substitute products and technical information if, in his opinion, it will best serve the interest of the OWNER.
- C. Field Quality-Control Submittals: Indicate results of CONTRACTOR-furnished tests and inspections.
- D. Preconstruction Photographs and/or Video: Submit digital files of photographs and/or video of Work areas and material storage areas.

1.05. CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06. QUALITY ASSURANCE

- A. Perform Work according to 15A NCAC 18C.
- B. Valves: Mark valve body with manufacturer's name and pressure rating.
- C. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372, including marking "NSF-pw" on piping
- D. As applicable, comply with NSF 14 for plastic potable-water service piping, including marking "NSF-pw" on piping.
- E. Perform Work according to the following requirements:
 - 1. Comply with all requirements of utility OWNER including the tapping of water mains and backflow prevention.
 - 2. Comply with all standards of authorities having jurisdiction for potable water service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire suppression water service piping, including materials, hose threads, installation, and testing.

1.07. QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience. Upon request of the ENGINEER, Manufacturer shall provide documentation of experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience in installation of necessary materials. Upon request of the ENGINEER, Installer shall provide documentation of experience.

1.08. DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Storage:
 - 1. Handle and store materials according to manufacturer instructions.
 - 2. Block individual and stockpiled pipe lengths to prevent moving.
 - 3. Do not place pipe or pipe materials on private property without documented written permission or in areas obstructing pedestrian or vehicle traffic.
 - 4. Store all pipe and appurtenances on sills above storm drainage level and deliver for laying after the trench is excavated.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing them in clean, dry locations remote from construction operations areas.
 - 2. Plastic materials shall be supported to prevent sagging and bending.
 - 3. Plastic materials shall be covered with tarps.
 - 4. Provide additional protection according to manufacturer instructions.

1.09. EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.01. WATER PIPING

- A. General Requirements
 - 1. All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs, and other imperfections, and true to industry-specified shapes and forms throughout. All materials shall be subject to the inspection of the ENGINEER at the plant, trench, or other point of delivery, for the purpose of culling and rejecting material which does not conform to the requirements of these specifications. Such material shall be marked by the ENGINEER, and the CONTRACTOR shall remove it from the project site upon notice being received of its rejection.

2. The use of couplings will not be allowed except as necessary and approved by the ENGINEER.
 3. When the work requires the use of a transition coupling, the use of such couplings shall be as approved by the ENGINEER. When the nominal diameter of the pipe does not change, an approved transition coupling may be used, as necessary. In these cases, a ductile iron, mechanical joint, solid sleeve shall be used to join these materials. The solid sleeve shall be as specified for fittings and shall be the long body type. The appropriate gaskets shall be selected based on the outside diameter(s) of the material(s) being joined. All gaskets shall be as specified. In all cases, the gap between the pipe sections being joined shall not exceed 0.25 inches.
 4. Where the nominal diameter of an existing water line changes as part of a rehabilitation project, an appropriate ductile iron, mechanical joint reducer, as specified for fittings, shall be used to join these materials. The appropriate gaskets shall be selected based on the outside diameter(s) of the material(s) being joined. All gaskets shall be as specified.
 5. All rubber gaskets for DIP pipe and fittings shall be in accordance with AWWA C111 and ASTM F477 for PVC pipe and fittings. All gaskets shall be a product of the pipe manufacturer, made specifically for the pipe being installed, and shall match the shape and configuration of the joint.
 6. Gaskets
 - a. Gasket material shall be Styrene Butadiene Copolymer (SBR) unless otherwise noted.
- B. Ductile-Iron Pipe:
1. Ductile iron pipe shall be of the size indicated on the Drawings and shall be in accordance with AWWA C150 and manufactured in accordance with AWWA C151.
 2. Class numbers or pressure rating shall be clearly marked on the pipe and fittings at the factory.
 3. Bituminous Outside Coating
 - a. All ductile iron pipe shall have an outside pipe coating of an asphaltic material a minimum of 1 mil thickness in accordance with AWWA C151. The final coat shall be continuous and smooth, being neither brittle when subjected to low temperatures nor sticky when exposed to hot sun. The coating shall adhere to the pipe at all temperatures.
 4. Pipe Mortar Lining (Interior Lining):
 - a. Line all ductile iron pipe and fittings with a cement mortar lining conforming to AWWA C104 except where other lining systems are specified by the ENGINEER.
 5. Joints:
 - a. Slip Joints (Push-on)
 - 1) Unless otherwise specified by the ENGINEER, all straight-line pipe joints shall be slip-joint type.
 - 2) Comply with AWWA C111.

- 3) Bells of "slip" joint pipe shall be contoured to receive a bulb-shaped circular rubber gasket, and plain ends shall have a slight taper to facilitate installation. The gasket and associated lubricant shall be furnished by the pipe manufacturer.
- b. Mechanical Joints
- 1) Comply with AWWA C111.
 - 2) Bolts for mechanical joints shall be high grade steel, low alloy type, with tee head and American Standard threads. Mechanical joint gland shall be ductile or gray iron and shall utilize a plain rubber gasket.
 - 3) Bolted mechanical pipe joints shall be used under all concrete structures and between all treatment structures for underground piping.
- c. Flanged Joints
- 1) Comply with AWWA C110, C115, and ASME B16.1.
 - 2) Flanged pipe shall have flanges with long hubs, shop fitted on the threaded end of the pipe.
 - 3) Where required, flanges shall be tapped for stud bolts. Flanges shall be accurately faced at right angles to the pipe axis and shall be drilled smooth and true, and covered with coal tar pipe varnish or otherwise protected against corrosion of flange faces. Flange faces shall be cleaned to bare metal with wire brushed before installation of pipe.
 - 4) Ductile iron flanged joint pipe shall be as specified by the ENGINEER. Pipe shall be ordered in lengths needed as no pipe shall be cut, threaded, or flanged in the field. All pipes shall have Class 125 flanges unless otherwise specified.
 - 5) Flanged joints shall be made with through bolts of the required size. Bolts shall be zinc plated, with good and sound, well-fitting threads, so that the nuts may be turned freely by hand.
 - 6) Flanged joints shall be made using only full-face gaskets with a minimum thickness of 1/8-inch. Ring gaskets are not acceptable. The gasket material shall be rubber or approved equal as recommended by the Manufacturer.
 - 7) Connecting flanges shall be in proper alignment and no external force shall be used to bring them together
- d. Restrained Joints
- 1) Unless otherwise specified by ENGINEER, all bends and valves shall be restrained joints.
 - 2) Carrier pipe for Bore-and-Jack and Horizontal Directional Drill Installations
 - a) Restrained joints shall be the boltless type to include ductile iron locking segments and rubber retainers
 - b) Restrained pipe and fittings shall be Flex-Ring or Lok-Ring as manufactured by American Cast Iron Pipe Company, TR Flex as

manufactured by US Pipe, Bolt-Lok as manufactured by Griffin Pipe Products, or approved equal.

- 3) Open Cut installations require a restrained joint system on all joints within a minimum of 20 feet on either side of all fittings, unless otherwise shown or directed.
 - a) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with present factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - b) Restraint for valves and fittings shall have ductile iron glands. Twist-off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - c) Stainless steel rodding and fasteners, minimum Type 304, is acceptable per standard details. The manufacturer's restraint system and/or glands are preferred in lieu of rodding, unless otherwise directed.

C. Pressure Class Polyvinyl Chloride (PVC) Pipe

1. Comply with AWWA C900 (4" through 60") DR18 or DR14.
2. Fittings shall be ductile iron mechanical joint as described herein.
3. Joints:
 - a. Slip joints (Push-On)
 - 1) Unless otherwise specified by the ENGINEER, all straight-line pipe joints shall be slip-joint type.
 - 2) The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints meeting the requirements of ASTM D3139 and ASTM F477.
 - 3) The lubricant used in making up the joints shall be furnished by the pipe manufacturer and shall be NSF approved.
 - 4) Solvent-cement couplings are not permitted.
 - b. Restrained Joints
 - 1) Unless otherwise specified by ENGINEER, all bends and valves shall be restrained joints.

- 2) Open Cut installations require a restrained joint system on all joints within a minimum of 20 feet on either side of all fittings, unless otherwise shown or directed.
 - a) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with present factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - b) Restraint for valves and fittings shall have ductile iron glands. Twist-off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - c) Stainless steel rodding and fasteners, minimum Type 304, is acceptable per standard details. The manufacturer's restraint system and/or glands are preferred in lieu of rodding, unless otherwise directed.

D. PVC: Pressure Rated PVC

1. Comply with ASTM D2241.
2. Maximum diameter: 12" nominal.
3. Pressure Class: Minimum allowable rating and thickness shall be Pressure Rating 200, SDR 21. Sustained pressure and quick-burst pressure testing requirements shall be in accordance with ASTM 1598 and ASTM 1599, respectively.
4. The exterior of all PVC Pipe shall bear a stamp which shows the AWWA certification, SDR, size and NSF seal.
5. Fittings shall be ductile iron mechanical joint as described herein.
6. Joints:
 - a. Slip joints (Push-On)
 - 1) Unless otherwise specified by the ENGINEER, all straight-line pipe joints shall be slip-joint type.
 - 2) The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints meeting the requirements of ASTM D3139 and ASTM F477.
 - 3) The lubricant used in making up the joints shall be furnished by the pipe manufacturer and shall be NSF approved.

4) Solvent-cement couplings are not permitted.

b. Restrained Joints

- 1) Unless otherwise specified by ENGINEER, all bends and valves shall be restrained joints.
- 2) Open Cut installations require a restrained joint system on all joints within a minimum of 20 feet on either side of all fittings, unless otherwise shown or directed.
 - a) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with present factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - b) Restraint for valves and fittings shall have ductile iron glands. Twist-off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision. The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.
 - c) Stainless steel rodding and fasteners, minimum Type 304, is acceptable per standard details. The manufacturer's restraint system and/or glands are preferred in lieu of rodding, unless otherwise directed.

2.02. FITTINGS

A. General

1. All fittings for any type of water piping shall be ductile iron.
2. Compact mechanical joint fittings shall be used for subsurface installations and compact flanged fittings shall be used for above-ground installations.
3. Coating and Lining:
 - a. Bituminous Coating: Comply with AWWA C110.
 - b. Cement-Mortar Lining: Comply with AWWA C104.

B. 2" Ductile Iron Fittings

1. Material: Grade 65-45-12 ductile iron in accordance with ASTM A536. Fittings shall have deep bell push-on joints with gaskets meeting ASTM F477. Transition gaskets are not allowed.

C. 3" through 64" Ductile Iron Fittings

1. Material: Ductile iron; comply with AWWA C110.
2. Compact Fittings (mechanical joint and flanged): Comply with AWWA C153.

2.03. UNDERGROUND PIPE LOCATION

- A. Materials for tracer tape and wire, pipe markers and locators shall be provided in accordance with Section 33 27 60 Underground Utility Detection System.

2.04. PIPE SUPPORTS AND ANCHORING

- A. Metal for Pipe Support Brackets:
 1. Material: Structural steel.
 2. Finish: Galvanized.
 3. Coating: Bituminous paint.
- B. Metal Tie Rods and Clamps or Lugs:
 1. Material: Stainless steel.

2.05. CONCRETE ENCASEMENT AND CRADLES

- A. Concrete:
 1. Concrete design: As specified.
 2. Type: Reinforced, air entrained.
 3. Compressive Strength: 4,000 psi at 28 days.
 4. Finish: Rough troweled.
 5. Reinforce concrete as specified.

2.06. MATERIALS

- A. Bedding and Backfill:
 1. General: No rock, boulders, stone, or debris larger than four inches shall be allowed in the bedding or backfill material. Deficient or unsuitable bedding or backfill material shall be replaced or substituted with suitable bedding or backfill material. Excavated material intended for use as bedding or backfill shall not be used if exceedingly wet nor shall trenches be backfilled if flooded or excessively wet.
 2. Stone: Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67.
 3. Soil: Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability
 - a. Class I Soil -Angular, 6 to 40 mm (¼" to 1½'), graded stone, including several fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.
 - b. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm (1½"), including variously graded sands and gravels containing small percentages of

finer, generally granular and non-cohesive, either wet or dry. Soil types of GW, GP, SW, and SP are included in this class.

- c. Class III Soil - Fine sand and clayey gravels, including fine sands, sand clay mixtures, and gravel clay mixtures. Soil types of GM, GC, SM, and SC are included in this class.
- d. Class IV Soil - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types of MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.
- e. Class V Soil - Includes the organic soil types of OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than 1½ inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

2.07. ACCESSORIES

A. Steel Rods, Bolt, Lugs, and Brackets:

1. Comply with ASTM A36 and A307.
2. Grade 316 stainless steel.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that existing utility water main size, location, and invert are as indicated on Drawings.

B. Existing Utilities

1. The CONTRACTOR shall be required to excavate to determine the precise location of utilities or other underground obstructions which are shown on the Plans and/or marked by the utility owners. Such location and excavation shall be performed prior to installation of the pipeline.
2. The CONTRACTOR shall notify all utility owners prior to excavation as required by the 1985 Underground Damage Prevention Act. Utility owners who are members of NC 811 may be notified by calling 811 (toll free) before any excavation or drilling. The CONTRACTOR will be fully responsible for damage to any utilities if the Owners have not been properly notified as required by the Underground Damage Prevention Act. All damage to such structures and pipelines and all damage to property or persons resulting from damage to such structures and pipelines shall be borne by the CONTRACTOR and shall be completely repaired within a reasonable time. No claim shall be made against the OWNER for damage or delay of the work on account of the proximity of, or the leakage from, such structures and pipelines. Where high pressure gas lines are to be crossed, they shall be uncovered by hand excavation methods before other excavation near them is started.
3. Utility Owners may, at their option, have representatives present to supervise excavation in the vicinity of their utilities. The cost of such supervision, if any, shall be borne by the CONTRACTOR.

4. Conflicts with underground utilities may necessitate changes in alignment and/or grade of this construction. The CONTRACTOR shall notify the ENGINEER promptly upon the discovery of such conditions. Changes in alignment and/or grade shall be approved by the ENGINEER before construction may proceed.
5. When underground obstructions not shown on the Plans are encountered, the CONTRACTOR shall promptly report the conflict to the ENGINEER and shall not proceed with construction until the conflict is resolved.

3.02. PREPARATION

A. Preconstruction Site Documentation:

1. Record video and/or photographs along centerline of proposed pipe trench; minimum one photograph for each 50 feet of pipe trench.
2. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing site features.
3. Include Project description, date taken, and sequential number on back of each photograph.

B. Pipe Cutting:

1. Cut pipe ends square, ream pipe and tube end to full pipe diameter and remove burrs.
2. Use only equipment specifically designed for pipe cutting; use of chisels or hand saws is not permitted.
3. Grind edges smooth with beveled end for push-on connections.
4. In the case of slip joint pipe, the cut ends shall be tapered with a portable grinder or coarse file to match the manufactured taper.

C. Remove scale and dirt on inside and outside of pipe before assembly.

D. Prepare pipe connections to equipment in accordance with equipment manufacturer's requirements.

3.03. INSTALLATION

A. General:

1. Pipe and fittings shall be laid as shown on the Drawings.
2. CONTRACTOR shall provide all materials, labor, tools, equipment, and incidentals required for the excavation, installation, backfilling and testing of water mains and associated appurtenances.
3. Do not use flanged pipe, fittings, or valves or unions for underground (buried) piping. Fittings and valves for underground (buried) piping shall be mechanical joints. Flanged pipe, fittings and valves and unions shall be used on aboveground piping and piping in vaults.
4. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used as specified, unless otherwise indicated.
5. All pipe fittings, valves, hydrants, and accessories shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage to pipe and

fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Any defective, damaged, or unsound material shall be repaired or replaced as directed by the ENGINEER.

B. Bedding and Backfill:

1. General:

- a. Place bedding material to the level shown on the Drawings.
- b. Work material carefully around the pipe to ensure adequate haunching.

2. PVC Pipe:

- a. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade. Excavated native material may be used if the material conforms to this specification.
- b. After the joint has been made, backfill to spring line of pipe with Class I, Class II, or No. 67 stone material. Additional bedding requirements are outlined in project drawings and shall be followed.

3. Ductile Iron Pipe:

- a. After excavation and the joint has been made, bed with 4" of Class I, II, III, or IV bedding material. This may be the native trench bottom if material conforms to this specification
- b. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface. Additional bedding requirements outlined in project drawings shall be followed.

4. Compaction:

- a. Backfill in 6- to 12-inch lifts. Tamp each lift carefully and uniformly to eliminate the possibility of lateral displacement of the pipeline.
- b. Compact pipe bedding and embedment material to 95% Standard Proctor.

C. Piping:

1. Comply with AWWA C600, C605, M41, and M23.
2. Handle and assemble pipe according to manufacturer instructions.
3. Steel Rods, Bolts, Lugs, and Brackets: Coat buried steel before backfilling.
4. Pipe Separation
 - a. Lateral Separation of Sewers and Water Mains
5. Maintain 10 feet of horizontal separation between water main and sewer piping.
 - 1) If local conditions or barriers prevent a 10-foot separation:
 - a) The water main shall be laid in a separate trench with the elevation of the bottom of the water main at least 18 inches above the top of the sewer;
or

- b) The water main shall be laid in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.
 - b. Crossing a Water Main over or under a Sewer
 - 1) A water main that crosses a sewer shall be laid a minimum vertical distance of 18 inches from the outside of the water main and the outside of the sewer, either above or below the sewer, with preference to the water main located above the sewer. One full length water pipe shall be located so that both joints will be as far from the sewer as possible.
 - c. Crossing a Storm Sewer
 - 1) All water lines shall have a minimum of 12 inches of vertical separation from storm sewers.
- 6. Pipe Insulation
 - a. All outdoor piping 4" in diameter and smaller which is not buried shall be insulated except where specifically stated otherwise on the Drawings or in these specifications.
 - b. Provide heat tape and controls as recommended by the manufacturer for temperatures down to -10° f. This requirement shall also apply to piping in vaults.
 - c. The piping shall be insulated with 1" thick polyfoam with the insulation laminated to an outside jacket of PVC with a finished color of white. The material shall be furnished in standard 25' rolls with insta-grip closure.
 - d. Fittings and valves shall be insulated with preformed white insulated fitting covers with 1" thick polyurethane foam insert.
 - e. Pipe insulation shall be wrapped around pipe and trac locked down in position. Insulation shall be held in place by sealing trac with fastener-weld or equal.
 - f. All butt joints and fitting covers shall be sealed with silicone sealant and then taped in place to provide a vapor barrier.
 - g. Installation procedures and accessory materials shall all be in accordance with the pipe insulation manufacturer's written instructions.
- 7. Connection to Existing Water Main/System
 - a. The CONTRACTOR shall make connection to the old mains when and as directed by the ENGINEER. In no case shall the CONTRACTOR shut off the water or operate the fire hydrants or gate valves of the old distribution or raw water system. In case it becomes necessary to delay the cut-off, such instructions shall be given and obeyed without recourse. At no time shall the CONTRACTOR operate any valves, gates, pumps, etc. All these operations must be done by the OWNER's personnel.
 - b. In making connections to the old distribution or raw water system, valves shall be set as shown on the plans or at such designated place as the ENGINEER may direct. If due to unforeseen conditions, these locations must be changed or

additional valves or fittings added, the CONTRACTOR shall install the valves or fittings at the new locations upon approval by the ENGINEER. Payment for special fittings or couplings will not be made unless approved by the ENGINEER prior to installation.

- c. The CONTRACTOR shall be responsible for determining and utilizing all measures required by the water utility OWNER in tapping or connecting to existing water mains. The CONTRACTOR shall also make appropriate arrangements with the water utility OWNER based on the size and location of the tap or connection to the water system as indicated in the drawings.
- d. If the proposed water extension does not begin at an existing valve, a new tapping sleeve and valve or cut-in valve of the size specified shall be installed at the required location as specified. All tapping sleeves and valves shall be installed in accordance with MSS SP-60. Alternately, if water service interruption is acceptable to the OWNER, a valve may be installed at the appropriate location in the existing water piping.
- e. The CONTRACTOR shall be responsible for installing all backflow prevention devices or other "jumpers" as may be required by the Plans or the water utility OWNER at the point of connection with the existing water system. For extensions of the existing system, the valve isolating the new system from the existing system will not be opened until all other water system construction has been completed and satisfactorily passed all testing in compliance with these specifications unless specifically authorized by the water utility OWNER.
- f. The CONTRACTOR shall be responsible for verifying the material, size, and restraint system on the existing piping and installing the proper thrust collar per the detail where shown or as directed. The CONTRACTOR shall excavate the existing pipe beyond the proposed connection location, to provide a minimum of 3 feet of undisturbed or existing soil from the connection point. Excavation shall be performed further away from the connection to accommodate the construction of the thrust collar. Allow 24 hours for concrete to cure before backfilling and 7 days minimum cure time before placing pressure load on concrete blocking.

8. Thrust Block Installation

- a. All turns, fittings, etc., that induce pressure which would cause separation of pipe, breakage, etc., shall be provided with adequate thrust blocks. Thrust blocks shall be constructed to the minimum dimensions shown on the drawings or as directed by the ENGINEER. Manufacturer's restraint system and thrust blocking are required unless otherwise directed by the ENGINEER.
- b. Thrust blocks shall be made of ready-mix concrete with a minimum compressive strength at 28 days of not less than 3,000 PSI when tested in accordance with ASTM C39. Sakrete or any similar material will not be permitted under any circumstances.
- c. Blocking shall be formed and placed in such a manner that the pressure to be exerted at the point of blocking shall be transferred to firm, undisturbed earth.

Where possible, the concrete shall be placed so that the fitting joints will be accessible for repair.

- d. All bolts and pipe joints shall be protected against contact with thrust block concrete by the installation of a 20-mil polyethylene film placed between the fittings and the concrete. Where any section of a main is provided with concrete thrust blocks, the hydrostatic pressure test shall not be made until seven days after installation of the concrete thrust blocks unless otherwise approved by the ENGINEER. Where trench conditions are, in the opinion of the ENGINEER, unsuitable for thrust blocks, the CONTRACTOR shall provide steel tie rods and socket clamps to adequately anchor the piping. All tie rods and clamps shall be given a bituminous protective coating or shall be galvanized.
- e. The CONTRACTOR shall also be responsible for any damage or repairs caused by blow-outs of any insufficiently blocked pipe.
- f. The CONTRACTOR shall allow 24 hours for concrete to cure prior to backfill and minimum 7 days cure time prior to placing pressure load on the concrete blocking.

9. Joint Construction

- a. Unless otherwise directed by ENGINEER, all bends and valves shall be restrained joint.
- b. All pipe joints shall be constructed in strict accordance with the pipe manufacturer's specifications and materials and any deviation must have prior approval of the ENGINEER.
- c. The maximum deflection per joint of flexible joint pipe shall be that deflection recommended by the manufacturer. However, at no time will a deflection greater than 3 degrees (11 inches in an 18'-0" pipe section) be allowed.
- d. A restrained joint system is required on all joints within a minimum 20 feet on either side of all fittings, unless otherwise shown or directed.
- e. Mechanical Joints
 - 1) Clean the last 8-inches outside the spigot, and the inside of the bell of mechanical joint pipe to remove oil, grit, tar (other than standard coating) and other foreign matter from the joint and then paint area clean with an approved soap solution. The ductile iron gland shall then be slipped on the spigot end of the pipe with the extension of the gland toward the socket or bell end. The rubber gasket shall be painted with the soap solution and placed on the spigot end with thick edge toward the gland.
 - 2) Push entire section of pipe forward to seat spigot end in the bell. Press gasket into place within the bell, being careful to have the gasket evenly located around the entire joint. Move ductile iron gland along the pipe into position for bolting, insert all bolts and screw nuts up tightly with fingers. Tighten all nuts with a suitable (preferably torque-limiting) wrench. Tighten nuts that are spaced 180 degrees apart alternately to produce equal pressure on all parts of the gland. If effective sealing is not obtained by tightening the bolts to the

specified torques, the joint shall be disassembled and reassembled after thorough cleaning.

- 3) An adapter having a fitting bell and a mechanical joint socket may be used by the CONTRACTOR when joining an existing bell and spigot to a new mechanical joint.

f. Push-on Joints

- 1) Clean gasket and spigot and inside of bell thoroughly to remove all direct and other foreign matter.
- 2) Insert the gasket furnished by the pipe manufacturer into the gasket groove in the bell. Gasket shall be properly seated in the grooves provided in the pipe bell.
- 3) Using a non-toxic vegetable soap, apply a film by hand to the inside surface of the gasket that comes into contact with the entering pipe and to the first 1" of the spigot end of the entering pipe. Use only lubricant specified by the pipe manufacturer.
- 4) Align the entering pipe with the bell to which it is to be joined. Enter the spigot end into the bell until it just contacts the gasket. Apply sufficient pressure to force the spigot end past the gasket up to solid contact with the bell.
- 5) When it is necessary to field cut pipe with rubber gaskets, chamfer the cut end 1/8-inch x 30 degrees and check for roundness before inserting into a rubber gasket bell.

10. Ductile-Iron Piping and Fittings: Comply with AWWA C600.

11. Grooved and Shouldered Pipe Joints: Comply with AWWA C606.

12. Field Welding Materials: Comply with AWWA C206.

13. Exposed Piping

- a. All exposed piping to be installed inside tanks, wetwells, vaults and buildings shall be installed as shown in the Drawings. All exposed pipes shall be ductile iron utilizing flanged joints unless otherwise noted.
- b. All exposed ductile iron pipe, fittings and valves shall be field painted with two (2) coats of epoxy paint as recommended by the paint manufacturer. Color of paint shall be as selected by the OWNER.

14. No pipe shall be laid except in the presence of the ENGINEER or his Representative or with special permission from the ENGINEER.

15. Route pipe in straight line and re-lay pipe that is out of alignment or grade.

16. Pipe shall be removed at any time if broken, injured or displaced in the process of laying same, or of backfilling the trench.

17. High Points:

- a. Pipe shall be installed in a manner that minimizes localized high points in the piping.

- b. If unforeseen field conditions arise that necessitate high points, install air-release valves as specified, as indicated on Drawings, or as directed by the ENGINEER.

18. Bearing:

- a. Maintain bearing along entire length of pipe.
- b. Excavate bell holes to permit proper joint installation.
- c. Do not lay pipe in wet or frozen trench.

19. Prevent foreign material from entering pipe during placement.

20. Allow for expansion and contraction without stressing pipe or joints.

21. Close pipe openings with watertight plugs during Work stoppages.

22. Establish elevations of buried piping with not less than 3 feet of cover.

- a. Measure depth of cover from final surface grade to top of pipe barrel.

D. PE Encasement:

- 1. Encase piping in PE where indicated to prevent contact with surrounding backfill material.
- 2. Comply with AWWA C105.
- 3. Terminate encasement 3 to 6 inches above ground where pipe is exposed.

E. Backfilling: Backfill around sides and to top of pipe as specified.

F. Underground Pipe Location System

- 1. Installation of tracer tape and wire installation, pipe markers and locators shall be installed in accordance with Section 33 27 60 Underground Utility Detection System.

3.04. FIELD QUALITY CONTROL

A. Testing: Pressure test and disinfect as specified.

B. Testing of tracer wire installation, pipe markers and locators shall be installed in accordance with Section 33 27 60 Underground Utility Detection System.

END OF SECTION

SECTION 33 14 17

WATER SERVICES

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials and incidentals necessary to perform and complete the installation of water services and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Pipe and fittings for water utility services.
2. Corporation stop assemblies.
3. Backflow preventers.
4. Meter setting equipment.
5. Meter boxes.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.

B. American Society of Mechanical Engineers:

1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

C. ASTM International:

1. ASTM A48 – Standard for Gray Iron Castings.
2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
4. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
5. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
6. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
7. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
8. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

9. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
10. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
11. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

E. American Water Works Association:

1. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
2. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
3. AWWA C800 - Underground Service Line Valves and Fittings.
4. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. Through 3 In., for Water Service.

F. Public Health and Safety Organization:

1. NSF 61 – Drinking Water System Components – Health Effects
2. NSF 372 – Drinking Water System Components – Lead Content
3. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
4. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
5. AWWA C800 - Underground Service Line Valves and Fittings.
6. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. Through 3 In., for Water Service.

1.03. SUBMITTALS

- A. Section 01 30 00 – Submittals/Electronic Submittals.
- B. Product Data: Submit manufacturer information regarding pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles, backflow preventers, and accessories.
- C. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

1.04. QUALITY ASSURANCE

- A. Perform Work according to the approved Plans and Specifications.
- B. All water piping shall be NSF approved, and shall bear the NSF seal of approval.
- C. All valves and fittings shall comply with NSF 61 and NSF 372.

1.05. DELIVERY, STORAGE, AND HANDLING

- A. Section 01 55 00 – Site Access and Storage.

- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from contamination by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.01. GENERAL

- A. All water service piping shall be copper tubing unless otherwise stated in the Drawings.
- B. Direct taps without the use of fittings or saddles shall not be allowed on PVC or HDPE water mains. Direct taps in DIP water mains shall be performed using a corporation stop of equal size to the water service connection unless ductile iron MJ fittings are specified on the approved Plans.

2.02. WATER PIPING AND FITTINGS

A. Copper Tubing:

- 1. Comply with ASTM B88.
- 2. Type: K, annealed.
- 3. Fittings: Cast copper; ASME B16.18
- 4. Joints: Compression or flared connection.

B. PVC Pipe:

- 1. Comply with ASTM D1785 for Schedule 40 and 80, ASTM D2241 for SDR-41 (100-psig rating), SDR-26 (160-psig pressure rating), and SDR-21 (200-psig rating), using PVC specification required by the OWNER.
- 2. Fittings: PVC; ASTM D2466.
- 3. Joints: Solvent welded; ASTM D2855.

C. HDPE Pipe:

- 1. Comply with AWWA C901, SDR 7.
- 2. Service pipe shall be blue.
- 3. Fittings:
 - a. Type: Molded.
 - b. Comply with AWWA C901,
- 4. Joints: Butt fusion.

2.03. CORPORATION STOP ASSEMBLIES

A. Corporation Stops:

1. Comply with ASTM B62 and AWWA C800.
2. Body: Brass or red brass alloy.
3. Inlet End: Threaded for tapping according to AWWA C800.
4. Outlet End: Compression fitting suitable for copper tubing. If other material is used for service pipe, outlet shall be suitable for service pipe specified.

B. Service Saddles:

1. Material: 85-5-5-5 brass alloy per ASTM B62, ASTM B584 and AWWA C800.
2. Type: double strap, hinge-less design with two (2) fastening nuts on each side of the saddle body, incorporating an EPDM rubber gasket per ASTM D2000.

2.04. CURB STOP ASSEMBLIES

A. Curb Stops:

1. Body: Brass or red brass alloy.
2. Comply with AWWA C800.
3. Valve Type: Ball
4. Sealing: Positive pressure.

2.05. METER BOXES

A. Polyvinyl Chloride Meter Boxes

1. Type: round style
2. Materials:
 - a. Minimum wall thickness of 0.375 inches
 - b. Minimum inside diameter of 18 inches with a 30 inch depth
 - c. Non-locking cast iron lid
 - d. Sized to accept a 5/8 inch water meter

B. Cast Iron Meter Boxes

1. Type: Two-piece design (box and cover)
2. Cast iron shall comply with ASTM A48 Class 25.
3. Non-locking cast iron lid
4. Sized to accept a 5/8 inch water meter

2.06. METER SETTING EQUIPMENT

A. Meter Setting:

1. Material:
 - a. Setter Tubing: Copper
 - b. Yoke: Iron or Copper
 - c. Valves: Brass

2. Height: 12", unless otherwise noted.
 3. Inlet: Lockable angle inverted ball valve
 4. Key Valves:
 - a. Connection: Bronze pins and spring washers.
 5. Outlet: Expansion connection, dual check valve
 6. End Connections: Flared copper tubing or compression type for plain end copper tubing.
 7. Furnish test valves.
- B. Proposed Meter:
1. Material:
 - a. Proposed meters shall be Hydrus Ultrasonic meters manufactured by Diehl, unless otherwise directed and approved by the Owner.

2.07. UNDERGROUND PIPE LOCATION SYSTEM

- A. Materials for tracer tape and wire, pipe markers and locators shall be provided in accordance with Section 33 27 60 Underground Utility Detection System.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify that building service connections and municipal utility water main sizes, locations, and inverts are as indicated on Drawings.

3.02. PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
- B. Remove scale and dirt from inside and outside of piping before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.03. INSTALLATION

- A. General:
 1. Water System Expansion:
 - a. For extensions of the existing water system, all buildable lots adjacent to the extension shall have a water service line provided unless otherwise directed. Additional service lines may be installed by the CONTRACTOR as directed and authorized by the ENGINEER.
 2. Rehabilitation of Existing Water Mains:
 - a. Where existing water mains are being rehabilitated, water service lines shall be constructed for each property that is occupied by a business or dwelling if it is currently served by the system being rehabilitated.
 - b. The CONTRACTOR shall be responsible to locate and connect all existing water service lines to the new main. In the event a service is missed during construction, the CONTRACTOR shall return to the site and perform all work necessary to

reinstate the connection. The CONTRACTOR will be compensated in accordance with the original contract unit pricing; however, re-mobilization to the site will not be paid for.

- c. Service connections shall be made only after the new main has been tested and disinfected.
 - d. Only enough new service tubing shall be required to connect the new water main to the existing service line on the street side of the meter. Meter yoke, meter, meter box, etc.; are all existing and shall remain in service. Reconnection of dwellings on the opposite side of the street from the new water mains will require replacement of the service tubing through bored holes to avoid damage to the existing pavement. The bored hole shall extend a minimum of 2 feet beyond the edge of pavement on each side of the road.
- B. Corporation Stop Assemblies:
1. Make connection for each different kind of water main, using suitable materials, equipment, and methods as approved by ENGINEER.
 2. Provide service clamps for mains constructed of materials other than cast iron or ductile iron.
 3. Location:
 - a. Taps shall be installed at an angle of 45° to a horizontal line perpendicular to the center-line of the pipe.
 - b. Locate and stagger corporation stops at least 12 inches apart longitudinally.
 4. Plastic Pipe Mains:
 - a. Provide full support for service clamp for full circumference of pipe, with minimum 2-inch width of bearing area.
 - b. Exercise care against crushing or causing other damage to mains at time of tapping or installation of service clamp or corporation stop.
 5. Use seals or other devices such that no leaks are present in mains at points of tapping.
 6. Do not backfill and cover service connections until installation has been approved by ENGINEER.
- C. Bedding:
1. Excavate pipe trench and backfill as specified.
- D. Service Pipe and Fittings:
1. Install water service as indicated on Drawings.
 2. The OWNER-maintained portion of each water service line shall have a minimum of 3 feet of cover.
 3. In general, service lines shall be constructed from the public water system to a point located at the edge of the public right-of-way or the water easement. Domestic service lines shall consist of a ¾-inch (for a single service) or 1-inch diameter pipe (for a double service), as listed in the Bid Schedule and/or shown on the Plans.

4. Non-copper service lines shall be installed with tracer wire in accordance with Section 33 27 60 Underground Utility Detection System.

E. Meter Box Assemblies:

1. Set meter boxes on compacted soil.
2. Boxes:
 - a. Center and plumb meter boxes.
 - b. Set box cover flush with finished grade.

F. Backflow Preventers:

1. Install backflow preventers where indicated on Drawings and according to manufacturer instructions.
2. Testing and Installation Requirements: Comply with local water company requirements and plumbing codes.

G. Disinfection of Water Piping System: Flush and disinfect system as specified.

3.04. FIELD QUALITY CONTROL

A. Testing:

1. Hydrostatic Testing: As specified.
2. Stops shall be fully shop tested for leaks with air pressure under water.

B. Testing of tracer wire installation, pipe markers and locators shall be installed in accordance with Section 33 27 60 Underground Utility Detection System.

END OF SECTION

SECTION 33 14 19
VALVES AND HYDRANTS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials and incidentals necessary to perform and complete the installation of valves, fire hydrants, and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Valves.
2. Valve boxes.
3. Fire hydrants.

1.02. REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. American Water Works Association:

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
2. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
3. AWWA C502 - Dry-Barrel Fire Hydrants.
4. AWWA C504 – Rubber Seated Butterfly Valves, 3 In. through 72 In.
5. AWWA C507 - Ball Valves, 6 in. through 60 in.
6. AWWA C508 – Swing-Check Valves for Waterworks Service, 2-In. through 24-In. NPS.
7. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
8. AWWA C512 - Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
9. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
10. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

C. ASTM International:

1. ASTM A48 – Standard Specification for Gray Iron Castings.
2. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A536 – Standard Specification for Ductile Iron Castings.
4. ASTM D429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.

- 5. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
- 6. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
 - 2. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- E. National Fire Protection Association:
 - 1. NFPA 291 - Recommended Practice for Fire Flow Testing and Marking of Hydrants.
- F. North Carolina Administrative Code
 - 1. 15A NCAC 18C – Rules Governing Public Water Systems
- G. NSF International:
 - 1. NSF 61 - Drinking Water System Components - Health Effects.
 - 2. NSF 372 - Drinking Water System Components - Lead Content.
- 1.03. COORDINATION
 - A. Coordinate Work of this Section with installation of water mains.
- 1.04. SUBMITTALS
 - A. Section 01 30 00 – Submittals/Electronic Submittals.
 - B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.
 - C. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
 - D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- 1.05. CLOSEOUT SUBMITTALS
 - A. Section 01 72 00 – Project Record Documents.
 - B. Project Record Documents: Record actual locations of valves and hydrants.
- 1.06. QUALITY ASSURANCE
 - A. Perform Work according to 15A NCAC 18C.
 - B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
 - C. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.
- 1.07. DELIVERY, STORAGE, AND HANDLING
 - A. Section 01 55 00 – Site Access and Storage.
 - B. Delivery:
 - 1. Seal valve and hydrant ends to prevent entry of foreign matter.

2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 1. Protect materials from contamination by storing in clean, dry location remote from construction operations areas.
 2. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.01. VALVES

- A. Unless otherwise noted, valves shall have the following performance and design criteria:
 1. Pressure Rating:
 - a. 12-inch Diameter and Smaller: 200 psig.
 - b. 14-inch Diameter and Larger: 150 psig.
 2. Underground (Buried) Installations:
 - a. Mechanical joint connections.
 - b. Non-rising stem type.
 - c. 2-inch square operating nut.
 3. Above Ground Installations:
 - a. Flanged ends with Class 125 flanges unless otherwise noted.
 - b. Rising stems, unless otherwise noted, with outside stem and yoke and 18-inch diameter minimum hand wheel.
 - c. All valves shall be operated by handwheel.
 4. Valves shall have a clear waterway equal to the full nominal diameter of the pipe.
 5. Each valve shall have the initials or name of the maker, pressure rating and year of manufacture cast on the body.
 6. Valves shall have an arrow cast in the operating nut indicating the direction of opening.
 7. Coatings:
 - a. Comply with AWWA C550.
 - b. Application: Interior and exterior.
 8. Operation: Counterclockwise opening.
- B. Resilient-Wedge Gate Valves:
 1. Description:

- a. Gate valves 2 inches through 24 inches in diameter size shall be of the resilient seated wedge type in accordance with AWWA C509 or C515. All valves shall be from one manufacturer and parts interchangeable.
 - b. Materials:
 - 1) Body, bonnet, and gate: Cast iron or ductile iron.
 - 2) Stem: Cast bronze with integral collars.
 - c. Coating:
 - 1) The valve body and bonnet shall be coated on both the interior and exterior surfaces with an NSF 61 approved fusion bonded epoxy paint conforming to AWWA C550.
 - 2) The gate shall be fully coated in accordance with ASTM D2000. Coating adhesion shall be in accordance with ASTM D429.
 - d. Stem:
 - 1) Non-rising stems shall have two O-rings located above thrust collar and one O-ring below. The non-rising stems on 4"-12" valves shall also have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.
 - e. Operation:
 - 1) Where called for in Plans, valves larger than 12 inches in diameter shall be designed for horizontal installation with beveled gear boxes with reduction gears to reduce the number of turns required to operate valve.
- C. Double-Disc Gate Valves:
1. Description:
 - a. Gate valves larger than 24 inches in diameter shall be of the double disc parallel seat type. All valves shall be from one manufacturer and parts interchangeable. Valves shall have a working pressure of 150 PSI.
 - b. Comply with AWWA C500.
 - c. Materials:
 - 1) Body, bonnet, and gate: Ductile iron conforming to ASTM A536.
 - 2) Gates: High strength cast iron.
 - 3) Stem: Cast bronze
 - 4) Trim, rollers, tracks, and scrapers: Bronze.
 - d. Coating: The valve body and bonnet shall be coated on both the interior and exterior surfaces with an NSF 61 approved fusion bonded epoxy paint conforming to AWWA C550.
 - e. Valves shall use bottom wedging type design with a two part floating wedge contact. The wedge and hook shall be separate castings and not a single piece.

- f. The stuffing box shall use “O”-ring seal type with two rings located above the thrust collar. The rings shall be replaceable with the valve fully open and under pressure. Flat gaskets and blind bolts are not allowed.
- g. Operation:
 - 1) Horizontal installation with beveled gear boxes with reduction gears to reduce the number of turns required to operate valve.

D. Butterfly Valves:

1. Description:

- a. Butterfly valves shall be of the tight-closing type with zero leakage at rated pressures (150 psi minimum) with flow in either direction and shall be satisfactory for frequent operation and for applications involving valve operation after long periods of inactivity. Valve manufacturer shall be Bray, Pratt, Mueller, or engineer approved equal.
- b. Butterfly valves shall be Class 150B in accordance with AWWA C504.
- c. Materials:
 - 1) Body: Cast iron (flanged - ASTM A126 Class B, mechanical joint – ASTM A48 Class 40) or ductile iron (ASTM A536 Grade 65 45 12)
 - 2) Seat ring: Stainless-steel that is mechanically retained without use of clamping devices, adjusting segments, or other hardware being in the waterway.
 - 3) Valve Disc: ductile iron without any external vanes, ribs, etc., to obstruct flow or alloy cast iron.
 - 4) Shaft: 18-8 Type 304 or Type 316 stainless-steel.
 - 5) Taper keys: 416 stainless-steel.
- d. Coatings:
 - 1) Valve body shall be primed with manufacturer's standard primer.
 - 2) Rubber seats shall be securely fastened to the valve body. No metal-to-metal seating surfaces shall be permitted. Valves shall have seats that are simultaneously molded in, vulcanized and bonded to the body. Seat bond must withstand 75 lbs. pull under test procedure ASTM D429, Method B.
- e. Discs and Resilient Seat:
 - 1) Seat shall be located on edge of disc, offset from the shaft, and seal against mating stainless steel body seat with 360 degree uninterrupted contact.
 - 2) Valve discs shall rotate 90 degrees from the full open position to the tight shut position.
 - 3) The resilient seal shall be locked to the disc by three separate means of retention, and be field-adjustable, if necessary, with no tools other than a standard socket wrench.
 - 4) Replacement of seat in field shall be possible without valve disassembly.

f. Shaft:

- 1) The disc shall be connected to the offset shaft by locked taper wedge keys and stainless steel retaining nuts on the back side of the disc.
- 2) Shaft shall be stub type for valves 30 inches and larger in diameter; one piece for valves 24 inches in diameter and smaller.
- 3) The valve shall be equipped with adjustable thruster for centering the disc on valves 30 inches and larger in diameter, if required.
- 4) Two trunnions for shaft bearings shall be integral with each valve body.
- 5) Shaft shall have nylon sleeve or woven Teflon fibreglassed backed sleeve for bearing surfaces. Bearings shall be corrosion resistant and self-lubricating.
- 6) Bearing load shall not exceed 1/5 of the compressive strength of the bearing or shaft material.
- 7) Shafts shall be turned, ground and polished.

g. Operation:

- 1) Manual operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
- 2) Operators shall be equipped with mechanical stop-limiting devices to prevent over-travel of the disc in the open and closed positions.
- 3) Operators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 80 lb. on the operator or handwheel.
- 4) Operator components shall withstand an input of 150 Ft.-Lbs. at extreme operator position without damage.

E. Plug Valves:

1. Description:

- a. Eccentric Plug Valves shall be of the tight closing, resilient faced non-lubricating variety and shall be of eccentric design such that the valve's pressure member (plug) rises off the body seat contact area immediately upon shaft readaptation during the opening movement. Plug valves shall be satisfactory for applications involving throttling service as well as frequent or infrequent on-off service.
- b. Eccentric plug valves and actuators shall meet or exceed the latest revisions of AWWA C517 and other applicable standards. Flanged ends shall be per ANSI B16.1, mechanical joint ends per AWWA C111, and grooved ends per AWWA C606.
- c. Pressure Rating:
 - 1) Pressure ratings shall be bi-directional. Every valve shall be given a certified hydrostatic and seat test, with test reports being available upon request.
 - 2) 12-inch Diameter and Smaller: 175 psig.
 - 3) 14-inch Diameter and Larger: 150 psig.

- d. Materials:
 - 1) Body: ASTM A126 Class B cast iron or ASTM A536 ductile iron.
 - 2) Bearings: sleeve type made of sintered, oil-impregnated permanently lubricated type 316 stainless steel per ASTM A743 Grade CF8M.
 - 3) Seats: 1/8-inch thick welded overlay of not less than 95 percent pure nickel.
 - 4) Grit Excluders: PTFE
 - 5) Shaft Seals: BUNA-N.
- e. Port: Rectangular with area 100 percent of Standard class pipe area.
- f. Seats:
 - 1) Seat shall be at least ½-inch wide and raised.
 - 2) 1/8-inch thick welded overlay of not less than 90 percent pure nickel
 - 3) The raised surface shall be completely covered with nickel to ensure that the resilient plug face contacts only the nickel seat.
- g. Plug:
 - 1) The plug shall have a cylindrical seating surface eccentrically offset from the center of the shaft.
 - 2) Plug shall not contact the seat prior to 90 percent closed.
 - 3) Plug facing shall be Chloroprene (CR), or other resilient facing suitable for the application. The rubber compound shall be approximately 70 (Shore A) durometer hardness. The rubber to metal bond must meet ASTM D429 Method B.
 - 4) Plug shall rotate approximately 90 degrees from the full-open to full-closed position and vice-versa.
- h. Shaft:
 - 1) Shaft seals shall permit inspection, adjustment or complete replacement of packing without disturbing any part of the valve or actuator assembly except the packing gland follower.
 - 2) Adjustable Packing shall be of the multiple V-ring type, with a packing gland follower.
- i. Actuator:
 - 1) Manual valves shall have lever or worm gear type actuators with handwheels, 2" square nuts, or chainwheels attached.
 - 2) Lever actuators shall be furnished on valves 8" and smaller where the maximum unseating pressure is 25 psig or less.
 - 3) Worm gear type actuators shall be furnished on all 4" or larger valves where the maximum unseating pressure is 25 psig or more.

- 4) Actuators shall be enclosed in a cast iron housing, with outboard seals to protect the bearings and other internal components.
 - 5) The actuator shaft and gear quadrant shall be supported on permanently lubricated bronze bearings.
 - 6) Buried actuators shall be 90 percent grease filled. Input shaft and fasteners shall be stainless steel. Actuator mounting brackets shall be totally enclosed.
- j. Position Indicators
- 1) Unless otherwise specified, each valve shall be provided with a position indicator to display the position of the plug relative to the body seat opening.
 - 2) For valves installed in interior locations, the indicating pointer shall be mounted on the outer end of the valve operating shaft extension and shall operate over an indicating scale on the operating mechanism cover. A suitable stuffing box or other seal shall be provided to prevent the entrance of water where the shaft passes through the cover.
 - 3) Position indicators will not be required for buried valves.
- F. Valves 1-1/2 Inches and Smaller
1. Description:
 - a. Unless otherwise noted, valves shall be full port ball valves with adjustable packing suitable for underground installation.
 - b. Comply with MSS-SP-110.
 - c. Body: Forged brass
 - d. End Connections: Threaded ends conforming to NPT standards.
 - e. Operation: Quarter-turn.
- G. PVC Ball Valves:
1. Description:
 - a. PVC ball valves ½-inch to 2-inch shall be true union design and 3-inch valves shall be a single union design.
 - b. Materials:
 - 1) Body: from Type 1, Grade 1, Polyvinyl Chloride as outlined in ASTM D1784.
 - 2) Ball seals: Teflon
 - 3) Stem and body seals: Viton
 - c. The valves shall carry a pressure rating of 150 psi at 73 degrees F.
- H. Air Release and Combination Air/Vacuum Valves:
1. Description:
 - a. Air release and combination air/vacuum valves shall be rated for a working pressure of 150 PSI minimum and hydrostatic test pressure of 300 PSI.

- b. Combination air valves shall combine the operation of both an air/vacuum and air release valve.
 - c. Comply with AWWA C512.
 - d. Materials:
 - 1) Body: Cast iron or Type 304 or 316 stainless steel, or as specified.
 - e. Inlets:
 - 1) The valve shall have a minimum two (2) inch NPT inlet.
 - 2) Combination air valves sized from 2 inches to 4 inches shall be provided with NPT inlets and outlets unless otherwise submitted for approval with flanged connections.
- I. Swing Check Valves:
- 1. Description
 - a. Check valves shall be in accordance with AWWA C508.
 - 2. Materials:
 - a. Body: high-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 125 and be suitable for horizontal or vertical installation.
 - b. Body seat ring: Stainless steel and shall be mechanically retained by means of roll pins or stainless steel cap screws. The body seat ring shall be replaceable.
 - c. Disc: Cast iron per ASTM A126 Class B, bronze, or alloy cast iron with bronze or stainless steel disc rings.
 - d. Disc arm: Ductile iron or steel.
 - e. Shaft: Austenitic stainless-steel.
 - 3. Disc:
 - a. The valve disc shall be attached to the disc arm by means of a single center pin permitting 360-degree articulation.
 - b. The disc shall present a convex surface to the direction of flow to compensate for oscillation.
 - c. Disc seats shall be replaceable.
 - 4. Shaft:
 - a. The shaft shall rotate freely without the need for external lubrication.
 - b. The shaft shall be sealed where it passes through the body by means of a stuffing box and adjustable packing.
 - c. Simple O-ring shaft seals are not acceptable. Hinge shafts shall be constructed of 316 stainless steel
 - d. Pivot pins and bushings: bronze or stainless steel.

5. The valve body shall be the full waterway type, designed to provide a net flow area not less than the nominal inlet pipe size when swung open no more than 25 degrees.
6. Unless otherwise noted, the valve shall be supplied with an outside lever and adjustable counterweight to initiate valve closure.
7. Air Cushioned Swing Check Valve:
 - a. Final closure shall be dampened by means of a single, side-mounted bronze air-cushion assembly directly mounted to the valve body on machined pads. The amount of cushioning shall be easily adjustable without the need for pre-charged air chambers. Commercial air cylinders, which pivot and/or are attached with fabricated brackets, are not acceptable.

J. Ball Check Valves:

1. Description:
 - a. Material:
 - 1) ASTM A536 ductile iron with sinking type ball made of a hollow metal core with vulcanized nitrile rubber covering, or;
 - 2) ASTM D1784 PVC with sinking type ball made of nitrile or Teflon.
 - b. The valves shall insure a positive seal to prevent reverse flow even with extremely low back pressure.
 - c. The valves shall be designed for horizontal or vertical installation and have a removable cover to permit inspection.

2.02. TAPPING SLEEVES AND VALVES

A. Tapping Sleeves:

1. Description:
 - a. Material: Ductile iron meeting ASTM A536 Grade 65-45-12.
 - b. Type: Dual compression.
 - c. Outlet Flange
 - 1) Comply with ASME B16.1, Class 125, and MSS SP-60.
 - 2) Outlet flange seals shall be of the O-Ring type of either round, oval, or rectangular cross-sectional shape
 - d. Bolts
 - 1) Body: High strength cast iron bolts.
 - 2) Glands: Steel bolts fastened to the bell opening of the sleeves.
 - e. Gasket: full circumferential type providing a 360° seal around existing pipe.
 - f. Bituminous Coating: Comply with AWWA C110.

B. Tapping Valves:

1. Description:

- a. Valves will be identical to resilient wedge gate valves elsewhere specified with inlet and outlet ends adaptable to the tapping machine and to provide mechanical joint connections to discharge pipes

2.03. FIRE HYDRANTS

A. Manufacturers:

1. The fire hydrants shall be manufactured by American Darling or approved equal.

B. Dry-Barrel, Breakaway Type:

1. Comply with AWWA C502.
2. Design:
 - a. Hydrants shall be of the traffic or safety model type incorporating a break away flange arrangement which will permit the upper section of the hydrant barrel to separate from the lower section upon impact and the hydrant valve will remain closed and reasonably tight.
3. Rating: Designed for a minimum working pressure of 150 psi and a hydrostatic test pressure of 300 psi with the valve in both the open and closed positions.
4. Burial Depth:
 - a. All hydrants shall be furnished with barrel and stem extensions as required to provide a nominal minimum cover of approximately three feet or greater if so required by field conditions.
5. Main Valve:
 - a. Size: 5-1/4 inches, unless otherwise specified.
 - b. Type: Compression type, closing with line pressure and capable of withstanding 250 PSI working pressures and 500 PSI hydrostatic test pressures, unless otherwise specified.
 - c. The valve seat ring shall thread into a bronze sub-seat, and all gaskets sealing the seat ring shall be a bronze-to-bronze surface.
6. Drain Valve: All bronze and allowing complete drainage of all residual water in the hydrant barrel.
7. Opening Nut: Pentagonal, 1-1/2 inches from the point to the flat, counterclockwise opening.
8. Stem and Seals:
 - a. Hydrants shall be of the "dry top" type with the upper rod threads completely enclosed in a sealed grease or oil chamber to lubricate the entire length of the threaded part of the valve stem each time the hydrant is operated.
 - b. All-weather grease shall be used to provide permanent lubrication. A thermoplastic thrust washer shall be used to reduce friction in the thrust collar while opening the hydrant.

- c. Two (2) "O"-ring seals between the revolving nut and bronze-sheathed upper section of the valve rod shall be utilized to ensure that threads on the valve stem do not come into contact with water at any time.
 - d. The top of the rod shall also be fitted with a travel stop nut to limit downward travel of the rod.
 - 9. End Connections: 6-inch Mechanical joint.
 - a. Joint restraint, if specified, shall be accomplished for mechanical joint by use of mechanical joint gripper glands.
 - 10. Bolts and Nuts: Stainless steel.
 - 11. Interior Coating: Comply with AWWA C550.
 - C. Hose Connections:
 - 1. One 4-1/2-inch pumper nozzle.
 - 2. Two (2) 2-1/2-inch hose nozzles.
 - 3. All connections shall be bronze with National Standard Threads.
 - 4. Cast iron nozzle caps attached by separate steel chains.
 - 5. Nozzles shall be reverse threaded into the fire hydrant barrel.
 - D. Finishes:
 - 1. All hydrants shall be painted the manufacturer's standard red unless otherwise specified.
 - 2. Color: Comply with requirements of utility company or fire department.
- 2.04. YARD HYDRANTS
- A. Type: 2-1/8-inch freeze-less post.
 - B. Inlet: 2-inch mechanical joint.
 - C. Nozzles:
 - 1. One (1) 2-1/2-inch fire nozzle with 1-1/2-inch nipple.
 - 2. One (1) standard 3/4-inch hose nozzle for wash down
 - D. Provide and install 3 cubic feet of crushed stone at freeze drain.
- 2.05. FREEZE-PROOF HOSE BIBS
- A. Manufacturers:
 - 1. The hose bibs shall be manufactured by Nibco (No. 74VB) or approved equal.
 - B. All hose bibs shall be freeze-proof.
- 2.06. VALVE BOXES
- A. Description: Valve boxes shall be of the close-grained gray cast iron and adjustable. The word "WATER" shall be cast in the lid. Valve boxes shall be coated with a protective bituminous coat before being shipped from the factory. Valve box weight shall not bear upon the valve bonnet.

B. Precast Concrete Valve Box Protector Ring:

1. Each cast iron valve box located outside of paved areas shall be installed with a 24" diameter, precast reinforced concrete protector ring.
2. Each cast iron valve box located in a paved area shall have a cast in place 24" x 24" x 7-1/2" concrete encasement installed 2" below grade with the top 2-1/2" being asphalt.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Determine exact location and size of valves and/or hydrants from Drawings.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify that elevations of existing facilities, prior to excavation and installation of valves and/or hydrants, are as indicated on Drawings.

3.02. PREPARATION

- A. Locate, identify, and protect from damage utilities to remain.
- B. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
 1. Notify ENGINEER not less than two days in advance of proposed utility interruption.

3.03. INSTALLATION

A. General:

1. CONTRACTOR shall provide all materials, labor, tools, equipment and incidentals required for the excavation, installation, backfilling and testing of valves and/or hydrants and associated appurtenances.
2. All valves and hydrants shall be installed in accordance with the manufacturer's instructions.
3. Valves, hydrants and accessories shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage.
4. Perform trench excavation, backfilling, and compaction as specified.
5. Disinfection of Water Piping System: Flush and disinfect valves and hydrants with water mains as specified.
6. Install valves and hydrants in conjunction with pipe laying.

B. Valve Installation:

1. Before setting each valve, the CONTRACTOR shall make sure the interior is clean and test opening and closing.
2. Valves shall be set with stems plumb, unless horizontal installation is called for on the plans, and at the exact locations shown.
3. Provide buried valves with valve boxes installed flush with finished grade.
4. Air Release and Combination Air/Vacuum Valves:

- a. All air release and combination air/vacuum valve assemblies shall be:
 - 1) Installed at locations shown and in accordance with specifications and details provided on the Plans.
 - 2) Installed in standard eccentric manhole.
 - 3) Provided with a saddle tap of the same size as the combination air valve assembly and isolated with a gate valve of the same size. The isolation gate valve shall be provided with NPT threads and connected with brass or bronze piping. Brass or bronze ball valves may be used in lieu of gate valves for installations 2 inches or smaller. The isolation valve shall be rated for 200 psi service or greater.

5. Tapping Sleeves and Valves:

- a. As indicated on Plans and according to manufacturer instructions. All sleeves are to include the end joint accessories and split glands necessary to assemble sleeve to pipe. Concrete thrust blocks shall be installed as specified prior to backfilling.

C. Valve Box Installation:

1. A valve box shall be installed over each underground valve. All boxes shall be installed in accordance with the manufacturer's instructions and set plumb and centered on the operating nut. Top of the valve box shall be flush with finished grade and with a precast concrete "donut" unless located within a hardened surface such as roadway or concrete slab.

D. Fire Hydrant Installation:

1. Fire hydrants shall be located as shown on Plans.
2. Each hydrant shall be connected to the main with a 6-inch diameter branch line, which shall include a 6-inch gate valve. The branch line shall have at least as much cover as the distribution main.
3. Hydrants shall be rodded to the 6-inch branch tee.
4. Orientation:
 - a. Set valves and hydrants plumb.
 - b. Set fire hydrants with pumper nozzle facing roadway.
 - c. Set fire hydrants with centerline of pumper nozzle 18 inches above finished grade and with safety flange above grade but not more than 2 inches above grade.
5. Provide thrust blocking and not less than eight (8) cubic feet of drainage gravel while installing fire hydrants; do not block drain hole. Place a cap block beneath the fire hydrant foot for a solid bottom.
6. After main-line pressure testing, flush fire hydrants and check for proper drainage.

3.04. FIELD QUALITY CONTROL

- A. Testing: Pressure test valves and hydrants with water mains as specified.

END OF SECTION

SECTION 33 15 00

MISCELLANEOUS VALVES AND APPURTENANCES

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete the installation of valves, and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Miscellaneous Valves.
2. Miscellaneous Appurtenances

1.02. REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. American Water Works Association:

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
2. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
3. AWWA C502 - Dry-Barrel Fire Hydrants.
4. AWWA C504 – Rubber Seated Butterfly Valves, 3 In. through 72 In.
5. AWWA C507 - Ball Valves, 6 in. through 60 in.
6. AWWA C508 – Swing-Check Valves for Waterworks Service, 2-In. through 24-In. NPS.
7. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
8. AWWA C512 - Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
9. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
10. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

C. ASTM International:

1. ASTM A48 – Standard Specification for Gray Iron Castings.
2. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A536 – Standard Specification for Ductile Iron Castings.
4. ASTM D429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.
5. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

6. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
 1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
 2. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved, and Flared Ends.
- E. North Carolina Administrative Code
 1. 15A NCAC 18C – Rules Governing Public Water Systems
- F. NSF International:
 1. NSF 61 - Drinking Water System Components - Health Effects.
 2. NSF 372 - Drinking Water System Components - Lead Content.
- 1.03. COORDINATION
 - A. Coordinate Work of this Section with installation of water mains.
- 1.04. SUBMITTALS
 - A. Section 01 30 00 – Submittals/Electronic Submittals.
 - B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.
 - C. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
 - D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- 1.05. CLOSEOUT SUBMITTALS
 - A. Section 01 72 00 – Project Record Documents.
 - B. Project Record Documents: Record actual locations of valves and hydrants.
- 1.06. QUALITY ASSURANCE
 - A. Where appropriate, perform Work according to 15A NCAC 18C.
 - B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.
 - C. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.
- 1.07. DELIVERY, STORAGE, AND HANDLING
 - A. Section 01 55 00 – Site Access and Storage.
 - B. Delivery:
 1. Seal valve and hydrant ends to prevent entry of foreign matter.
 2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
 - C. Store materials according to manufacturer instructions.
 - D. Protection:

1. Protect materials from contamination by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.01. VALVES

A. Unless otherwise noted, valves shall have the following performance and design criteria:

1. Pressure Rating:
 - a. 12-inch Diameter and Smaller: 200 psig.
 - b. 14-inch Diameter and Larger: 150 psig.
2. Underground (Buried) Installations:
 - a. Mechanical joint connections.
 - b. Non-rising stem type.
 - c. 2-inch square operating nut.
3. Above Ground Installations:
 - a. Flanged ends with Class 125 flanges unless otherwise noted.
 - b. Rising stems, unless otherwise noted, with outside stem and yoke and 18-inch diameter minimum hand wheel.
 - c. All valves shall be operated by handwheel.
4. Valves shall have a clear waterway equal to the full nominal diameter of the pipe.
5. Each valve shall have the initials or name of the maker, pressure rating, and year of manufacture cast on the body.
6. Valves shall have an arrow cast in the operating nut indicating the direction of opening.
7. Coatings:
 - a. Comply with AWWA C550.
 - b. Application: Interior and exterior.
8. Operation: Counterclockwise opening.

B. Altitude Control Valves:

1. Manufacturers:
 - a. The altitude control valve shall be manufactured by Cla-Val, GA Industries, Inc., Singer or approved equal.
2. Description:
 - a. Altitude control valves shall be hydraulically operated, pilot actuated diaphragm type globe or angle valve designed for ground level control of water in an elevated storage tank and reservoirs.

- b. The valve operates on a differential in pressure between the height of the water in the reservoir and an adjustable spring-loaded pilot control.
 - c. Materials:
 - 1) Body: Cast iron (ASTM A126).
 - 2) Shaft/Stem: Stainless-steel.
 - 3) Seat ring: Bronze
 - 4) Upper stem bushing: Bronze
 - 5) Diaphragms: Nylon reinforced.
 - 6) Valve control pilots: Bronze
 - 7) Internal parts: Stainless-steel and Buna N.
 - d. The valve is to be non-throttling and will remain in the full open position until the shut off point is reached.
 - e. It shall be designed for an internal working pressure of 175 PSI and maximum differential pressure across the diaphragm of basic valve and pilots is not to exceed 300 PSI.
 - f. The installation shall be designed for either one-way flow or two way flow as indicated on the Contract drawings.
 - 1) One-way flow: The valve will be used where pressure on the inlet side of the valve is greater than the pressure created by the maximum reservoir or tank head. The valve's sole function is to fill an elevated tank or reservoir to a desired level.
 - 2) Two-way flow: The valve will be used when pressure on the inlet side is variable. When inlet pressure falls below reservoir pressure the valve opens, allowing reverse flow from the reservoir and thus maintaining fluid pressure within the water distribution system.
- C. Pressure-Reducing Valves:
- 1. Manufacturers:
 - a. The pressure-reducing valve shall be manufactured by GA Industries, Inc. (Figure 4500-D) or approved equal.
 - 2. Description:
 - a. Pressure Reducing Valves larger than 2-inches in diameter shall consist of a main valve assembly and a pilot system, completely assembled tested as unit and ready for field installation.
 - b. The valve shall function to reduce a higher, fluctuating inlet pressure to a lower, steady outlet pressure regardless of variations in demand.
 - c. Materials:

- 1) Body: High-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 125.
- d. Valve body shall be globe style and have an integral bottom pad or feet to permit support directly beneath the body.
- e. The main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area and the area on the upper surface is greater than that of the underside. There shall be no diaphragms or springs in the main valve.
- f. The valve piston shall be fully guided on its outside diameter and all guiding and sealing surfaces shall be bronze. To minimize the consequences of throttling, throttling shall be by long, stationary vee-ports located downstream of the seat and not by the seat itself. Sawtooth attachments or other add-on devices are not permitted.
- g. The valve shall be fully capable of operating in any position without the need of springs and shall not incorporate stems, stem guides or spokes in the waterway. A visual position indicator shall be provided.
- h. The main valve shall be serviceable in the line through a single flanged cover which provides easy access to all internal components.
- i. Pilot System:
 - 1) Provide a system of pilots and controls to enable the valve to perform the function listed below. All controls and control piping shall be non-corrosive and suitable for the working pressure.
 - 2) System shall include a normally open, direct-acting, diaphragm operated, spring loaded bronze pressure reducing pilot. Pilot shall be easily field-adjustable from near zero to a minimum of 10 percent above the factory setting. Controls shall include adjustable closing speed control, y-strainer, and pilot isolating valves.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Determine exact location and size of valves and/or appurtenances from Drawings.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify that elevations of existing facilities, prior to excavation and installation of valves and/or hydrants, are as indicated on Drawings.

3.02. PREPARATION

- A. Locate, identify, and protect from damage utilities to remain.
- B. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
 1. Notify ENGINEER not less than two days in advance of proposed utility interruption.

3.03. INSTALLATION

A. General:

1. CONTRACTOR shall provide all materials, labor, tools, equipment and incidentals required for the excavation, installation, backfilling and testing of valves and/or associated appurtenances.
2. All valves and appurtenances shall be installed in accordance with the manufacturer's instructions.
3. Valves and appurtenances shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage.
4. Perform trench excavation, backfilling, and compaction as specified.
5. Disinfection of Water Piping System: Flush and disinfect valves and appurtenances with water mains as specified.
6. Install valves and appurtenances in conjunction with pipe laying.

B. Valve Installation:

1. Before setting each valve, the CONTRACTOR shall make sure the interior is clean and test opening and closing.
2. Valves shall be set with stems plumb, unless horizontal installation is called for on the plans, and at the exact locations shown.
3. Provide buried valves with valve boxes installed flush with finished grade.

3.04. FIELD QUALITY CONTROL

- #### A. Testing: Pressure test valves and hydrants with water mains as specified.

END OF SECTION

SECTION 33 27 60
UNDERGROUND UTILITY DETECTION SYSTEM

PART 1 GENERAL

1.01. SCOPE OF WORK

- A. The work covered by this section consists of all work necessary to furnish and install the pipeline tracer wire system used to locate buried underground pipelines.
- B. All materials used on this project must have a preliminary inspection by the Inspector before being used for construction purposes. Rejection of materials not meeting specifications shall be immediately removed from the job site.

1.02. SUBMITTALS

- A. The CONTRACTOR shall submit to the ENGINEER shop drawings for all products and components provided under this specification section to be used for the construction of this project.

PART 2 PRODUCTS

2.01. COLOR CODING

- A. All trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

2.02. TRACE WIRE

- A. Open Trench
 - 1. Trace wire shall be #14 AWG Copper Clad Steel with a minimum 250 lb. break load and a minimum 30 mil HDPE insulation thickness.
- B. Directional Drilling/Boring
 - 1. Trace wire shall be #12 AWG Copper Clad Steel with a minimum 1,150 lb. break load and a minimum 45 mil HDPE insulation thickness.
- C. Pipe Bursting/Slip Lining
 - 1. Trace wire shall be 7x19 stranded 304 Stainless Steel with a minimum 3,700 lb. break load and a with a minimum 45 ml HDPE insulation thickness.

2.03. CONNECTORS

- A. All mainline trace wires must be interconnected in intersections, mainline tees, and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At crosses, the four wires shall be joined using a 4-way connector. The use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- B. Direct bury wire connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner to prevent any uninsulated wire exposure.
- C. Non-locking friction fit, twist on or taped connectors are prohibited.

2.04. ACCEPTABLE PRODUCTS

A. The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

1. Copper clad Steel (CCS) trace wire
 - a. Open Trench
 - 1) Copperhead part # 1430-HS
 - b. Directional Drilling/Boring
 - 1) Copperhead part # 1245*EHS
 - c. Pipe Bursting/Slip Lining
 - 1) Copperhead part # PBX-50
2. Connectors
 - a. Copperhead 3-way locking connector part # LSC1230*
 - b. DryConn 3- way Direct Bury Lug: Copperhead Part # 3WB-01
3. Termination/Access
 - a. Non-Roadway access boxes applications
 - 1) Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP
 - b. Concrete / Driveway access box applications
 - 1) Trace wire access boxes Grade level Copperhead Part # CD14*TP 14"
4. Grounding
 - a. Drive in Magnesium Anode
 - 1) Copperhead Part # ANO-1005 (1.5 lb)

PART 3 INSTALLATION

3.01. GENERAL

- A. Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances more than 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- B. Trace wire systems must be installed as a single continuous wire, except when using approved connectors. No looping or coiling of wire is allowed.
- C. Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- D. Trace wire shall be installed at the top half of the pipe and secured (taped/tied) at 5-foot intervals.

- E. Trace wire must be properly grounded as specified.
- F. Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway. (See 3.02 Termination/Access)
- G. At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. (See 3.06 Grounding)
- H. Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead- end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
- I. All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- J. In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using approved splice connectors, and shall be properly grounded at the splice location as specified.

3.02. TERMINATION/ACCESS

- A. All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
- B. All grade level/in-ground access boxes shall be appropriately identified with "sewer" or "water" cast into the cap and be color coded.
- C. A minimum of 2 feet of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
- D. All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- E. Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.

3.03. SERVICE LATERALS ON PUBLIC PROPERTY

- A. Trace wire must terminate at an approved grade level/in- ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.

3.04. SERVICE LATERALS ON PRIVATE PROPERTY

- A. Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.

3.05. LONG-RUNS, IN EXCESS OF 500 LINEAR FEET WITHOUT SERVICE LATERALS OR HYDRANTS

- A. Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a polyethylene marker post, minimum of 48 inches tall, color coded per APWA standard for the specific utility being marked.

3.06. GROUNDING

- A. Trace wire must be properly grounded at all dead ends/stubs.
- B. Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.
- C. When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
- D. When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
- E. Where the anode wire will be connected to a trace wire access box, a minimum of 2 feet of excess/slack wire is required after meeting final elevation.

3.07. SANITARY SEWER SYSTEM

- A. A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
- B. Lay mainline trace wire continuously, by-passing around the outside of manholes/structures on the North or East side.
- C. Trace wire on all sanitary service laterals must terminate at an approved trace wire access box color coded green and located directly above the service lateral at the edge of road right of way.

3.08. WATER SYSTEM

- A. A mainline trace wire must be installed, with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
- B. Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side.
- C. Trace wire on all water service laterals must terminate at an approved trace wire access box color coded blue and located directly above the service lateral at the edge of road right of way.
- D. All conductive and non-conductive service lines shall include tracer wire.

3.09. PROHIBITED PRODUCTS AND METHODS

- A. The following products and methods shall not be allowed.
 - 1. Uninsulated trace wire
 - 2. Trace wire insulations other than HDPE
 - 3. Trace wires not domestically manufactured
 - 4. Non-locking, friction fit, twist on or taped connectors
 - 5. Brass or copper ground rods
 - 6. Wire connections utilizing taping or spray-on waterproofing
 - 7. Looped wire or continuous wire installations that have multiple wires installed side-by-side or in close proximity to one another
 - 8. Trace wire wrapped around the corresponding utility
 - 9. Brass fittings with trace wire connection lugs
 - 10. Wire terminations within the roadway, i.e., in valve boxes, cleanouts, manholes, etc.
 - 11. Connecting trace wire to existing conductive utilities

3.10. TESTING

- A. A minimum of 2' of excess trace wire shall be accessible at all access points.
- B. All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.
- C. This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.
- D. Continuity testing in lieu of actual line tracing shall not be accepted.

END OF SECTION

SECTION 33 31 11

PUBLIC SANITARY SEWERAGE GRAVITY PIPING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials and incidentals necessary to install and complete installation of sanitary sewer gravity piping and appurtenances in accordance with the plans. All pipe and appurtenance material shall be of the type and class specified herein.

B. Section Includes:

1. Sanitary sewerage piping.
2. Connection to existing manholes.
3. Wye branches.
4. Sanitary laterals.
5. Pile support systems.
6. Bedding and cover materials.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
5. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
6. AWWA C600 – Installation of Ductile-Iron Mains and Their Appurtenances.

C. ASTM International:

1. ASTM A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM A746 – Standard Specification for Ductile Iron Gravity Sewer Pipe
3. ASTM C891– Standard Practice for Installation of Underground Precast Concrete Utility Structures
4. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

5. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 6. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
 7. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 8. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 9. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe
- D. North Carolina Administrative Code
1. 15A NCAC 02T – Waste Not Discharged to Surface Waters
- E. National Fire Protection Association
1. NFPA 70 – National Electrical Code
- 1.03. COORDINATION
- A. Coordinate Work of this Section with appropriate utilities department.
 - B. Do not interrupt service to facilities occupied by OWNER or others unless approved by the ENGINEER and OWNER no fewer than 72 hours in advance of proposed interruption and after arranging to provide temporary sewer service.
- 1.04. SUBMITTALS
- A. Section 01 30 00 – Submittals/Electronic Submittals.
 - B. Product Data: Submit manufacturer information indicating proposed materials, accessories, details, and construction information.
 - C. Installation manuals shall be furnished to the ENGINEER for his review and approval prior to installation of any materials. The ENGINEER may augment any manufacturer's installation recommendations if, in his opinion, it will best serve the interest of the OWNER.
 - D. Shop Drawings:
 1. Drawings and descriptive data on manholes (including wall thicknesses, vertical dimensions, and deflection angles), concrete used in manufacture of manholes and precast inverts, rubber gaskets, joint sealant, flexible manhole sleeves and joints, frames and covers, inverts, and manhole steps shall be submitted to the ENGINEER for review prior to their manufacture.
 2. All sizes and types of pipe.
 3. All pipe fittings and appurtenances.
 4. All transition couplings.
 - E. Field Quality-Control Submittals: Indicate results of CONTRACTOR-furnished tests and inspections.

- F. Preconstruction Photographs and/or Video: Submit digital files of photographs and/or video of Work areas and material storage areas, as specified in Section 01 39 00 – Pre-Construction Video

1.05. CLOSEOUT SUBMITTALS

- A. Section 01 72 00 – Project Record Documents.
- B. Project Record Documents: Record invert elevations and actual locations of pipe runs, connections, material changes, manholes service lines, and cleanouts.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06. QUALITY ASSURANCE

- A. Perform Work according to 15A NCAC 02T and the following requirements:
 - 1. Comply with all requirements of utility OWNER.
 - 2. Comply with all standards of authorities having jurisdiction for public sanitary sewerage, including materials, installation, and testing.
- B. All piping materials shall bear label, stamp, or other markings of specified testing agency.

1.07. QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience. Upon request of the ENGINEER, Manufacturer shall provide documentation of experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience in installation of necessary materials. Upon request of the ENGINEER, Installer shall provide documentation of experience.
- C. The design, installation and operation of any temporary pumping system, when required to maintain sewer flows in the existing system, shall be the CONTRACTOR's responsibility. Demonstrate experience in the design and operation of temporary bypass pumping systems or employ the services of a vendor who can demonstrate this experience. The CONTRACTOR or vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed within the past three (3) years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction and not interrupt existing wastewater service nor cause road closures.

1.08. DELIVERY, STORAGE, AND HANDLING

- A. Section 01 55 00 – Site Access and Storage.
- B. Coordinate material deliveries with the manufacturer/supplier. Handle and store all materials in accordance with the manufacturer's recommendations using methods that will prevent damage to the materials. Further, all manhole components shall be handled and stored in accordance with ASTM C891.
- C. Transport:
 - 1. Unload pipe and appurtenances so as to avoid deformation or other injury thereto. Pipe shall not be placed within pipe of a larger size and shall not be rolled or dragged over gravel or rock during handling. If any defective material is discovered after

installation, remove and replace with sound pipe or repair in an approved manner at no additional cost to the OWNER.

- D. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- E. Storage:
 - 1. Store materials according to manufacturer instructions.
 - 2. Block individual and stockpiled pipe lengths to prevent moving.
 - 3. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
 - 4. Store plastic materials out of sunlight.
 - 5. Store all pipe and appurtenances on sills above storm drainage level and deliver for laying after the trench is excavated.
- F. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Plastic materials shall be supported to prevent sagging and bending.
 - 3. Plastic materials shall be covered with tarps.
 - 4. Provide additional protection according to manufacturer instructions.
 - 5. When any material is damaged during transporting, unloading, handling or storing, the undamaged portions may be used as needed, or, if damaged sufficiently, the ENGINEER will reject the material as being unfit for installation. The ENGINEER will reject any ductile iron pipe with a damaged cement mortar lining.

1.09. EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.
- B. Existing Service:
 - 1. Interruption of Existing Sanitary Sewerage Service: The interruption of sewer flows within the collection system or service to any occupied structure or facility will not be permitted unless specifically approved by the utility OWNER. Maintain sewer flows at all times.
 - 2. When by-pass pumping of sewer flows is necessary, submit a by-pass pumping work plan to the ENGINEER and utility OWNER as specified.

PART 2 PRODUCTS

2.01. GENERAL

- A. All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs and other imperfections, and true to theoretical shapes and forms throughout.
- B. As particular specifications are cited, the designation shall be construed to refer to the latest revision under the same specification number, or to superseding specifications under a new number except provisions in revised specifications which are clearly inapplicable.

2.02. SANITARY SEWERAGE PIPING

A. Gaskets

- 1. Gasket material shall be Styrene Butadiene Copolymer (SBR) unless otherwise noted.

B. Ductile Iron Pipe:

- 1. All ductile iron pipe shall conform to ASTM A746 and be Pressure Class 350 unless otherwise specified. Class numbers or pressure rating shall be clearly marked on the pipe and fittings at the factory.
- 2. Ductile iron pipe shall be of the size indicated on the Drawings and shall be designed in accordance with AWWA C150 and manufactured in accordance with AWWA C151.
- 3. Bituminous Outside Coating
 - a. All ductile iron pipe shall have an outside pipe coating of an asphaltic material a minimum of 1 mil thickness in accordance with AWWA C151. The final coat shall be continuous and smooth being neither brittle when subjected to low temperatures nor sticky when exposed to hot sun. The coating shall adhere to the pipe at all temperatures.
- 4. Interior Lining
 - a. Unless otherwise specified, line the interior of all ductile iron pipe and fittings with a ceramic epoxy coating consisting of two-part component, amine cured novalac epoxy containing a minimum of 20% by volume ceramic pigmentation.
- 5. Joints:
 - a. Unless otherwise shown on the Drawings, pipe joints shall be push joint type.
- 6. Long Span Pipe:
 - a. "Long span" type ductile iron pipe shall be used for unsupported spans greater than 20'-0". "Long span" ductile iron pipe and associated pipe joints shall be designed by the pipe manufacturer specifically for elevated crossings with unsupported spans shown on the drawings. Submit shop drawings from the pipe manufacturer for the long span pipe. Shop drawings shall include material specifications for the pipe and joints, and shall specify locations of joints with respect to the pier locations shown on the drawings. Long span ductile iron pipe shall be as manufactured by American, U.S. Pipe, or equal.

C. PVC

1. All PVC pipe shall conform to Type PSM SDR-35PVC unless otherwise specified. Class and pressure rating shall be clearly marked on the pipe at the factory.
 2. PVC pipe shall be of the size indicated on the Drawings and shall be designed in accordance with ASTM D3034.
 3. Pipe shall be supplied in 20-foot lengths.
 4. Joints:
 - a. Unless otherwise shown on the Drawings, pipe joints shall be bell-and-spigot style, with rubber-ring-sealed gasketed compression type joints.
 - b. Joints and gaskets to comply with ASTM F477 and ASTM D3212.
 5. Fittings: PVC or as shown on the Drawings.
- D. PVC Pressure Pipe for Gravity Sewer Applications Conforming to Water Main Standards:
1. PVC pressure pipe for gravity sewer applications conforming to water main standards shall be used where called for on the Drawings.
 2. Material: Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784.
 3. Comply with ASTM D2241.
 4. Minimum SDR 26, Pressure Rated 160.
 5. Pipe shall be green in color signifying its use in a sewer application.
 6. Joints
 - a. Pipe shall have an integral elastomeric-gasket bell end.
 - b. Joints and gaskets to comply with ASTM F477 and ASTM D3139.
- 2.03. WYE BRANCHES AND SADDLES
- A. Wye Branches
1. Material: Wyes shall be of the same material and strength as the sewer mains on which they are installed.
 2. PVC wyes shall conform to ASTM D3034 and DIP wyes to ASTM A536.
- B. Saddles
1. Use saddle wye or tee with stainless steel clamps for taps into existing piping.
 2. Saddle type fittings shall not be used on new construction.
 3. Material
 - a. Saddles shall be of the same material and strength as the sewer mains on which they are installed.
 - b. Straps and hardware shall be 304 stainless steel.
 4. Saddles on PVC pipe shall comply with ASTM D3034.
 5. Saddles on PVC pipe shall comply with ASTM A536.

6. Lay out holes with template and cut holes with mechanical cutter.

2.04. SERVICE LATERALS

- A. Unless otherwise specified in the Plans and/or Specifications, service laterals shall be constructed of 4-inch diameter Schedule 40 PVC pipe or Class 350 psi ductile iron pipe, including the cleanout stack.
- B. PVC pipe shall comply with ASTM D1785.

2.05. FLEXIBLE COUPLINGS

- A. The use of flexible couplings will not be allowed on a new gravity system unless specifically called for on the Drawings.
- B. In general, during the rehabilitation of existing sewer lines, the use of appropriate transition couplings shall be permitted as approved by the ENGINEER. All changes in pipe size within the gravity sewer collection system shall require the installation of a manhole as specified elsewhere.
- C. Couplings shall comply with the following:
 - 1. Material: Shielded rubber sleeve with a stainless-steel shear ring and clamps
 - 2. Sleeve shall comply with ASTM C425 and ASTM C1173. Shear ring shall comply with ASTM A240.
 - 3. Accessories: Clamps shall be included with nut and bolt or worm drive take-up fasteners. "O" ring-type seals shall be provided under each sealing clamp to prevent slippage and provide a positive seal.
 - 4. The gap between the pipe sections being jointed shall not exceed 0.25 inches.
- D. Only electro-fusion couplings shall be used when connecting HDPE pipe.

2.06. FLEXIBLE PIPE BOOTS FOR MANHOLE PIPE ENTRANCES

- A. Description:
 - 1. Material: Ethylene-propylene-diene terpolymer (EPDM).
 - 2. Comply with ASTM C923.
 - 3. Attachment: stainless-steel clamp and hardware.
 - 4. Deflection: permit at least an 8° deflection from the centerline of the opening in any direction while maintaining a watertight connection.
 - 5. Seal: Joints shall be watertight under a 30 foot head of water.

2.07. CONCRETE ENCASEMENT AND CRADLES

- A. Concrete:
 - 1. Strength: 4,000 psi at 28 days.
 - 2. Air entrained.
 - 3. Finish: Rough troweled.
 - 4. Concrete shall be as specified.

2.08. MATERIALS

A. Bedding and Backfill:

1. General: No rock, boulders, stone or debris larger than four inches shall be allowed in the bedding or backfill material. Deficient or unsuitable bedding or backfill material shall be replaced or substituted with suitable bedding or backfill material. Excavated material intended for use as bedding or backfill shall not be used if exceedingly wet nor shall trenches be backfilled if flooded or excessively wet.
2. Stone: Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67.
3. Soil: Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability
 - a. Class I Soil -Angular, 6 to 40 mm ($\frac{1}{4}$ " to $1\frac{1}{2}$ "), graded stone, including a number of fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.
 - b. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm ($1\frac{1}{2}$ "), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.
 - c. Class III Soil - Fine sand and clayey gravels, including fine sands, sand clay mixtures, and gravel clay mixtures. Soil types GM, GC, SM, and SC are included in this class.
 - d. Class IV Soil Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.
 - e. Class V Soil - Includes the organic soils types OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than $1\frac{1}{2}$ inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

PART 3 EXECUTION

3.01. EXAMINATION

- A. Verify that excavation base is ready to receive Work of this Section.
- B. Verify that excavations, dimensions, and elevations are as indicated on Drawings.
- C. Existing Utilities
 1. All utility Owners shall be notified prior to excavation as required by the 1985 Underground Damage Prevention Act. Utility Owners who are members of NC OneCall may be notified by calling 811 (toll free) before any excavation or drilling. The CONTRACTOR will be fully responsible for damage to any utilities if the Owners have not been properly notified as required by the Underground Damage Prevention Act. All damage to such structures and pipelines and all damage to property or persons

resulting from damage to such structures and pipelines shall be borne by the CONTRACTOR and shall be completely repaired within a reasonable time. No claim shall be made against the OWNER for damage or delay of the work on account of the proximity of, or the leakage from, such structures and pipelines. Where high pressure gas lines are to be crossed, they shall be uncovered by hand excavation methods before other excavation near them is started.

2. Where required by the Contract Documents, excavate to determine the precise location of utilities or other underground obstructions which are shown on the Plans and/or marked by the utility Owners. Such location and excavation shall be at least 500 feet ahead of construction, unless otherwise noted.
3. Utility Owners may, at their option, have representatives present to supervise excavation in the vicinity of their utilities. The cost of such supervision, if any, shall be borne by the CONTRACTOR.
4. When underground obstructions not shown on the Plans are encountered, promptly report the conflict to the ENGINEER and do not proceed with construction until the conflict is resolved.
5. Conflicts with underground utilities may necessitate changes in alignment and/or grade of this construction. All such changes will be approved by the ENGINEER before construction proceeds.

3.02. PREPARATION

A. Preconstruction Site Photos:

1. As specified in Section 01 39 00 – Pre-Construction Video.
2. Take photographs along centerline of proposed pipe trench; minimum one photograph for each fifty (50) feet of pipe trench.
3. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing Site features.
4. Include Project description, date taken, and sequential number on back of each photograph.

B. Protect and support existing utilities and appurtenances.

C. Inspect each pipe and fitting before and after installation; replace those found defective and remove from site. Provide proper equipment for lowering sections of pipe into trenches.

D. Provide tools, implements, and facilities for the safe completion of pipe laying in accordance with manufacturer requirements and these specifications. All pipe and other materials used in the laying of pipe will be lowered into the trench piece by piece by means of suitable equipment in such a manner to prevent damage to the pipe, materials, to the protective coating on the pipe materials, and to provide a safe working condition to all personnel in the trench. Each piece of pipe being lowered into the trench shall be clean, sound and free from defects. It shall be laid on the prepared foundation, as specified elsewhere to produce a straight line on a uniform grade, each pipe being laid so as to form a smooth and straight inside flow line. Pipe shall be removed at any time if broken, injured or displaced in the process of laying same, or of backfilling the trench.

- E. When cutting short lengths of pipe, a pipe cutter, as recommended by the manufacturer, will be used and the cut shall be made at right angles to the centerline of the pipe. In the case of push on joints, the cut ends shall be tapered with a portable grinder, in accordance with manufacturer guidelines.

3.03. INSTALLATION

A. Installing Pipe on Line and Grade:

1. Excavate pipe trench as specified.
2. Excavate to lines and grades as indicated on Drawings.
3. Dewater excavations where required to maintain dry conditions and to preserve final grades at bottom of excavation.
4. Provide sheeting and shoring as specified.

B. Bedding and Backfill:

1. Place bedding material (No. 67 stone) to establish the required invert elevation and pipe grade.
2. Work bedding material carefully around pipe to ensure adequate haunching.

C. PVC Pipe:

1. After the joint has been made, backfill to top of pipe with No. 67 stone material. Do not allow the pipe to shift. Additional bedding requirements outlined in project drawings shall be followed.

D. Ductile Iron Pipe:

1. After joint has been made, backfill to top of pipe using Class I or Class II soils or No. 67 stone. Do not allow pipe to shift. Additional bedding requirements outlined in project drawings shall be followed.

E. Backfill and Compaction:

1. Backfill in 8 to 12-inch lifts. Tamp each lift carefully and uniformly so as to eliminate the possibility of lateral displacement of the pipeline.
2. Compact pipe bedding and embedment material to 95% Standard Proctor.

F. Piping:

1. Pipe is to be installed in strict accordance with the manufacturer's recommendations and the contract specifications. The ENGINEER may augment any manufacturer's installation recommendations if, in his opinion, it will best serve the interest of the OWNER.
2. Install pipe to grades and invert elevations indicated on Drawings.
3. Begin at downstream end of system and progress upstream.
4. Lay gravity sewer pipe with the bell ends in the upgrade direction.
5. All pipe laid on a grade of twenty (20) percent or greater shall require thrust blocking or keying as shown on the drawings and standard details.

6. Plug end of piping at end of each day and when work stops. No trench water or other material shall be permitted to enter the pipe. Clear interior of piping and manholes of dirt and debris as work progresses. If water is in the trench do not remove the plug until the danger of mud or earth entering the pipe has passed.
 7. Backfill and compact as specified.
 8. Do not displace or damage pipe when placing and compacting backfill.
 9. Ductile Iron Gravity Sewer
 - a. Comply with ASTM A746 and AWWA C600
 10. PVC Gravity Sewer
 - a. Comply with ASTM D2321 and ASTM F1668
 - b. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.
- G. Connections to Existing Manholes:
1. Connect to new manholes at precast inverts using the integrally cast neoprene boot and following manufacturer's guidelines. When new inverts must be made in manholes, use concrete core saw, pneumatic hammers, chipping guns, or sledge hammers shall not be used to form new inverts.
 2. Install watertight neoprene gasket and seal annular space with nonshrink concrete grout.
 3. Prevent construction debris from entering existing sewer line when making connection.
- H. Wye Branches and Saddles:
1. Concurrent with pipe-laying operations, install service connections using appurtenance indicated and at locations indicated on Drawings.
- I. Sanitary Laterals:
1. Construct laterals from service connection to terminal point at right-of-way or edge of permanent easement. Terminate lateral with clean-out in accordance with detail.
 2. Minimum Depth of Cover over Piping: two (2) feet.
 3. Minimum Separation Distance between Laterals: five (5) feet.
 4. Minimum residential sewer service slope: two (2) percent.
 5. Install watertight plug at termination of lateral, braced to withstand pipeline test pressure.
- J. PE Encasement:
1. Encase piping in PE where indicated to prevent contact with surrounding backfill material.
 2. Comply with AWWA C105.
 3. Terminate encasement three (3) to six (6) inches above ground where pipe is exposed.

3.04. ABANDONMENT OF EXISTING SEWERS AND MANHOLES

- A. Manholes which are to be abandoned shall first have both influent and effluent lines plugged inside the manhole with watertight masonry or concrete. The manhole will then be filled with non-compressible material (crushed stone or materials approved by the ENGINEER), to a point not less than three (3) feet below the finish grade. The remainder of the manhole shall be broken down and removed. The excavation shall be backfilled to finish grade.
- B. Abandoned mains at active manholes shall be completely disconnected from the manhole by cutting the pipe outside the manhole and then plugging the abandoned main and the manhole wall with watertight masonry. The invert shall then be rebuilt to conform to new flow pattern.
- C. The minimum length of watertight masonry and concrete plugs will be the diameter of the abandoned pipe plus one (1) foot.

3.05. REINSTATING EXISTING SEWER SERVICE LINES

- A. Where existing sewer mains are being rehabilitated, sewer service lines shall be constructed for each property that is occupied by a business or dwelling if it is currently served by the system being rehabilitated.
- B. The CONTRACTOR shall be responsible to locate and connect all existing sewer service lines to the new main. In the event a service is missed during construction, return to the site and perform all work necessary to reinstate the connection. The CONTRACTOR will be compensated in accordance with the original contract unit pricing; however, re-mobilization to the site will not be paid for. In addition, the CONTRACTOR shall be responsible for any costs associated with a sanitary sewer overflow and associated damage to public or private property through the omission of reinstating an active sewer service.
- C. Service lines four (4) inches or less in diameter shall be tapped into the sewer main, not into a manhole. Service connections six (6) inches or greater shall only be made into an existing or proposed manhole, unless otherwise approved by the ENGINEER.

3.06. TOLERANCES

- A. Maximum Variation from Indicated Slope: 1/8 inch in ten (10) feet, but installed slope shall never be less than the minimum slope for the pipe size.

3.07. FIELD QUALITY CONTROL

- A. Pipe Testing: As specified.

END OF SECTION

SECTION 33 37 00

CORROSION PROTECTION FOR BURIED PIPELINES

PART 1 GENERAL

1.01. THE REQUIREMENT

- A. This specification section addresses the materials, installation and testing for basic corrosion control and monitoring facilities required on most buried metallic piping. The corrosion control facilities include in this specification section are: corrosion test stations, joint bonding, insulating flange kits, casing test stations, wire and cable, alumino-thermic welds, and simple sacrificial anode installations. Large piping projects or projects requiring large sacrificial anode or impressed current cathodic protection systems will require more detailed drawings and specifications.

1.02. SUBMITTALS

- A. Submit shop drawings in accordance with Specification Section 01 30 00 - Submittals.
- B. Submit manufacturer's catalog data and descriptive literature for all material items listed below and included in the project. Show dimensions and materials of construction by specification reference and grade where applicable.

1.03. DUCTILE IRON PIPE ENCASEMENT

- A. Unless otherwise specified all ductile iron pipe shall be fully encased in 8 mil (0.008 inches) polyethylene sheet material in accordance with AWWA C105 Method A and STD SPEC 15056. The plastic encasement shall be installed without pinholes or tears and shall be fully protected from damage during backfilling. All pipe sections shall be fully inspected by the ENGINEER before the pipe is backfilled.

1.04. BURIED, VALVES, FLANGES, AND COUPLINGS

- A. Area with groundwater or perched water Wax Tape Coating

All buried, non-mortar coated piping surfaces such as valves, couplings, adapters, flanges or bare pipe shall be wrapped with petrolatum wax tape coating in accordance with AWWA C-217 and this specification

The fittings and bolts surfaces shall be primed with a blend of petrolatum, plasticizer, insert fillers, and corrosion inhibitor having a paste-like consistency.

Filling covering material shall be a synthetic felt tape, saturated with a blend of petrolatum plasticizers, and corrosion inhibitors that is easily formable over irregular surfaces.

The primed and wax tape wrapped fitting shall be wrapped with plastic tape covering consisting of 1.5 mil, polyvinylidene chloride or metallocene resin material. The tape shall have high dielectric strength, be stretchable and be able to conform well to irregular shapes.

- B. Areas with no groundwater or perched water

Unless otherwise specified all ductile iron pipe shall be fully encased in 8 mil (0.008 inches) polyethylene sheet material in accordance with AWWA C105 Method A and Standard Specifications Section 15056. The plastic encasement shall be installed

without pinholes or tears and shall be fully protected from damage during backfilling. All pipe sections shall be fully inspected by the ENGINEER before the pipe is backfilled.

PART 2 PRODUCTS

2.01. TEST STATION

A. At-Grade Test Station

Box

- a. The box shall be constructed of a rigid plastic material conforming to ASTM B-253.

Cover

- b. Cover shall be ductile iron or cast iron with terminals. The cover shall be labeled "test Wire" and color coded to APWA Standards.

Precast Concrete Protector Ring

- c. Each cast iron valve box located out of paved areas shall be installed with a 24" diameter, precast reinforced concrete protector ring.

Fiberglass Marker

- d. Each test station shall be marked with a fiberglass marker.

2.02. PREPACKAGED MAGNESIUM ANODES

- A. Magnesium anodes shall be prepackaged magnesium alloy ingots of the following chemical composition unless otherwise specified:

Magnesium Anode Standard Potential	
Aluminum	5.3% to 6.7%
Manganese	0.15 to 0.30%
Zinc	2.5 to 3.5%
Copper	0.02% MAX
Nickel	0.002% MAX
Iron	0.003% MAX
Silicon	0.10% MAX
Other	0.05% Each or 0.3% MAX Total
Magnesium	Remainder

Magnesium Anode Standard Potential	
Aluminum	0.010%
Manganese	0.50 to 1.30%
Copper	0.02% MAX
Nickel	0.001% MAX
Iron	0.03% MAX
Other	0.05% Each or 0.3% MAX Total
Magnesium	Remainder

B. Anode Weight

Unless otherwise specified the ingot weight of prepackaged magnesium anodes shall be 20 pounds.

C. Anode Backfill

Each magnesium anode shall be prepackaged in a permeable cloth bag with a backfill of the following composition:

Anode Backfill	
Gypsum	75 %
Powdered Bentonite	20 %
Anhydrous Sodium Sulfate	5%

Backfill grains shall be capable of 100% passing through a 100-mesh screen. The backfill shall be firmly packed around the anode by mechanical vibration to a density, which will maintain the magnesium ingot in the center of the cloth bag and surrounded by at least one inch of backfill.

D. Prepackage Weight

The total packaged weight of 20-pound (ingot weight) magnesium anodes and backfill shall be approximately 80 pounds.

E. Anode Lead Wire

Anode lead wire shall be AWG No. 12 stranded copper wire with THWN insulation conforming to UL Standard 83. Wire shall be connected to the strap core with silver solder. The connection shall be mechanically secured before soldering and shall have at least one and one-half (1.5) turns of wire at the connection. The connection shall

then be insulated by filling the remainder of the recess with electrical potting compound. Anode lead wire shall be of sufficient length to extend from the anode to the designated termination point without a splice. Wires with cut or damaged insulation will not be accepted and replacement of the entire lead will be required at the CONTRACTOR's expense.

2.03. SHUNTS

- A. Shunts used in the anode test boxes shall be 0.01 ohms - resistance and rated at 6 amperes capacity and accurate to plus or minus 1%. Use Holloway Type RS shunt unless otherwise specified.

2.04. WIRE AND CABLE

A. General

All DC wires shall be stranded copper with high molecular weight polyethylene (HMWPE) or thermal plastic (THWN) insulation suitable for direct burial in corrosive soil and water conforming to UL 83 and ASTM Standards B3 or B8. HMWPE insulation shall conform to the requirements of ASTM D1248 Type 1, Class C. THWN insulation shall conform to the requirements of ASTM D-2220. Wires with cut or damaged insulation will not be accepted and replacement of the entire length of wire will be required at the CONTRACTOR's expense.

B. Test Leads

Unless otherwise indicated, test wires shall be AWG No. 8 HMWPE wire. THWN wire shall be used only where specifically called out. Each test lead shall be of sufficient length to extend from the attachment to the pipe or structure to the test box without a splice.

C. Bond Wires

Bond wires shall be AWG No. 2, No. 4, or No. 6 HMWPE depending on the pipe diameter and as indicated in the Contract Documents or directed by the ENGINEER. Bond wires shall be as short as possible.

2.05. LEAD WIRE CONNECTORS

A. Terminal Lugs

Terminal lugs shall be solder-less, UL 486 copper or brass and sized to accommodate the wire.

B. Split-bolt Connectors

Split-bolt connectors shall be UL 486 copper or brass and sized to accommodate the lead wire and shunt being used.

2.06. INSULATING FLANGE KITS

A. General

Insulating flange kits shall consist of Type E, full-face gaskets, insulating sleeves and double washers (steel and dielectric) on each end. All insulating material shall be of the type designated by the manufacturer as suitable for the operating temperature and pressure of the service.

B. Gaskets

Insulating gaskets shall be dielectric neoprene-faced phenolic. Note that the sealing surfaces of both flanges must be compatible with the gasket.

C. Sleeves

Use full-length sleeves except for installation on threaded studs where half-length sleeves are required. For installation on threaded bolts, i.e., at butterfly valve flange bonnets and bases, the sleeves shall be half-length. Use 1/32-inch thick G10 epoxy glass tube material as per NEMA LI-1 unless directed otherwise by the District.

D. Washers

Insulating washers shall be 1/8-inch thick G10 epoxy glass sheet material per NEMA LI-1.

E. Steel Washers

Steel washers shall be 1/8-inch thick cadmium plated or zinc plated carbon steel.

2.07. PIPELINE CASING INSULATORS

A. Body

The casing insulator body shall be constructed of a 12-inch wide steel band with a heat-fused plastic (PVC) coating with a minimum thickness of 10 mils. The steel band shall be flanged with stainless steel tightening bolts and nuts. The body shall be provided with a ribbed PVC liner to protect the pipe coating and prevent slippage.

B. Runners

2-inch wide reinforced plastic (18,000 psi compressive strength). Runners are attached with stainless steel nuts on 3/8-inch threaded studs that are welded to the steel band before coating. The bolt holes shall be counterbored and filled with epoxy.

C. Acceptable Products

Use PSI Model A12G-2 or equal. Wooden skids or high-density polyethylene casing insulators are not acceptable.

2.08. CASING END SEALS

- A. End seals shall be either a heat shrinkable sleeve type or the mechanical link type. End seals shall provide full dielectric isolation and a watertight seal between the casing and the carrier pipes. Pre-molded casing seals held in place by an external band of metal or other material are not acceptable.

Heat Shrinkable Seal

- a. Heat shrinkable sleeve shall have a minimum tensile strength of 2,500 psi and be resistant to abrasion, corrosive gases and be able to tolerate typical expansion and contraction of the casing and carrier pipes. Provide a separate non-conductive support skirt or transition padding that will allow a smooth transition of the heat shrink material from casing to carrier diameter. Watertight seals on both the casing and the carrier pipes are required. Use Raychem Caseal or Canusa CSK Casing Seal Kit.

Mechanical Link-seal

- b. Articulated mechanical annular seal shall include EPDM rubber seal elements, non-metallic pressure plates and Type 316b stainless steel nuts and bolts for tightening. When compressed a full watertight seal is required. Use link-Seal Model "C" or District approved equivalent.

2.09. ALUMINO-THERMIC WELD KITS AND WELD COATING

A. Weld Kits

Wire-to-pipe connections shall be made by the alumino-thermic welding process. Weld charges and mold size shall be as specified by the manufacturer for various pipe sizes and surface configurations. Weld charges for use on cast and ductile iron are different from those used on steel. Care shall be taken during installation to be sure correct charges are used. Welding charges and molds shall be the product of a manufacturer regularly engaged in the production of such materials. Weld charges for steel pipelines shall have green caps and weld charges for cast or ductile iron shall have orange caps.

B. Weld Cap Primer

Weld cap primer shall be an elastomer-resin based corrosion resistant primer for underground services such as Royston Roybond Primer 747 or District approved equal.

C. Weld Caps

Alumino-thermic welds shall be sealed with a pre-fabricated plastic cap filled with formable mastic compound on a base of elastomeric tape. Weld caps shall be Royston Handy Cap 2 or District approved equal.

D. Weld Cap Overcoating

Weld caps and the surrounding area shall be overcoated with a cold-applied, black, thixotropic material containing plasticized coal tar pitch, solvents, and special fillers per MIL-C-18480A such as Protecto Wrap 160/160H, Carboline 330M, Tape-Coat TC Mastic or 3M Scotch Clad 244. Apply to at least 20 mils thickness.

2.10. MORTAR

- A. Mortar used to repair concrete coated pipe after attachment of bond or pipe test lead wires shall be the fast drying, non-shrinkable type.

PART 3 EXECUTION

3.01. GENERAL

- A. Except as directed differently below, the installation of corrosion control and monitoring facilities shall conform to the latest editions of NACE Publication RP-0169 - Recommended Practice, Control of External Corrosion on Underground and Submerged Metallic Piping Systems and NACE RP0286 - Electrical Isolation of Cathodically Protected Pipelines.

3.02. TEST STATION

A. At-Grade Test Stations

Location

- a. The at-grade test boxes shall be installed directly over the pipeline if possible. If the pipeline is in a paved roadway install behind the curb and out of traffic lanes. Test boxes can be embedded in the sidewalk just beyond the curb or placed in a concrete pad in the planter strip or just beyond the sidewalk. The ENGINEER shall approve test station locations.

Installation

- b. Mount test box flush with pavement or 1-inch higher than grade in grass or landscaped areas with the concrete pad domed to make a smooth transition to grade at the perimeter of the pad. The bottom of the box shall be native soil. Do not place rock, gravel or cement inside the box. All wires shall be properly identified with adequate cut off such that there is approximately 18-inches of slack wire above finish grade and coiled inside the test box. Keep the inside of the test box clear of all debris and other foreign material.

Wire Identification

- c. Brass identification tags shall be securely attached to each of the wires in the test box. Tags shall be stamped in ¼-inch characters with the size-material-service of the pipe to which the test leads are attached. The tag shall read similar to the following "18"-STL-PW". Brass tags on wires in insulating flange test boxes shall be stamped with the additional identification of "N", "S", "E", or "W" for North, South, East or West to indicate on which side of the insulating flange the wires are attached. Attach tags with bare No. 14 copper wire.

Fiberglass Marker

- d. Fiberglass markers are required wherever at-grade anode test stations are utilized in a remote area. Locate marker within 6-inches of the test station or as directed by the ENGINEER.

3.03. INSTALLING MAGNESIUM ANODES

A. General

Anodes shall be installed at locations as shown on the Drawings or as directed by the ENGINEER. Care shall be taken to ensure that the cloth bag is not damaged and no backfill material lost during installation. Each magnesium anode shall be centered in the cloth bag. It may be necessary to re-center the anode in the cloth bag by rolling it on the ground prior to installation. Each magnesium anode shall be lowered into the hole using a sling or rope and placed vertically at the bottom of the hole. Do not lower, transport, handle or lift the anode by the lead wire.

Prepackaged magnesium anodes shall be installed in a vertical augured hole of 12-inches in diameter.

B. Relative Position

In general, anodes shall be offset from the steel pipe as far as possible while staying within the District's right-of-way. A minimum offset of 10 feet shall be used unless otherwise indicated on the Corrosion Protection Detail Drawings or directed by the ENGINEER. At no time shall an anode be installed outside of the pipeline right-of-way

or District's easement. Anodes shall not be installed such that a foreign metallic pipe is between the protected pipe and the anode.

C. Anode Soaking (Augured Holes)

Once the prepackaged anode is in the hole, water shall be poured into the hole so that the anode is completely covered with water. Allow to soak for at least 15 minutes. Stone-free native soil shall then be used to backfill the anode hole. Do not use imported sand for backfilling. The anode hole shall be backfilled in stages and carefully tamped to ensure that no voids exist around the bag and that the bag and anode lead wire is not damaged. After backfill is level with the top of the anode, a minimum of 15 gallons of water shall be poured into the hole to completely saturate the soil backfill. More water shall be added if it is suspected that the backfill is not completely saturated. Care must be taken to avoid damage to the anode and anode lead wire.

D. Anode Soaking (Backhoe Installations)

Prepackaged anode must be pre-soaked in water for at least 15 minutes before installing in the trench. After covering the anode with native, rock-free soil (approximately 3-inches over the anode) the anode and initial backfill shall be further soaked with 15 to 20 gallons of water and allowed to soak for 15 minutes. The remainder of the trench shall be backfilled with native soil.

3.04. INSTALLING ANODE LEAD WIRES

A. Lead Wire

Anode lead wire shall be long enough to reach from the anode to the anode test box without a splice. Anode lead wires shall terminate individually in the appropriate anode test box. Care shall be taken not to damage the lead wire through the installation process.

B. Wire Trenching

If anode wire insulation is damaged during installation, the wire and anode shall be replaced unless wire splices or insulation repairs are approved by the ENGINEER. Anode replacement shall be at the CONTRACTOR's expense.

C. Wire Splicing and Insulation Repairs

Neither splices nor insulation repairs shall be allowed unless specifically approved by the ENGINEER.

3.05. WIRE AND CABLE

A. General

No less than two (2) test wires shall be attached to the pipe at each designated test site. All test wires shall terminate in a test box without a splice. A minimum of 18-inches of slack wire shall be coiled at the wire-to-pipe connection and in at-grade test boxes for each test wire. At post-mounted test stations slack wire shall be provided inside the box to the extent possible and with one 8-inch diameter loop at the below-grade entrance to the conduit.

B. Connection to Pipe

Connections of copper wire to the pipeline shall be made with alumino-thermic weld charges or by brazing. Welding charges shall be the product of a manufacturer regularly engaged in the manufacture of the material. Manufacturer's recommend cartridge size and type shall be used. Each weld shall be installed, tested and coated as described below.

a. Preparation of Wire

- 1) Use a cutter to prevent deforming wire ends. Remove only enough insulation from the wire to allow the weld connection to be made. Do not use a hacksaw for cutting.

b. Preparation of Metal

- 1) Remove all coating, dirt, grime and grease from the metal pipe at weld location by wire brushing and/or use of suitable safe solvents. Clean the pipe to a bright, shiny surface free of all serious pits and flaws by use of mechanical grinder or a file. The area of the pipe where the attachment shall be made must be absolutely dry. Failure to provide a dry surface for welding will result in a poor quality weld and could result in serious injury to the workman. Do not cut reinforcing rods when preparing metal surface for wire attachment.

c. Attachment of Wire-to-pipe

- 1) The attachment of copper wire shall be made using an alumino-thermic weld as shown on the Standard Drawings. The wire shall be held at 30° to 45° angle to the surface when welding. Only one (1) wire shall be attached with each weld.

d. Testing of All Completed Welds

- 1) As soon as the weld has cooled, the weldment shall be tested for strength by striking a sharp blow with a two-pound hammer while pulling firmly on the wire. All unsound welds are to be re-welded and re-tested. All weld slag shall be removed from the weldment.

e. Coating of All Completed Welds

- 1) Thoroughly clean by wire brushing the area to be coated. The area must be completely dry. Apply the weld cap primer and the weld cap. Overcoat the weld cap with a bituminous mastic coating material in accordance with the manufacturer's recommendations. Completely coat the weld, all bare pipe surfaces around the weld and any exposed copper wire. Allow sufficient time to dry prior to repair of the mortar coating on steel pipe.

f. Mortar Repair

- 1) On mortar coated pipe, the mortar coating shall be repaired after the bituminous weld coating has dried, using fast-setting, non-shrinkable mortar to restore the original outside diameter of the pipe at each weld location.

C. Plastic Lined Pipe

Do not weld test or bond wires directly to plastic lined pipe. Wires must be attached to factory installed bonding pads.

D. Wire Trenching and Backfill

Depth

- a. All buried horizontal test or anode lead runs shall be installed at a minimum depth of 24-inches.

Backfill

- b. The bottom 2-inches of the finished trench shall be sand or stone-free earth. The first 3-inches of the backfill shall be sand or stone-free earth placed directly on the wires. The remainder of the trench shall be backfilled with native earth with a maximum stone size of 2-inches and compacted as specified in Standard Specification 02223.

Damaged Wire

- c. Care shall be taken when installing wire and backfilling trench so that insulation is not broken, cut, nicked, or bruised. If wire insulation is damaged during installation, it shall be replaced completely at the CONTRACTOR's expense.

Warning Tape

- d. Plastic warning tape shall be installed over all wire runs 12-inches below-grade.

E. Wire Splices or Repairs

Approval

- a. No wire splices or insulation repairs shall be made unless approved by the ENGINEER.

Splices

- b. The minimum amount of insulation shall be removed from each wire end. Brass crimp or split-bolt connectors shall be used. The splice shall be encased in a plastic mold filled with insulating resin such as 3M Scotchcast splice kits.

Insulating Repairs

- c. Depending on the severity of the insulation damage repairs shall be made with electrical tape or with a splice kit as determined by the ENGINEER.

Inspection

- d. All splices and insulation repairs shall be inspected by the ENGINEER before they are buried.

3.06. CONTINUITY BONDING

A. General

All joints on buried steel pipe shall be metallically continuous by welding or bonding. DIP joints may also be bonded if directed by the Project Documents or the ENGINEER. Joints to be bonded include all unwelded pipe joints and mechanical joints including flanges (except insulating flanges), valves, couplings, adapters and special fittings. All bonding shall be done with single conductor, stranded copper jumper wires with HMWPE insulation. Bond wires shall be as short as possible with only minimal slack.

All pipe reaches with one or more unwelded joints (or one or more bonds) will be tested for continuity.

B. Pipe Joints

At least two (2) wires are required for each steel or ductile iron pipe bond. Two (2) wires shall be installed unless otherwise specified. Three (3) wires may be required at valves, couplings, special fittings and across unwelded joints on pipe larger than 24-inches. Bond wire sizes may be No. 2, 4 or 6. Use No. 4 bond wires unless indicated otherwise in the project drawings.

C. Mechanical Joints and Fittings

All flanges and in-line fittings (valves, couplings, etc.) shall be completely bridged by at least two (2) bond wires. Three (3) wires may be required on fittings larger than 24-inches. One additional No. 6 HMWPE wire is required from the pipe (on either side) to the fitting. Bond wire sizes may be No. 2, 4 or 6. Use No. 4 bond wires unless indicated otherwise in the project drawings.

D. Wire Attachment Method

Bond wire attachment, testing and subsequent coating of the welds shall be as specified in paragraph 3.06.B.

E. Wire Attachment Location

Bond wires can either be attached to the pipe or pipe cylinder directly or to the outside edges of flanges that are welded to the pipe. Bond wires shall not be attached to valve bodies, but instead to the flange of the valve.

3.07. INSULATING FLANGE KITS

A. Flange Kits

Insulating kits shall be installed as shown on drawings and as recommended by the manufacturer. Moisture, soil, or other foreign matter must be carefully prevented from contacting any portion of the mating surfaces prior to installing insulator gasket. If moisture, soil, or other foreign matter contacts any portion of these surfaces, the entire joint shall be disassembled, cleaned with a suitable solvent and dried prior to re-assembly.

B. Spool Assembly

All direct buried insulating kits, greater than 20-inches in diameter, shall be pre-installed and tested on the pipe spool prior to installing the spool in the ditch. If possible, all smaller size direct buried insulating kits shall be similarly pre-installed and tested.

C. Handling of Gasket

Care shall be taken to prevent any excessive bending or flexing of the gasket. Creased or damaged gaskets shall be rejected and removed from the job site.

D. Alignment

Alignment pins shall be used to properly align the flange and gasket.

E. Bolt-tightening

The manufacturer's recommended bolt-tightening sequence shall be followed. Bolt insulating sleeves shall be centered within the insulation washers so that the insulating sleeve is not compressed and damaged.

F. Testing

All insulating flanges must be tested by a qualified Corrosion Technician or Engineer and accepted by the ENGINEER. All buried insulating flanges must be tested prior to wax tape wrap coating and backfilling. The assembled flange shall be tested as described below.

G. Wax Tape Coating

After testing and the ENGINEER's acceptance, the insulating flange shall be fully wrapped with petrolatum wax tape as indicated in this specification section.

3.08. SUPPLEMENTARY INTERIOR LINING AT INSULATING FLANGES

A. General

Supplementary linings are required only where called out in the Contract Documents. It is the CONTRACTOR's responsibility to determine and verify which insulating flanges require supplementary internal lining.

B. Extent of lining

The interior of the pipeline shall be lined with a supplementary epoxy lining for a distance of two (2) pipe diameters in each direction away from an insulating flange. At an insulated flange on a valve, the supplementary lining shall be applied (for a distance of two pipe diameters) only to the pipe directly adjacent to the insulating flange.

C. Surface Preparation

The surface preparation of the mortar lining shall consist of wire brushing (hand or power) or water blasting to remove the latence and all loose mortar to provide a clean abraded surface for adhesion of the lining. The surface shall be clean and free of dust and standing water but not necessarily dry.

D. Mixing

The two-part epoxy paint shall be thoroughly mixed per the manufacturer's recommendations but at a minimum of two (2) minutes by hand or with a mechanical mixer before being applied by brush.

E. Pot Life

A typical pot life is 30 minutes. The lining material shall not be applied after its useful pot life.

F. Application

Application of undiluted lining material shall be by spray, roller or brush until a maximum coating thickness of 20 mils is achieved. Each ensuing coat shall be applied before the previous coat fully cures, usually within 3 to 6 hours. Typically, this material is applied at the rate of 140 square feet per gallon. This would ordinarily produce the required coating with a total of two (2) coats. However, the 20-mil minimum

thickness shall be satisfied regardless of the number of applications necessary to achieve it.

G. Inspection

Each pipe spool to which the supplementary lining is applied must be inspected and accepted by the ENGINEER prior to assembly.

3.09. CASING INSTALLATION

A. Casing Insulators

The number and orientation of runners on each casing insulator shall be as recommended by the manufacturer depending on pipe size. The spacing between insulators shall be determined by the civil or structural engineer.

B. End Seals

Heat shrinkable or mechanical link-seals shall be installed in accordance with the manufacturer's recommendations. Remove all contaminants and debris from the annulus. Seals must be watertight.

C. Casing Test Stations

Test stations (4-wire) shall be installed on all casings. Use two (2) each No. 10 HMWPE wires on the casing and two (2) each No. 8 HMWPE wires on the carrier pipe unless otherwise directed. Use post-mounted or at-grade test stations as indicated in the project drawings or as directed by the ENGINEER.

3.10. SYSTEM TESTING

A. Test Leads and Bond Wires

The CONTRACTOR shall be responsible for testing all test leads and bond wire welds.

Test Method

- a. All completed wire connection welds shall be tested for strength by striking the weld with a sharp blow with a 2-pound hammer while pulling firmly on the wire. Welds failing this test shall be re-welded and re-tested. Wire welds shall be spot tested by the CONTRACTOR. After backfilling pipe, all test lead pairs shall be tested using a standard ohmmeter or resistance meter for broken welds. Bond wires shall be tested through continuity testing described below.

Acceptance

- b. The resistance between each pair of test leads shall not exceed 150% of the total wire resistance as determined from calculations based on published wire resistance data and an estimate of test wire length.

B. Anode Installation

The CONTRACTOR must provide the proper rated potential anode, sufficient anode lead wire length and the proper anode hole depth. The CONTRACTOR shall test each installed anode for wire connection integrity and for open-circuit potential.

Notification

- a. The CONTRACTOR shall notify the ENGINEER at least five (5) days in advance of the start and completion of the anode installations, including anodes and test stations.

Cathodic Protection Performance Test Method

- b. The performance of the cathodic protection system shall be tested by the CONTRACTOR. The testing shall include:
 - 1) Measurement of all open-circuit anode potentials
 - 2) Pipe-to-soil potentials at each test station and other locations as necessary before the anodes are connected
 - 3) Initial anode currents after connecting anode leads to the pipe leads
 - 4) Pipe-to-soil potential at each previously tested site with all anodes connected
- c. Pre- and post cathodic protection potentials at midpoints between anode beds are required as necessary to verify that the pipeline is fully protected. Adequate protection shall be as defined in NACE RP0169.

Field Report

- d. All system deficiencies shall be listed and described in one or more field test reports and presented to the CONTRACTOR for repairs.

Acceptance

- e. The system will be accepted if all anodes, test stations, and supporting facilities are installed properly.

C. Wire Trenching

The CONTRACTOR shall inspect wire trenches and backfill material and methods.

Test Method

- a. The depth, trench bottom padding and backfill material shall be visually inspected prior to backfilling.

D. Insulator Testing

Insulating flanges shall be inspected and tested by the CONTRACTOR. Buried insulators must be tested and approved prior to application of wax tape and backfilling. Large diameter insulators shall be tested on the spool prior to installation in the ditch.

Test Method

- a. The assembled flange shall be tested with an insulator testing device (i.e., Gas Electronics Model 601 Insulation Checker) specifically designed for this purpose. Additionally, the pipe-to-soil potential, using a high impedance voltmeter and suitable reference cell, shall be measured on each side of the insulator after installation in the trench but before backfilling. Potential testing can only be done on piping that has been installed in the ditch.

Acceptance

- b. The installation shall be considered complete when the insulator testing device indicates that no shorts or partial shorts are present and when the potential tests indicate greater than 20-millivolt pipe-to-soil potential difference across the flange. (Note that this test may not be valid if the pipe on each side of the insulator is in contact through interconnection piping or through contacts to the electrical grounding system.) If shorts are detected the CONTRACTOR shall determine the locations of partial shorts or shorted bolts. All disassembly and re-assembly necessary to gain approval from the ENGINEER shall be done at the CONTRACTOR's expense.

E. Pipeline Continuity

The CONTRACTOR shall test the continuity of all sections of buried steel pipe that contains non-welded pipe joints or mechanical joints or fittings. All such joints are required to be bonded per this specification. Bonded DIP also requires continuity testing.

Test Method

- a. Resistance shall be measured by the linear resistance method. A direct current shall be impressed from one end of the test section to the other (test station to test station) using DC power supply (battery). A voltage drop is measured for several current levels. The resistance (R) is calculated using the equation $R = dV/I$, where dV is the voltage drop and I is the current. The resistance shall be calculated for three or four different current levels.

Acceptance

- b. Acceptance is reasonable comparison of the measured resistance with the calculated or theoretical resistance. The measured resistance shall not exceed the theoretical resistance by more than 130%. The CONTRACTOR shall submit calculations of the theoretical resistance and the measured resistance for each section of pipe tested.

Deficiencies

- c. If discontinuity or high resistance is found between sections of pipe tested, it is the CONTRACTOR's responsibility to locate, excavate, and repair all bonds that are found to be discontinuous. Continuity tests shall be repeated after repairs are made. Note: Discontinuities may be difficult and expensive to locate and may require several excavations to expose pipe joints and attach temporary test leads for progressive continuity testing. Accordingly, the CONTRACTOR shall exercise due care in installing continuity bonds and shall schedule continuity testing as early as possible so that discontinuity location and repairs, if necessary, do not conflict with road paving operations.

F. Test Stations

The CONTRACTOR will inspect all test station installations for compliance with this specification. The CONTRACTOR will test all wires for continuity and proper connection.

Test Method

- a. Test stations will be visually inspected. Wire continuity will be tested by potential and resistance measurements.

Acceptance

- b. Installation in accordance with this specification and good workmanship and verification that all wires are properly connected.

G. Wax Tape Coating and Polyethylene

The CONTRACTOR shall inspect all completed wax tape and polyethylene wrapping for compliance with these specifications prior to backfilling.

Test Method

- a. Inspection shall be visual.

Wax Tape Acceptance

- b. Wax tape applications shall be accepted if: the application conforms with this specification; there are no voids or gaps under the wax tape; stud- ends, nuts, couplings rods and all irregular surfaces are individually wrapped such that there is complete coverage with the petrolatum material; the outer wrap is complete and tightly adhering to the wax tape; and the application is done in a good workman-like manner.

Supplementary Lining Acceptance

- c. Internal supplementary linings must cover the specified length of pipe and must be well bonded to the substrate and free of voids or damage.

H. Casing Isolation

The CONTRACTOR shall test the isolation between the carrier pipe and the casing and verify that there is no metallic contact between the two structures.

Method

- a. Two test methods are required. Structure-to-soil potentials of each structure shall differ by more than 30 millivolts with the reference cell located in the same place. Resistance between the two structures, measured with a megger or other suitable resistance meter, shall exceed 25 ohms. Additional or alternate test methods recommended by the CONTRACTOR shall be approved by the ENGINEER.

Notification for Testing

- b. The CONTRACTOR shall notify the ENGINEER at least five (5) days in advance of plans to test isolation between the carrier pipe and the casing.

Acceptance

- c. Complete metallic isolation is required. Under no conditions will a metallic short between the carrier pipe and the casing be allowed.

I. Deficiencies

Any deficiencies or omissions in materials or workmanship found by these tests shall be rectified by the CONTRACTOR at his expense. Deficiencies shall include but are not

limited to: broken or missing test leads; improper or unclean wire trench backfill; inadequate pipeline continuity; shorted or partially shorted insulators or casings; lack of 18-inch slack wire in at-grade test boxes; improperly mounted or located test boxes; improper wire identification; poorly applied wax tape or supplementary lining; and other deficiencies associated with the workmanship, installation and non-functioning equipment.

END OF SECTION

SHEET INDEX

SCHEDULE 1: 2-UNIT BOX HANGAR

GENERAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	G-000	SCHEDULE 1 COVER SHEET
		01/17/2025	G-001	SCHEDULE 1 SHEET INDEX
		01/17/2025	G-002	GENERAL NOTES
		01/17/2025	G-003	PARTITION DETAILS
1	01-28-2025	01/17/2025	G-004	APPENDIX B
		01/17/2025	LS-101	LIFE SAFETY PLAN

CIVIL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01-2025	GA-001	CONSTRUCTION SAFETY PLAN (ALL SCHEDULES)
		01-2025	GA-101	CONSTRUCTION PHASING PLAN (ALL SCHEDULES)
		01-2025	VA-101	SURVEY CONTROL PLAN (SCHEDULE 1)
1	02-05-2025	01-2025	CA-101	EXISTING CONDITIONS AND REMOVAL PLAN (SCHEDULE 1)
1	02-05-2025	01-2025	CA-111	SITE LAYOUT PAVING AND MARKING PLAN (SCHEDULE 1)
1	02-05-2025	01-2025	CA-121	GRAVING & DRAINAGE PLAN (SCHEDULE 1)
1	02-05-2025	01-2025	CA-131	PAVEMENT ELEVATION PLAN (SCHEDULE 1)
1	02-05-2025	01-2025	CA-140	SEDIMENTATION & EROSION CONTROL PLAN - 1 (SCHEDULE 1)
1	02-05-2025	01-2025	CA-141	SEDIMENTATION & EROSION CONTROL PLAN - 2 (SCHEDULE 1)
1	02-05-2025	01-2025	CA-221	DRAINAGE PROFILES (SCHEDULE 1)
1	02-05-2025	01-2025	CA-401	TYPICAL PAVEMENT SECTIONS (SCHEDULE 1)
		01-2025	CA-510	PAVING DETAILS (SCHEDULE 1)
		01-2025	CA-520	DRAINAGE DETAILS (SCHEDULE 1)
		01-2025	CA-540	SEDIMENTATION & EROSION CONTROL DETAILS - 1 (SCHEDULE 1)
		01-2025	CA-541	SEDIMENTATION & EROSION CONTROL DETAILS - 2 (SCHEDULE 1)

WATER & SEWER

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
1	02-03-2025	01-2025	CA-160	UTILITY NOTES
1	02-03-2025	01-2025	CA-161	UTILITY PLAN (SCHEDULE 2A)
1	02-03-2025	01-2025	CA-560	UTILITY DETAILS (SHEET 1 OF 2)
1	02-03-2025	01-2025	CA-561	UTILITY DETAILS (SHEET 2 OF 2)

STRUCTURAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	S-001	GENERAL NOTES
		01/17/2025	S-002	ABBREVIATIONS AND SYMBOL LEGEND
		01/17/2025	S-101	FOUNDATION PLAN
		01/17/2025	S-301	PEMB SECTIONS AND DETAILS
		01/17/2025	S-302	PEMB PIER DETAILS

ARCHITECTURAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	A-101	FIRST FLOOR PLAN
		01/17/2025	A-111	FIRST FLOOR CEILING PLAN
		01/17/2025	A-121	ROOF PLAN
		01/17/2025	A-201	BUILDING ELEVATIONS
		01/17/2025	A-301	BUILDING SECTIONS
		01/17/2025	A-311	WALL SECTIONS
1	01-28-2025	01/17/2025	A-321	SECTION DETAILS
		01/17/2025	A-401	ENLARGED PLANS
		01/17/2025	A-410	ENLARGED PLANS - ADD ALTERNATES
		01/17/2025	A-411	ENLARGED RESTROOM PLAN AND ELEVATIONS
		01/17/2025	A-412	ENLARGED CEILING PLANS - ADD ALTERNATES
		01/17/2025	A-501	PLAN DETAILS
1	01-28-2025	01/17/2025	A-601	DOOR SCHEDULE
		01/17/2025	A-602	WINDOW TYPES
		01/17/2025	A-701	FINISH PLAN

PLUMBING

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	P-001	PLUMBING LEGEND, SCHEDULES, AND DETAILS
		01/17/2025	P-101	PLUMBING PLANS
		01/17/2025	P-401	ENLARGED PLUMBING- BASE BID
		01/17/2025	P-402	ENLARGED PLUMBING- ALTERNATE BID

MECHANICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	M-001	MECHANICAL LEGEND, NOTES AND ENERGY SCHEDULE
		01/17/2025	M-101	MECHANICAL PLAN
		01/17/2025	M-102	MECHANICAL ROOF
		01/17/2025	M-401	ENLARGED MECHANICAL PLANS
		01/17/2025	M-402	ENLARGED MECHANICAL PLANS- ADD ALTERNATE
		01/17/2025	M-601	MECHANICAL SCHEDULES
		01/17/2025	M-701	MECHANICAL CONTROL DIAGRAMS

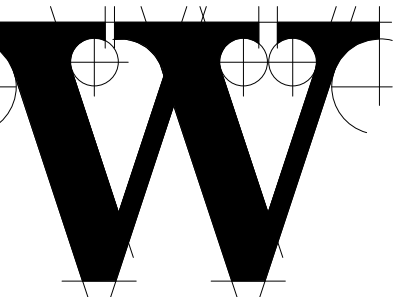
ELECTRICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
1	02-04-2025	01/17/2025	E-001	ELECTRICAL NOTES AND LEGEND
		01/17/2025	E-101	ELECTRICAL BASE BID PLAN
		01/17/2025	E-102	ELECTRICAL POWER PLAN ALTERNATE AL-01
		01/17/2025	E-103	ELECTRICAL ENLARGED POWER PLANS ALTERNATE ALT-01
		01/17/2025	E-111	ELECTRICAL BASE BID LIGHTING PLAN
		01/17/2025	E-112	ELECTRICAL ALTERNATE ALT-01 LIGHTING PLANS
		01/17/2025	E-113	ELECTRICAL ENLARGED LIGHTING PLANS
1	02-04-2025	01/17/2025	E-501	ELECTRICAL DETAILS
		01/17/2025	E-502	ELECTRICAL DETAILS
		01/17/2025	E-601	ELECTRICAL PANEL SCHEDULES BASE BID
		01/17/2025	E-602	ELECTRICAL PANEL SCHEDULES ALTERNATE ALT-01
		01/17/2025	E-701	ELECTRICAL RISERS



Schedule 1: 2-Unit Box Hangar

Lumberton, NC 28358



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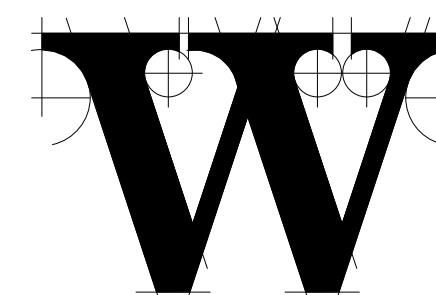
REVISIONS

DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

SCHEDULE 1 SHEET INDEX

SHEET NUMBER

G-001



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REVISIONS

1 01-28-20 ADDENDUM AD-01
25

DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

APPENDIX B

SHEET NUMBER
G-004

**2018 APPENDIX B
BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
(EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)**
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: LBT Box Hangars with Office
Address: [number, street, city, state, zip]
Owner/Authorized Agent: [name, phone number, email]
Owned by: City/County Private State
Code Enforcement Jurisdiction: City: [city] County: Robeson State

CONTACT: [name, firm, phone number, email]

Discipline	Firm	Name	Lic. #	Phone	E-Mail
Architectural	The Wilson Group	Travis W Pence	9272	704-331-9747	travis@twgrouparchitects.com
Civil	Talbert & Bright	Randall R Fender	047432	910-763-5350	rfender@tbilim.com
Structural	Stewart, P.A.	Perrina A Agnello	041315	704-334-7925	agnello@stewartinc.com
Plumbing	Cheatham & Assoc.	Casey D Gilman	043164	910-454-4210	office@cheatham.com
Mechanical	Cheatham & Assoc.	Kenneth Lynch	17655	910-454-4210	office@cheatham.com
Electrical	Cheatham & Assoc.	Mark A Chiarocca	17593	910-454-4210	office@cheatham.com

CODE CLASSIFICATION SUMMARY

2018 NC Code For:	<input checked="" type="checkbox"/> New Construction	<input type="checkbox"/> Addition	<input type="checkbox"/> Renovation
	<input type="checkbox"/> 1 st Time Interior Completion	<input type="checkbox"/> Shell Core	<input type="checkbox"/> Phased Construction - Shell Core
2018 NC Existing Building Code:	<input type="checkbox"/> Prescriptive	<input type="checkbox"/> Repair	<input type="checkbox"/> Chapter 14
Alteration:	<input type="checkbox"/> Level I	<input type="checkbox"/> Level II	<input type="checkbox"/> Level III
	<input type="checkbox"/> Historic Property	<input type="checkbox"/> Change of Use	

2018 NC Administrative Code and Policies Appendix B for Building

Contracted:	[date]	Original Occupancy (Ch. 3):	[Type]
Renovated:	[date]	Current Occupancy (Ch. 3):	[Type]
Risk Category (T 1604.5):	Current: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV	Proposed: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV	

BASIC BUILDING DATA

Construction Type: (Check all that apply)	<input type="checkbox"/> I-A <input type="checkbox"/> I-B <input type="checkbox"/> I-C <input type="checkbox"/> I-D <input type="checkbox"/> I-E <input type="checkbox"/> I-F <input type="checkbox"/> I-G <input type="checkbox"/> I-H <input type="checkbox"/> I-I <input type="checkbox"/> I-J <input type="checkbox"/> I-K <input type="checkbox"/> I-L <input type="checkbox"/> I-M <input type="checkbox"/> I-N <input type="checkbox"/> I-O <input type="checkbox"/> I-P <input type="checkbox"/> I-Q <input type="checkbox"/> I-R <input type="checkbox"/> I-S <input type="checkbox"/> I-T <input type="checkbox"/> I-U <input type="checkbox"/> I-V <input type="checkbox"/> I-W <input type="checkbox"/> I-X <input type="checkbox"/> I-Y <input type="checkbox"/> I-Z
Standpipes:	<input checked="" type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/> Yes (Identify type below)
Fire District:	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Primary)
SI Required:	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes

GROSS BUILDING AREA

Story	Existing SF	New SF	Reno/Alter SF	Sub-Total
(edit)		11,900		11,900
Total		11,900		11,900

ALLOWABLE AREA

Primary Occupancy Classification: (Select One)	<input type="checkbox"/> A-1 <input type="checkbox"/> A-2 <input type="checkbox"/> A-3 <input type="checkbox"/> A-4 <input type="checkbox"/> A-5
Assembly:	<input type="checkbox"/> A-1 <input type="checkbox"/> A-2 <input type="checkbox"/> A-3 <input type="checkbox"/> A-4 <input type="checkbox"/> A-5
Business:	<input checked="" type="checkbox"/> B (Secondary Occupancy)
Educational:	<input type="checkbox"/> E
Factory:	<input type="checkbox"/> F-1 Moderate <input type="checkbox"/> F-2 Low
Hazardous:	<input type="checkbox"/> H-1 Deontate <input type="checkbox"/> H-2 Dehagrate <input type="checkbox"/> H-3 Combust <input type="checkbox"/> H-4 Health <input type="checkbox"/> H-5 HPM
Institutional:	<input type="checkbox"/> I-1 Condition: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4

2018 NC Administrative Code and Policies Appendix B for Building

Mercantile:	<input type="checkbox"/> L-4
Residential:	<input type="checkbox"/> R-1 <input type="checkbox"/> R-2 <input type="checkbox"/> R-3
Storage:	<input checked="" type="checkbox"/> S-1 Moderate (Hangar) <input type="checkbox"/> S-2 Low <input type="checkbox"/> High-Piled
Utility and Miscellaneous:	<input type="checkbox"/> U
Accessories:	<input type="checkbox"/> A-1 <input type="checkbox"/> A-2 <input type="checkbox"/> A-3 <input type="checkbox"/> A-4 <input type="checkbox"/> A-5
Incidental Uses (T 509):	
Special Uses (Chapter 4 - List Code Sections):	412
Special Provisions (Chapter 5 - List Code Sections):	
Mixed Occupancy:	<input type="checkbox"/> No <input type="checkbox"/> Yes - Separation: <input type="checkbox"/> 2 Hour <input type="checkbox"/> Exception: [list]
	<input type="checkbox"/> Non-Separated Use (508.3): The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
	<input checked="" type="checkbox"/> Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

Actual Area of Occupancy A (9,100) Actual Area of Occupancy B (2,800)

Allowable Area of Occupancy A (12,000) Allowable Area of Occupancy B (23,000) $0.82 \leq 1.00$

Story	Description & Use	(A) Bldg. Area per Story (Actual)	(B) Table 506.2.4 Area for Frontage Increase 1,2	(C) Area for Frontage Increase 1,2	(D) Allowable Area per Story or Unlimited 1,3
1	SI Hangar	9,100	12,000*	Not Used	35,000
1	B (Office)	2,800	23,000	Not Used	

Frontage area increases from Section 506.3 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = (F)
b. Total Building Perimeter (P)
c. Ratio (F/P) = (F/P)
d. W = Minimum width of public way = (W)
e. Percent of frontage increase = $1 + 100 [(F/P) - 0.25] \times W/30$ (%)
* Unlimited area applicable under conditions of Section 507.

2018 NC Administrative Code and Policies Appendix B for Building

¹ Provide code reference if the "Show on Plans" quantity is not based on Table 504.3 or 504.4.
² The maximum height of air traffic control towers must comply with Table 412.3.1.
³ The maximum height of open parking garages must comply with Table 406.5.4

ACCESSIBLE DWELLING UNITS - (SECTION 1107)

Total Units	Accessible Units Required	Accessible Units Provided	Type A Units Required	Type A Units Provided	Type B Units Required	Type B Units Provided	Total Accessible Units Provided

ACCESSIBLE PARKING - (SECTION 1106)

Lot or Parking Area	Total Number of Parking Spaces		Total Number of Accessible Spaces		Accessible Space Summary		
	Required	Provided	Required	Provided	Regular	Van with Access Aids	Van with Access Aids
[lot]							
Total							

2018 NC Administrative Code and Policies Appendix B for Building

FIRE PROTECTION REQUIREMENTS

Building Element	Fire Separation Distance (feet)	Rating	Detail # and Sheet #		Design # for Rated Assembly	Design # for Rated Penetration	Design # for Rated Joints
			Provided (w/ reduction)	Required			
Struct. Frame, incl. cols, girders, trusses		0 hr					
Bearing Walls							
Exterior							
North	>30"	0 hr					
East	>30"	0 hr					
West	>30"	0 hr					
South	>30"	0 hr					
Interior	>30"	0 hr					
Nonbearing Walls and Partitions							
Exterior Walls							
North	>30"	0 hr					
East	>30"	0 hr					
West	>30"	0 hr					
South	>30"	0 hr					
Interior walls and partitions		0 hr					
Floor Const., incl. supp. beams & joists		0 hr					
Floor Ceiling Assembly		0 hr					
Column Supporting Floors		0 hr					
Roof Const., incl. supp. beams & joists		0 hr					
Roof Ceiling Assembly		0 hr					
Column Supporting Roof		0 hr					
Shaft Enclosures - Exit		N/A					
Shaft Enclosures - Other		N/A					
Corridor Separation		N/A					
Occupancy/Fire Barrier Separation		1 hr	2 hr	UL V433			
Party/Fire Wall Separation		N/A					
Smoke Barrier Separation		N/A					
Smoke Partition		N/A					
Tenant/Dwelling Unit/Sleeping Unit Sep.		N/A					
Incidental Use Separation		N/A					

2018 NC Administrative Code and Policies Appendix B for Building

PERCENTAGE OF WALL OPENING CALCULATIONS

Fire Separation Distance (Feet from Property Lines)	Degrees of Opening Protection (Table 705.8)	Allowable Area (%)	Actual Shown on Plans (%)
>30'-0"	NS	No Limit	

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: No Yes

Exit Signs: No Yes

Fire Alarm: No Yes

Smoke Detection System: No Yes Partial

Carbon Monoxide Detection: No Yes (If "Other" specify source here)

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: LS-101

Fire and/or smoke rated wall locations (Chapter 7)

Assumed and real property line locations (if not on the site plan)

Exterior wall opening area with respect to distance to adjacent property lines (705.8)

Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.2)

Occupant loads for each area

Exit access travel distances (1017)

Common path of travel distances (1006.2.1 & 2006.3.2(1))

Dead end lengths (1020.4)

Clear exit widths for each exit door

Maximum allocated occupant load capacity each exit door can accommodate based on egress width (1005.3)

Actual occupant load for each exit door

A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation and supporting construction for a fire barrier fire partition/smoke barrier.

Location of doors with panic hardware (1010.1.10)

Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)

Location of doors with electromagnetic egress locks (1010.1.9.9)

Location of doors equipped with hold-open devices

Location of emergency escape windows (1030)

The square footage of each fire area (202)

The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)

2018 NC Administrative Code and Policies Appendix B for Building

Note any code exceptions or table notes that may have been utilized regarding the items above

PLUMBING FIXTURE REQUIREMENTS - (TABLE 2902.1)

[adjust per occupancy]
Use: S-I (Almost Storage Hangar) - No requirement for Plumbing Fixtures
Use: B (Business) - 26 Occupants

	Water Closets	Urinals	Lavatories	Showers / Tubs	Drinking Fountains	Other
Required	2	0	2	0	1	1
Provided	1	1	0	1	1	1

2018 NC Administrative Code and Policies Appendix B for Building

SPECIAL APPROVALS

	Male	Female	Male	Female	Regular	Accessible
Required	2	0	2	0	1	1
Provided	1	1	0	1	1	1

Special approval: (Local Jurisdiction, Department of Insurance, SCO, DPI, DHHS, ICC, etc., describe below)

2018 NC Administrative Code and Policies Appendix B for Building

ENERGY SUMMARY

ENERGY REQUIREMENTS:

The following data shall be considered minimum and any special attribute required to meet the North Carolina Energy Conservation Code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design and annual energy cost for the proposed design.

Existing building envelope complies with code: No Yes (The remainder of this section is not applicable)

Exempt Building: No Yes (Provide Code or Statutory reference)

Climate Zone: 3A 4A 5A

Method of Compliance: Energy Code Performance Prescriptive

ASHRAE 90.1 Performance Prescriptive (If "Other" specify source here)

2018 NC Administrative Code and Policies Appendix B for Building

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Skylights in each assembly: _____
U-Value of skylight: _____
Total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Openings (windows or doors with glazing): _____
U-Value of assembly: _____
Solar heat gain coefficient: _____
Projection factor: _____
Door R-Values: _____

Walls below grade (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

2018 NC Administrative Code and Policies Appendix B for Building

Floors over unconditioned space (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors slab on grade

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Horizontal/Vertical requirement: _____
Slab Hatched: _____

**2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN**
(PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (Is) _____
Seismic (Is) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Ultimate Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: A B C D

Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) I II III IV
Spectral Response Acceleration S_e Sig Nsig
Site Classification (ASCE 7) A B C D E F
Data Source: Field Test Presumptive Historical Data
Basic structural system Bearing Wall Dual w/Special Moment Frame Building Frame Dual w/Intermediate R/C or Special Steel

2018 NC Administrative Code and Policies Appendix B for Building

LATERAL DESIGN CONTROL: Earthquake Wind

SOIL BEARING CAPACITIES: Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

**2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
MECHANICAL DESIGN**
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Interior design conditions

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System

Unitary

description of unit: _____
heating efficiency: _____
cooling efficiency: _____
size category of unit: _____
Boiler

Size category, if oversized, state reason: _____

Chiller

2018 NC Administrative Code and Policies Appendix B for Building

List equipment efficiencies: _____

**2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
ELECTRICAL DESIGN**
(PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code Prescriptive Performance

ASHRAE 90.1 Prescriptive Performance

Lighting schedule (each fixture type)

lamp type required in fixture _____
number of lamps in fixture _____
ballast type used in the fixture _____
number of ballasts in fixture _____
total wattage per fixture _____
total interior wattage specified vs. allowed (whole building or space by space) _____
total exterior wattage specified vs. allowed _____

Additional Efficiency Package Options
(When using the 2018 NEC/C; not required for ASHRAE 90.1)

C406.2 More Efficient Mechanical Equipment
 C406.3 Reduced Lighting Power Density
 C406.4 Enhanced Digital Lighting Controls
 C406.5 On-Site Renewable Energy
 C406.6 Dedicated Outdoor Air System
 C406.7 Reduced Energy Use in Service Water Heating

2018 NC Administrative Code and Policies Appendix B for Building

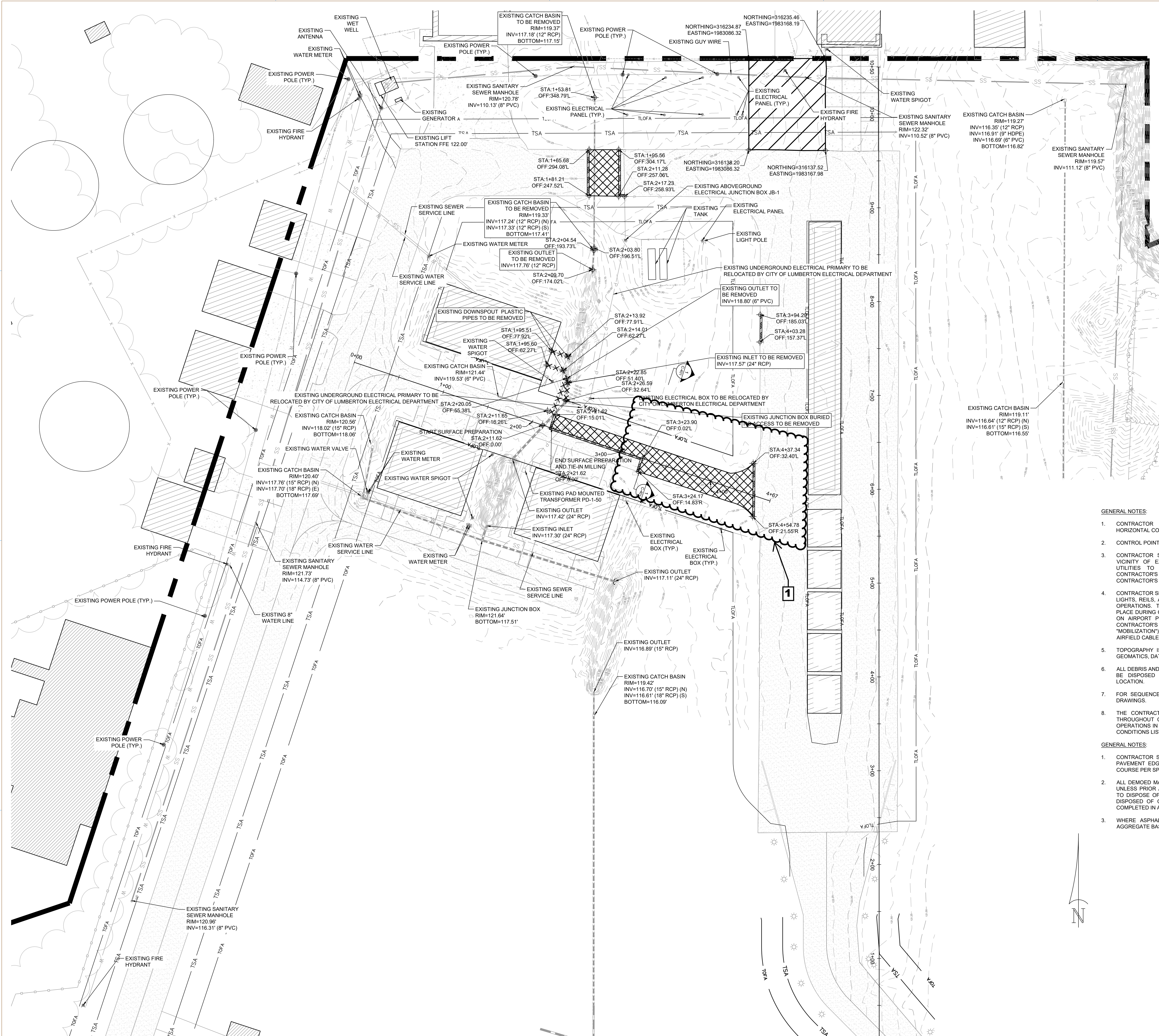


Section 1: Project Information

Energy Code: 2009 IECC
Project Title: Lumberton - LBT Box Hangar
Project Type: New Construction

Construction Site: _____ Owner/Agent: _____ Designer/Contractor: _____

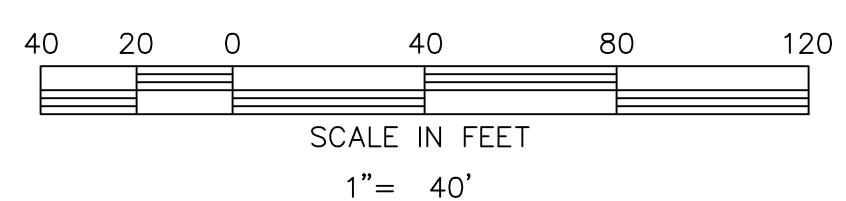
Building Location (for weather data): Lumberton, North Carolina
Climate Zone: 3A
Vertical Glazing / Wall Area Pct.: 5%
Building Use: Commercial **Class Area** 11000



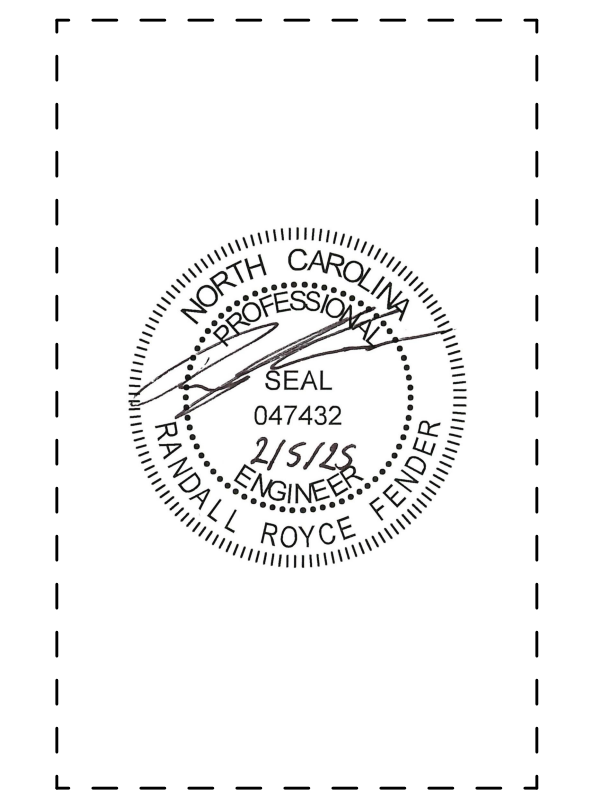
LEGEND

	ASPHALTIC PAVEMENT TO BE REMOVED (FULL-DEPTH)
	ASPHALTIC PAVEMENT TIE-IN MILLING, 1.5" DEPTH
	EXISTING AIRPORT BUILDINGS
	EXISTING CONCRETE PAVEMENT
	EXISTING BITUMINOUS PAVEMENT
	EXISTING CONTOURS
	EXISTING FENCE
	EXISTING STORM SEWER TO BE REMOVED
	EXISTING STORM SEWER
	EXISTING SANITARY SEWER
	EXISTING WATER LINE
	EXISTING OVERHEAD ELECTRICAL LINE
	EXISTING UNDERGROUND ELECTRICAL LINE
	EXISTING TAXIWAY LIGHTS
	TSA TAXIWAY SAFETY AREA
	TOFA/TLOFA TAXIWAY/TAXILANE OBJECT FREE AREA
	SUE INVESTIGATION LIMITS

- GENERAL NOTES:**
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING VERTICAL AND HORIZONTAL CONTROL FOR THE DURATION OF THE PROJECT.
 - CONTROL POINTS AND BENCHMARKS ARE SHOWN ON SHEET VA-101.
 - CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THE VICINITY OF EXISTING UNDERGROUND CABLES, TAXIWAY LIGHTS AND UTILITIES TO PREVENT DAMAGE. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
 - CONTRACTOR SHALL HAVE EXISTING ELECTRICAL LINES SERVICING RUNWAY LIGHTS, REELS, AND ALL OTHER UTILITIES LOCATED PRIOR TO EXCAVATION OPERATIONS. THESE ELECTRICAL SERVICE LINES SHALL BE PROTECTED IN PLACE DURING CONSTRUCTION. THE SERVICE TO LOCATE AND MARK LINES ON AIRPORT PROPERTY WITHIN CONSTRUCTION LIMITS SHALL BE THE CONTRACTOR'S RESPONSIBILITY (COSTS INCLUDED IN THE ITEM "MOBILIZATION"). CONTRACTOR WILL BE RESPONSIBLE FOR MARKING ALL AIRFIELD CABLES WITHIN THE PROJECT LIMITS.
 - TOPOGRAPHY IS BASED ON GROUND SURVEY PERFORMED BY COASTAL GEOMATICS, DATED AUGUST 2024.
 - ALL DEBRIS AND EXCESS SOIL, AGGREGATE, ASPHALT, ETC. REMOVED SHALL BE DISPOSED OFF AIRPORT PROPERTY IN A PROPERLY PERMITTED LOCATION.
 - FOR SEQUENCE OF CONSTRUCTION AND PHASING, SEE GA-100 SERIES DRAWINGS.
 - THE CONTRACTOR SHALL MAINTAIN COPIES OF ALL PERMITS ON-SITE THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL PERFORM ALL OPERATIONS IN A MANNER CONSISTENT WITH THE PERMITS, INCLUDING ALL CONDITIONS LISTED THEREIN.
- GENERAL NOTES:**
- CONTRACTOR SHALL CUT BACK GRASS AND VEGETATION 10 FEET FROM PAVEMENT EDGES TO ALLOW PLACEMENT OF NEW ASPHALTIC SURFACE COURSE PER SPECIFICATION SECTION P-101.
 - ALL DEMOED MATERIALS SHALL BE DISPOSED OF OFF AIRPORT PROPERTY UNLESS PRIOR APPROVAL IS GIVEN BY AIRPORT MANAGER AND ENGINEER TO DISPOSE OF CERTAIN MATERIALS ON AIRPORT PROPERTY. MATERIALS DISPOSED OF ON AIRPORT PROPERTY SHALL BE PLACED IN LIFTS AND COMPLETED IN ACCORDANCE WITH SPECIFICATION P-152.
 - WHERE ASPHALT IS CALLED OUT TO BE REMOVED, THE UNDERLYING AGGREGATE BASE COURSE SHOULD BE LEFT IN PLACE.



**Schedule 1:
2-Unit Box Hangar**
Lumberton Regional Airport
Lumberton, NC 28358



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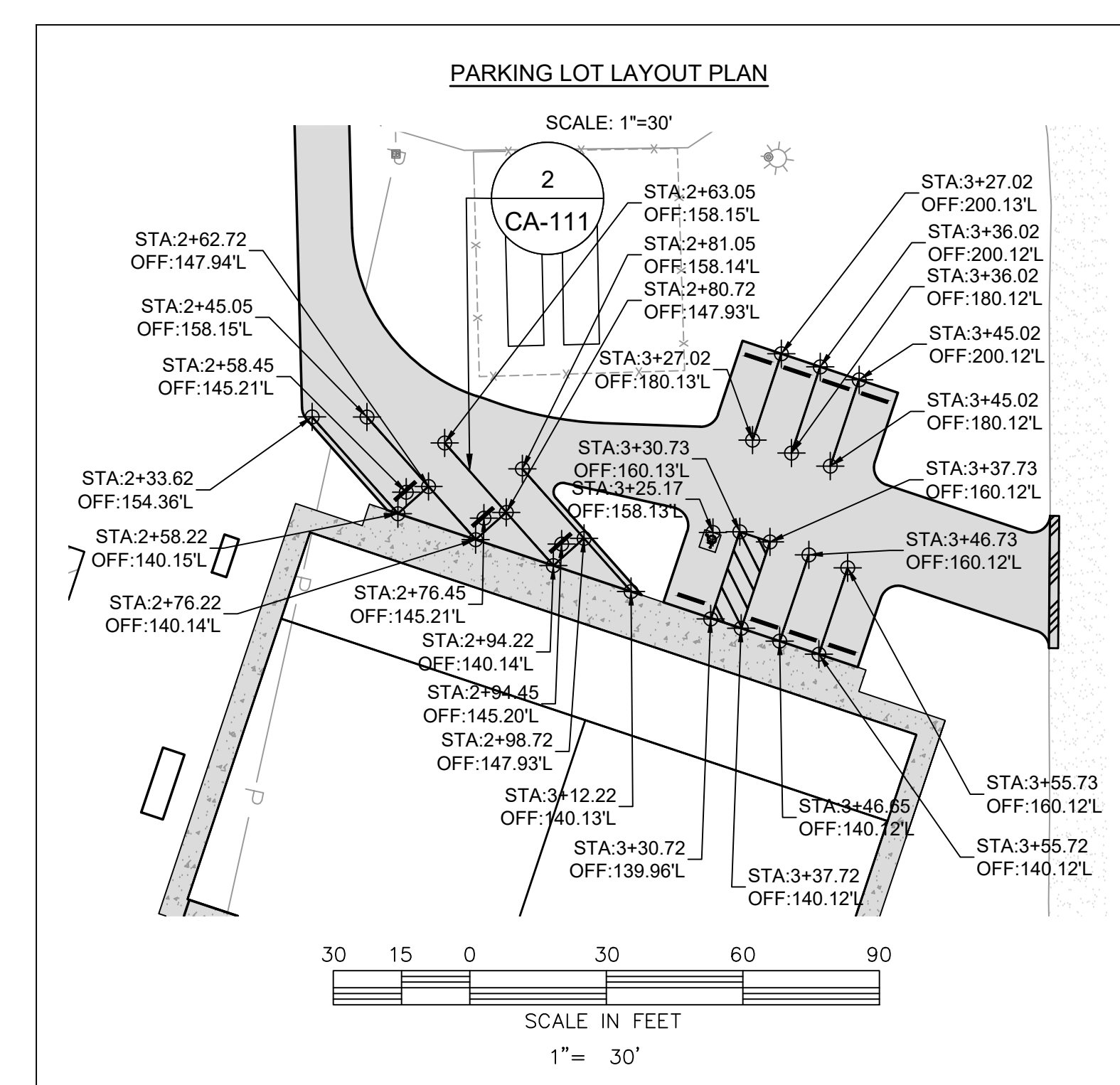
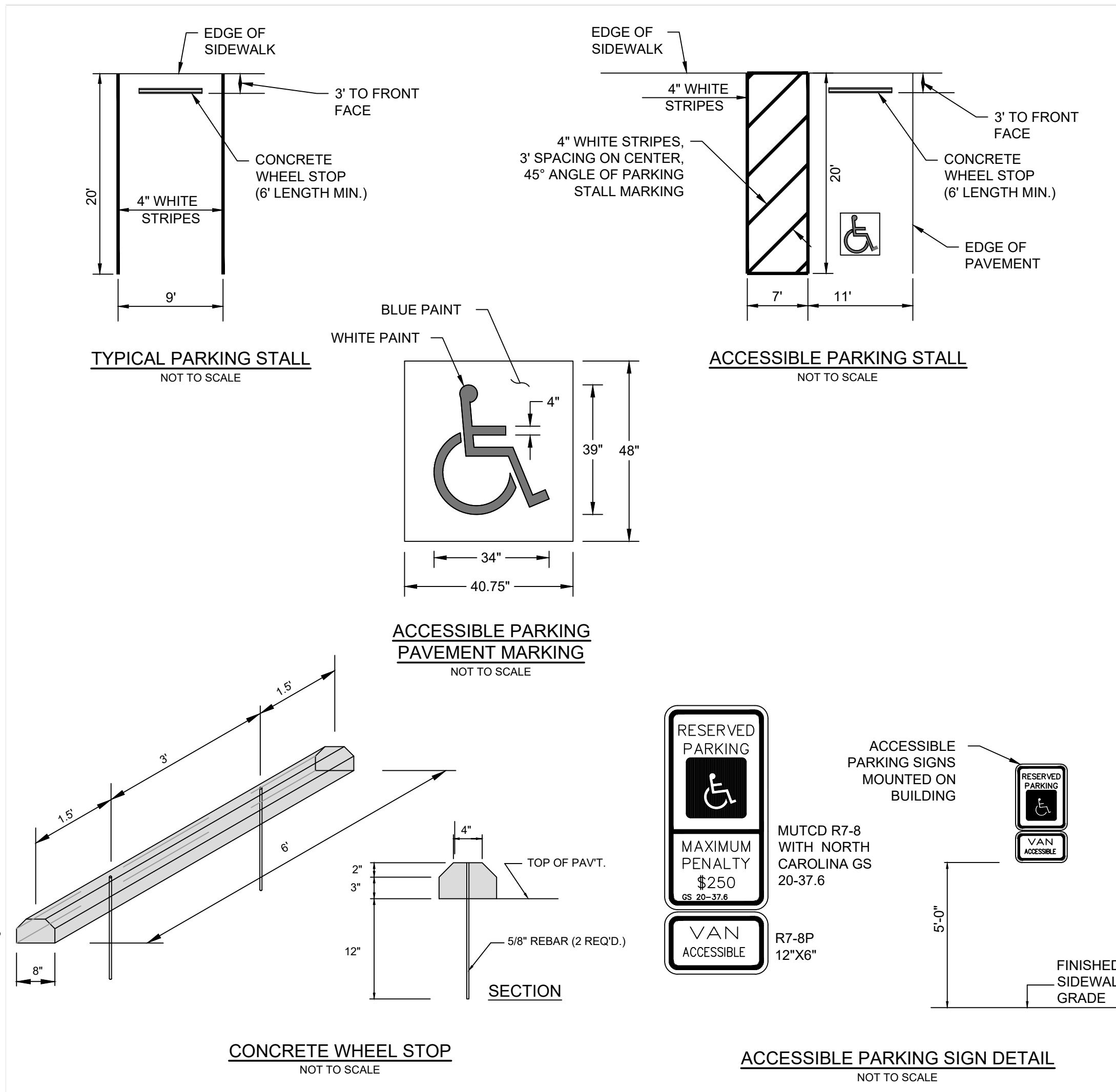
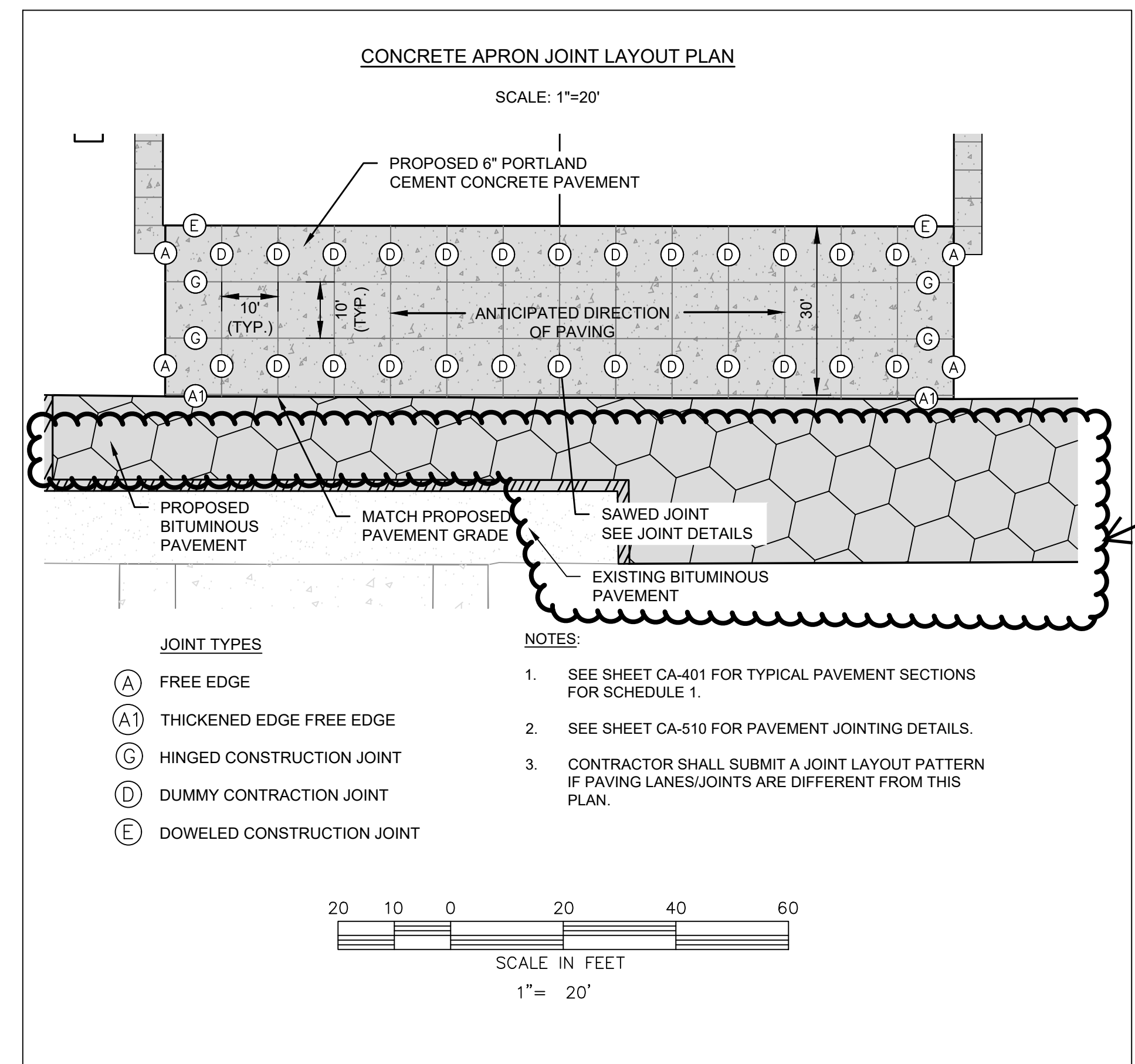
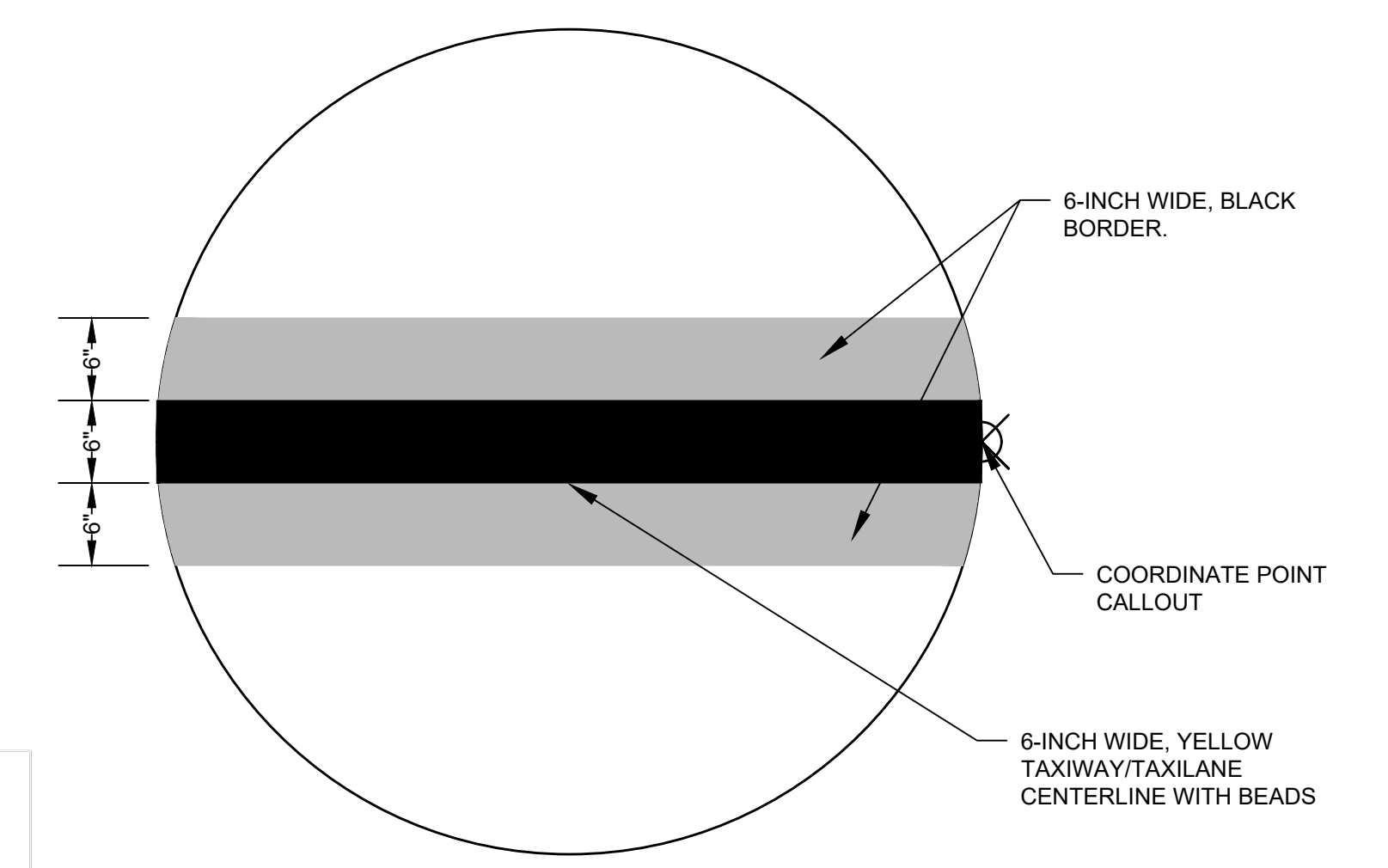
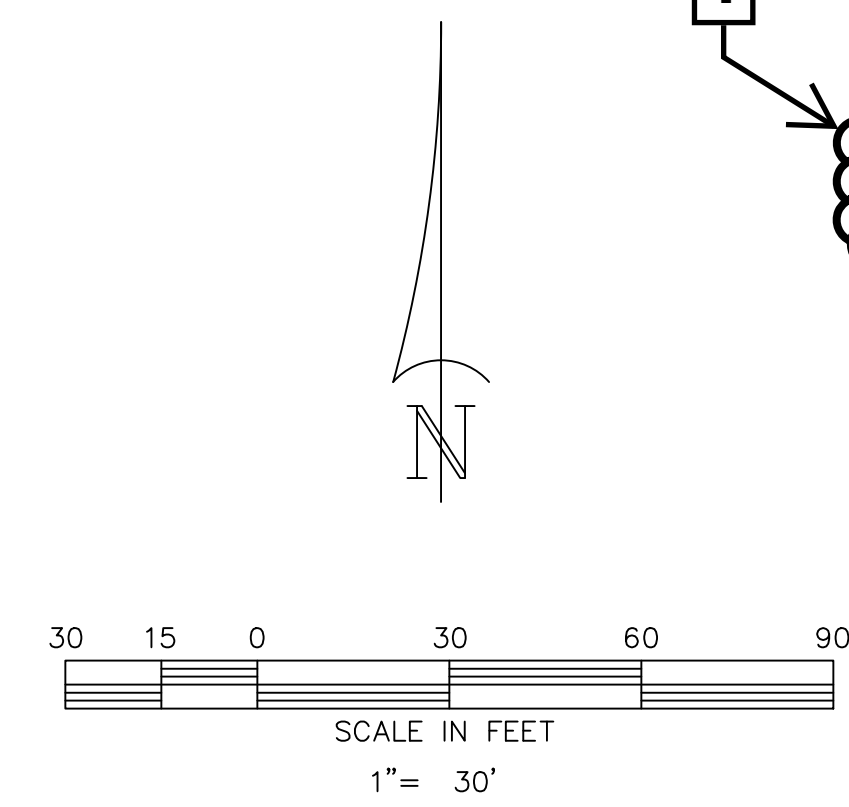
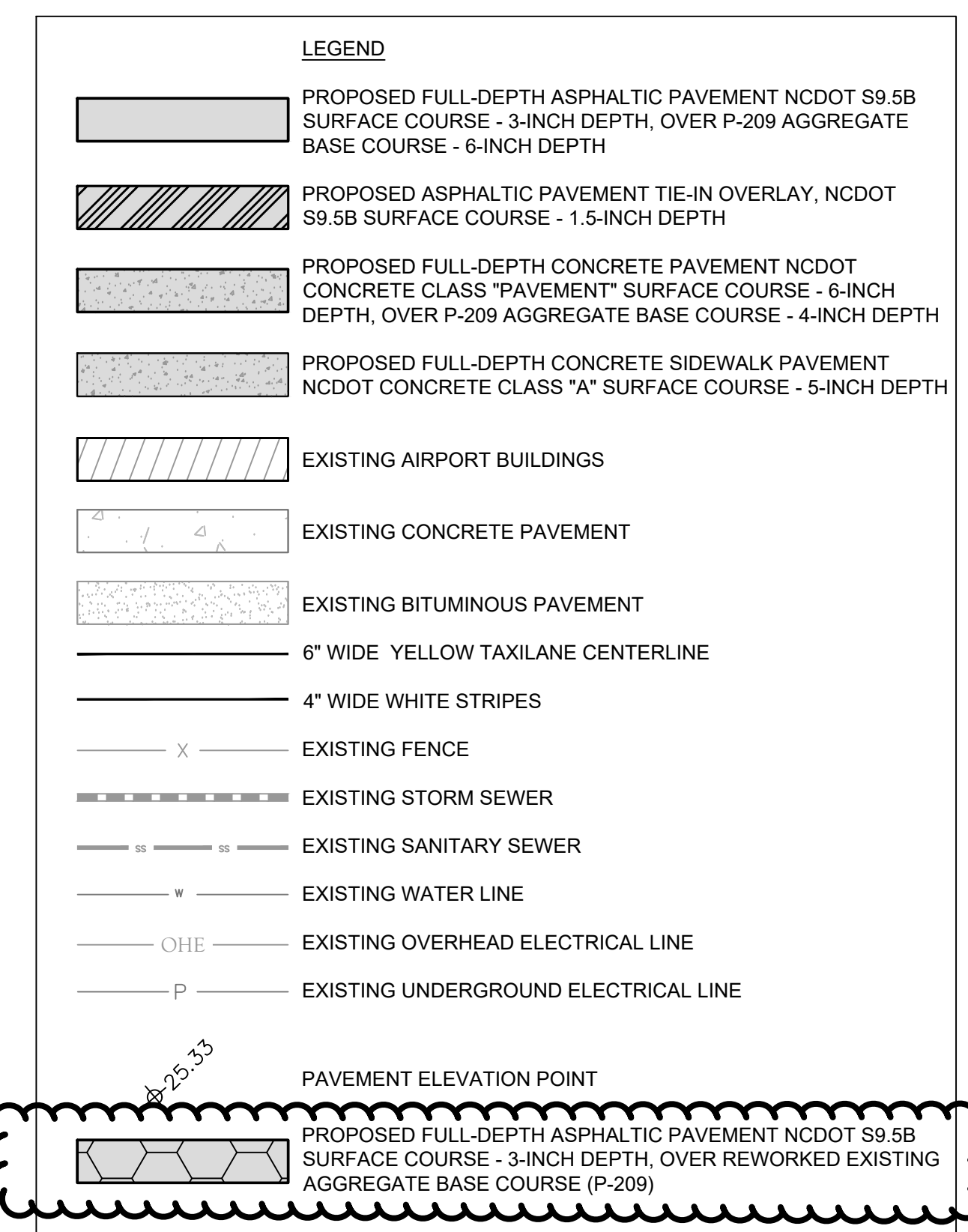
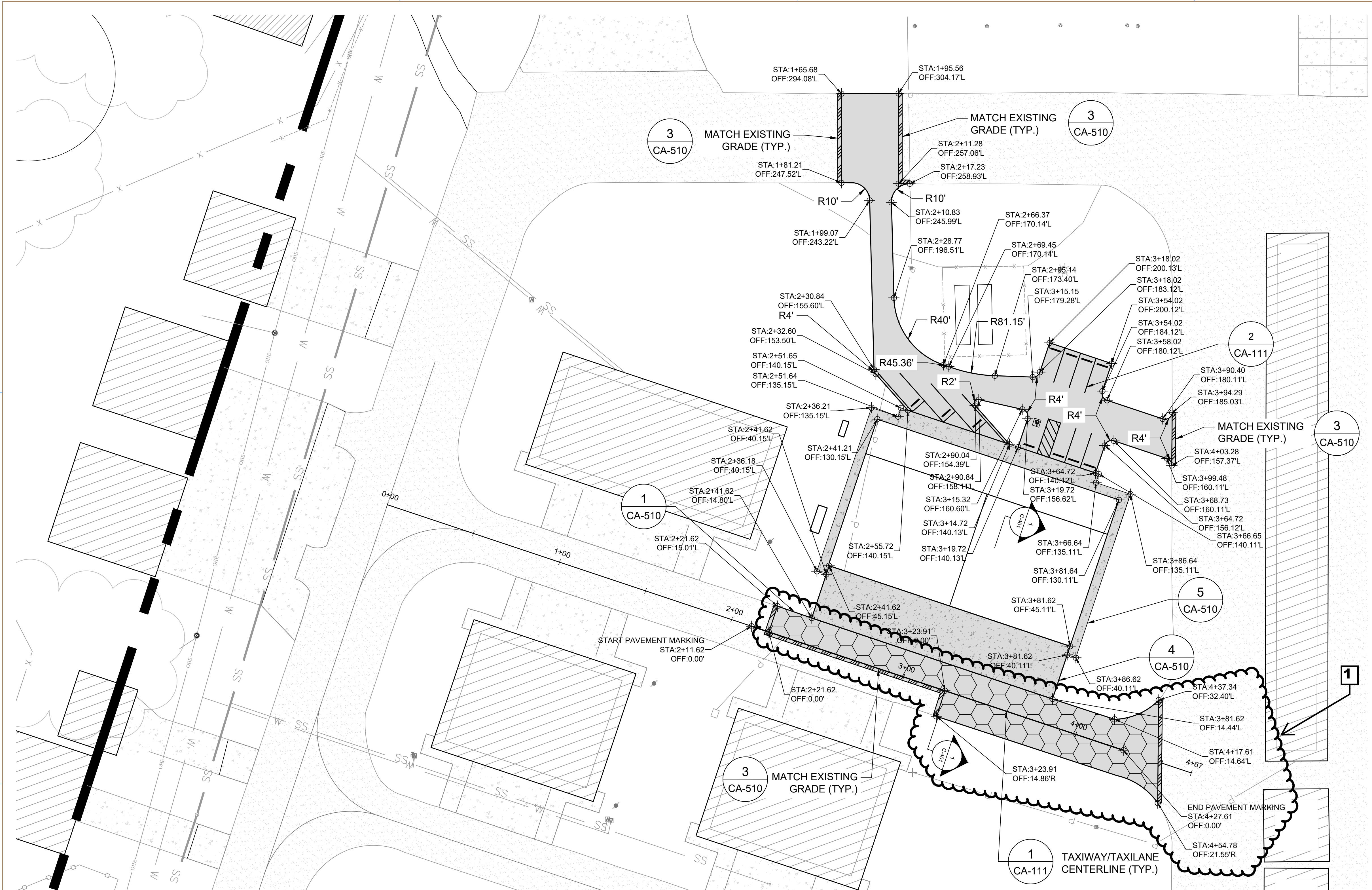
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REVISIONS
1 - ADDENDUM #1

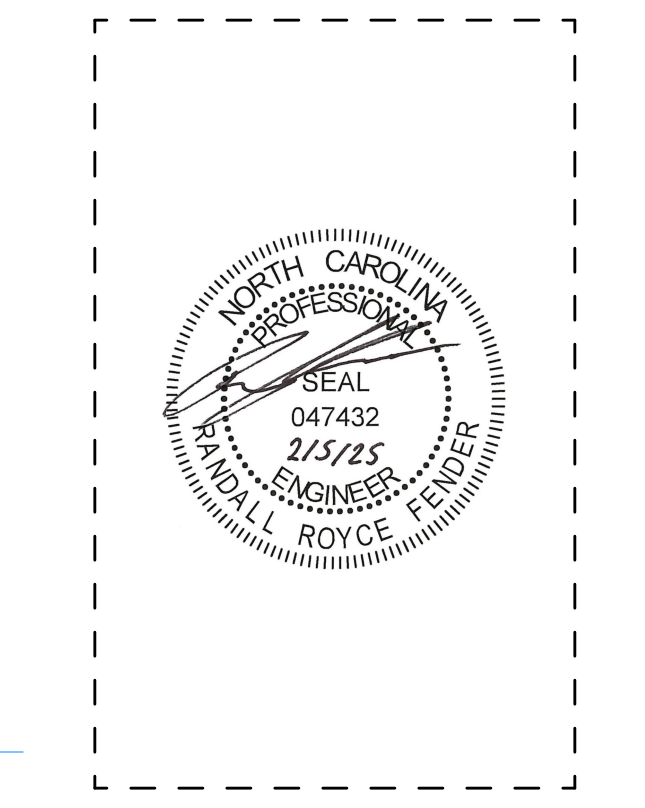
DATE: JANUARY 2025
PROJECT NUMBER: 3105-2401
SHEET TITLE:

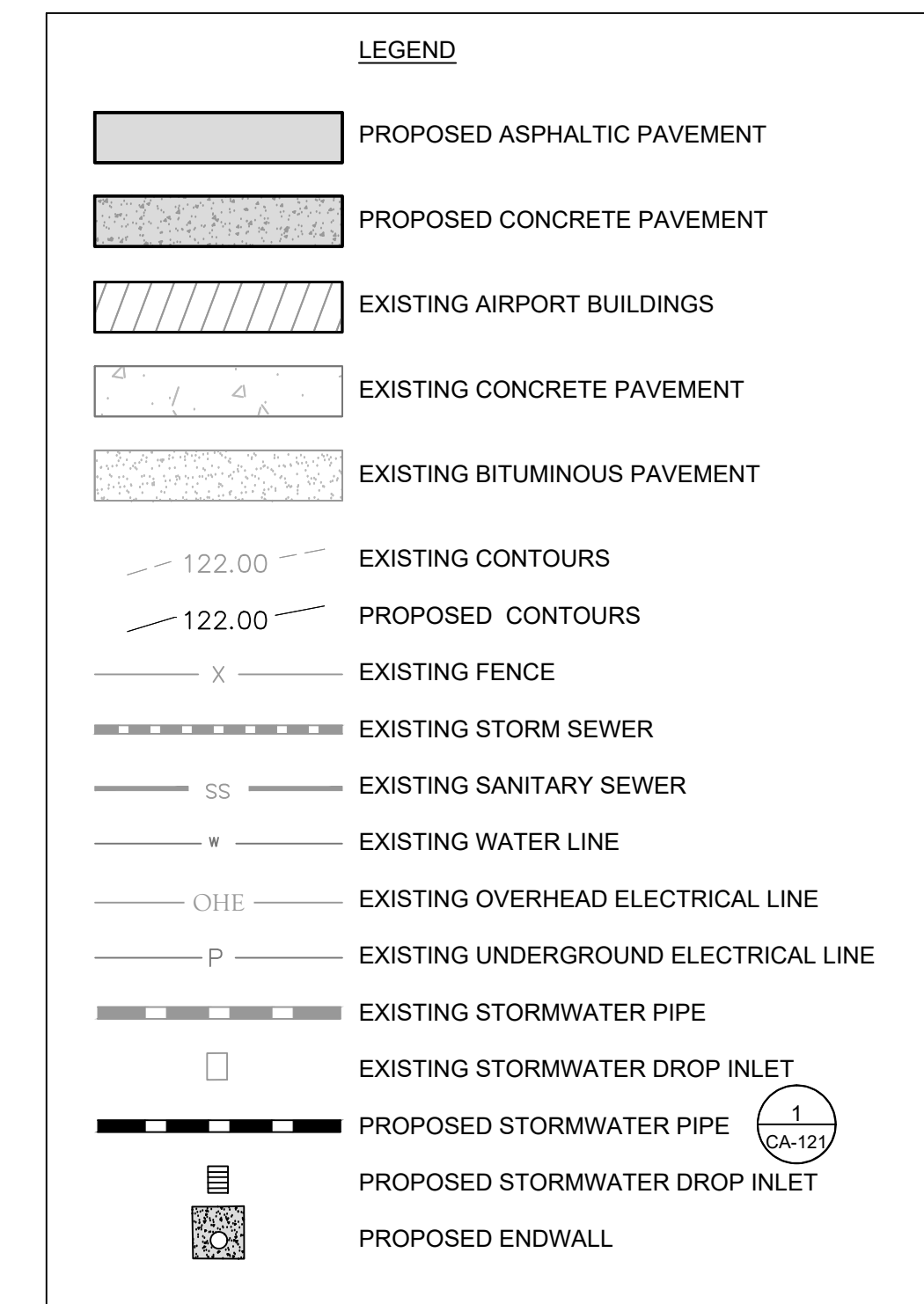
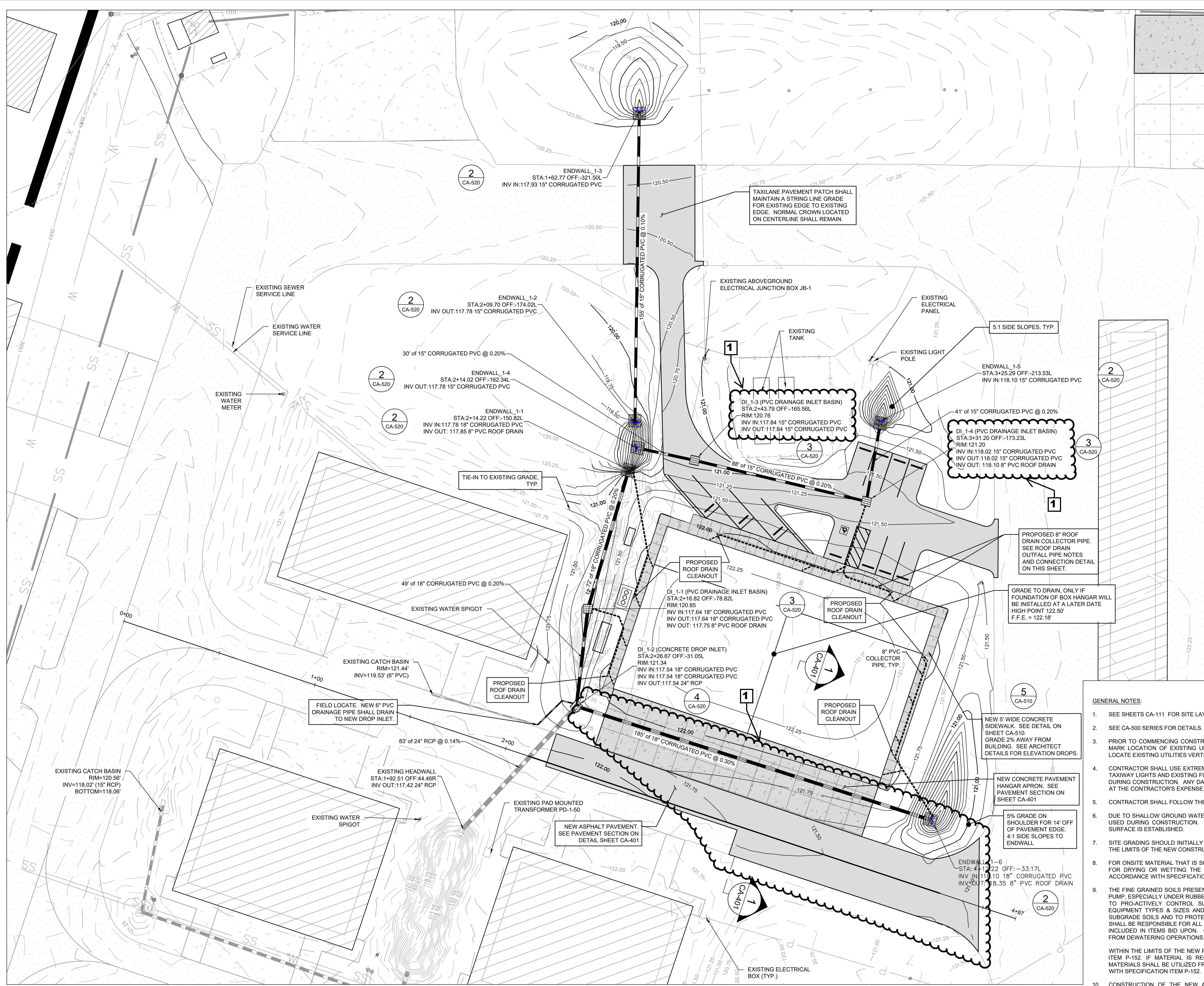
EXISTING CONDITIONS AND REMOVAL PLAN (SCHEDULE 1)

SHEET NUMBER
CA-101



2 PARKING LOT MARKING, WHEEL STOP, AND ACCESSIBLE SIGN DETAIL
NOT TO SCALE



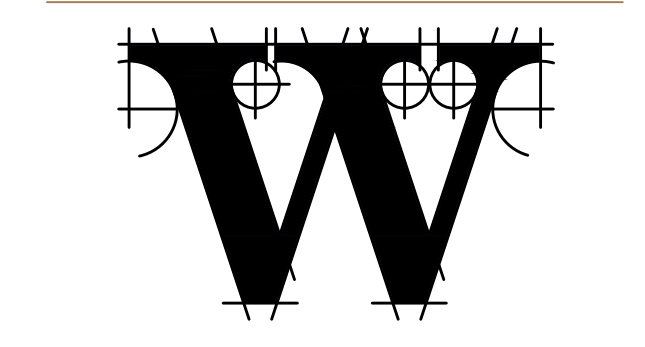
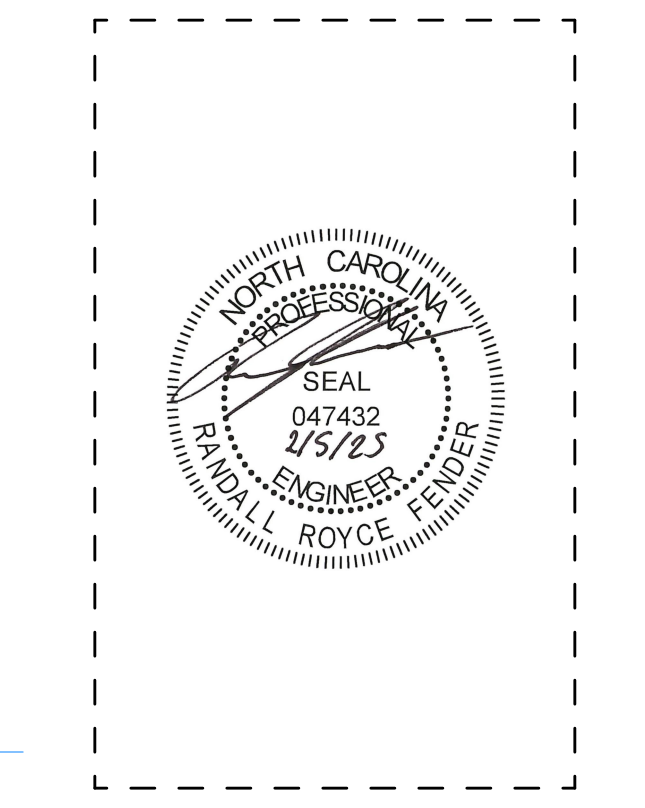
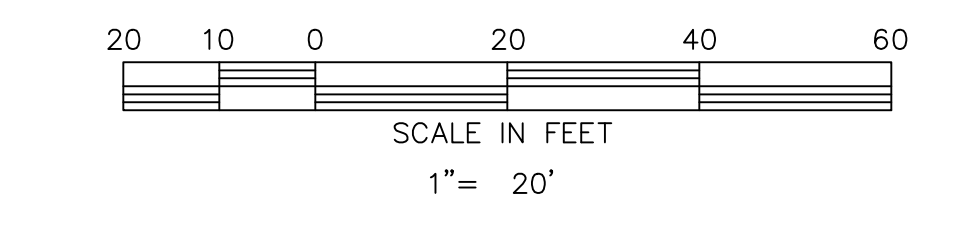


ROOF DRAIN CONNECTION DETAIL
NOT TO SCALE

**** ROOF DRAIN OUTFALL PIPE NOTES**

1. ROOF DRAINAGE FROM DOWNSPOUTS SHALL DRAIN INTO THE UNDERGROUND ROOF DRAIN COLLECTION SYSTEM DEPICTED ON THIS DRAWING. FINAL ALIGNMENT OF ROOF DRAIN LEADERS AND INVERTS TO BE COORDINATED IN THE FIELD TO AVOID OTHER UTILITIES IN THE AREA.
2. ROOF DRAIN UNDERGROUND COLLECTOR PIPES SHALL BE 8" PVC (SCH 40) AND SHALL BE INSTALLED TO MAINTAIN A MINIMUM 1% SLOPE ON THE COLLECTOR PIPE. ROOF DRAIN COLLECTOR PIPES SHALL CONNECT TO THE PROPOSED DRAINAGE INLET AS SHOWN.
3. UNDERGROUND ROOF DRAIN COLLECTION SYSTEM PIPE SHALL BE TURNED VERTICALLY AT EACH DOWNSPOUT LOCATION AND A DOWNSPOUT ADAPTER SHALL BE INSTALLED ABOVE THE SURFACE OF THE GROUND TO INTERCEPT EACH DOWNSPOUT WHERE IT ENTERS THE UNDERGROUND COLLECTION SYSTEM. A CLEANOUT SHALL BE INSTALLED AT THE END OF THE SYSTEM. THE COST FOR THE DOWNSPOUT ADAPTERS AND CLEANOUT SHALL BE INCLUDED IN THE PER LINEAR FOOT PRICE FOR 8" ROOF DRAIN OUTFALL PIPE.

- GENERAL NOTES:**
1. SEE SHEETS CA-111 FOR SITE LAYOUT PLAN.
 2. SEE CA-500 SERIES FOR DETAILS.
 3. PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL CONTACT THE LOCAL UTILITY LOCATING COMPANIES TO MARK LOCATION OF EXISTING UNDERGROUND UTILITIES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE EXISTING UTILITIES VERTICALLY AND HORIZONTALLY.
 4. CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING IN THE VICINITY OF EXISTING UNDERGROUND CABLES AND TAXIWAY LIGHTS AND EXISTING FUEL FARM TO PREVENT DAMAGE. CONTRACTOR SHALL PROTECT ALL UTILITIES IN PLACE DURING CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
 5. CONTRACTOR SHALL FOLLOW THE SEQUENCE OF CONSTRUCTION DESCRIBED ON SHEET CA-140.
 6. DUE TO SHALLOW GROUND WATER AND LOOSE OR SOFT SOILS, IT IS RECOMMENDED THAT WIDE TRACKED VEHICLES BE USED DURING CONSTRUCTION. HEAVY RUBBER-TIRE VEHICLES SHOULD BE KEPT OFF OF THE SITE UNTIL A STABLE SURFACE IS ESTABLISHED.
 7. SITE GRADING SHOULD INITIALLY BEGIN WITH THE REMOVAL OF ANY TOPSOIL AND SURFACE VEGETATION FROM WITHIN THE LIMITS OF THE NEW CONSTRUCTION. THE ANTICIPATED DEPTH OF TOPSOIL AND VEGETATION IS 3 INCHES.
 8. FOR ONSITE MATERIAL THAT IS SUITABLE FOR USE IN PROJECT EMBANKMENT, THE CONTRACTOR WILL BE RESPONSIBLE FOR DRYING OR WETTING THE MATERIAL TO WITHIN 2% OF OPTIMUM MOISTURE AND COMPACT THE MATERIAL IN ACCORDANCE WITH SPECIFICATION SECTION P-152.
 9. THE FINE GRAINED SOILS PRESENT IN THE PROJECT AREA ARE SENSITIVE TO EXCESSIVE MOISTURE, AND MAY RUT AND PUMP, ESPECIALLY UNDER RUBBER TIRE TRAFFIC LOADING WHEN WET. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PRO-ACTIVELY CONTROL SURFACE RUNOFF AND GROUND WATER, TO EXERCISE DISCRETION IN SELECTING EQUIPMENT TYPES & SIZES AND TO SEQUENCE HIS OPERATIONS SO AS TO MINIMIZE DETERIORATION OF EXPOSED SUBGRADE SOILS AND TO PROTECT THE SUBGRADE UNTIL THE OVERLYING MATERIALS CAN BE PLACED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEWATERING OPERATIONS DURING CONSTRUCTION. COST FOR DEWATERING SHALL BE INCLUDED IN ITEMS BID UPON. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROLLING ALL SEDIMENT PRODUCED FROM DEWATERING OPERATIONS.
 10. CONSTRUCTION OF THE NEW ASPHALTIC PAVEMENT SHALL INCLUDE PLACEMENT OF THE ASPHALTIC PAVEMENT SURFACE COURSE IN TWO LIFTS. EACH LIFT OF PAVEMENT SHALL BE CONSTRUCTED AND COMPACTED IN ACCORDANCE WITH THE APPLICABLE SPECIFICATION. AFTER THE FIRST LIFT HAS BEEN PLACED AND HAD ADEQUATE TIME TO COOL, TACK COAT SHALL BE APPLIED TO THE PAVEMENT SURFACE. PRIOR TO PAVING THE NEXT LIFT.
 11. UPON COMPLETION OF THE PAVING OPERATIONS, STOCKPILED TOPSOIL SHALL BE PLACED ON DISTURBED AREAS PRIOR TO SODDING OR SEEDING AND MULCHING. ALL EXCESS STOCKPILED TOPSOIL AND EXCAVATED SOIL PREVIOUSLY STOCKPILED SHALL BE DISPOSED OF OFF AIRPORT PROPERTY. THERE SHALL BE NO SEPARATE MEASUREMENT AND PAYMENT FOR STOCKPILED TOPSOIL AND PLACING THE TOPSOIL IN ITS FINAL LOCATION OR HAULING OFFSITE AND DISPOSAL OF EXCESS MATERIAL.
 12. INSTALL SOD FOR ALL DISTURBED AREAS AROUND NEW HANGAR AND HANGAR INFIELD.



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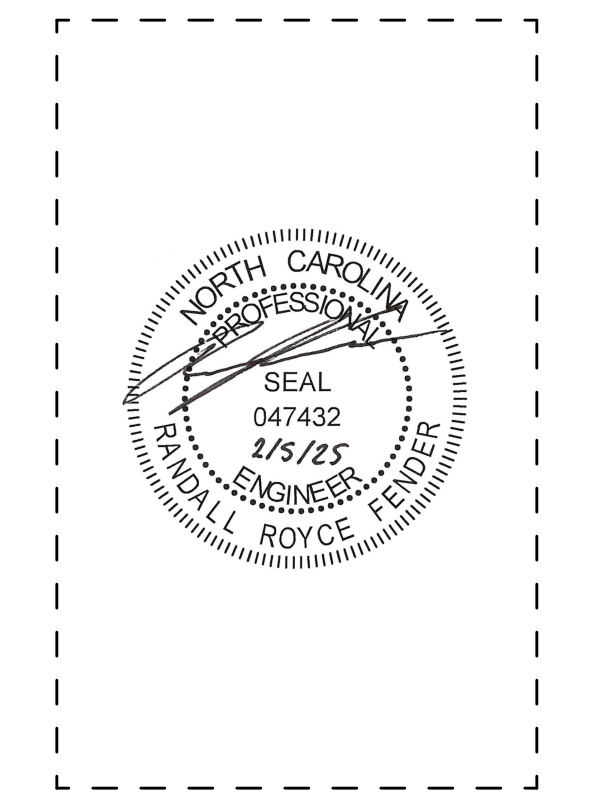
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REVISIONS
1 - ADDENDUM #1 (PVMT/STORMWATER)

DATE: JANUARY 2025
PROJECT NUMBER: 3105-2401
SHEET TITLE:

GRADING & DRAINAGE PLAN (SCHEDULE 1)

SHEET NUMBER
CA-121



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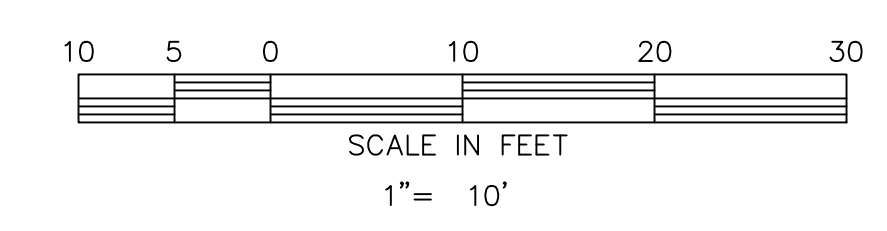
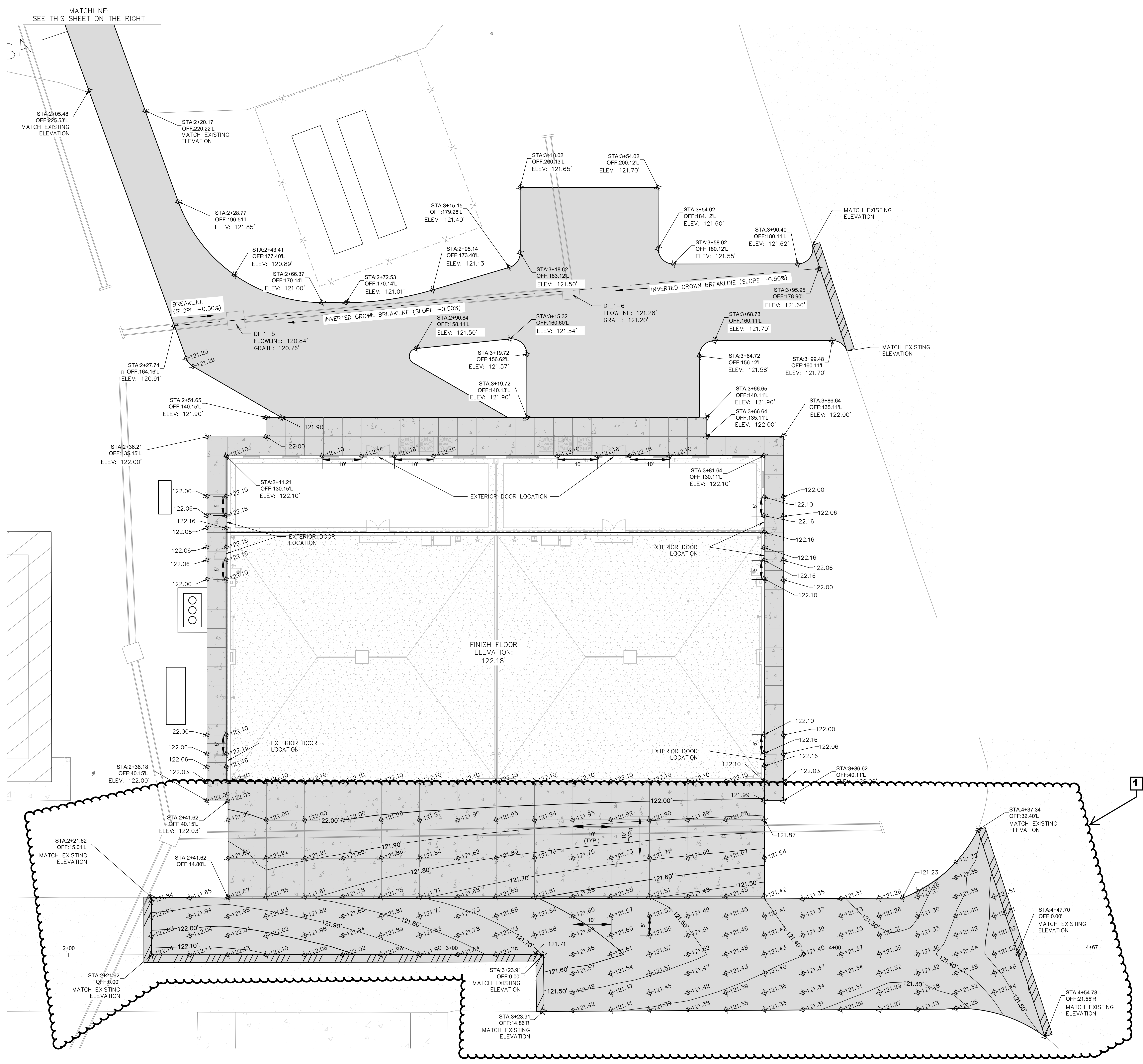
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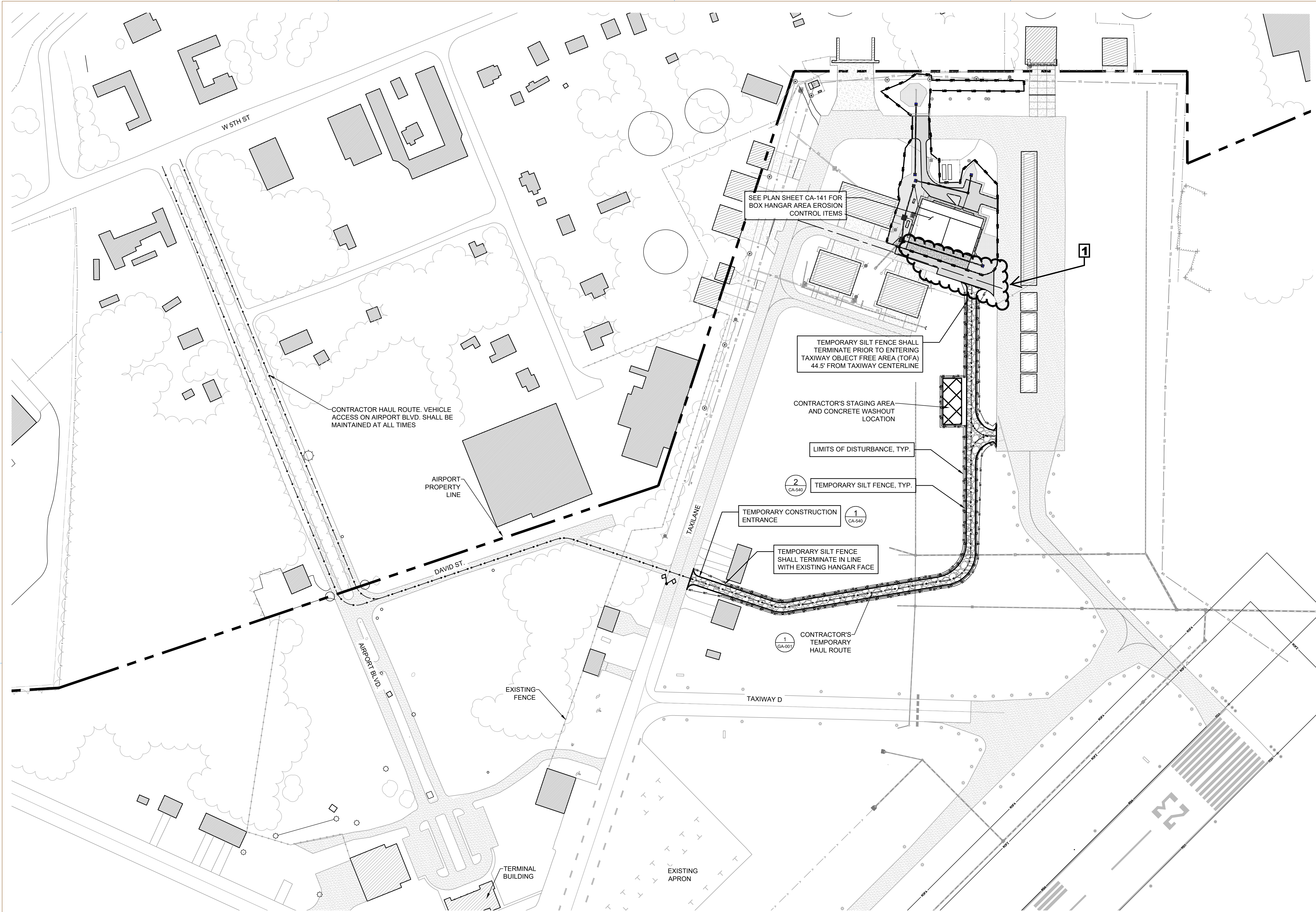
REVISIONS
 1 - ADDENDUM #1 (PVMT/GRADES)

DATE: JANUARY 2025
 PROJECT NUMBER: 3105-2401
 SHEET TITLE:

PAVEMENT ELEVATION PLAN (SCHEDULE 1)

SHEET NUMBER
CA-131





PERMANENT SEED MIXES SHALL BE APPLIED AS FOLLOWS:

SEED	APPLICATION RATE (LBS/ACRE)	SEEDING DATES
COMMON BERMUDAGRASS (HULLED)	50	MAR. 1 - JUL. 31
COMMON BERMUDAGRASS (UNHULLED)	70	AUG. 1 - FEB. 28

TEMPORARY SEED MIXES SHALL BE APPLIED AS FOLLOWS:

SEED	APPLICATION RATE (LBS/ACRE)	SEEDING DATES
RYE (GRAIN)	120	JAN. 1 - MAR. 31
KOBE LESPEDEZA	50	APR. 1 - AUG. 15
HULLED BERMUDA GRASS	50	APR. 1 - AUG. 15
RYE (GRAIN)	120	AUG. 16 - DEC. 31

FERTILIZER: FERTILIZER SHALL BE APPLIED AT THE RATE OF 500 LBS/ACRE OF A 10-10-10 COMMERCIAL FERTILIZER. FERTILIZER SHALL BE APPLIED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION T-901 SEEDING OF THE PROJECT SPECIFICATIONS.

LIME: LIME SHALL BE APPLIED AT THE RATE OF 3,000 LBS/ACRE. LIME SHALL BE APPLIED IN ACCORDANCE WITH SECTION T-901 SEEDING OF THE PROJECT SPECIFICATIONS.

MULCH: MULCH SHALL CONSIST OF MANUFACTURED MULCH. MULCH SHALL BE EVENLY APPLIED AT THE RATE OF 2 TO 3 TONS PER ACRE TO PROVIDE A LOOSE DEPTH OF 1 1/2"-3". MANUFACTURED MULCH SHALL BE APPLIED AT THE RATE AS RECOMMENDED BY THE MANUFACTURER. MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION T-908 - MULCHING OF THE SPECIFICATIONS.

MAINTENANCE OF SEEDED AREAS: THE CONTRACTOR SHALL BE REQUIRED TO ESTABLISH A GOOD STAND OF GRASS OF UNIFORM COLOR AND DENSITY TO THE SATISFACTION OF THE ENGINEER AND OWNER. THE CONTRACTOR SHALL WATER THE SEEDED AREAS AS REQUIRED FOR SEED GERMINATION AND AS REQUIRED TO MAINTAIN AREAS OF ESTABLISHED GRASS. THE CONTRACTOR SHALL MOW GRASS AREAS AND CONTROL THE PRESENCE OF INVASIVE SPECIES AS REQUIRED. CONTRACTOR WILL BE REQUIRED TO RESEED AND MULCH ALL AREAS WHERE SEEDING EMERGENCE IS POOR. ALL AREAS OF EROSION SHALL BE REPAIRED AND RESEEDED AS SOON AS POSSIBLE. CONTRACTOR SHALL PROTECT SEEDED AREAS FROM TRAFFIC AS MUCH AS POSSIBLE.

GENERAL SEQUENCE OF CONSTRUCTION:

THE FOLLOWING GENERAL SEQUENCE OF CONSTRUCTION HAS BEEN DEVELOPED TO OUTLINE THE REQUIREMENTS FOR EROSION AND SEDIMENTATION CONTROL. IN ACCORDANCE WITH THE CONTRACT PROVISIONS, THE CONTRACTOR SHALL DEVELOP AND SUBMIT A DETAILED PROJECT CONSTRUCTION SCHEDULE.

SEQUENCE OF CONSTRUCTION - SEDIMENT AND EROSION CONTROL:

- PERFORM PROJECT LAYOUT (SURVEY), MARK UTILITIES AND FLAG CLEARING LIMITS FOR REVIEW BY ENGINEER.
- AIRPORT WILL HOLD PRECONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.
- INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
- CLOSE CONSTRUCTION AREA FOR AIRPORT TRAFFIC WITH APPROPRIATE BARRICADES AND TAXIWAY CLOSURE CROSSES.
- INSTALL TEMPORARY SILT FENCE AND OTHER TEMPORARY EROSION CONTROL MEASURES.
- SET UP STAGING AND STOCKPILE AREAS.
- STRIP APPROXIMATELY 4 INCHES TO REMOVE TOPSOIL AND GRASS ROOTMATS.
- INSTALL NEW PIPE AND DRAINAGE STRUCTURES.
- BEGIN PLACING FILL TO BRING SITE TO PROPOSED GRADES.
- INSTALL TEMPORARY DROP INLET PROTECTION.
- COMPLETE WATER AND SANITARY SEWER UTILITIES INSTALLATION AND GRADING.
- COMPLETE FINAL GRADING.
- COMMENCE PLACEMENT OF STONE BASE COURSE, COMPACT, AND GRADE TO SPECIFIED ELEVATIONS AND GRADE.
- CONSTRUCT ASPHALTIC PAVEMENT AND CONCRETE PAVEMENT.
- COMPLETE SHOULDER GRADING OPERATIONS AS NECESSARY.
- BEGIN SODDING, SEEDING, AND MULCHING OPERATIONS FOR DISTURBED AREAS.
- REMOVE MISCELLANEOUS EQUIPMENT, STOCKPILES, DEBRIS, ETC., FROM PROJECT AND STAGING AREA TO DISPOSE OF OFF AIRPORT PROPERTY, AS REQUIRED.
- COMPLETE RESTORATION OF ALL DISTURBED AREAS AND COMPLETE SODDING, SEEDING AND MULCHING ON ALL AREAS THROUGHOUT THE PROJECT. FOLLOWING STABILIZATION OF THE SITE, INCLUDING ESTABLISHMENT OF A GOOD STAND OF GRASS IN ALL AREAS, THE CONTRACTOR SHALL REQUEST FINAL INSPECTION BY ENGINEER. REMOVE REMAINING TEMPORARY EROSION CONTROL MEASURES AS THE PROJECT IS COMPLETED OR GRASSED AREAS ARE REESTABLISHED AS DIRECTED BY THE ENGINEER.
- ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE INSPECTED WEEKLY AND AFTER RAINFALL EVENTS. NEEDED REPAIRS WILL BE MADE IMMEDIATELY. SEE MAINTENANCE REQUIREMENTS FOR EACH EROSION AND SEDIMENT CONTROL PRACTICE.

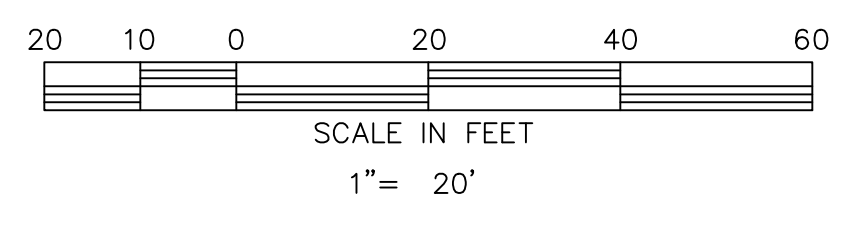
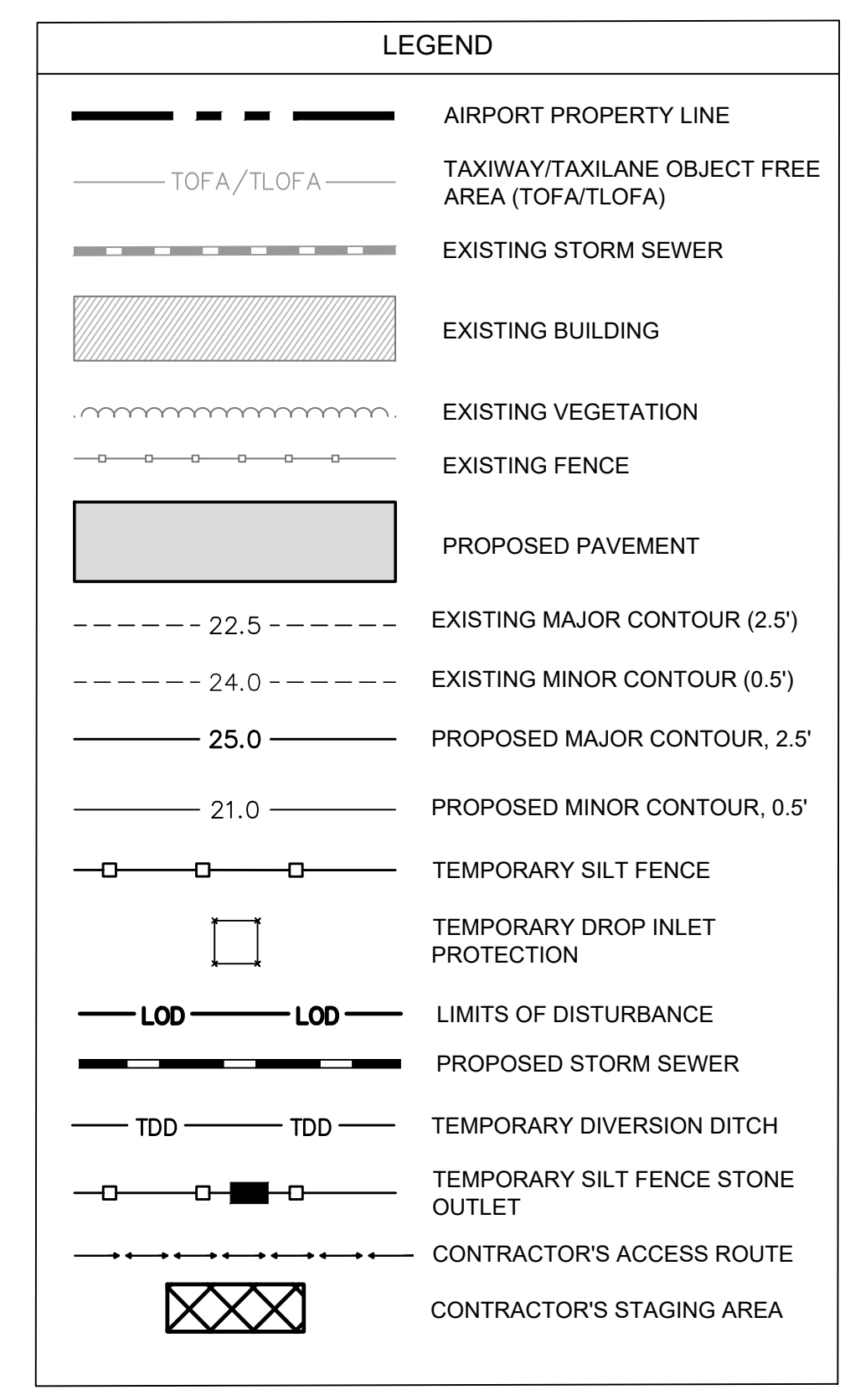
EROSION AND SEDIMENT CONTROL NOTES:

- ALL TEMPORARY OR PERMANENT EROSION AND SEDIMENT CONTROL PRACTICES NECESSARY FOR RETAINING SEDIMENTS ON THE CONSTRUCTION SITE SHALL BE INSTALLED AT THE LOCATIONS AS SPECIFIED ON THE PLANS PRIOR TO ANY LAND CLEARING OR GRUBBING ACTIVITIES. A RAIN GAUGE PROVIDED BY CONTRACTOR MUST BE LOCATED ON SITE AT ALL TIMES.
- SUFFICIENT MATERIALS REQUIRED FOR STABILIZATION AND/OR REPAIR OF EROSION CONTROL MEASURES AND STORMWATER ROUTING AND TREATMENT SHALL BE ON SITE AT ALL TIMES.
- CRITICAL EROSION AREAS SHALL BE GIVEN SPECIAL ATTENTION PRIOR TO AND DURING CONSTRUCTION OF THE PROJECT AND UNTIL SUCH TIME AS STABILIZATION OF THE PROJECT HAS BEEN ESTABLISHED.
- CONTRACTOR SHALL MAKE PERIODIC SITE INSPECTIONS OF THE EROSION AND SEDIMENT CONTROL MEASURES TO DETERMINE THEIR CONDITION AND PERFORMANCE. IF SEDIMENT HAS DEPOSITED IN A STREAM OR WETLAND, CONTRACTOR SHALL NOTIFY OWNER AND THE DIVISION OF WATER QUALITY OFFICE WITHIN 24 HOURS AND WRITTEN NOTICE MUST BE PROVIDED WITHIN 5 DAYS. SHOULD ANY ADJUSTMENTS OR REPAIRS NEED TO BE MADE, THE CONTRACTOR SHALL RESPOND IMMEDIATELY IN MAKING NECESSARY REPAIR, ADJUSTMENT AND/OR REPLACEMENT. ANY SEDIMENT WHICH HAS BEEN TRANSPORTED BEYOND THE PROJECT LIMITS SHALL BE REMOVED AND/OR STABILIZED AS DIRECTED BY THE ENGINEER.
- TOPSOIL AND AGGREGATE STOCKPILES SHALL BE PLACED AT THE LOCATION AS DIRECTED BY THE ENGINEER. DEDICATED DEMOLITION AND OTHER WASTE AREAS AND EARTHEN MATERIAL STOCKPILES MUST BE LOCATED AT LEAST 50' FROM STORM DRAINS OR STREAMS UNLESS NO ALTERNATIVE IS FEASIBLE. SILT FENCE SHALL BE ERRECTED AT THE TOE OF THE STOCKPILES. SILT FENCE SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
- WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICLES TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.
- CONTRACTOR SHALL MAINTAIN AND REPAIR EXISTING AGGREGATE BASE ON ACCESS ROADS, PARKING AREAS AND/OR OTHER VEHICLE TRANSPORTATION ROUTES AS REQUIRED OR AS DIRECTED BY THE ENGINEER.
- EROSION AND SEDIMENT CONTROL MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. THE MEASURES ARE TO BE KEPT CLEAR OF DEBRIS AND SEDIMENTS SHALL BE CLEANED OUT PERIODICALLY DURING AND AFTER CONSTRUCTION ACTIVITIES. ALL OTHER STORM WATER MANAGEMENT FACILITIES SHALL BE INSTALLED AND MADE OPERATIONAL AS SHOWN OR REQUIRED BY CONSTRUCTION ACTIVITIES.
- A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DISTURBED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION. PERMANENT VEGETATIVE COVER SHALL CONSIST OF LIMING, FERTILIZING, SEEDING, AND MULCHING TO ASSURE A FIRM STAND OF GRASS. TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED ONLY WHEN STABILIZATION HAS BEEN ESTABLISHED.

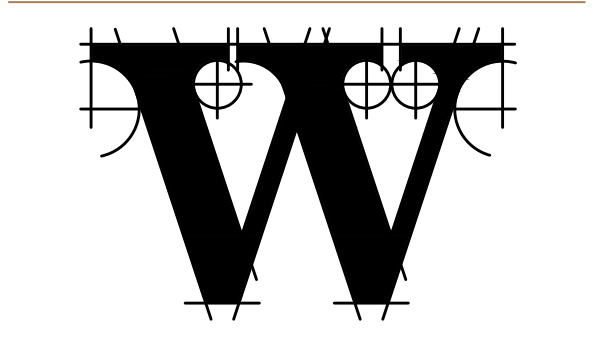
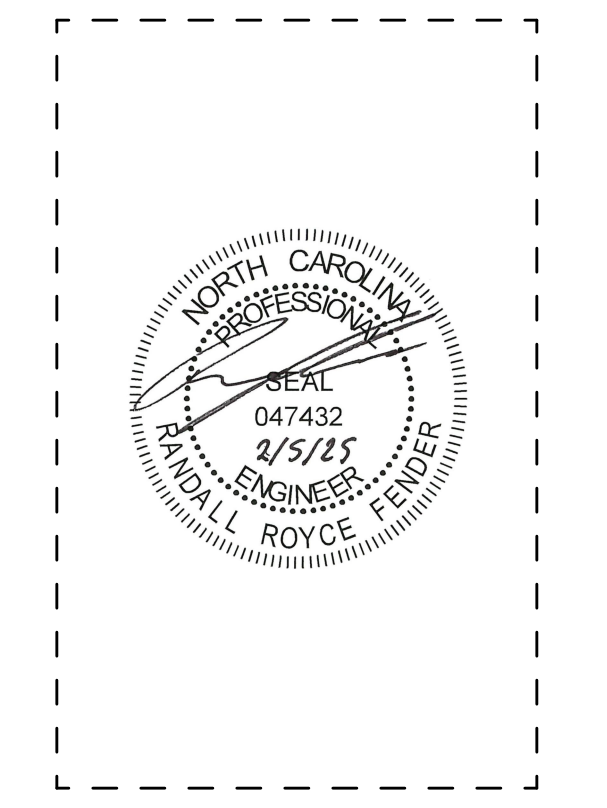
- CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.
- MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE SCHEDULED BY THE CONTRACTOR ON A WEEKLY BASIS AND AFTER EACH RAINFALL PRODUCING RUNOFF DURING THE PROJECT. NECESSARY REPAIR, ADJUSTMENT AND/OR REPLACEMENT SHALL BE PERFORMED IMMEDIATELY. RAINY SEASONS OR WET PERIODS WILL BE OF PARTICULAR CONCERN AND THE PROJECT SHALL BE INSPECTED DAILY BY THE CONTRACTOR.
- AIRBORNE SEDIMENTS (DUST) SHALL BE CONTROLLED IN ACCORDANCE WITH REQUIREMENTS OF THE SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
- A PERMANENT GROUND COVER MUST BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR 90 CALENDAR DAYS (WHICHEVER IS SHORTER), FOLLOWING COMPLETION OF EACH PHASE OF CONSTRUCTION.
- ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) SHALL BE PROVIDED TEMPORARY AND PERMANENT STABILIZATION WITH GROUND COVER AS SOON AS PRACTICABLE BUT IN ANY EVENT WITHIN 7 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACTIVITY.
- ALL OTHER DISTURBED AREAS SHALL BE PROVIDED TEMPORARY OR PERMANENT STABILIZATION WITH GROUND COVER AS SOON AS PRACTICABLE BUT IN ANY EVENT WITHIN 14 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACTIVITY.
- ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED BY THE CONTRACTOR EVERY SEVEN (7) DAYS OR AFTER EACH RAINFALL OCCURRENCE THAT EXCEEDS ONE-HALF (1/2) INCH DURING THE PROJECT AND FINAL STABILIZATION OF PROJECT. DAMAGED OR INEFFECTIVE DEVICES SHALL BE REPAIRED OR REPLACED, AS NECESSARY.
- ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED BY THE CONTRACTOR DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL REQUIREMENTS OF THE NORTH CAROLINA SEDIMENTATION CONTROL LAW AND THE RELATED REGULATIONS, INCLUDING IMPLEMENTATION OF THE EROSION AND SEDIMENT CONTROL PLAN AND THE REQUIREMENTS OF THE NPDES GENERAL PERMIT.
- THE CONTRACTOR SHALL MAINTAIN ON SITE AT ALL TIMES A COPY OF THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, DATED MAY, 2013.

SITE AREA DESCRIPTION	STABILIZATION TIMEFRAMES	
	STABILIZATION	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES, SLOPES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

- NOTES:
- EXCELSIOR MATTING SHALL BE INSTALLED ON ALL DISTURBED OR NEW SLOPES 5:1 OR GREATER. SEE DETAIL ON SHEET CB-541.
 - SEE SEDIMENTATION AND EROSION CONTROL NOTES AND DETAILS ON SHEETS CB-540 THROUGH CB-543.
 - FEDERAL REGULATIONS WILL NOT ALLOW MEASURES SUCH AS SILT FENCE TO BE PLACED WITHIN EXISTING TAXILANE OBJECT FREE AREAS THAT ARE OPEN FOR USE.
 - THERE MAY BE INSTANCES WHERE SHRUB AND TREE GROWTH NEXT TO THE FENCE MAKES IT IMPRACTICAL TO PLACE SILT FENCE WITHIN THE FENCE. IN THIS CASE, SILT FENCE SHALL BE INSTALLED ON THE OTHER SIDE OF THE FENCE WHILE ENSURING THE SILT FENCE IS STILL INSTALLED ON AIRPORT PROPERTY. IN TRANSITIONS FROM EITHER SIDE OF THE FENCE TO THE OTHER, SUFFICIENT OVERLAP SHOULD BE ADDED TO ENSURE SEDIMENT IS CONTAINED ON SITE.



Schedule 1:
2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358



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NC Cert. No.: 51140

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CHEATHAM & ASSOCIATES, P.A.
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WATER & SEWER ENGINEER
WITHERS RAVENEL
219 STATION ROAD, SUITE 101
WILMINGTON, NC 28405
PHONE: 910-256-9277 LICENSE NO. E-1479

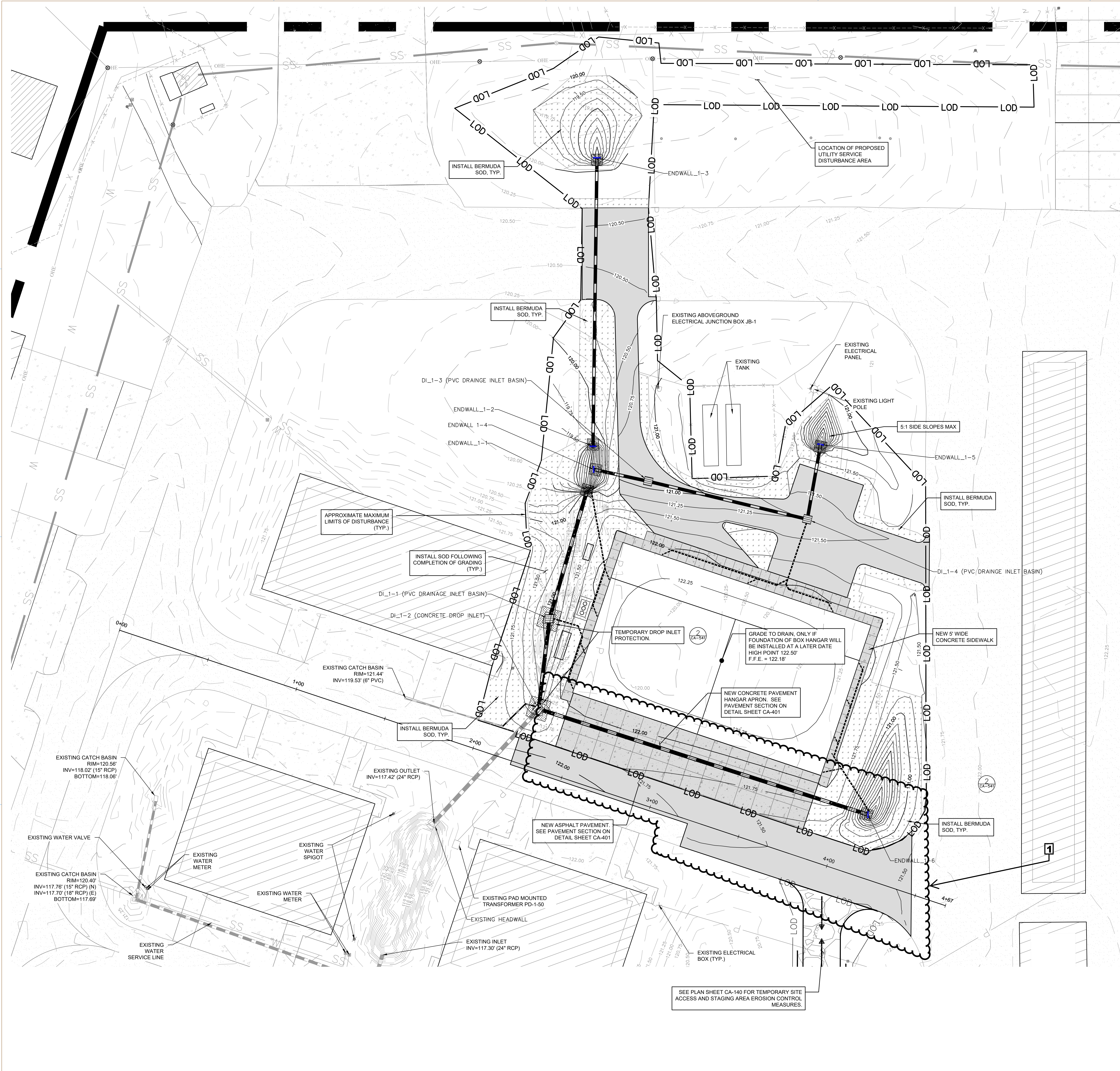
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REVISIONS
1 - ADDENDUM #1 (PVMT/STORMWATER)

DATE JANUARY 2025
PROJECT NUMBER 3105-2401
SHEET TITLE

SEDIMENTATION & EROSION CONTROL PLAN - 1 (SCHEDULE 1)

SHEET NUMBER
CA-140



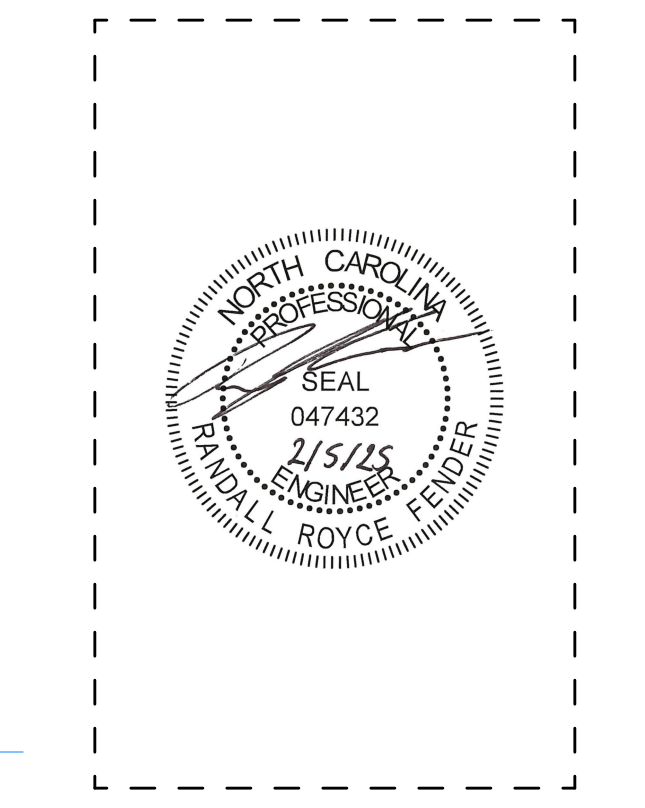
LEGEND

	AIRPORT PROPERTY LINE
	TAXIWAY/TAXILANE OBJECT FREE AREA (TOFATLOFA)
	EXISTING STORM SEWER
	EXISTING BUILDING
	EXISTING VEGETATION
	EXISTING FENCE
	PROPOSED ASPHALT PAVEMENT
	PROPOSED CONCRETE PAVEMENT
	EXISTING SANITARY SEWER
	EXISTING WATER LINE
	EXISTING OVERHEAD ELECTRICAL LINE
	EXISTING UNDERGROUND ELECTRICAL LINE
	EXISTING MAJOR CONTOUR (2.5')
	EXISTING MINOR CONTOUR (0.5')
	PROPOSED MAJOR CONTOUR, 2.5'
	PROPOSED MINOR CONTOUR, 0.5'
	TEMPORARY SILT FENCE
	TEMPORARY DROP INLET PROTECTION
	LIMITS OF DISTURBANCE
	PROPOSED STORM SEWER
	TEMPORARY DIVERSION DITCH
	CONTRACTOR'S ACCESS ROUTE
	CONTRACTOR'S STAGING AREA
	BERMUDA SOD

- NOTES:**
- SEE SEDIMENTATION AND EROSION CONTROL NOTES AND DETAILS ON SHEETS CA-540 AND CA-541.
 - FEDERAL REGULATIONS WILL NOT ALLOW MEASURES SUCH AS SILT FENCE TO BE PLACED WITHIN EXISTING TAXILANE OBJECT FREE AREAS THAT ARE OPEN FOR USE.



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2-Unit Box Hangar**
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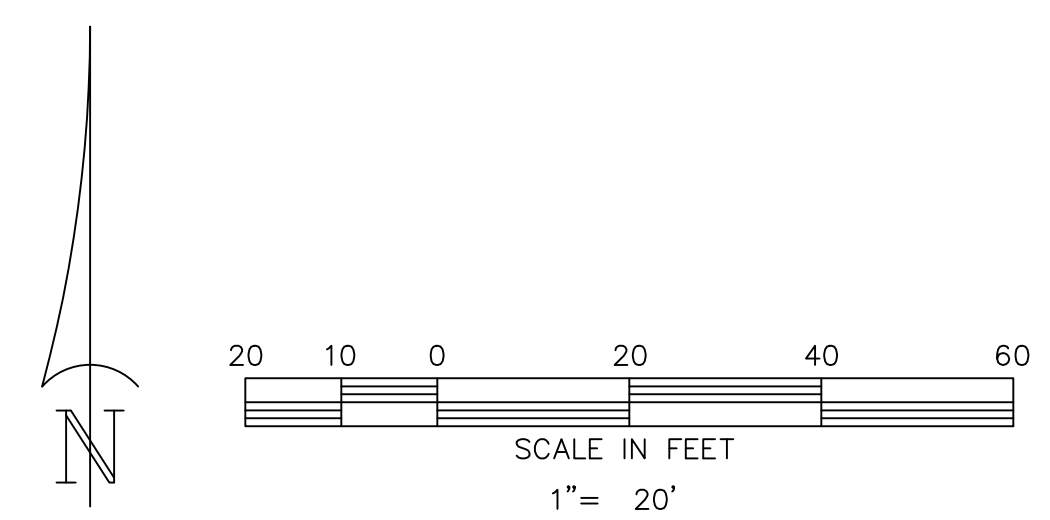
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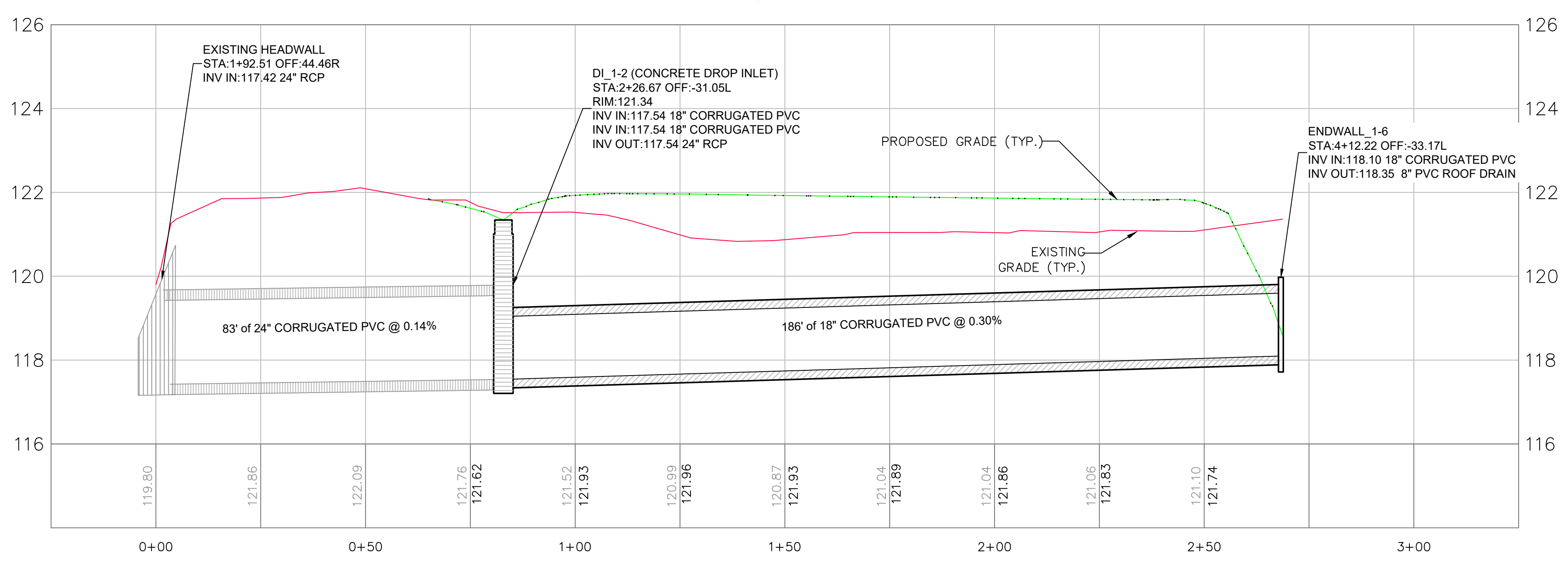
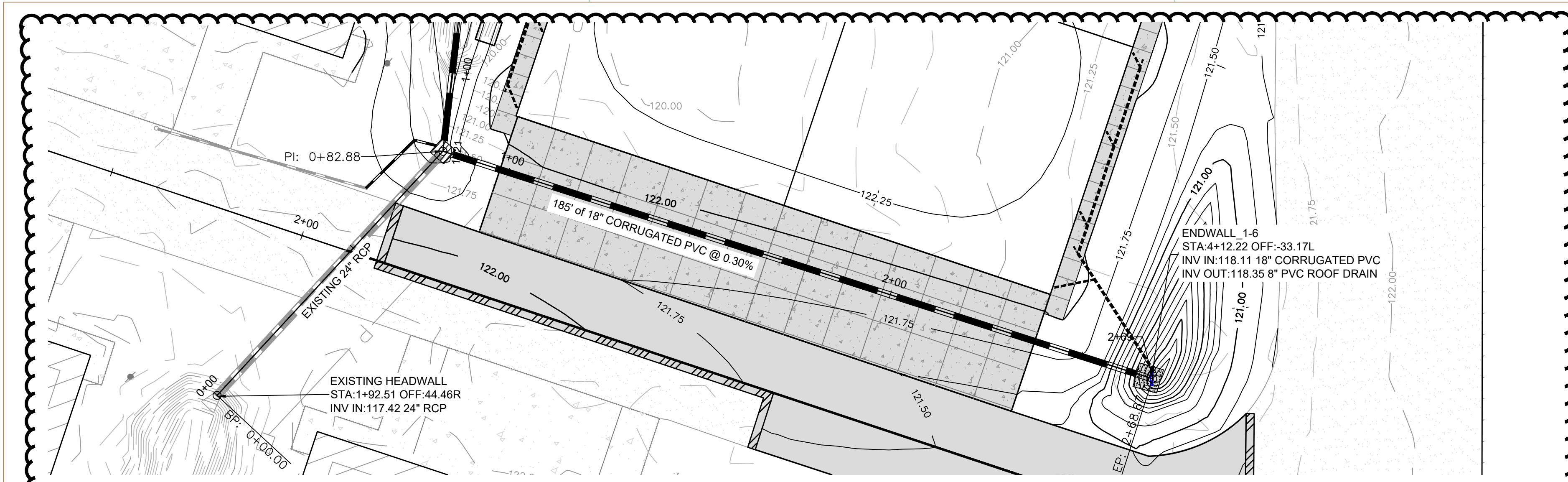
REVISIONS
1 - ADDENDUM #1 (PVMT/STORMWATER)

DATE: JANUARY 2025
PROJECT NUMBER: 3105-2401
SHEET TITLE:

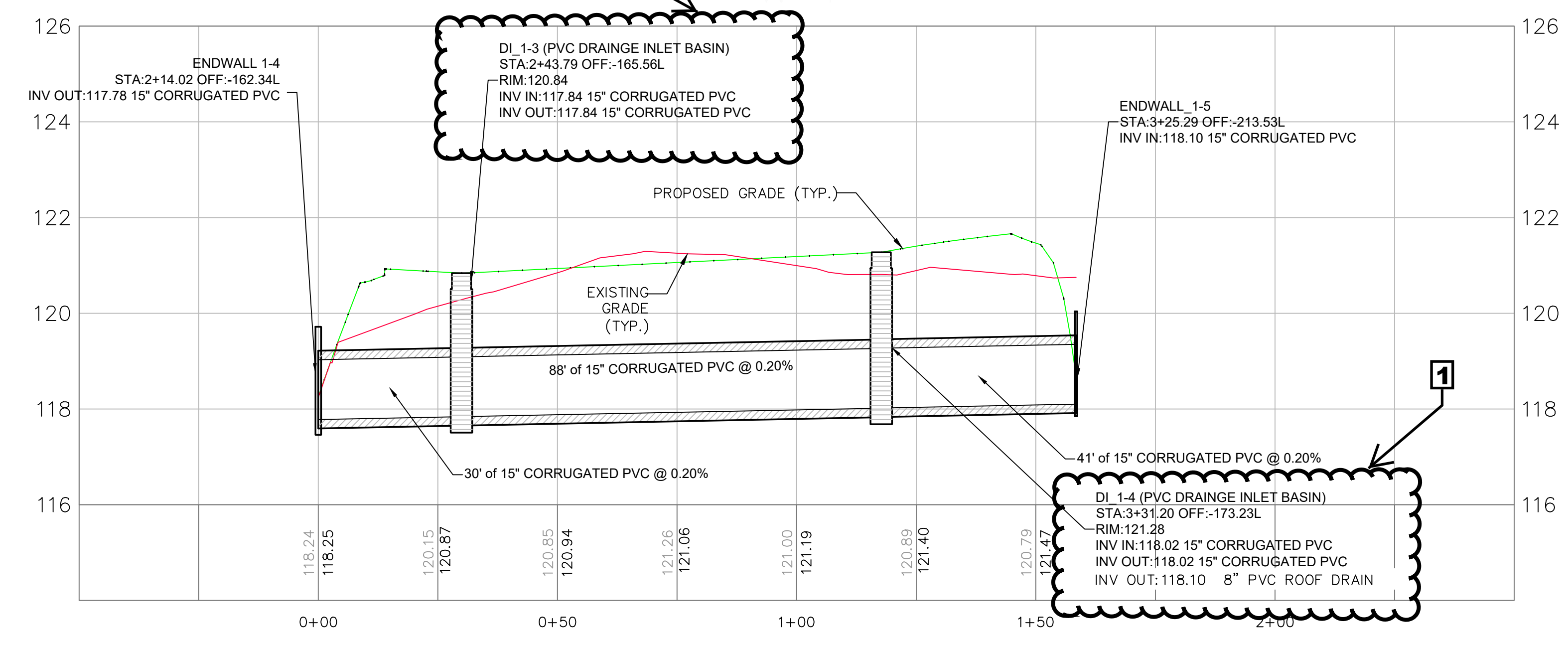
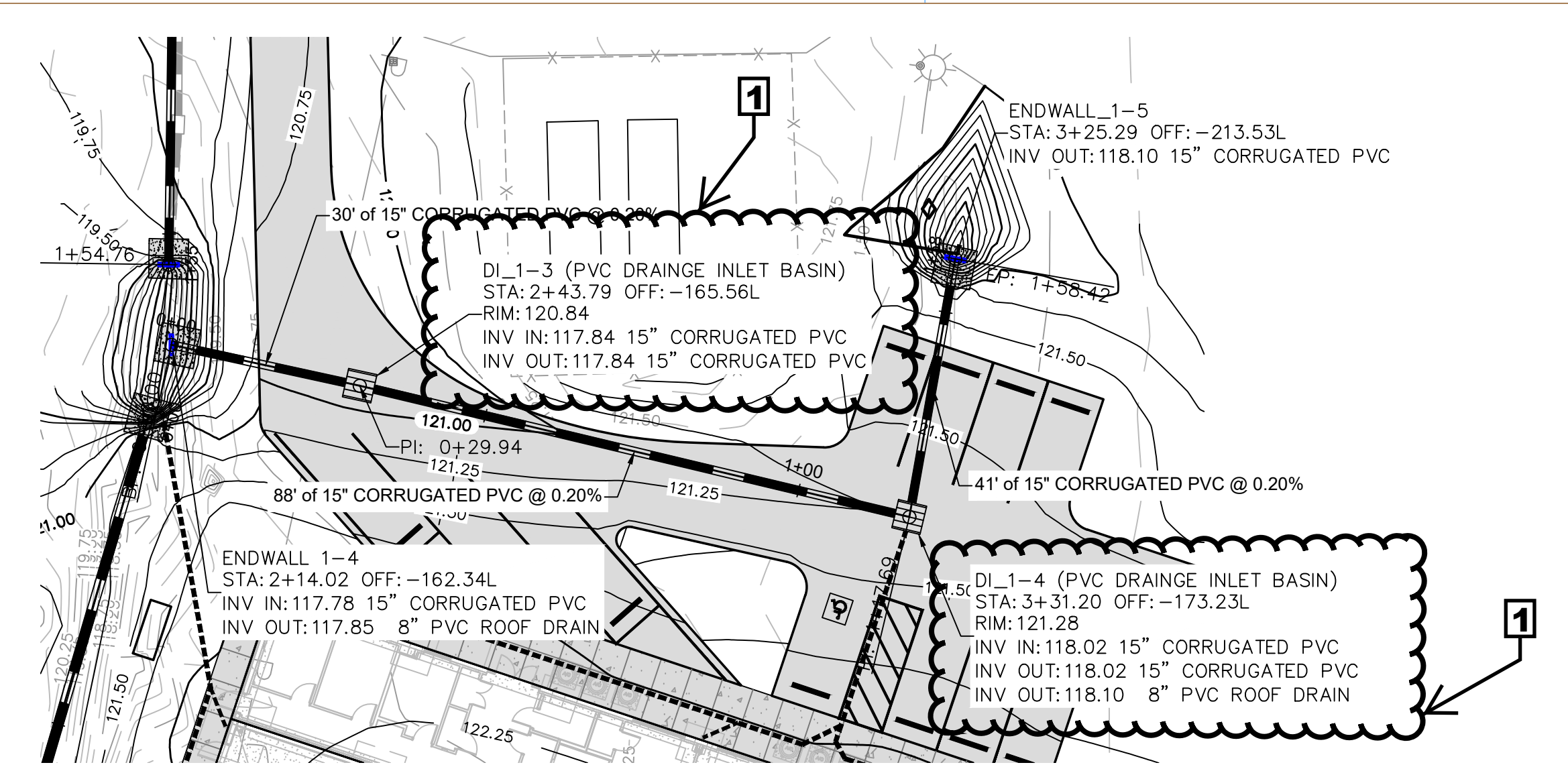
SEDIMENTATION & EROSION CONTROL PLAN - 2 (SCHEDULE 1)

SHEET NUMBER
CA-141

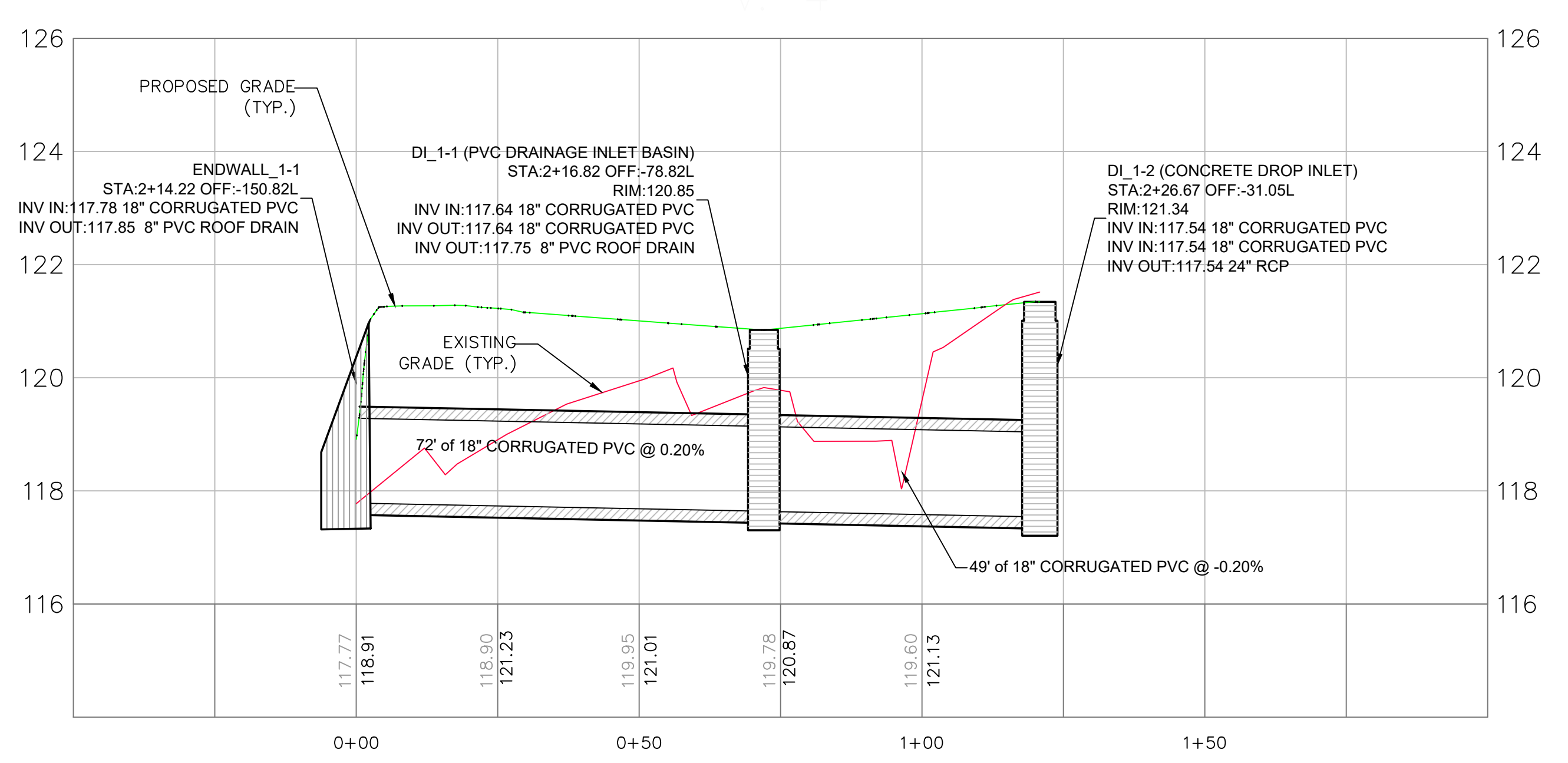
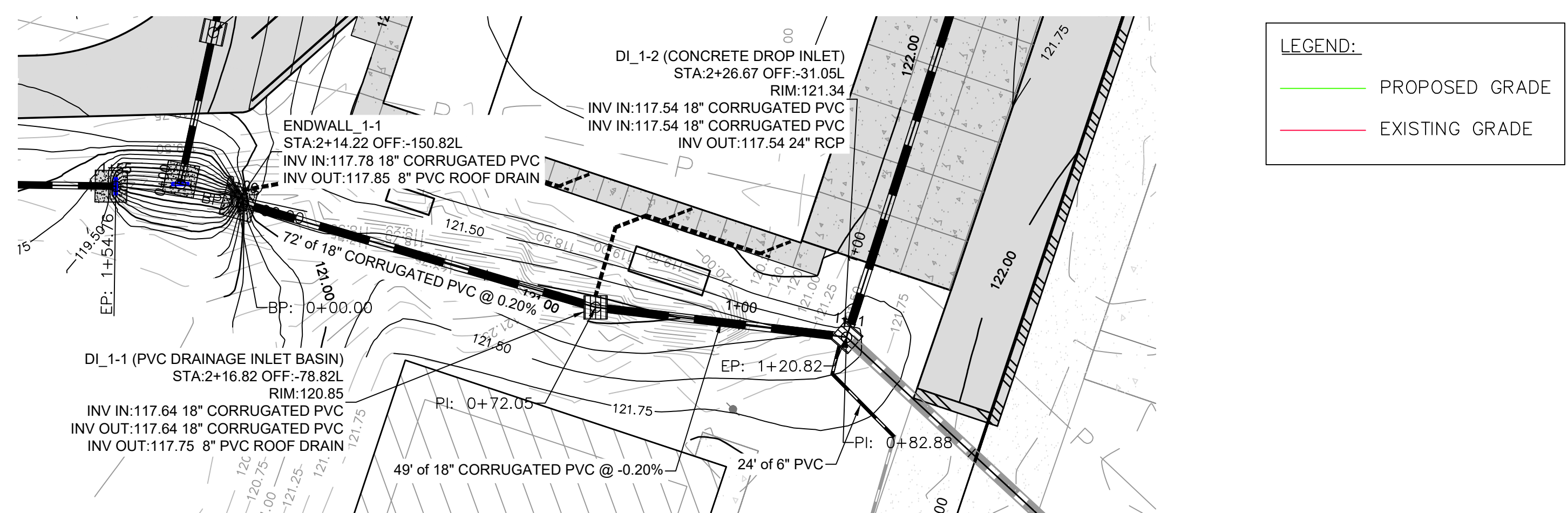




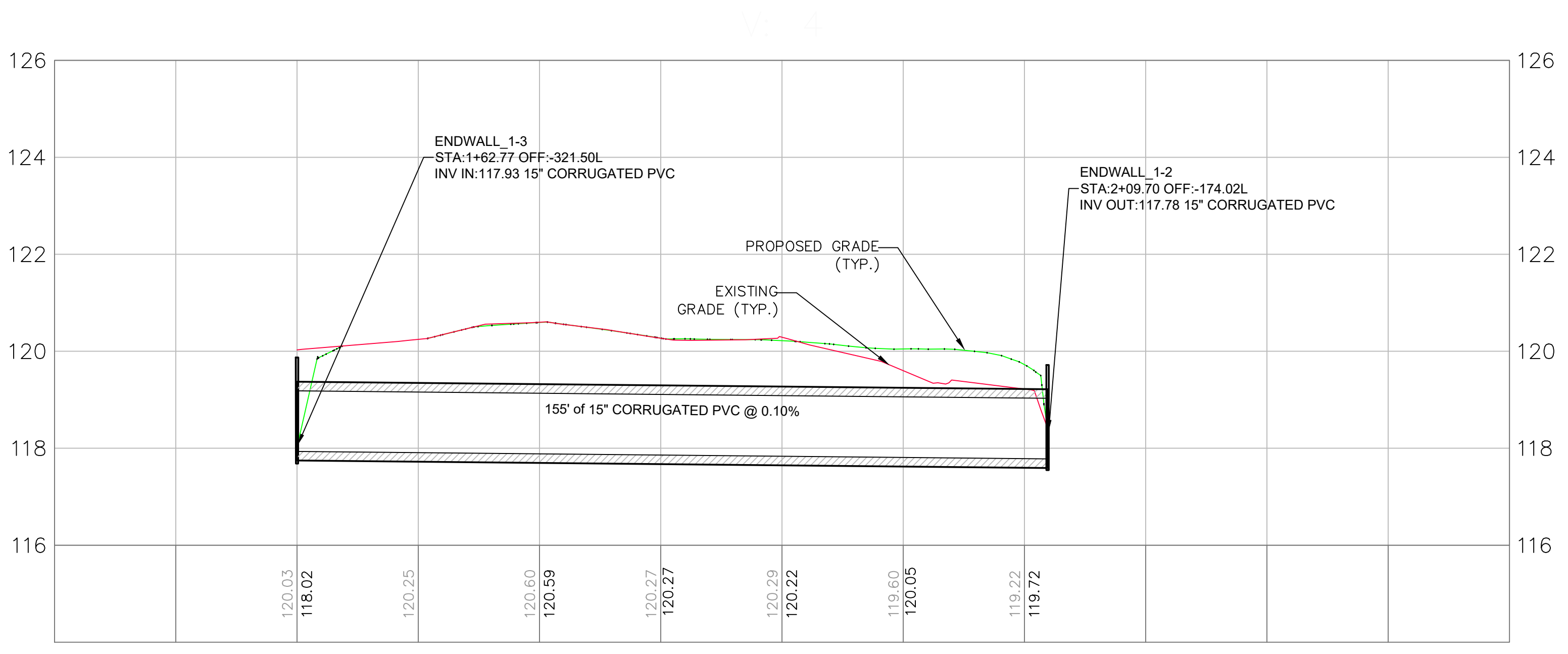
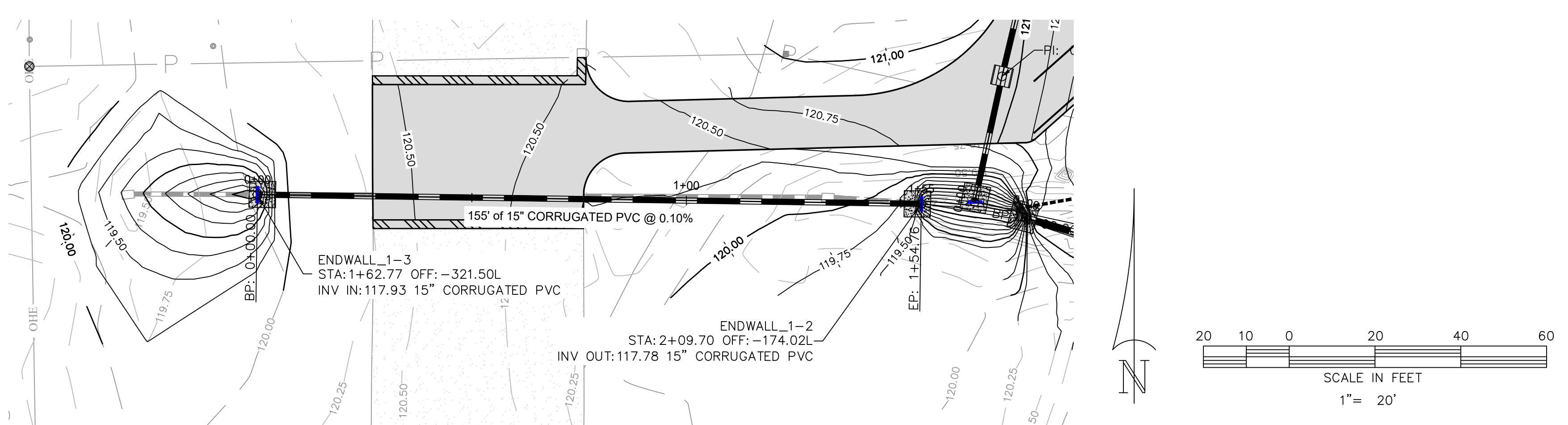
SCHEDULE 1 PROPOSED STORMWATER (STRUCTURE ENDWALL 1-6 TO DL 1-2)
H: 1"=20'
V: 1"=2'



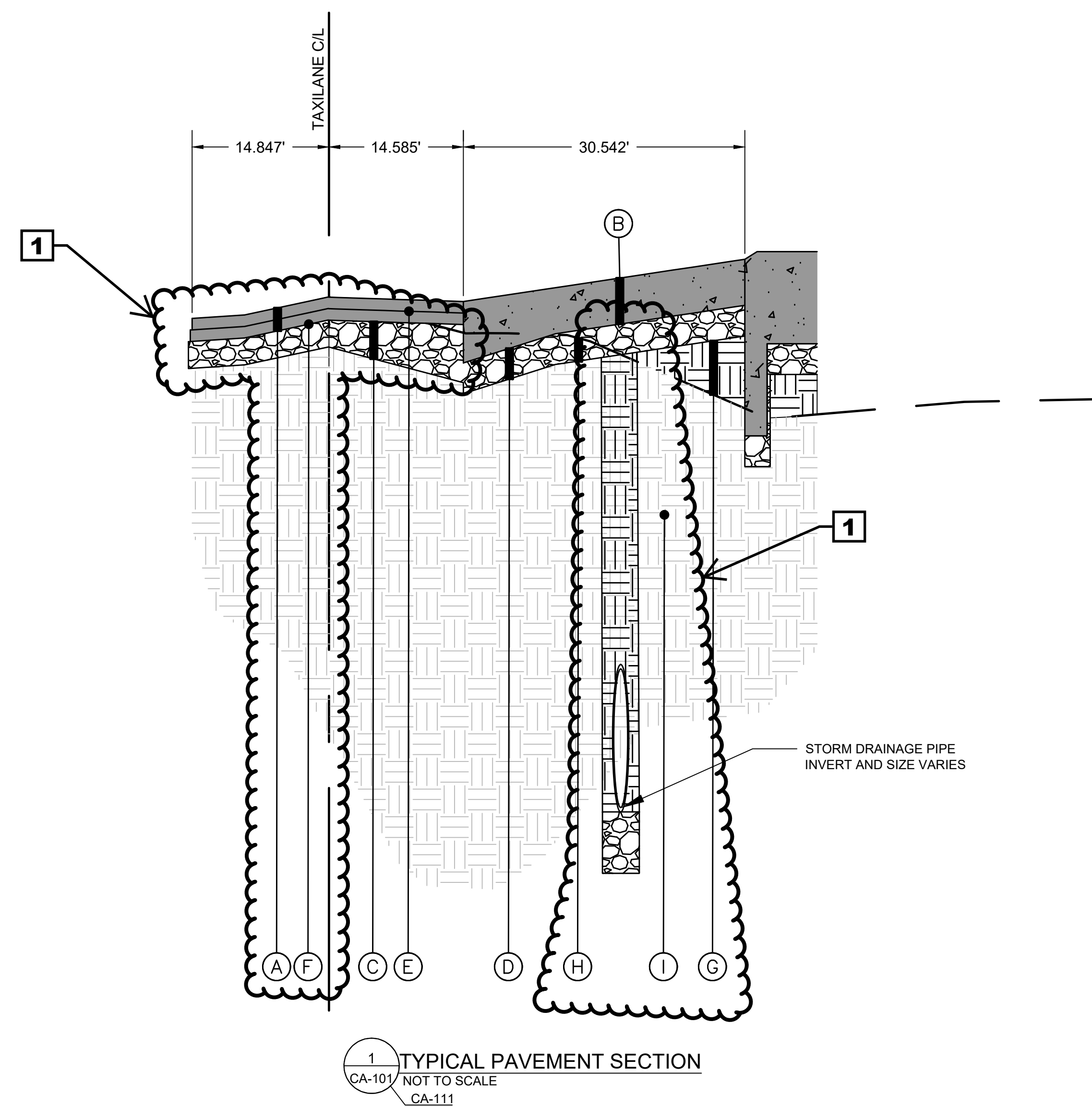
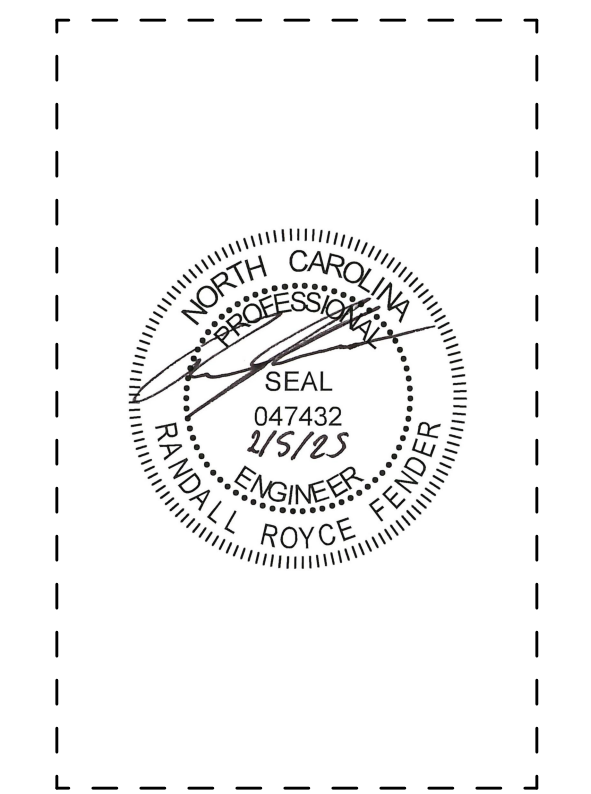
SCHEDULE 1 PROPOSED STORMWATER (STRUCTURE ENDWALL 1-5 TO ENDWALL 1-4)
H: 1"=20'
V: 1"=2'



SCHEDULE 1 PROPOSED STORMWATER (STRUCTURE FES 1-1 TO DL 1-2)
H: 1"=20'
V: 1"=2'



SCHEDULE 1 PROPOSED STORMWATER (STRUCTURE ENDWALL 1-3 TO ENDWALL 1-2)
H: 1"=20'
V: 1"=2'



1 TYPICAL PAVEMENT SECTION
CA-101/ NOT TO SCALE
CA-111

LEGEND:

- (A) PROPOSED HOT MIX ASPHALT SURFACE COURSE, 3-INCH DEPTH (2 - 1.5" LIFTS, S9.5B)
- (B) PROPOSED NCDOT CONCRETE CLASS "PAVEMENT" PAVEMENT, 6-INCH DEPTH
- (C) REWORK EXISTING AGGREGATE BASE COURSE (P-209)
- (D) PROPOSED AGGREGATE BASE COURSE, 4-INCH DEPTH (P-209)
- (E) PROPOSED ASPHALTIC TACK COAT (P-603)
- (F) PROPOSED ASPHALTIC PRIME COAT (P-602)
- (G) FILL/UNCLASSIFIED EXCAVATION (P-152)
- (H) CUT/UNCLASSIFIED EXCAVATION (P-152)
- (I) EXISTING SUBGRADE

NOTES:

1. SEE SHEET CA-111 FOR SCHEDULE 1 PAVING LIMITS.
2. SEE THE CA-120 SERIES DRAWINGS FOR SCHEDULE 1 SITE GRADING.

GENERAL NOTES:

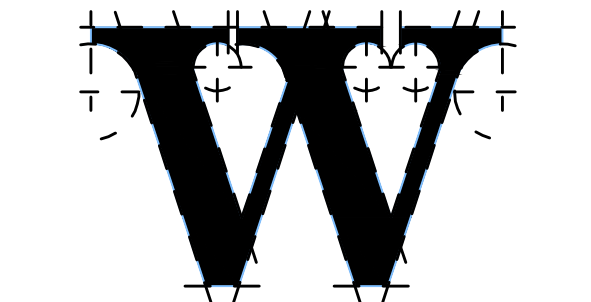
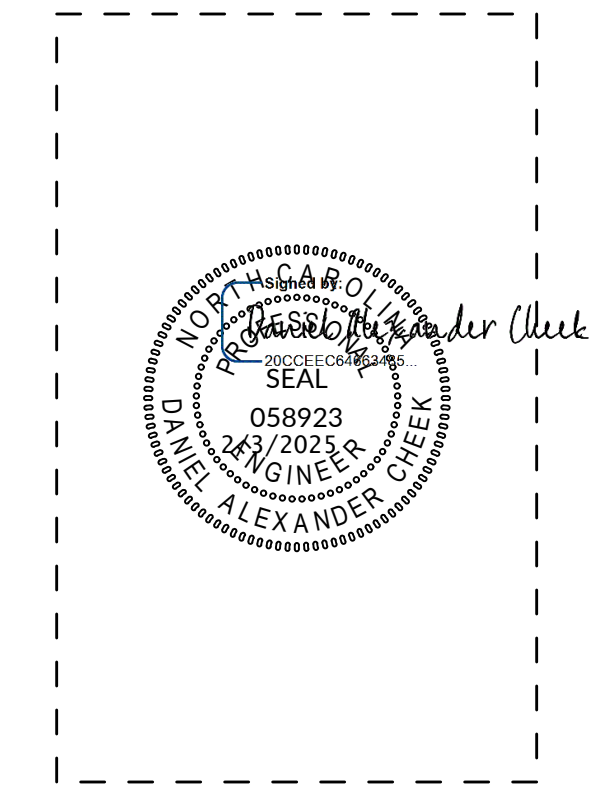
1. THE WORK SPECIFIED IN THESE PLANS IS CONSIDERED INCIDENTAL AND NECESSARY FOR THE COMPLETION OF THE WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAYMENT MADE FOR THE WORK SPECIFIED ON THIS SHEET UNLESS SPECIFICALLY CALLED OUT IN THE BID SCHEDULE AND MEASUREMENT AND PAYMENT SECTION OF THE SPECIFICATIONS.
2. **EXISTING SITE CONDITIONS:** THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE EXISTING SITE CONDITIONS PRIOR TO BIDDING THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A WORKABLE SITE CONDITION DURING THE EXECUTION OF THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL DISTURBED AREAS TO ORIGINAL OR BETTER CONDITIONS AS APPROVED BY THE OWNER.
3. THE CONTRACTOR SHALL HAVE A COMPLETE SET OF CONTRACT DOCUMENTS AS WELL AS ALL PERMIT APPROVALS AND EASEMENTS ON THE JOB SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS WITH MINIMUM DISTURBANCES TO THE EXISTING WATER DISTRIBUTION AND SEWER COLLECTION SYSTEMS.
5. THE CONTRACTOR IS RESPONSIBLE TO CONSTRUCT THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS IN A MANNER TO MAINTAIN WATER SERVICE TO PROPERTIES AFFECTED BY THE PROJECT.
6. THE CONTRACTOR SHALL COORDINATE SERVICE INTERRUPTIONS WITH THE CITY OF LUMBERTON AND THE ENGINEER.
7. THE CONTRACTOR SHALL FOLLOW OSHA GUIDELINES REGARDING TRENCHING AND EXCAVATION SAFETY AND SHALL INCORPORATE APPROPRIATE SAFETY MEASURES AS NECESSARY TO MEET COMPLIANCE.
8. CONSTRUCTION AND MATERIAL SPECIFICATIONS SHALL CONFORM TO ALL STATE OF NORTH CAROLINA MINIMUM REQUIREMENTS AND THE CONTRACT DOCUMENTS REQUIREMENTS, WHICHEVER IS MORE STRINGENT.
9. ALL SHOP DRAWINGS MUST BE REVIEWED AND APPROVED BY ENGINEER BEFORE EQUIPMENT AND MATERIALS ARE ORDERED.
10. CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND UTILITIES. KNOWN EXISTING UTILITIES HAVE BEEN LOCATED FROM THE INFORMATION AVAILABLE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCURATELY LOCATE BOTH HORIZONTALLY AND VERTICALLY ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE NC ONE CALL CENTER AT 800.622.4249. ALL COSTS ASSOCIATED WITH ANY DAMAGE TO KNOWN OR UNKNOWN EXISTING UTILITIES RESULTING FROM THE CONTRACTOR'S FAILURE TO ADEQUATELY PROTECT THE EXISTING UTILITIES DURING CONSTRUCTION SHALL BE BORNE SOLELY BY THE CONTRACTOR.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATION OF EXISTING UTILITIES IF REQUIRED DURING INSTALLATION OF NEW WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAY ITEMS FOR THIS WORK UNLESS SPECIFICALLY CALLED OUT IN THE BID FORM. ANY RELOCATION OF EXISTING UTILITIES MUST BE COORDINATED WITH THE AFFECTED UTILITY COMPANY.
12. CONTRACTOR SHALL MAKE EVERY EFFORT TO SAVE PROPERTY IRONS, MONUMENTS, OTHER PERMANENT POINTS AND LINES OF REFERENCE AND CONSTRUCTION STAKES. A REGISTERED LAND SURVIVOR AT THE CONTRACTOR'S EXPENSE SHALL REPLACE PROPERTY IRONS, MONUMENTS, AND OTHER PERMANENT POINTS OF REFERENCE DISTURBED BY THE CONTRACTOR.
13. CONTRACTOR SHALL CLEAR AND GRUB ALL UTILITY EASEMENTS, AS DIRECTED BY THE OWNER, TO INSTALL NEW UTILITIES. CONTRACTOR SHALL ONLY CLEAR THE MINIMUM ALONG THE PROPOSED ALIGNMENTS.
14. THE CONTRACTOR SHALL SUPPORT ALL UTILITY POLES AS NECESSARY. THE CONTRACTOR SHALL COORDINATE UTILITY POLE SUPPORT WITH THE APPROPRIATE UTILITY COMPANIES. ALL UTILITY POLES AND GUY WIRES INTERFERING WITH CONSTRUCTION SHALL BE RELOCATED WITH UTILITY COMPANY COORDINATION.
15. CONTRACTOR SHALL RESTORE/REPLACE ALL SIGNS, MAILBOXES, ETC. ENCOUNTERED DURING CONSTRUCTION TO ORIGINAL CONDITION.
16. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO THE EXISTING GRADE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
17. ALL DITCHES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION OR BETTER. ALL DITCHES SHALL BE LINED WITH EROSION CONTROL MATTING TO ESTABLISH VEGETATION.
18. ALL EXCAVATED MATERIAL SHALL BE PLACED WITHIN THE LIMITS OF DISTURBANCE DURING UTILITY INSTALLATION. THE CONTRACTOR SHALL PROVIDE THE NECESSARY SEDIMENT AND EROSION CONTROL MEASURES TO CONTROL RUN-OFF. ALL EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED OF LEGALLY.
19. THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN ALL NECESSARY EROSION CONTROL MEASURES WHETHER OR NOT SHOWN ON THE PLANS TO PROTECT ADJACENT CREEKS, RIVERS, ROADWAYS, ETC. FROM SILTATION AND EROSION.
20. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND SHALL INSTALL TRAFFIC SAFETY MEASURES IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AT NO ADDITIONAL COST TO THE OWNER.
21. PRESENCE OF OWNERS' REPRESENTATIVE AT WORK SITE DOES NOT LESSEN THE CONTRACTOR RESPONSIBILITY FOR CONFORMING TO APPROVED CONSTRUCTION PLANS AND/OR SPECIFICATIONS. SHOULD THE ENGINEER OR INSPECTOR ACCEPT MATERIALS OR WORK THAT DOES NOT CONFORM WITH APPROVED PLANS OR SPECIFICATIONS, WHETHER FROM LACK OF DISCOVERY OR FOR ANY OTHER REASON, SHALL IN NO WAY PREVENT LATER REJECTION OR CORRECTIONS TO MATERIALS OR WORK WHEN DISCOVERED. CONTRACTOR TO HAVE NO CLAIM FOR LOSSES SUFFERED DUE TO ANY NECESSARY REMOVALS OR REPAIRS RESULTING FROM UNSATISFACTORY WORK. ANY WORK THAT HAS BEEN COVERED WITHOUT INSPECTOR APPROVAL SHALL BE UNCOVERED AND BE MADE AVAILABLE FOR OBSERVATION AT CONTRACTOR EXPENSE.
22. CONTRACTOR SHALL PROVIDE PROPER OIL POLLUTION PREVENTION MEASURES TO MINIMIZE THE IMPACT OF DIESEL FUEL TO THE ENVIRONMENT AT NO ADDITIONAL COST TO THE OWNER. MEASURES SHALL BE IN ACCORDANCE WITH STATE AND LOCAL LAWS.
23. CONTRACTOR TO RESTORE ALL DISTURBED DRIVEWAYS/ROADS TO ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER. ALL DRIVEWAYS SHALL BE REPAIRED AS SOON AS CONSTRUCTION HAS PASSED. A MINIMUM OF 6" OF CABC SHALL BE USED FOR TEMPORARY REPAIR ON ASPHALT AND CONCRETE DRIVEWAYS UNTIL PERMANENT REPAIR CAN BE COMPLETED. AND A MINIMUM OF 6" OF CABC SHALL BE USED AS PERMANENT REPAIR ON GRAVEL DRIVEWAYS.
24. MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES AT ALL TIMES AND PROVIDE MINIMUM 48 HOUR NOTICES PRIOR TO DISTURBANCE OF ACCESS TO THE SITES. SECURE CONSTRUCTION SITE AT END OF WORK DAILY AND BACKFILL OR COVER EXCAVATIONS WITH STEEL PLATES SUITABLE FOR VEHICULAR TRAFFIC. MAINTAIN AND IMMEDIATELY RESTORE UTILITY SERVICES, TELEPHONE, NATURAL GAS OR INTERNET IF DAMAGED TO ADJACENT PROPERTIES.
25. POSITIVE DRAINAGE TO BE PROVIDED FOR ALL AREAS THROUGHOUT CONSTRUCTION.
26. THE CONTRACTOR SHALL INCLUDE IN THE COST OF THE PROPOSED UTILITIES, ALL SHEETING, SHORING, ROADWAY PLATING, PROTECTIVE PLATING, AND TEMPORARY AND/OR PERMANENT RESTORATION AS SHOWN IN THE CONTRACT DOCUMENTS.
27. PIPE TRENCHES TO BE NO STEEPER THAN 1:1 FROM EDGE OF EXISTING PAVEMENT.
28. COMPLETELY REMOVE UNSTABLE AND/OR ORGANIC MATERIAL ("MUCK") ENCOUNTERED IN TRENCHES OR IN ROADWAYS AND REPLACE WITH SUITABLE MATERIAL AND COMPACT AS SPECIFIED.
29. PROVIDE FOR AND MAINTAIN SAFETY MEASURES NECESSARY FOR PROTECTION OF ALL PERSONS ON WORK SITE AND FULLY COMPLY WITH ALL LAWS, REGULATIONS, AND BUILDING CODE REQUIREMENTS TO PREVENT ACCIDENT OR INJURY TO PERSONS ON OR ABOUT LOCATION OF WORK, INCLUDING ALL APPLICABLE PROVISIONS OF OSHA REGULATIONS. BARRICADE ALL WALKS, ROADS, AND AREAS TO KEEP PUBLIC AWAY FROM CONSTRUCTION. ALL TRENCHES, EXCAVATIONS, OR OTHER HAZARDS IN VICINITY OF WORK TO BE WELL BARRICADED, AND PROPERLY LIGHTED AT NIGHT.
30. DURING CONSTRUCTION IF CONCRETE THRUST BLOCKS ARE FOUND ALONG THE PROPOSED ALIGNMENT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF CONCRETE INTERFERING WITH THE PROPOSED ALIGNMENT.
31. HORIZONTAL DATUM IS NAD 83(2011).
32. VERTICAL DATUM IS NAVD 88.
33. FINAL CONNECTIONS OF PROPOSED WATER MAINS ARE TO BE MADE AFTER THE PROPOSED WATER MAIN PASSES PRESSURE TESTING AND BACTERIA TESTING, AND AFTER FINAL APPROVAL BY THE CITY OF LUMBERTON.

RELATION OF WATER MAINS TO NON-POTABLE WATER MAINS

1. FOR THE PURPOSES OF THIS RULE, SEWER SHALL MEAN ANY EXISTING OR PROPOSED GRAVITY OR FORCE MAIN USED TO CONVEY SANITARY OR INDUSTRIAL PROCESS WASTE.
2. LATERAL SEPARATION OF SEWERS AND WATER MAINS: WATER MAINS SHALL BE LAID AT LEAST 10 FEET LATERALLY FROM EXISTING OR PROPOSED SEWERS, UNLESS LOCAL CONDITIONS OR BARRIER PREVENT 10-FOOT LATERAL SEPARATION, IN WHICH CASE:
 - A. THE WATER MAIN SHALL BE LAID IN SEPARATE TRENCH, WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER; OR
 - B. THE WATER MAIN SHALL BE LAID IN THE SAME TRENCH AS THE SEWER, WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
3. CROSSINGS: A WATER MAIN THAT CROSSES A SEWER SHALL BE LAID A MINIMUM VERTICAL DISTANCE OF 18 INCHES FROM THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER, EITHER ABOVE OR BELOW THE SEWER, WITH PREFERENCES TO THE WATER MAIN LOCATED ABOVE THE SEWER. ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
4. WATER MAINS AND STORM SEWER PIPES: PIPES CARRYING STORM DRAINAGE SHALL BE SEPARATED FROM WATER MAINS IN ACCORDANCE WITH SECTION 3 OF THIS RULE, 12 INCHES.
5. WATER MAINS AND RECLAIMED WATER DISTRIBUTION LINES: WATER MAINS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM OR AT LEAST 18 INCHES ABOVE WATER PIPES CARRYING TREATED AND DISINFECTED WASTEWATER IN RECLAIMED WATER DISTRIBUTION LINES. CROSSINGS SHALL BE MADE IN ACCORDANCE WITH SECTION 3 OF THIS RULE.
6. SPECIAL CONDITIONS: IF AN ENGINEER DEMONSTRATES IT IS IMPRACTICABLE TO MAINTAIN THE SEPARATION DISTANCES REQUIRED BY THIS RULE, TAKING INTO CONSIDERATION FEASIBILITY, COST, AND THE FACTORS SET FORTH IN THIS PARAGRAPH, THE DEVIATION MAY BE APPROVED ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA AND ALTERNATIVE CONSTRUCTION CRITERIA PROVIDED BY THE DESIGN ENGINEER. DATA AND ALTERNATIVE CONSTRUCTION CRITERIA SUBMITTED BY THE DESIGN ENGINEER TO JUSTIFY THE DEVIATION MUST DESCRIBE:
 - A. 1) THE RATIONALE FOR DETERMINING THAT SEPARATION CRITERIA DESCRIBED IN THIS RULE ARE IMPRACTICABLE;
 - B. 2) THE EXTENT OF THE DEVIATION FROM SEPARATION CRITERIA IN THIS RULE;
 - C. 3) A CONSIDERATION OF PIPE MATERIALS, PRESSURE RATINGS, TYPE OF JOINTS FOR WATER MAIN AND NON-POTABLE WATER MAIN, AND SOIL CONDITIONS;
 - D. 4) THE ABILITY TO PROVIDE ADEQUATE WORK SPACE TO REPAIR OR REPLACE PIPE SEGMENTS OR OTHER UTILITY INFRASTRUCTURE WITHOUT CAUSING DAMAGE TO OR OTHERWISE COMPROMISING THE INTEGRITY OF PIPES; AND
 - E. 5) THE RATIONALE FOR DETERMINING THAT THE DEVIATION WILL NOT RESULT IN UNREASONABLE RISK TO PUBLIC HEALTH.



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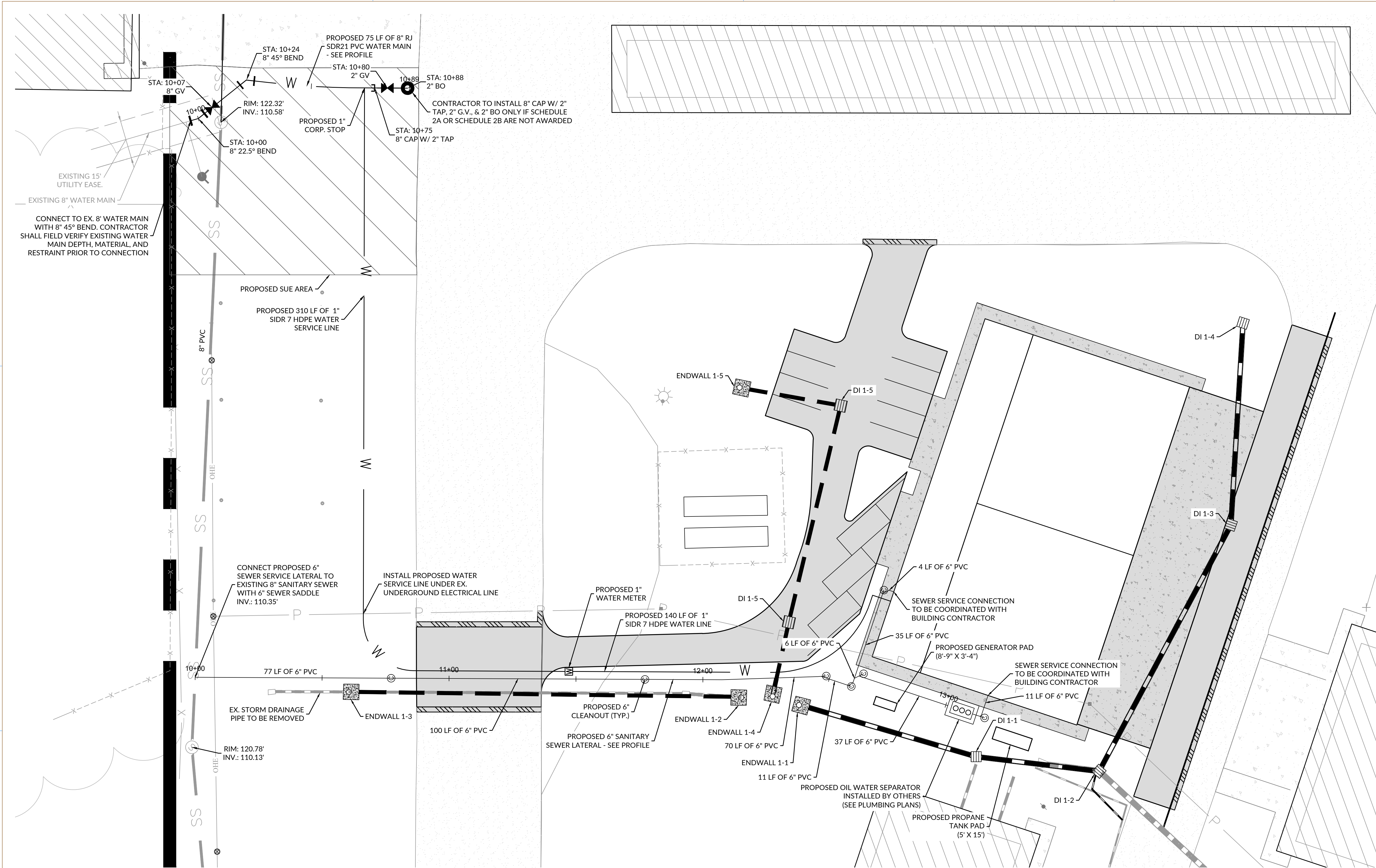
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DATE: JANUARY 2024
PROJECT NUMBER: 3105-2401
SHEET TITLE:

UTILITY NOTES

SHEET NUMBER

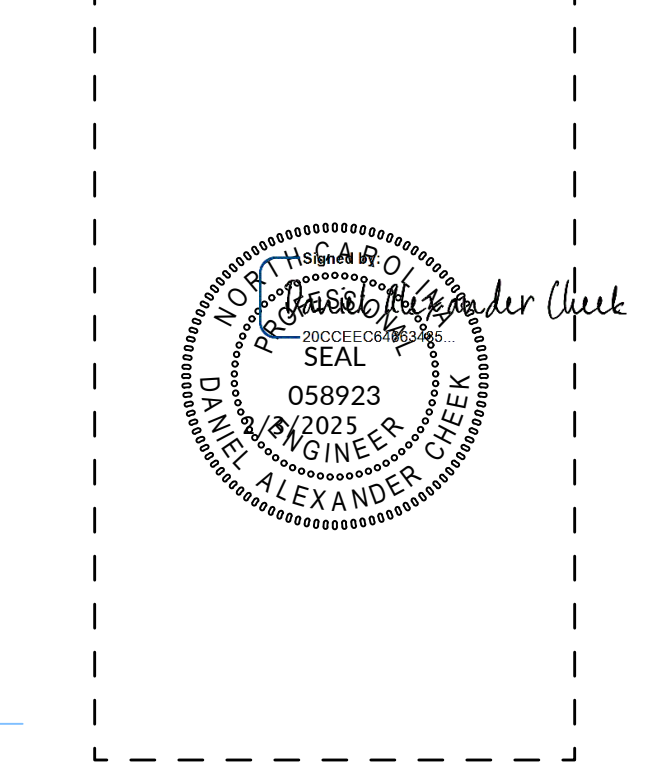
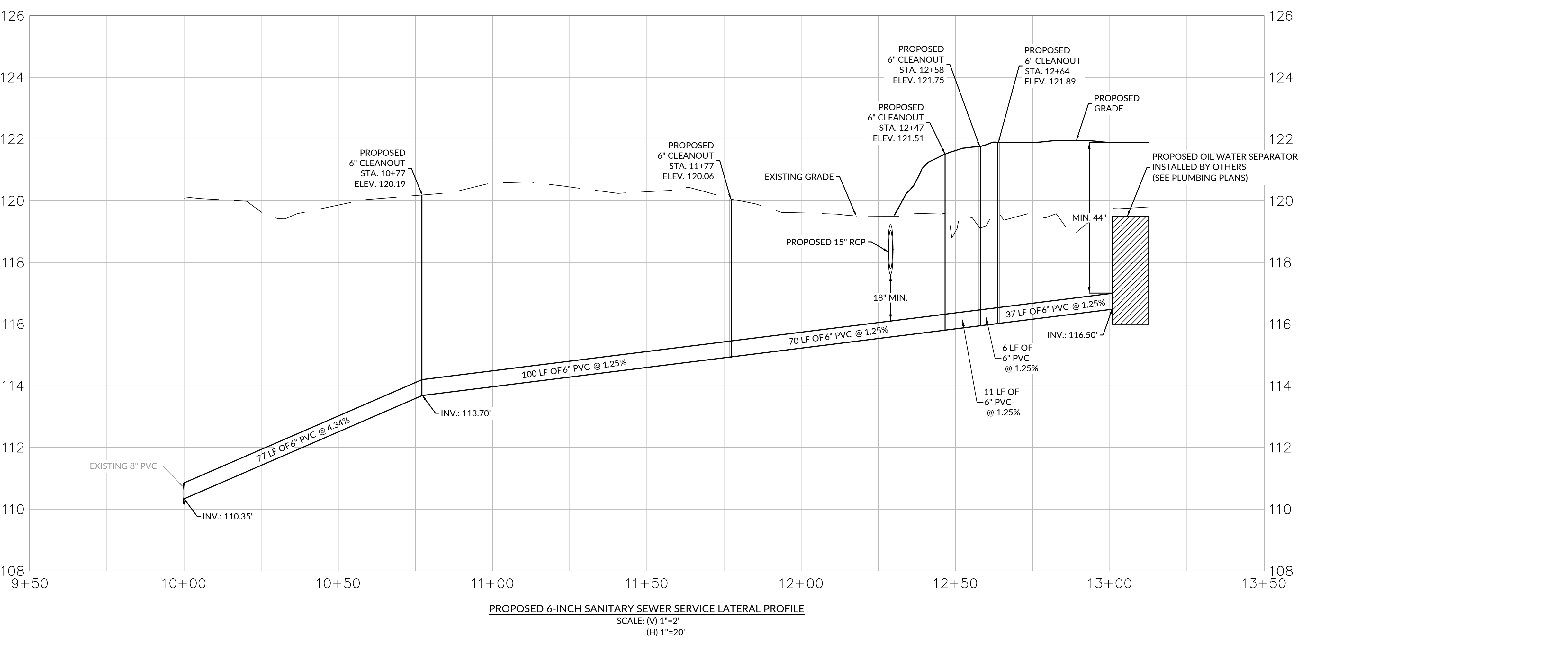
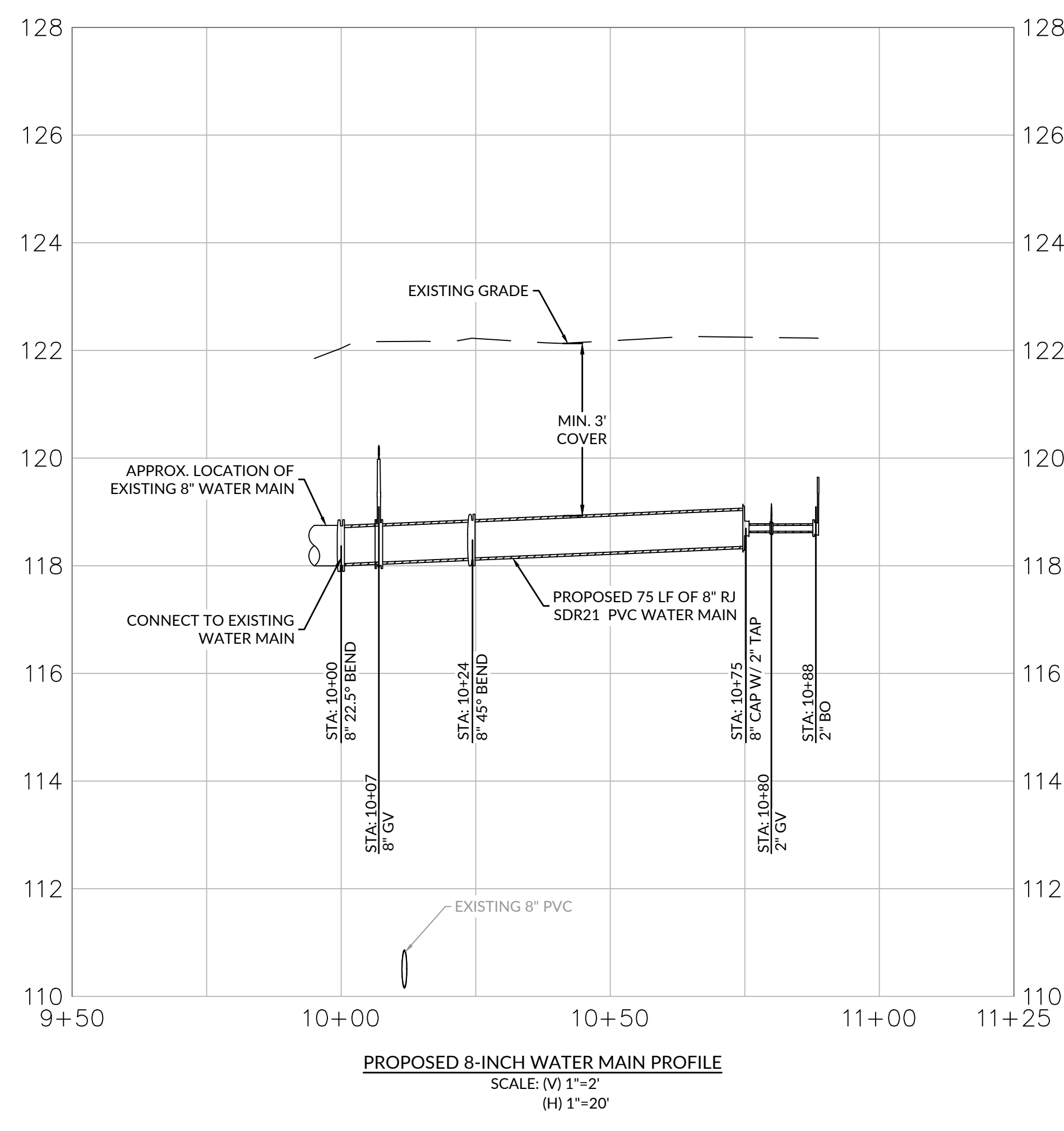
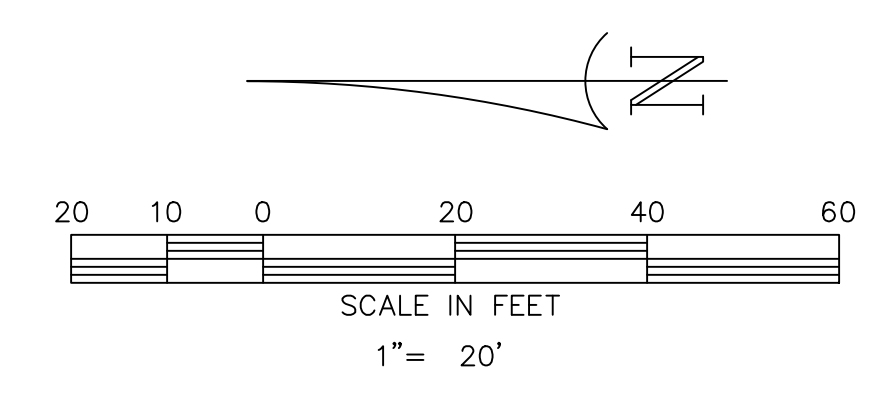
CA-160



LEGEND

- W — PROPOSED WATER
- SS — PROPOSED SANITARY SEWER SERVICE LATERAL
- ⊞ PROPOSED WATER METER
- ⊞ PROPOSED VALVE
- ⊞ PROPOSED CAP
- ⊞ PROPOSED BLOW OFF
- PROPOSED SANITARY SEWER SERVICE LATERAL
- ⊞ PROPOSED CLEANOUT
- ▨ PROPOSED ASPHALTIC PAVEMENT
- ▨ PROPOSED CONCRETE PAVEMENT
- ▨ PROPOSED CONCRETE SIDEWALK PAVEMENT
- ▨ EXISTING AIRPORT BUILDINGS
- ▨ EXISTING CONCRETE PAVEMENT
- ▨ EXISTING BITUMINOUS PAVEMENT
- x — EXISTING FENCE
- SS — EXISTING STORM SEWER
- SS — EXISTING SANITARY SEWER
- W — EXISTING WATER LINE
- OHE — EXISTING OVERHEAD ELECTRICAL LINE
- P — EXISTING UNDERGROUND ELECTRICAL LINE
- ⊞ EXISTING STORM SEWER DROP INLET
- PROPOSED STORM SEWER
- ⊞ PROPOSED STORM SEWER DROP INLET
- ▭ SUE INVESTIGATION LIMITS

- GENERAL NOTES:**
- FOR SEQUENCE OF CONSTRUCTION AND PHASING, SEE GA-100 SERIES DRAWINGS.
 - SCHEDULE 1 WORK SHALL ONLY BE COMPLETED IF AWARDED.
 - CONTROL POINTS AND BENCHMARKS ARE SHOWN ON SHEET VA-101.
 - SEE SHEET CA-101 FOR EXISTING CONDITIONS AND REMOVAL ITEMS.
 - SEE CA-120 SERIES FOR SITE GRADING.
 - SEE CA-140 SERIES FOR SEDIMENTATION & EROSION CONTROL PLAN.
 - CONTRACTOR WILL BE RESPONSIBLE FOR PERFORMING AN SUE INVESTIGATION WHERE DENOTED ON THE PLANS TO LOCATE WATER LINE, VALVES, END CAPS, AND PIPE DEPTH, SIDE, MATERIAL.



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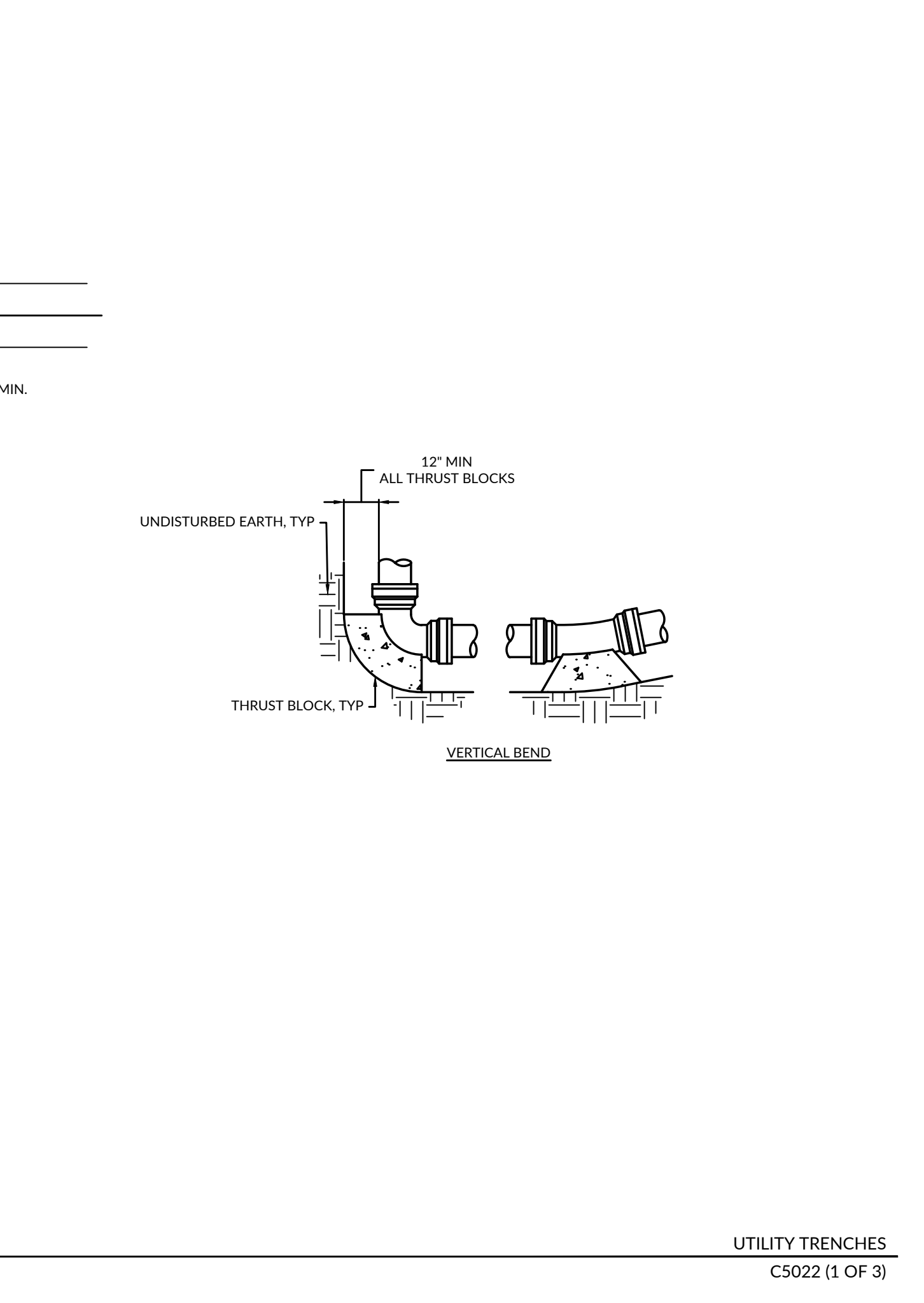
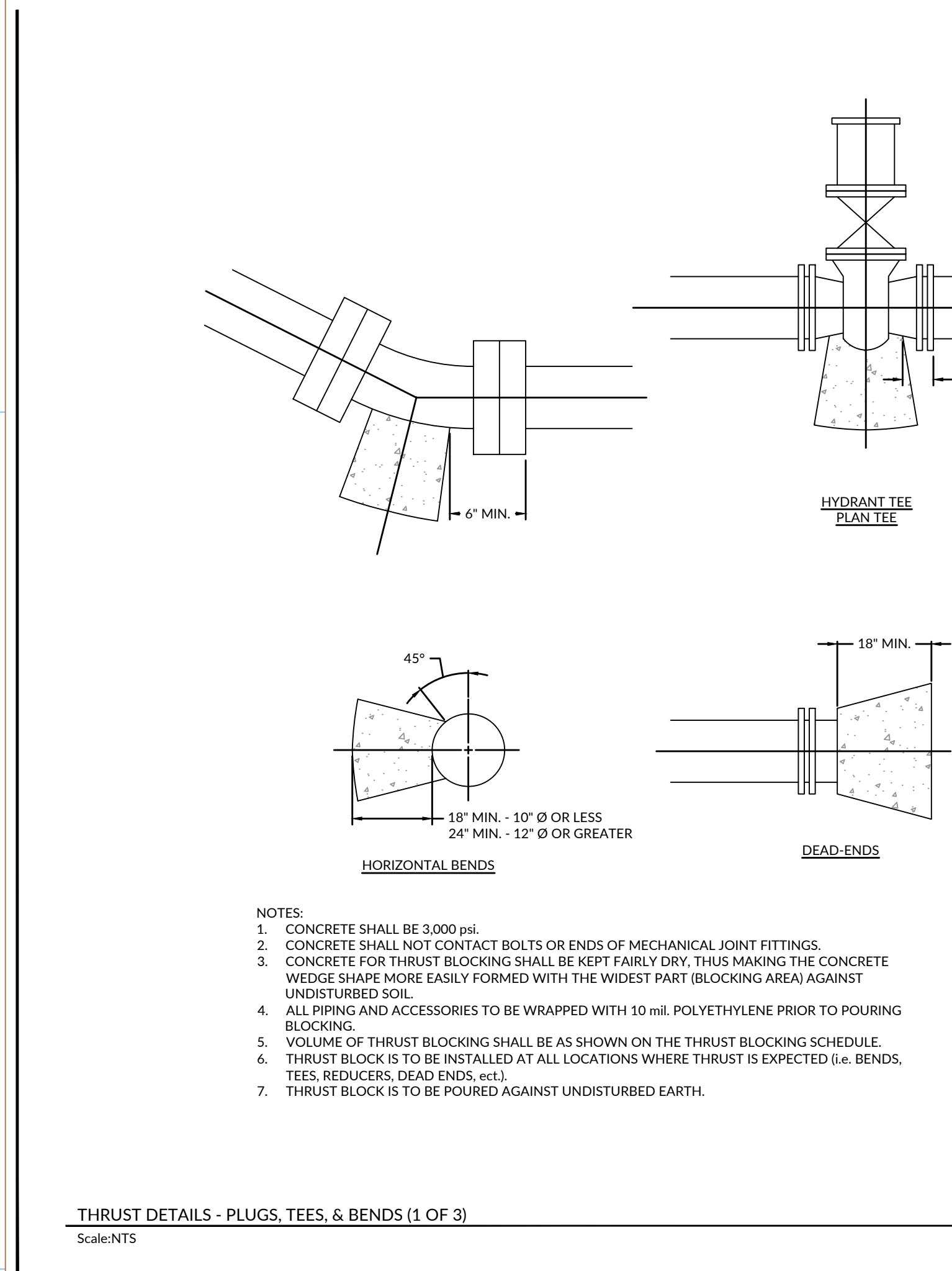
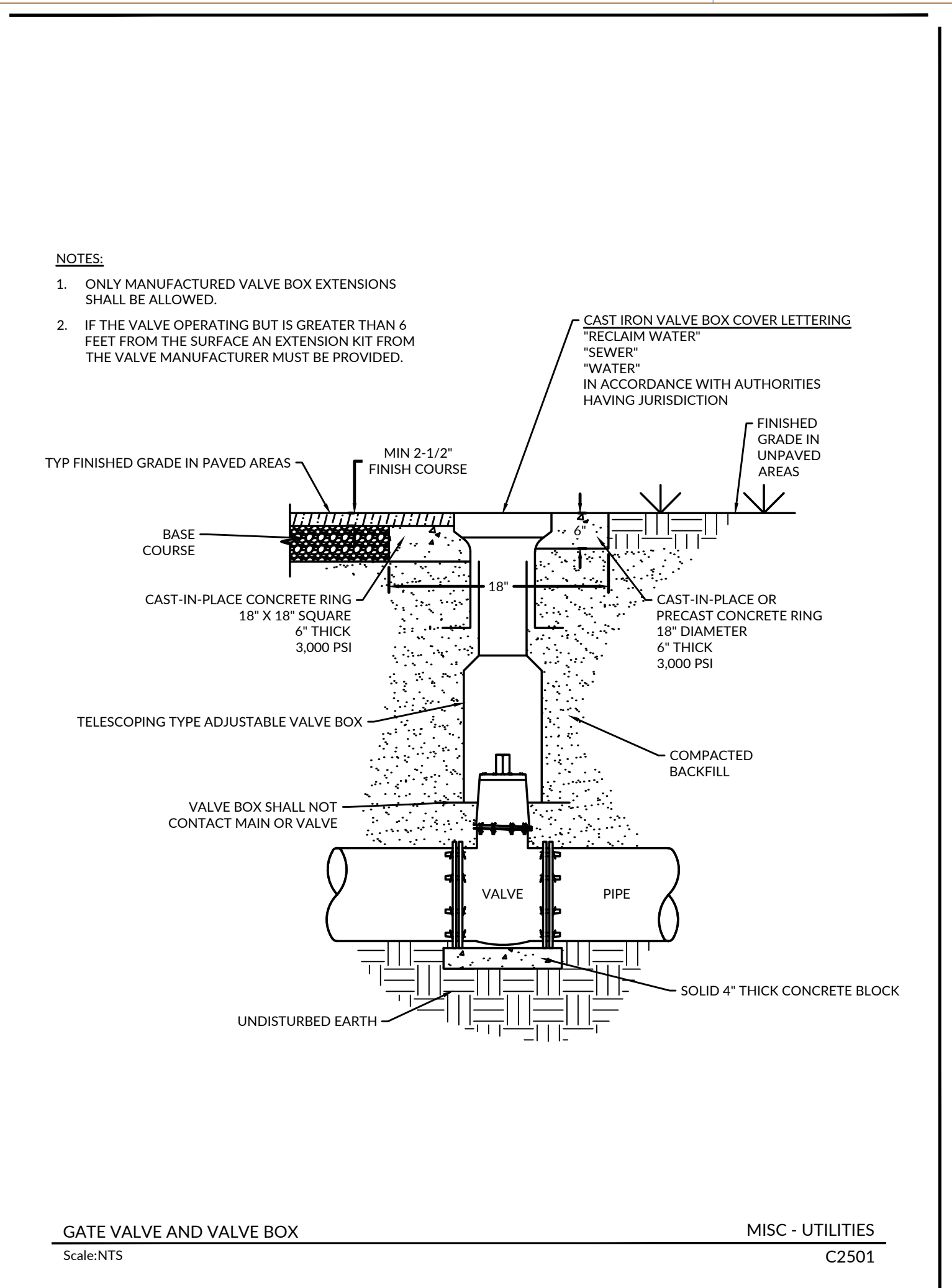
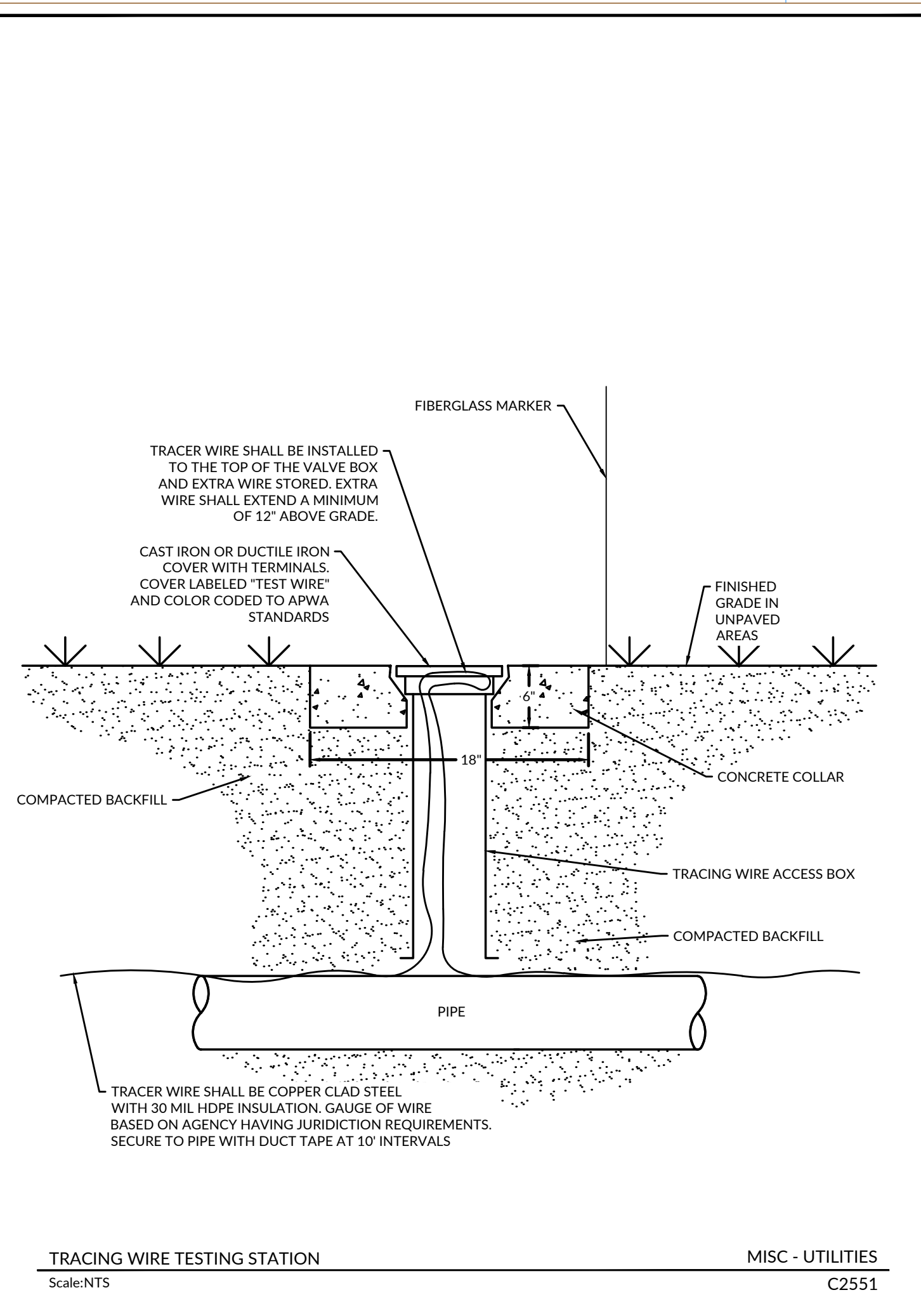
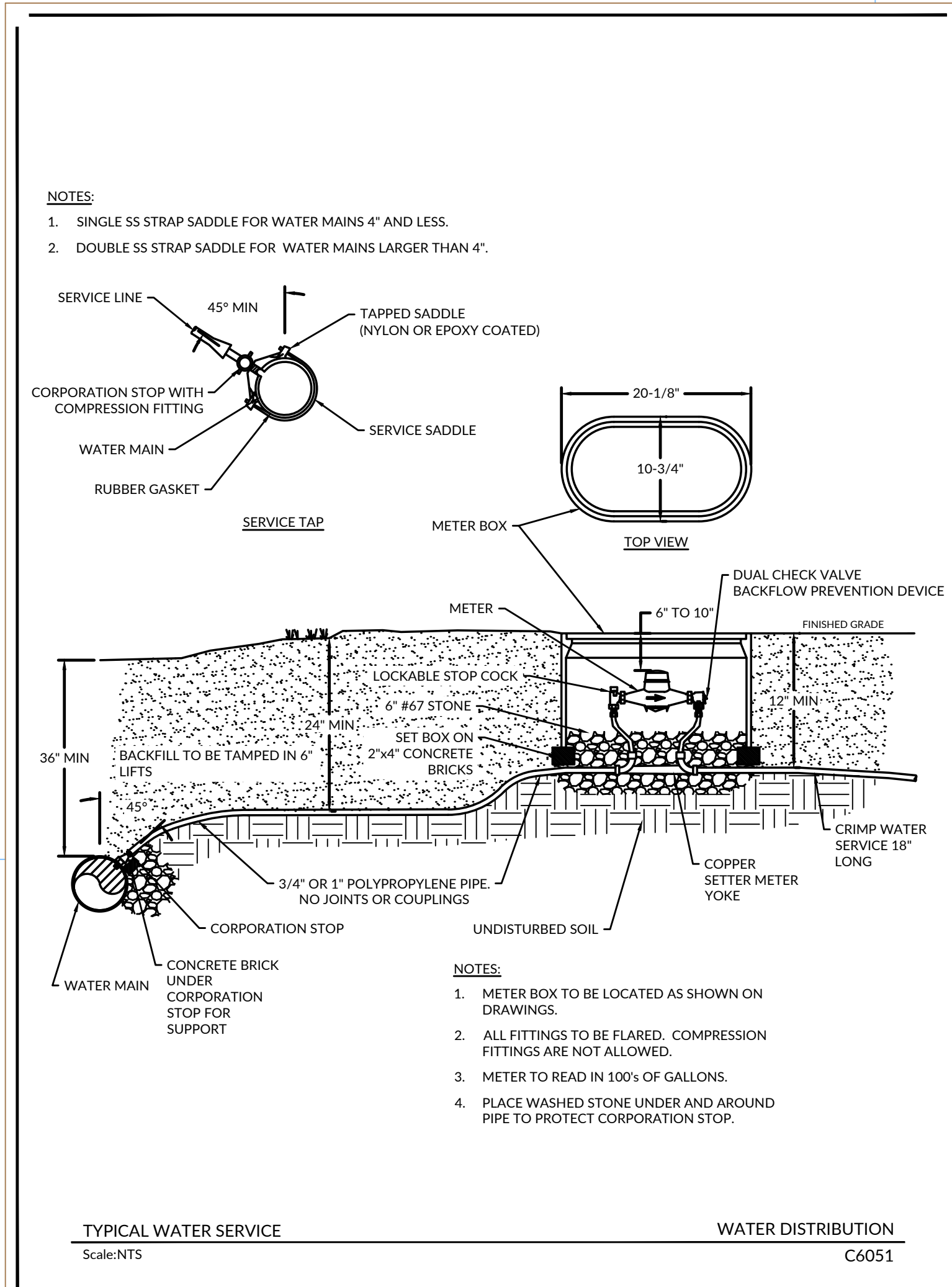
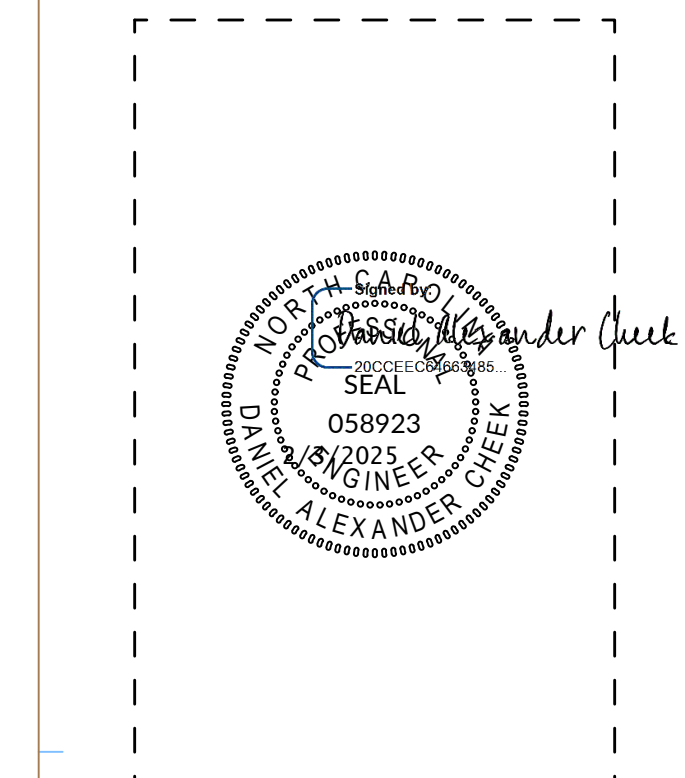
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REVISIONS
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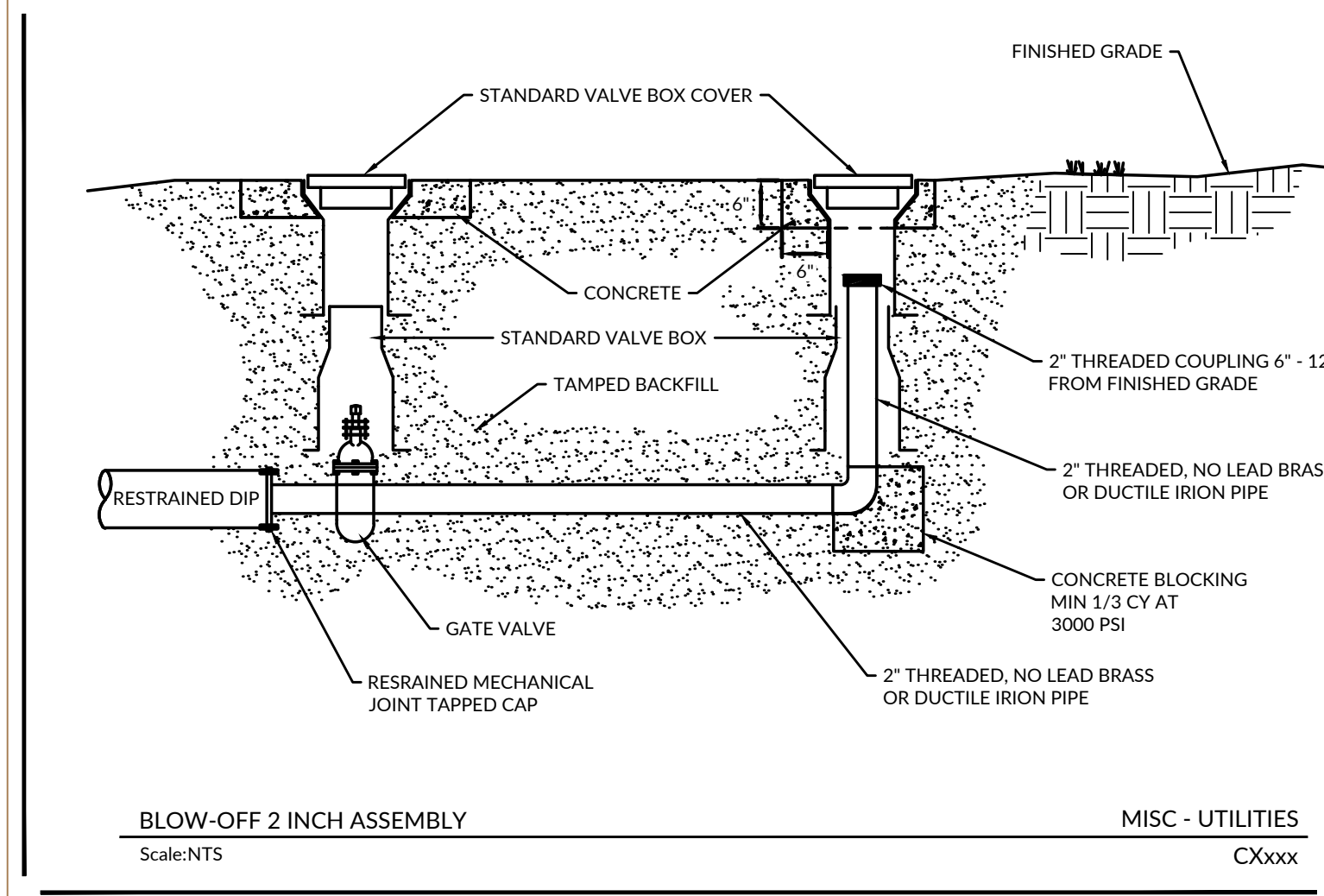
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PROJECT NUMBER: 3105-2401
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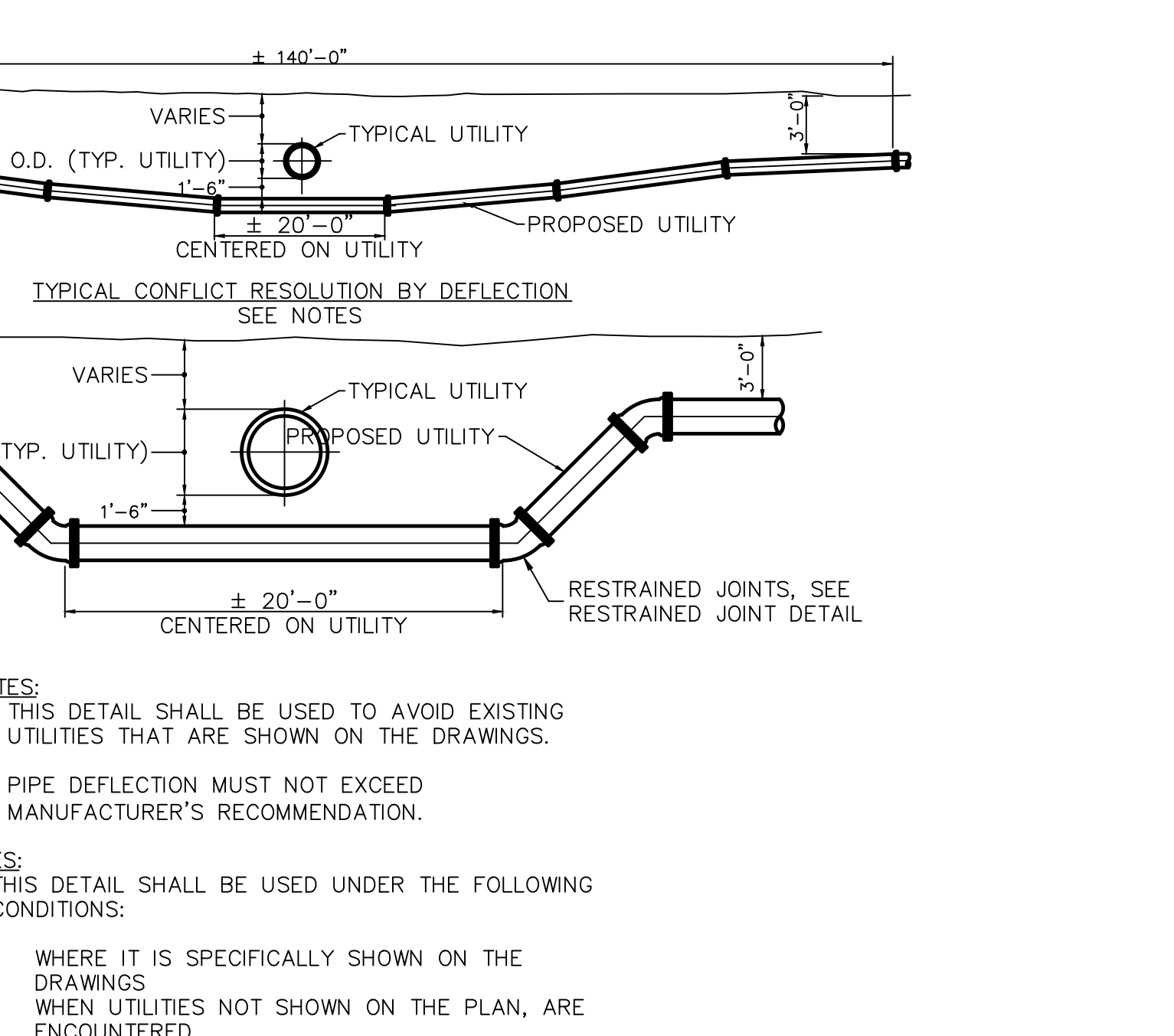
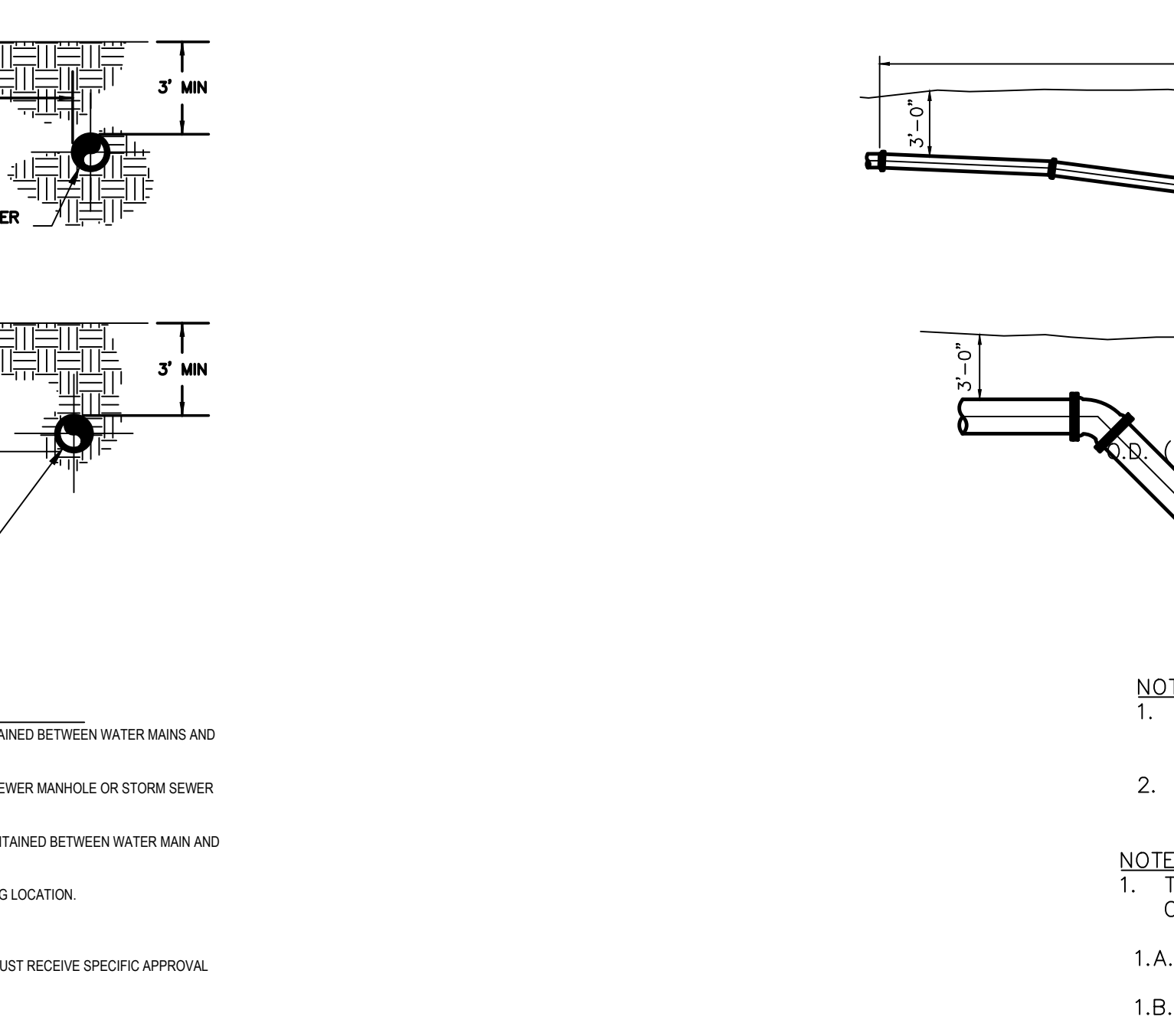
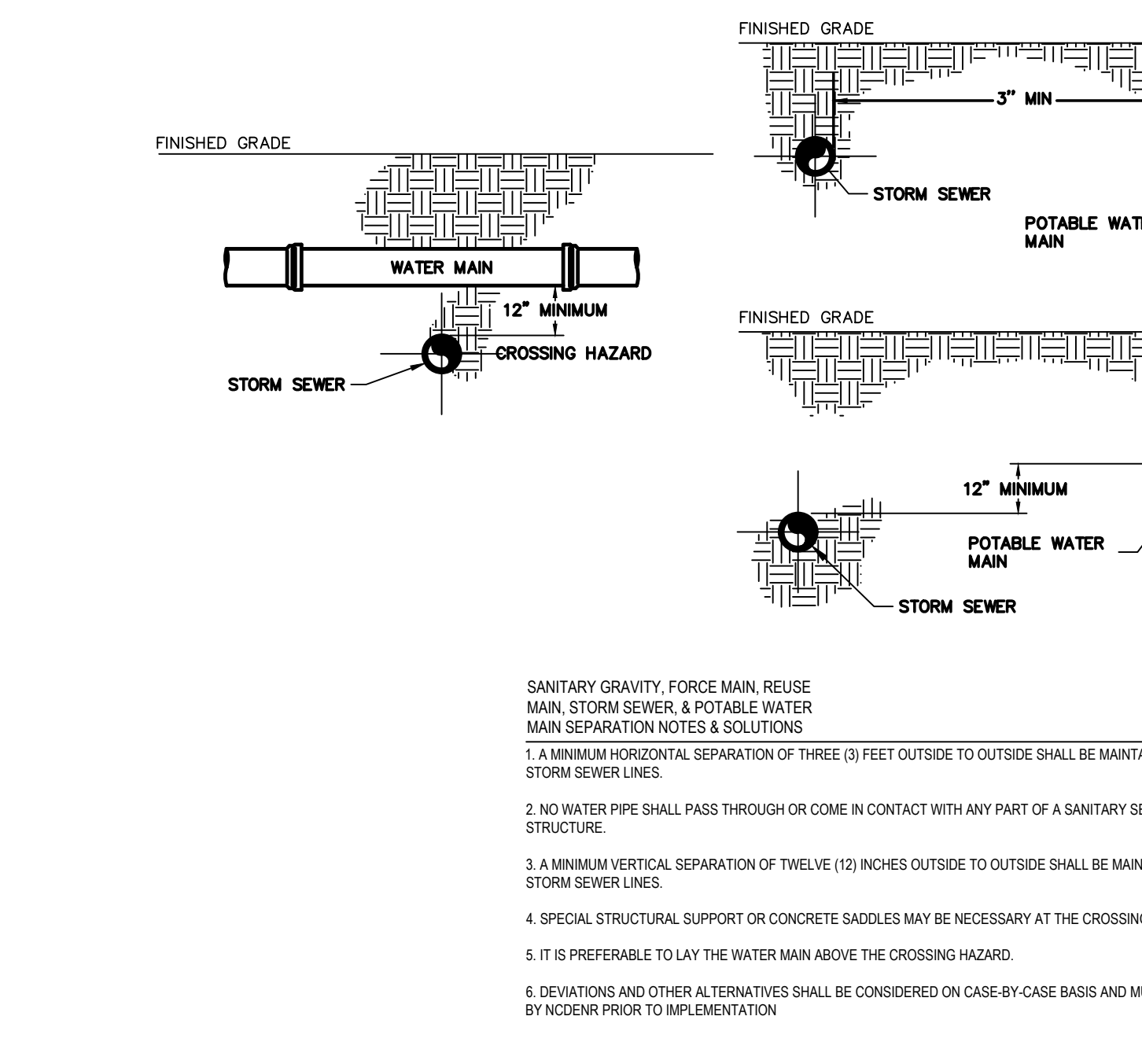
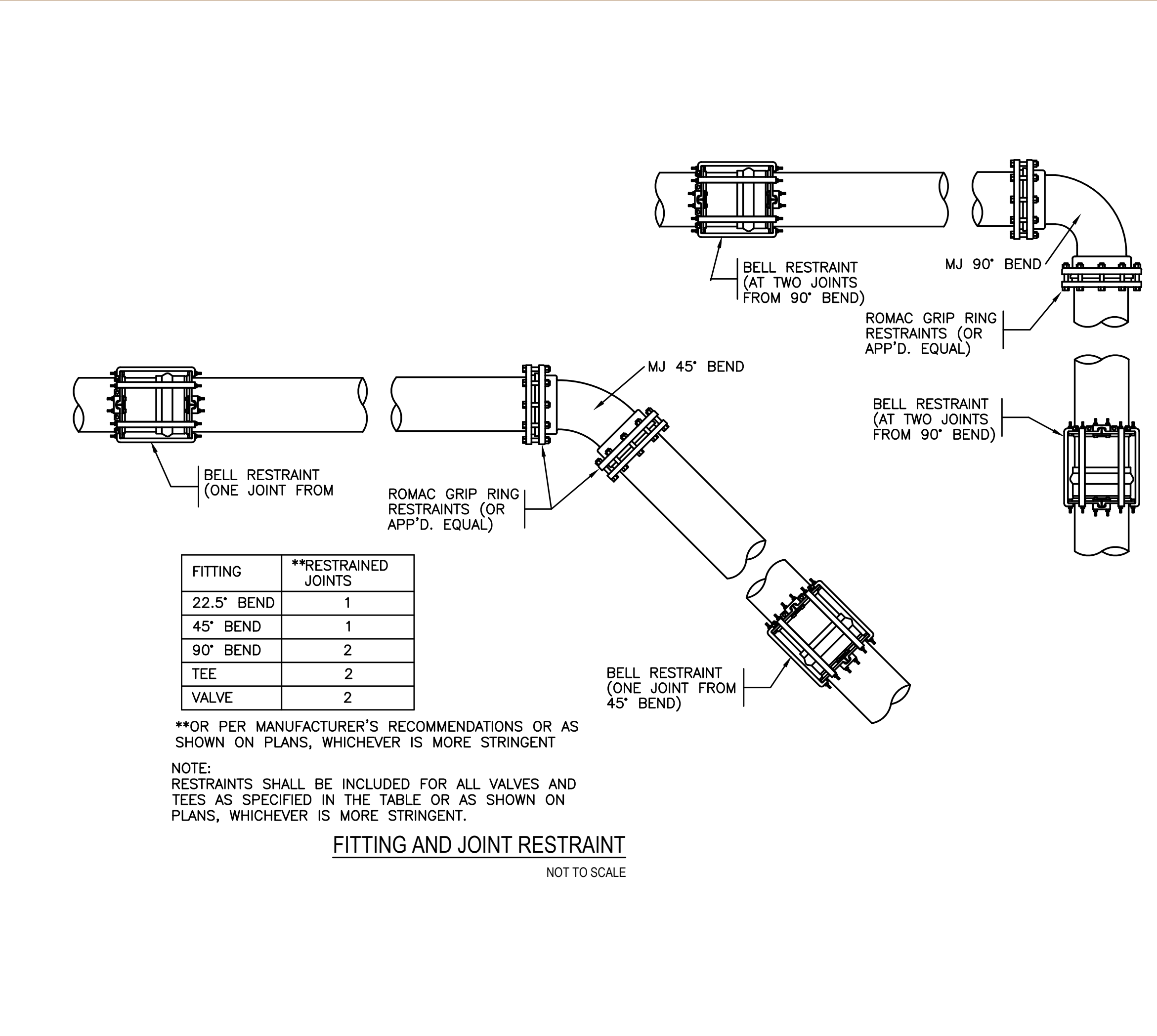
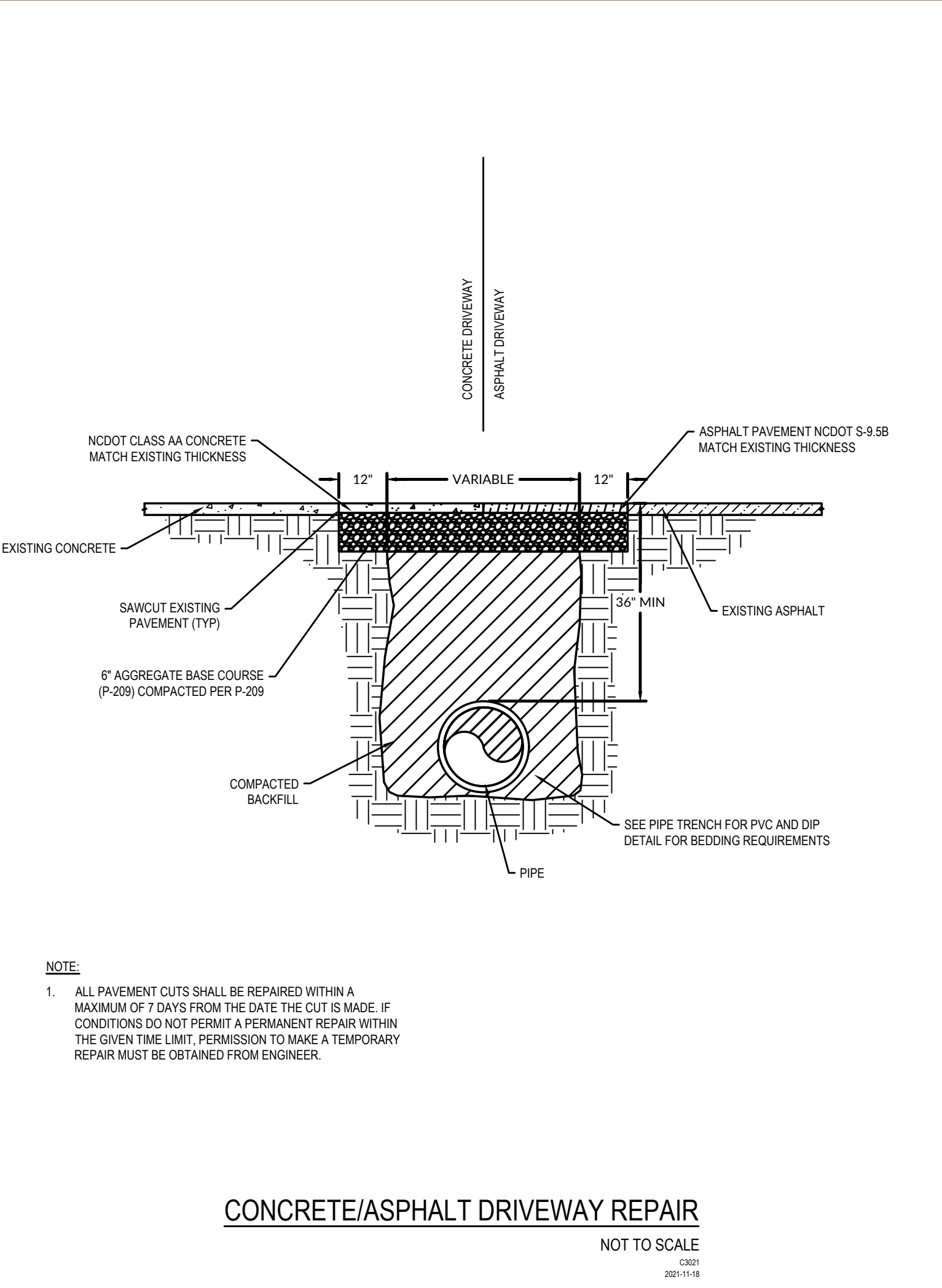
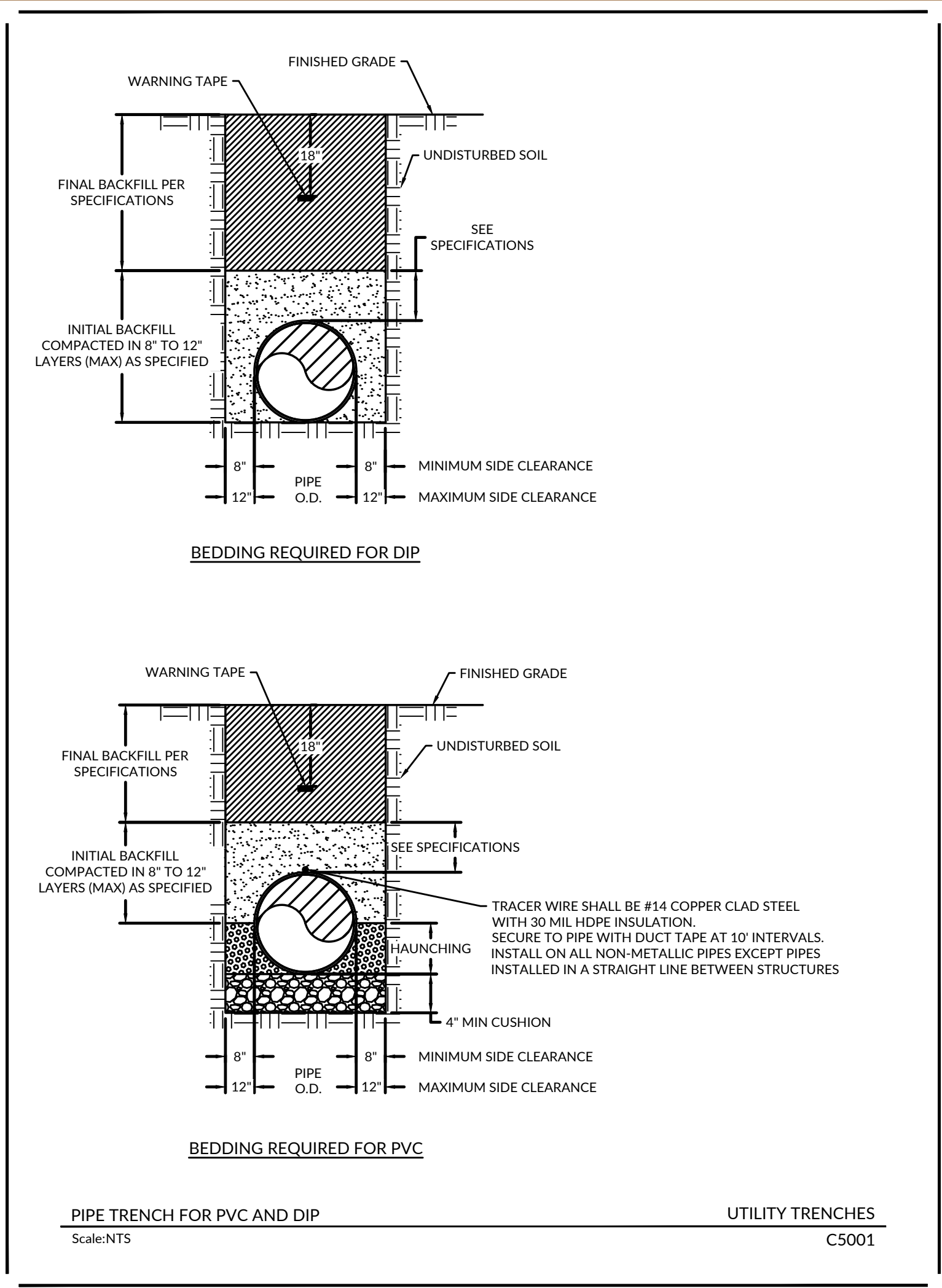
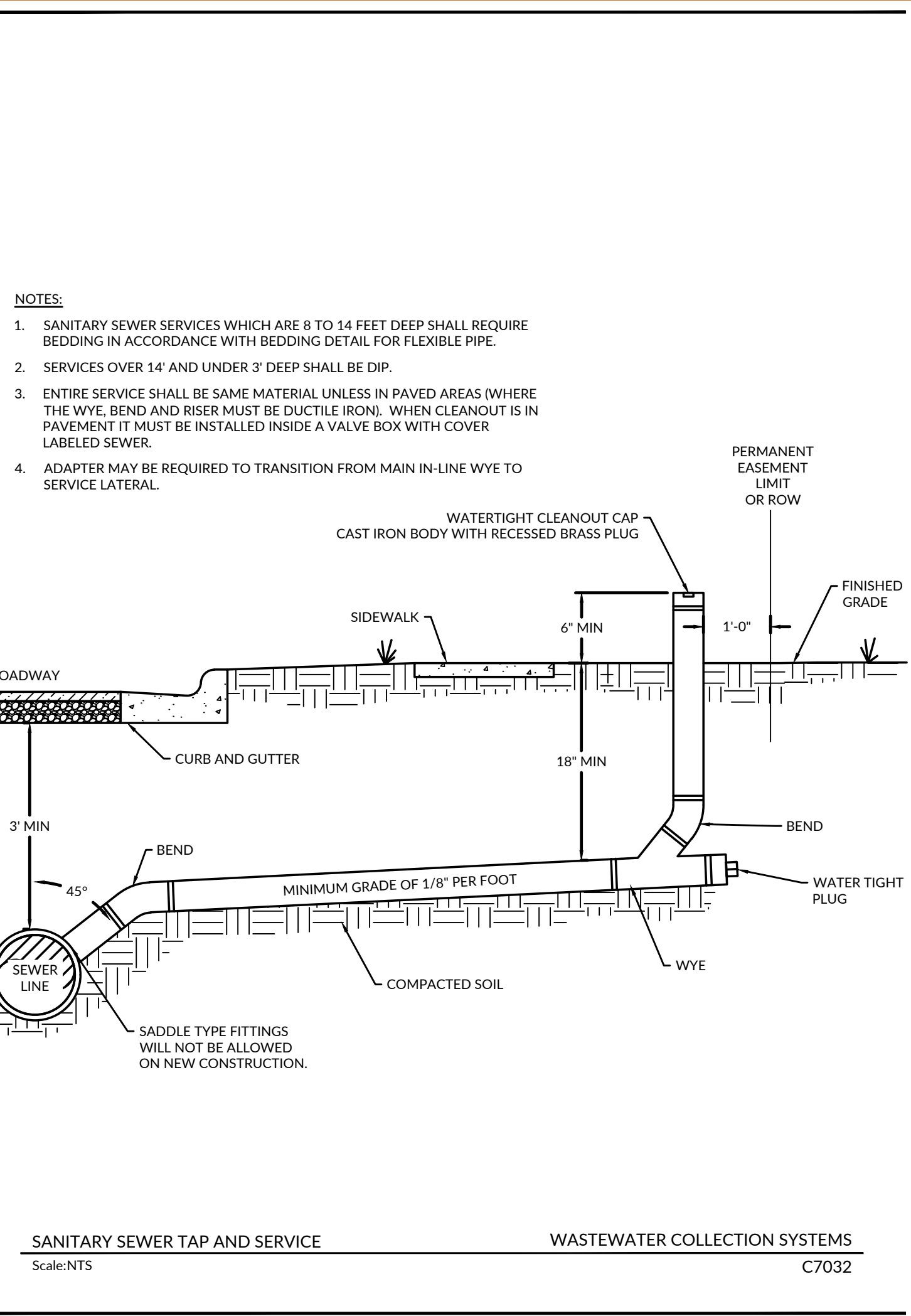
UTILITY PLAN (SCHEDULE 1)



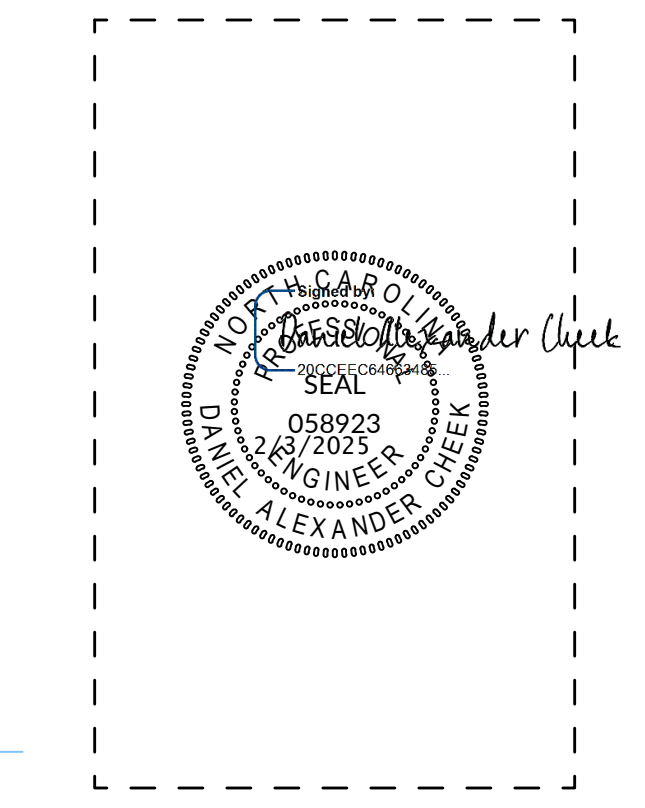
Test Pressure	Factor of Safety	Pipe Size	Bend Thrust Block Bearing Areas									
			200 psi		Soil Bearing Capacity							
			Quicksand Very Poor	Gravel/Coarse Sand	Soft Clay	Sand Clean Dry	Moderately Dry Clay	Dry Clay Always Dry	Rock Poor			
11.25	1.5	1.5 in	49 lbs	0.10 sf	0.06 sf	0.05 sf	0.02 sf	0.02 sf	0.01 sf	0.01 sf	0.01 sf	0.01 sf

Test Pressure	Factor of Safety	Branch Size	Plug, Tee, & Wye Thrust Block Bearing Areas							
			Soil Bearing Capacity							
			Quicksand Very Poor	Gravel/Coarse Sand	Soft Clay	Sand Clean Dry	Moderately Dry Clay	Dry Clay Always Dry	Rock Poor	
11.25	1.5	1.5 in	353 lbs	0.53 sf	0.33 sf	0.26 sf	0.13 sf	0.09 sf	0.07 sf	0.05 sf





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2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358



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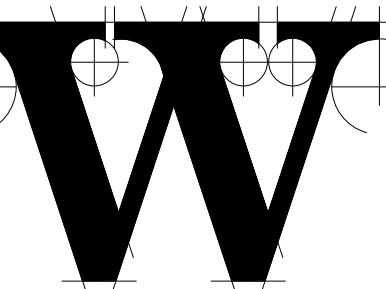
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1 - ADDENDUM #1

DATE: JANUARY 2024
PROJECT NUMBER: 3105-2401
SHEET TITLE:

UTILITY DETAILS
(SHEET 2 OF 2)

SHEET NUMBER
CA-561



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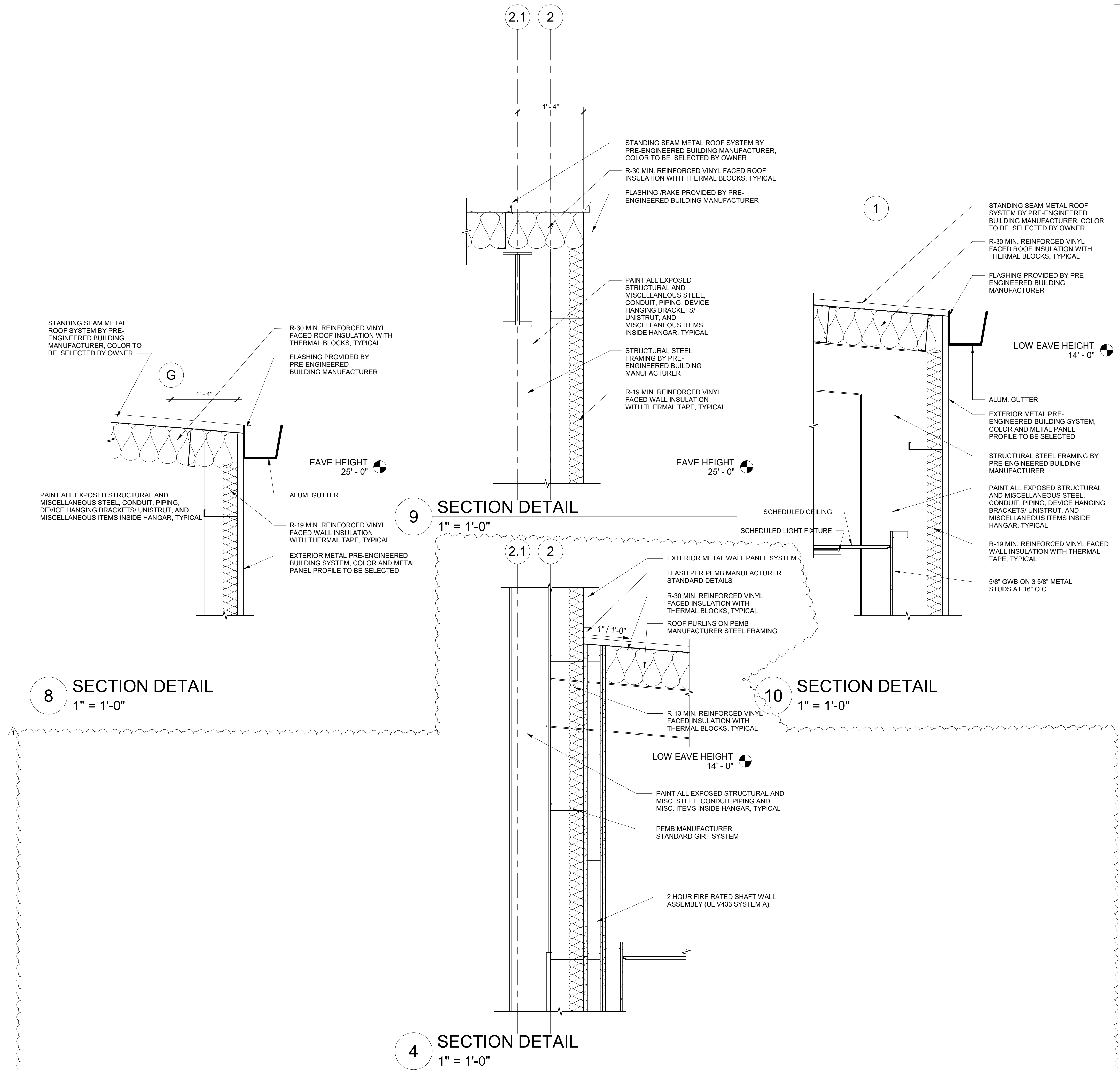
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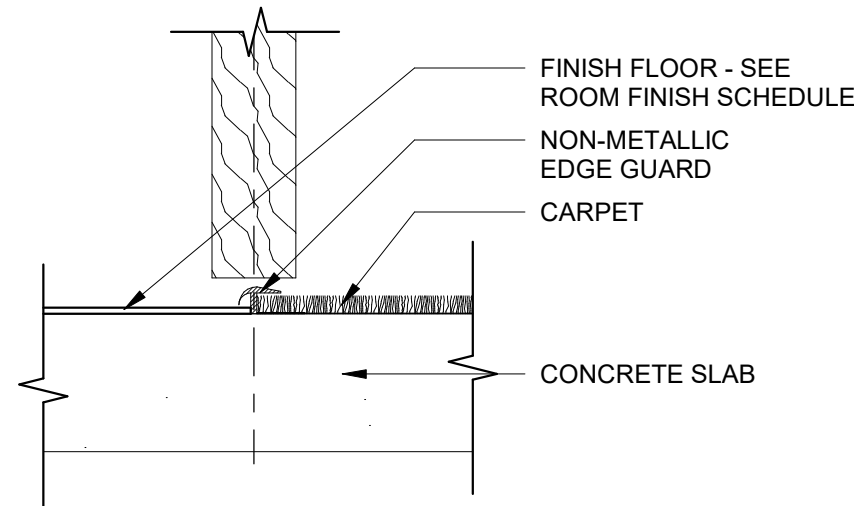
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DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

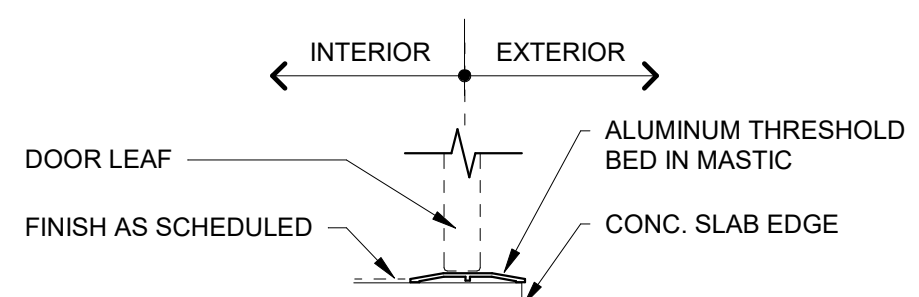
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DETAILS**

SHEET NUMBER
A-321

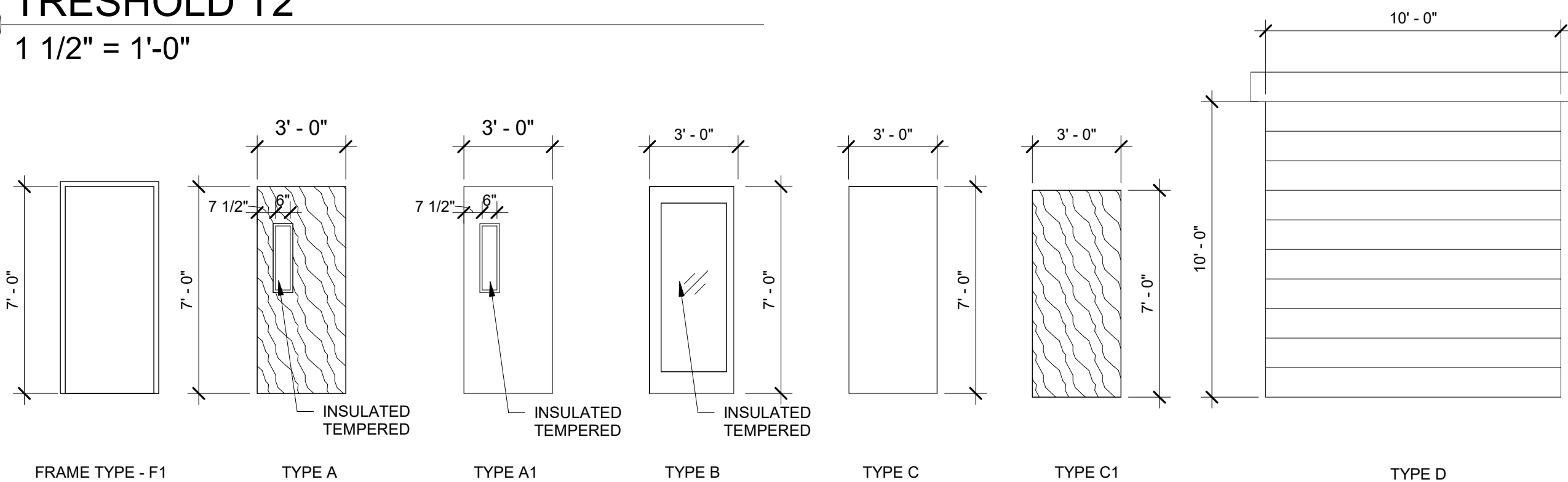




17 THRESHOLD T1
3" = 1'-0"



16 THRESHOLD T2
1 1/2" = 1'-0"



GLAZING LEGEND AND NOTES

G1	INSULATED LOW E GLAZING - CLEAR
G2	INSULATED LOW E FULLY TEMPERED GLAZING - CLEAR
G3	GLAZING - CLEAR
G4	TEMPERED GLAZING - CLEAR
G5	SPANDREL GLASS

NOTES:
 1. ALL DIMENSIONS ARE NOMINAL OF ROUGH OPENING AND ARE THE OVERALL SIZE. VERIFY IN FIELD PRIOR TO FABRICATION.
 2. SEE WINDOW ELEVATIONS FOR GLAZING TYPE(S).
 3. SEE WINDOW ELEVATIONS FOR DIMENSIONS/ LOCATIONS OF MULLIONS.
 4. ALL EXTERIOR WINDOWS ARE TO RECEIVE WINDOW ROLLER SHADES AS SPECIFIED UNLESS NOTED OTHERWISE.
 5. ALL GLAZING IN RESTROOM LOCATIONS SHALL BE FULLY TEMPERED (G2).
 6. SEE PLANS FOR FROSTED GLASS LOCATIONS (I.E. RESTROOMS).

DOOR SECURITY NOTES:
 1. ALL EXTERIOR DOOR FRAMES ARE TO BE MINIMUM 16 GA.
 2. ALL EXTERIOR HM DOORS ARE TO BE STEEL- 16 GA. MINIMUM.
 3. EXTERIOR LOCKSETS ARE TO BE GRADE 1 COMMERCIAL LOCKSETS WITH 3/4" LATCH THROW.
 4. EXTERIOR DOORS TO BE EQUIPPED WITH A LATCH PROTECTOR.

DOOR SCHEDULE

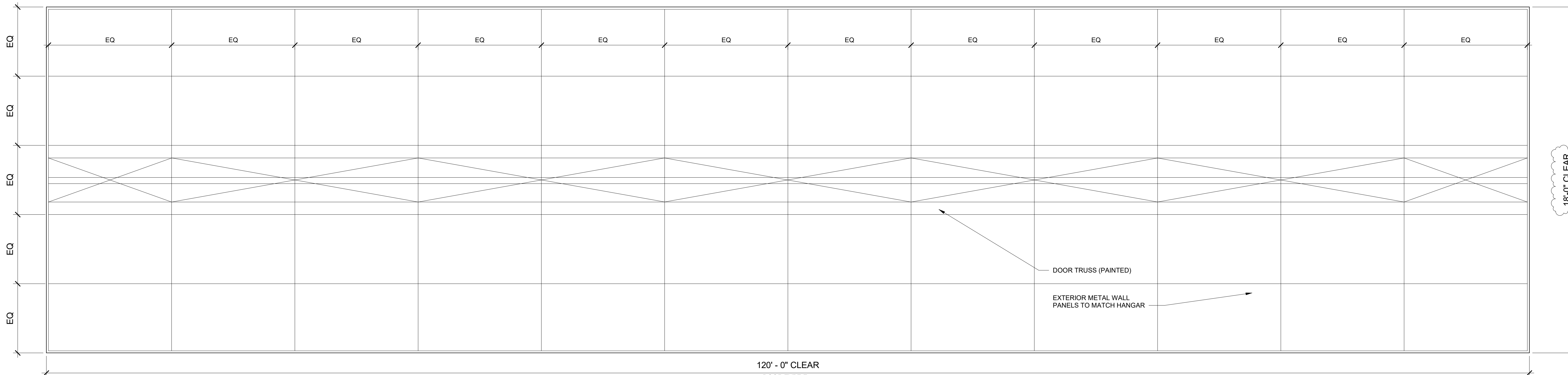
DOOR NUMBER	ROOM NAME	ROOM NUMBER	DOOR					FRAME			DETAILS			FIRE RATING	HARDWARE SET	COMMENTS		
			DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HEAD	JAMB				THRESHOLD	
101A				6'-0"	18'-0"	1 3/4"												
101B	HANGAR BAY 1	101		3'-0"	7'-0"	2"	HM	PAINT	F1	HM	PAINT	H3	J3		2 HR		DOOR DIMENSIONS ARE CLEAR DIMENSIONS	
101C	HANGAR BAY 1	101		3'-0"	7'-0"	2"	HM	PAINT	F1	HM	PAINT	H3	J3		2 HR			
101D	HANGAR BAY 1	101		8'-6"	10'-0"	1 3/4"	*	FACTORY	*	*	*	*	*		2 HR		*FIRE SHUTTER TIED INTO ALARM SYSTEM	
105A	ENTRY	105		3'-0"	8'-0"	2"	ALUM.	*	STOREFRONT	ALUM.	*	*	*	SEE MANUF.	SEE MANUF.	9a/A-602		*FACTORY FINISH
105B	CORRIDOR	105		3'-0"	7'-0"	2"	HM	PAINT	F1	HM	PAINT	H2	J2					
106B	CORRIDOR	106		6'-0"	8'-0"	2"	ALUM.	*	STOREFRONT	ALUM.	*	*	*	SEE MANUF.	SEE MANUF.	9a/A-602		*FACTORY FINISH
106A	ELEC	106		3'-0"	7'-0"	1 3/4"	HM	PAINT	F1	HM	PAINT	H1	J1		2 HR			
109A	RESTROOM	109		3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR			
121A	HANGAR BAY 2	121		3'-0"	7'-0"	1 3/4"	HM	PAINT	F1	HM	PAINT	H3	J3		0 HR		DOOR DIMENSIONS ARE CLEAR DIMENSIONS	
121C	HANGAR BAY 2	121		3'-0"	7'-0"	1 3/4"	HM	PAINT	F1	HM	PAINT	H3	J3		0 HR			
121D	CORRIDOR	126		8'-6"	10'-0"	1 3/4"	*	FACTORY	*	*	*	*	*		2 HR			
125A	ENTRY	125		3'-0"	8'-0"	2"	ALUM.	*	STOREFRONT	ALUM.	*	*	*	SEE MANUF.	SEE MANUF.	9a/A-602		*FACTORY FINISH
126A	CORRIDOR	126		3'-0"	7'-0"	1 3/4"	HM	PAINT	F1	HM	PAINT	H2	J2					
126B	CORRIDOR	126		6'-0"	8'-0"	2"	ALUM.	*	STOREFRONT	ALUM.	*	*	*	SEE MANUF.	SEE MANUF.	9a/A-602		*FACTORY FINISH
129A	RESTROOM	129		3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR			

DOOR SCHEDULE - ALT-01

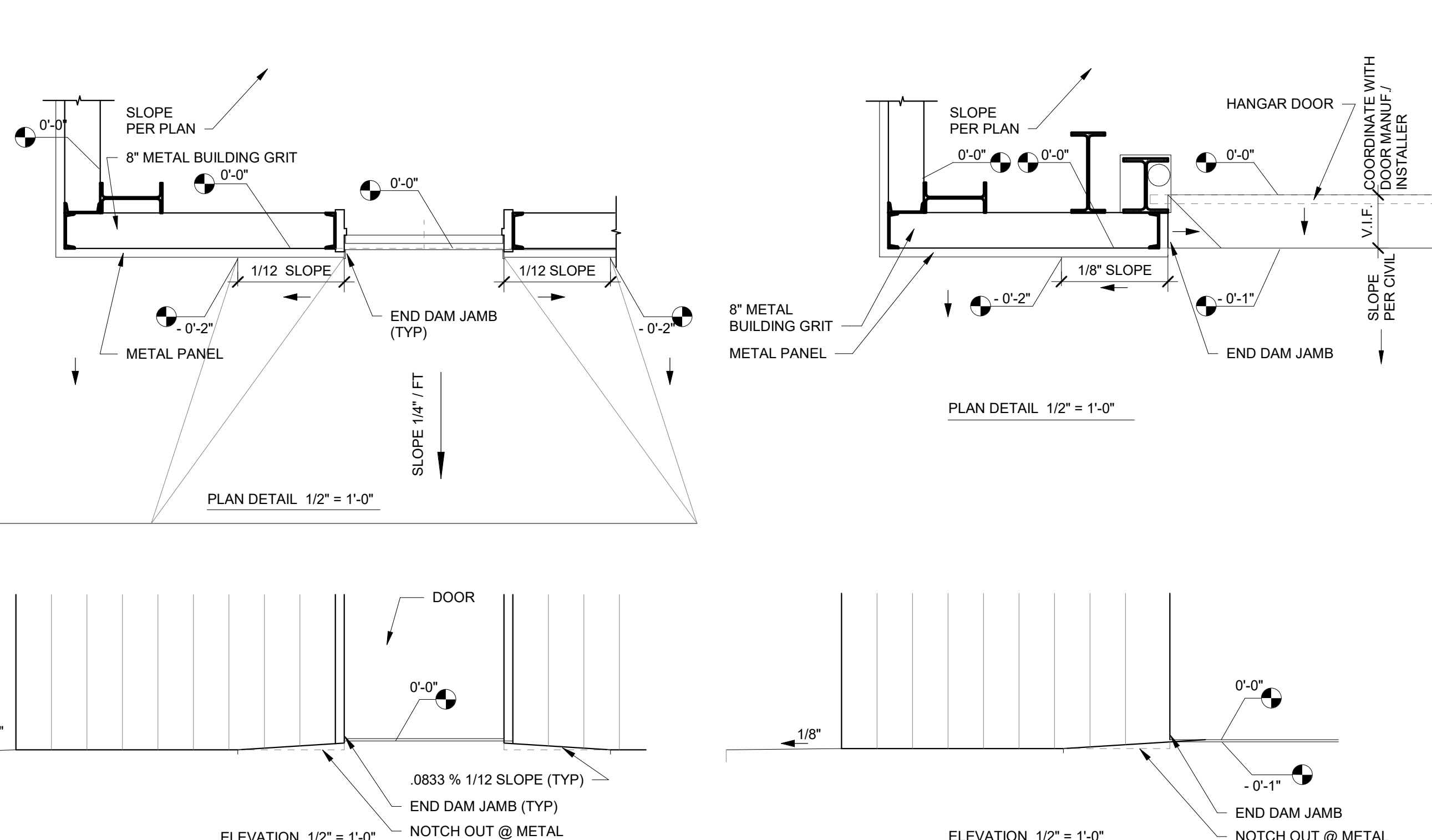
DOOR NUMBER	ROOM NAME	ROOM NUMBER	DOOR					FRAME			DETAILS			FIRE RATING	HARDWARE SET	COMMENTS	
			DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HEAD	JAMB				THRESHOLD
107A	STOR	107	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
110A	CONFERENCE	110	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
111A	OFFICE / BREAK	111	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
112A	OFFICE	112	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
113A	OFFICE	113	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
114A	ENTRY	105	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
115A	ENTRY	105	C1	4'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
116A	STOR	116	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		

DOOR SCHEDULE - ALT-02

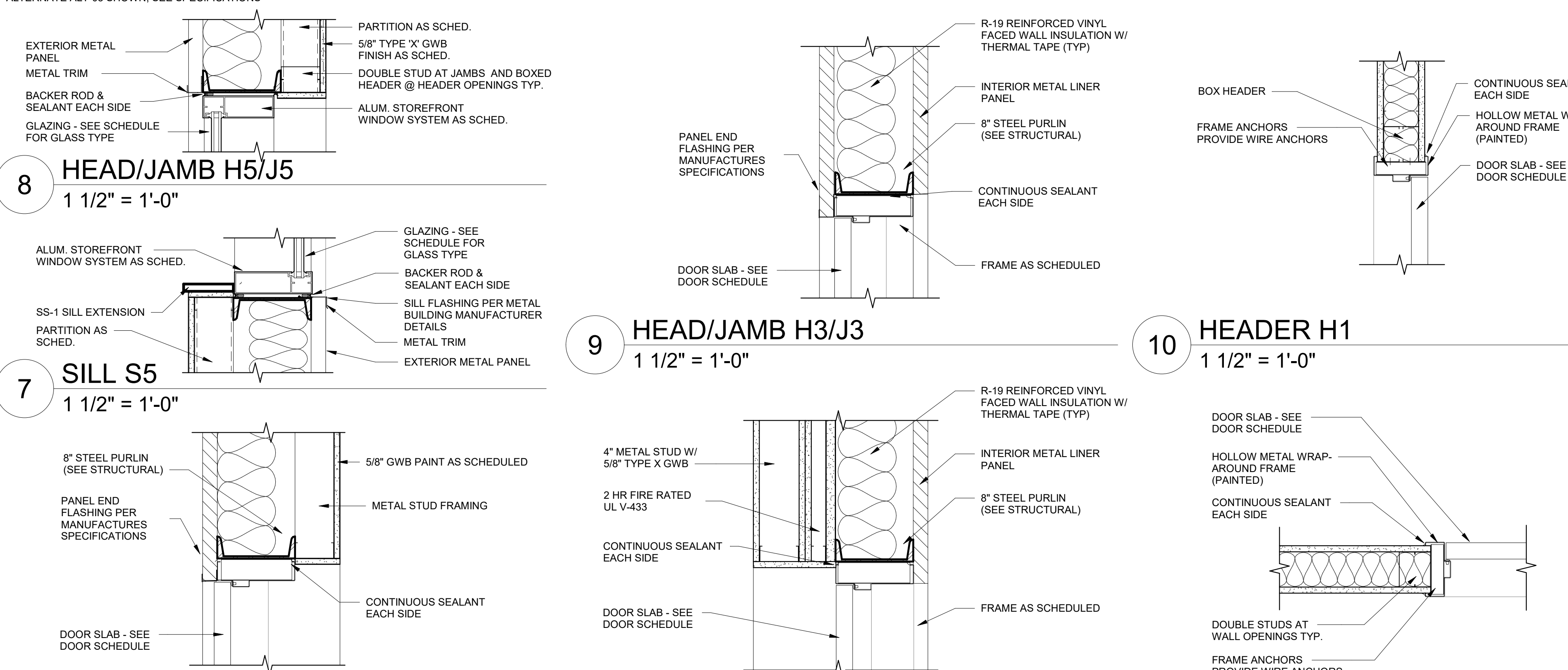
DOOR NUMBER	ROOM NAME	ROOM NUMBER	DOOR					FRAME			DETAILS			FIRE RATING	HARDWARE SET	COMMENTS	
			DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HEAD	JAMB				THRESHOLD
127A	STOR	127	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
128A	ELEC	128	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
130A	CONFERENCE	130	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
131A	OFFICE / BREAK	131	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
132A	OFFICE	132	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
133A	OFFICE	133	A	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
139A	STOR	139	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
140A	JAN	140	C1	3'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		
141A	IT	141	C1	4'-0"	7'-0"	1 3/4"	WD	STAIN	F1	HM	PAINT	H1	J1		0 HR		



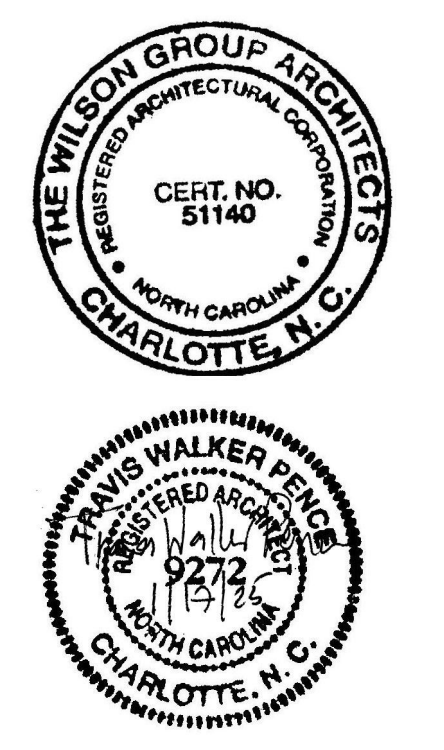
DOOR TYPES
1/4" = 1'-0"



DOOR TYPE E
HYDRAULIC HANGAR DOOR - OWNER PREFERRED
ALTERNATE ALT-03 SHOWN, SEE SPECIFICATIONS



Schedule 1:
2-Unit Box Hangar
Lumberton, NC 28358



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REVISIONS
1 01-28-20 ADDENDUM AD-01
25

DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

DOOR SCHEDULE

SHEET NUMBER
A-601

ELECTRICAL NOTES

- ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.
- PERMITS FOR ELECTRICAL WORK SHALL BE OBTAINED BY AND PAID BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL PAY FOR ANY ADDITIONAL FEES FOR INSPECTIONS, TESTS, AND OTHER SERVICES AS REQUIRED FOR THE COMPLETION OF THE WORK.
- THE ELECTRICAL CONTRACTOR AND ANY OF HIS SUBCONTRACTORS SHALL VISIT THE PROJECT SITE TO WITNESS EXISTING CONDITIONS AND BECOME FAMILIAR WITH THE SCOPE OF THE WORK REQUIRED PRIOR TO SUBMITTING PROPOSALS. WORK REQUIRED BY EXISTING JOB CONDITIONS NOT INDICATED ON DRAWINGS SHALL BE INCLUDED IN THE PROPOSALS.
- THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO RESULT IN THE PRODUCTION OF A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MATERIAL, LABOR, EQUIPMENT, AND OTHER SERVICES AS NECESSARY TO COMPLETE THE WORK.
- DISCREPANCIES IN THE DRAWINGS AND SPECIFICATIONS THAT WILL AFFECT THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT, ENGINEER, AND/OR OWNER PRIOR TO SUBMITTING PROPOSALS.
- UNLESS NOTED OTHERWISE, ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND INCLUDE A 3RD PARTY LABEL (I.E.: UL, CSA, ETL, ETC.) LISTING APPROVAL FOR ITS INSTALLED APPLICATION.
- REVIEW PLANS OF OTHER TRADES FOR COORDINATION OF WORK AND FOR RELATED AND ADJOINING WORK.
- REVIEW COMPLETE PLAN SET FOR CONSTRUCTION TYPE, FINISHES, HEADROOM, ROOF FINISHES, CEILING, ETC. REVIEW COMPLETE PLAN SET FOR PROJECT PHASING AND STAGING. REVIEW COMPLETE PLAN SET FOR WORK COVERED BY ALTERNATE BID ITEMS. COORDINATE DEVICE AND EQUIPMENT MOUNTING HEIGHTS WITH OTHER DISCIPLINE DRAWINGS, CASEWORK DETAILS & SUBMITTALS, EQUIPMENT DETAILS & SUBMITTALS, ETC.
- PENETRATIONS OF FIRE-RATED WALLS, FLOORS, CEILING, AND PARTITIONS SHALL BE FIRE STOPPED IN ACCORDANCE WITH REQUIREMENTS OF THE STATE BUILDING CODE. COORDINATE WORK TO INSURE THAT FIRE STOPPING IS COMPLETED.
- PENETRATIONS OF EXTERIOR BUILDING WALLS, FLOORS, OR ROOFS SHALL BE SEALED WATERTIGHT. INTERIORS OF RACEWAY PENETRATIONS THROUGH EXTERIOR WALLS SHALL BE SEALED WITH NON-HARDENING ELECTRICAL PUTTY.
- CUTTING AND PATCHING TO INSTALL DEVICES AND EQUIPMENT SHALL BE PERFORMED WITH FINISHES RESTORED TO THEIR ORIGINAL CONDITION. SUCH WORK SHALL BE COMPLETED TO A DEGREE THAT IS ACCEPTABLE TO THE ARCHITECT, ENGINEER, AND/OR OWNER.
- COORDINATE PRECISE LOCATION OF HVAC EQUIPMENT WITH THE MECHANICAL CONTRACTOR.
- FOR HVAC EQUIPMENT, VERIFY CIRCUIT BREAKER RATINGS, FUSE RATINGS, AND WIRE SIZES. IF RATINGS DIFFER FROM THOSE INDICATED ON THE DRAWINGS, NOTIFY THE ARCHITECT, ENGINEER, AND OWNER FOR DIRECTION. PROVIDE OVERCURRENT PROTECTION IN ACCORDANCE WITH EQUIPMENT MANUFACTURER NAMEPLATE DATA. IF THE EQUIPMENT LISTING LABEL REQUIRES FUSED PROTECTION, ENSURE THAT FUSES IN A FUSED DISCONNECT SWITCH AT THE EQUIPMENT ARE SIZED AS INDICATED ON THE EQUIPMENT LABEL.
- VERIFY PROPER SIZING OF OVERLOAD DEVICES IN STARTERS BASED ON EQUIPMENT NAMEPLATE DATA.
- IF HORSEPOWER OR LOAD RATINGS OF EQUIPMENT DIFFER FROM THOSE INDICATED ON THE DRAWINGS, NOTIFY THE ARCHITECT, ENGINEER, AND OWNER FOR DIRECTION.
- PROVIDE NATIONAL ELECTRICAL CODE REQUIRED CLEARANCES FOR ALL ELECTRICAL EQUIPMENT. COORDINATE RESOLUTION OF CONFLICTS WITH OTHER TRADES.
- RECEPTACLE, SWITCH, DATA/TELEPHONE OUTLETS SHALL BE FLUSH MOUNTED IN FINISHED SPACES UNLESS OTHERWISE NOTED.
- PRIOR TO ORDERING LIGHT FIXTURES, CONTRACTOR SHALL VERIFY TYPE OF CEILING OR WALL BY REVIEW OF ARCHITECTURAL FINISH SCHEDULES AND PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL INDICATED.
- RECESSED LIGHT FIXTURES INSTALLED IN CEILING WITH INSULATION (AS INDICATED IN ARCHITECTURAL PLANS, OR FOUND AS EXISTING CONDITIONS) SHALL BE U.L. RATED FOR DIRECT CONTACT WITH INSULATION.
- EXIT AND EMERGENCY LIGHTS SHALL BE CONNECTED TO THE NEAREST UNSWITCHED CIRCUIT THAT SERVES LIGHT FIXTURES WITHIN THE SAME SPACE.
- NO MOUNTING HARDWARE SHALL BE ATTACHED TO ROOF DECKS. ATTACHMENTS SHALL BE MADE TO THE ROOF SUPPORTING STRUCTURE.
- PANEL BUS MATERIAL: COPPER.
- SHARED NEUTRAL CONDUCTORS SHALL NOT BE USED UNLESS SPECIFICALLY INDICATED SO ON HOMERUN CIRCUITRY DESIGNATIONS.
- PANEL BREAKER CONFIGURATIONS SHALL BE INSTALLED AS INDICATED ON THE PANEL SCHEDULES OR AS NOTED. BREAKER POSITION REVISIONS WILL NOT BE ACCEPTED UNLESS APPROVED IN WRITING BY THE ENGINEER.
- LOAD CIRCUITS SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS. CIRCUITRY REVISIONS WILL NOT BE ACCEPTED UNLESS APPROVED IN WRITING BY THE ENGINEER.

ABBREVIATIONS

ADA	AMERICAN DISABILITIES ACT
AFB	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLER UNIT
AIC	AMPS INTERRUPTING CAPABILITY
ARA	AREA OF RESCUE ASSISTANCE
BKR	BREAKER
C	CONDUIT
C/B	CIRCUIT BREAKER
CLG	CEILING
CKT	CIRCUIT
COMP	COMPRESSOR
CU	COPPER
DAHJ	DUCTLESS AIR HANDLING UNIT
DHP	DUCTLESS HEAT PUMP
DIA	DIAMETER
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSED
EXISTG	EXISTING
G	EQUIPMENT GROUND
GECC	GROUNDING ELECTRODE CONDUCTOR
LTS	GROUND FAULT CIRCUIT INTERRUPTER
GFCI	GROUND FAULT INTERRUPTER
GF	HEAT PUMP
HP	HORSEPOWER
HP	INTERMEDIATE METAL CONDUIT
IMC	KILO (THOUSAND)
K	LIGHT EMITTING DIODE
LED	LIGHTS
LTG	MECHANICAL CONTRACTOR
LTS	MAIN CIRCUIT BREAKER
MC	MANUFACTURER
MCB	MAIN LUG ONLY
MFR	N/A
MLO	NATIONAL ELECTRICAL CODE
N/A	NOT TO SCALE
NEC	PHASE OR POLE
NEMA	PHASE
NTS	PANEL
NOT	RECEPTACLE
PH	RECEPTACLE
PNL	RECEPTACLE
REC	REQUIRED
RECPT	RIGID GALVANIZED CONDUIT
REQ	RIGID GALVANIZED STEEL
RGC	STAINLESS STEEL
RGS	S.S. SYSTEM
S.S.	SOLID NEUTRAL
SYS	TYPICAL
S/N	UNDERWRITERS LABORATORY
TYP	UNLESS NOTED OTHERWISE
UL	UNLESS OTHERWISE NOTED
UNO	VOLTS-AMPS
UON	WATTS
V	WIRE
VA	WITH
W	WEATHERPROOF
W	TRANSFORMER
W/	
WP	
XFMR	

LUMINAIRE SCHEDULE

CALLOUT	SYMBOL	DESCRIPTION	LAMP	BALLAST	VOLTS	MOUNTING	MANUFACTURER / MODEL	NOTES	CALLOUT
B2M		2x2, ARCHITECTURAL LENSED, INDIRECT	(1) 40W LED	LED DIMMABLE DRIVER	120V 1P 2W	RECESSED	COLUMBIA #LCAT SERIES DAYBRITE #FCX SERIES METALUX #Z2CZ SERIES	4400 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. SMOOTH, ROUND LENSE.	B2M
EG		EMERGENCY EGRESS, BATTERY	(2) 7W MR 16 LED	BATTERY	120V 1P 2W	WALL; MTD 8'-0" AFF	EMERGLITE #COMPACT PREMIER SERIES BEHELLI #E000 LUNA LED SERIES LIGHTALARMS #COMPACT GRANDE SERIES	CONNECT TO NEAREST UNSWITCHED LIGHT CIRCUIT IN SAME SPACE. THESE FIXTURES ARE NOT TAGGED WITH "EG" ON THE DRAWINGS; ONLY THE SYMBOL IS USED. DESIGN CRITERIA: 70 FT SPACING, UTILIZING 1 FC AVG AND 0.2 FC MINIMUM.	EG
H		HIGH BAY	(1) 147W LED	LED DIMMABLE DRIVER	120V 1P 2W	PENDANT; MTD 20'-0" AFF	COLUMBIA #CLH-LSCS SERIES DAY-BRITE #FBX SERIES METALUX #0HB SERIES	19,000 NOMINAL LUMENS. 4000K COLOR TEMPERATURE, 80 CR. WIRE GUARD. POLYCARBONATE LENS.	H
IM		4' INDUSTRIAL	(1) 44W LED	LED DRIVER	120V 1P 2W	PENDANT/SURFACE	COLUMBIA #LCL SERIES DAYBRITE #FSS SERIES METALUX #SNLED SERIES	5300 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. WIRE GUARD. FROSTED LENS.	IM
IV1		INVERTER, EGRESS LIGHTING	N/A	BATTERY	120V 1P 2W	SURFACE	EMERGI-LITE #EMIU SERIES BODINE #ELI-S SERIES LIGHTALARMS #LMUI SERIES	INVERTER FOR BATTERY BACKUP OF EGRESS LIGHTING; 100W FOR 90 MINUTES (MINIMUM). INCLUDE SELF-DIAGNOSTIC OPTION. LOCATE ON WALL OR ABOVE CEILING WHERE APPLICABLE - PROVIDE "LIGHTING INVERTER" LABEL ON CEILING GRID BELOW INSTALLED LOCATION. STANDARD LIGHTING CONTROL OVERRIDE FOR 0-10V DIMMING SYSTEM.	IV1
P4W		PARKING LOT LIGHT	(1) 122W LED	LED DRIVER	120V 1P 2W	POLE, 25' AFG MOUNTING HEIGHT	BEACON #VIPER SERIES LUMARK #PREVAIL LED SERIES GARCCO #ECF SERIES	TYPE 4 WIDE DISTRIBUTION; 4000K; 18000 LUMENS; FINISH SELECTION BY ARCHITECT. 22" ROUND TAPERED ALUMINUM POLE SUITABLE FOR 110 MPH WIND TO MEET NC BUILDING CODE.	P4W
R6		6" RECESSED CAN	(1) 25W LED	LED DIMMABLE DRIVER	120V 1P 2W	RECESSED	PRESOLITE #LFR6RD SERIES LIGHTOLIER #Z6RDL SERIES PORTFOLIO #D6A SERIES	2500 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. SELF-FLANGED LENSED REFLECTOR TRIM; LOW IRIDESCENT CLEAR FINISH.	R6
R6XE		6" RECESSED CAN, EXTERIOR, EGRESS	(1) 18W LED	LED DRIVER	120V 1P 2W	RECESSED	PHILIPS LIGHTOLIER #L6R SERIES WILLIAMS #RDR SERIES ATLANTIC #LE6GIC SERIES	DAMP LOCATION. 2000 NOMINAL LUMENS. 4000K COLOR TEMP; SELF-FLANGED OPEN REFLECTOR TRIM, LOW IRIDESCENT CLEAR FINISH. IC RATED, AIRTIGHT CONSTRUCTION. GASKET BETWEEN FIXTURE & SOFFIT; SEE SPECIFICATIONS FOR ENERGY CODE REQUIREMENTS.	R6XE
W1		HALF CYLINDER WALL PACK	(1) 30W LED	LED DRIVER	120V 1P 2W	WALL; MTD 12' AFG	HUBBELL #RD2 SERIES GARCCO #104L SERIES MCGRAW-EDISON #RSC SERIES	3100 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. TYPE IV DISTRIBUTION. FINISH SELECTION BY ARCHITECT.	W1
W2		LED FLOOD LIGHT	(1) 206W LED	LED DRIVER	120V 1P 2W	WALL; MTD 23' AFG	VIPER #MICRO STRIKE LUMARK #PREVAIL SERIES GARCCO #ECF-S SERIES	29000 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. TYPE IV DISTRIBUTION. FINISH SELECTION BY ARCHITECT.	W2
WB		HALF CYLINDER WALL PACK, EGRESS	(1) 20W LED (1) 20W LED	LED DRIVER LED DRIVER	120V 1P 2W	WALL	HUBBELL #RD2 SERIES GARCCO #104L SERIES MCGRAW-EDISON #RSC SERIES	5300 NOMINAL LUMENS. 4000K COLOR TEMPERATURE. TYPE IV DISTRIBUTION. DUAL LED DRIVERS AND DUAL LED ARRAYS FOR EGRESS REQUIREMENTS. DOWNLIGHT ONLY. FINISH SELECTION BY ARCHITECT.	WB
X		EXIT SIGN, BATTERY BACKUP	(2) 1W LED	BATTERY	120V 1P 2W	UNIVERSAL	EMERGLITE #PREMIER SERIES BEHELLI #FACO PY SERIES LIGHTALARMS #GRANDE SERIES	CONNECT TO NEAREST UNSWITCHED LIGHT CIRCUIT IN SAME SPACE. THESE FIXTURES ARE NOT TAGGED WITH "X" ON THE DRAWINGS; ONLY THE SYMBOL IS USED.	X

SWITCH LEGEND

SYMBOL	DESCRIPTION	NOTES
	DIMMER SWITCH	RATED FOR VOLTAGE WHERE APPLIED, 1200W, MTD 42" AFF UNO
	4-WAY SWITCH	RATED FOR VOLTAGE WHERE APPLIED, 20A; MTD 42" AFF UNO; WHERE SHOWN PAIRED, PROVIDE DUAL LEVEL SWITCHING; SEE DUAL LEVEL SWITCHING NOTES AT THE STANDARD SWITCH SYMBOL IN THIS LEGEND.
	OCCUPANCY SENSOR WALL SWITCH, SINGLE CKT, DUAL TECHNOLOGY	RATED FOR VOLTAGE WHERE APPLIED, 20A; MTD 42" AFF UNO
	OCCUPANCY SENSOR, LOW VOLTAGE, DUAL DIAGRAMS	INCORPORATE POWER PACK FOR CIRCUITRY SWITCHING, SEE WIRING DIAGRAMS
	PHOTOCELL, EXTERIOR	MOUNT ON NORTH FACE OF BLDG, FACING NORTH
	TOGGLE SWITCH, SINGLE POLE	RATED FOR VOLTAGE WHERE APPLIED, 20A; MTD 42" AFF UNO; WHERE INDICATED, WHERE USED AS AN EQUIPMENT DISCONNECT, PROVIDE LOCKABLE TYPE COVER.
	3-WAY SWITCH	RATED FOR VOLTAGE WHERE APPLIED, 20A; MTD 42" AFF UNO

FIRE ALARM LEGEND

SYMBOL	DESCRIPTION	MOUNTING
	FIRE ALARM CONTROL PANEL	WALL
	MONITOR MODULE FOR MONITORING A DRY CONTACT CLOSURE DEVICE	
	PULL STATION	WALL
	SMOKE DETECTOR	CEILING

RECEPTACLE LEGEND

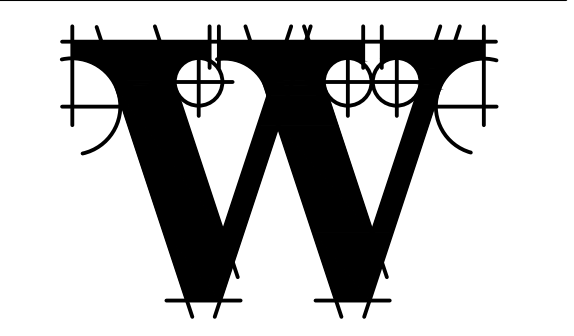
SYMBOL	NEMA	VOLTS	DESCRIPTION
	5-20R	120V 1P 2W	DUPLEX, MTD 18" AFF UNO
	5-20R	120V 1P 2W	POWER FOR GENERATOR BLOCK HEATER
	5-20R	120V 1P 2W	DUPLEX GFCI, MTD 6" ABOVE COUNTER OR 6" ABOVE BACKSPASH IF APPLICABLE. CONTRACTOR TO COORDINATE WITH ARCHITECTURAL BACKSPASH DETAILS.
	5-20R	120V 1P 2W	DISHWASHER OUTLET, DUPLEX, MTD 12" AFF UNO. SUPPLY FROM GFCI TYPE C/B.
	5-20R	120V 1P 2W	DUPLEX GFCI, MTD 18" AFF UNO; LISTED WEATHER-RESISTANT TYPE; PROVIDE CAST ALUMINUM WEATHERPROOF IN-USE COVER WITH CAST ALUMINUM FD WEATHERPROOF BOX
	5-20R	120V 1P 2W	DUPLEX GFCI, MTD 18" AFF UNO
	5-20R	120V 1P 2W	POWER FOR ICE MACHINE; MTD 24" AFF UNO
	5-20R	120V 1P 2W	DUPLEX FOR REFRIGERATOR; MOUNT 48" AFF UNO. SUPPLY FROM GFCI TYPE C/B.
		120V 1P 2W	POWER FOR EMERGENCY RESPONDER COMMUNICATION COVERAGE SYSTEM
		120V 1P 2W	POWER FOR FIRE ALARM CONTROL PANEL
	5-20R	120V 1P 2W	QUAD, MTD 18" AFF UNO
	5-20R	120V 1P 2W	POWER FOR GENERATOR BATTERY CHARGER, BATTERY HEATER, & WINDING HEATER
	5-20R	120V 1P 2W	QUAD, MTD IN FLUSH FLOOR BOX; SEE AUX SYS PLANS FOR SHARED BOX; PROVIDE DIVIDER FOR POWER SEPARATION FROM VOICE/DATA
		120V 1P 2W	EXHAUST FAN; SEE MECHANICAL SCHEDULE. PROVIDE POWER PACK FOR SWITCHING WITH LIGHTING CEILING OCCUPANCY SENSOR.

MISC. ELECTRICAL SYMBOL LEGEND

	ENCLOSED CIRCUIT BREAKER, NEMA 3R OUTSIDE. AMPERAGE AS INDICATED OR BASED ON SUPPLY CIRCUIT RATING.
	PANELBOARD, SEE PANEL SCHEDULE
	GROUND ROD, 3/4" X 10' COPPER CLAD, WHERE TWO RODS ARE INDICATED, SPACE A MINIMUM OF 22' APART.
	PUSH BUTTON SWITCH CONTROLLER FOR HANGAR DOOR. MOUNT 42" AFF.
	EQUIPMENT CONNECTION
	HOMERUN DESIGNATION, #12 CONDUCTORS UNLESS NOTED OTHERWISE.
	EQUIPMENT GROUND CONDUCTOR PHASE CONDUCTOR NEUTRAL CONDUCTOR
	LETTER INDICATES ELEVATION OR DETAIL; NUMBER INDICATES PLAN OR SECTION
	SHEET NUMBER WHERE PLAN, SECTION, ELEVATION OR DETAIL IS DRAWN
	2 HOUR RATED PARTITION



Schedule 1:
2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

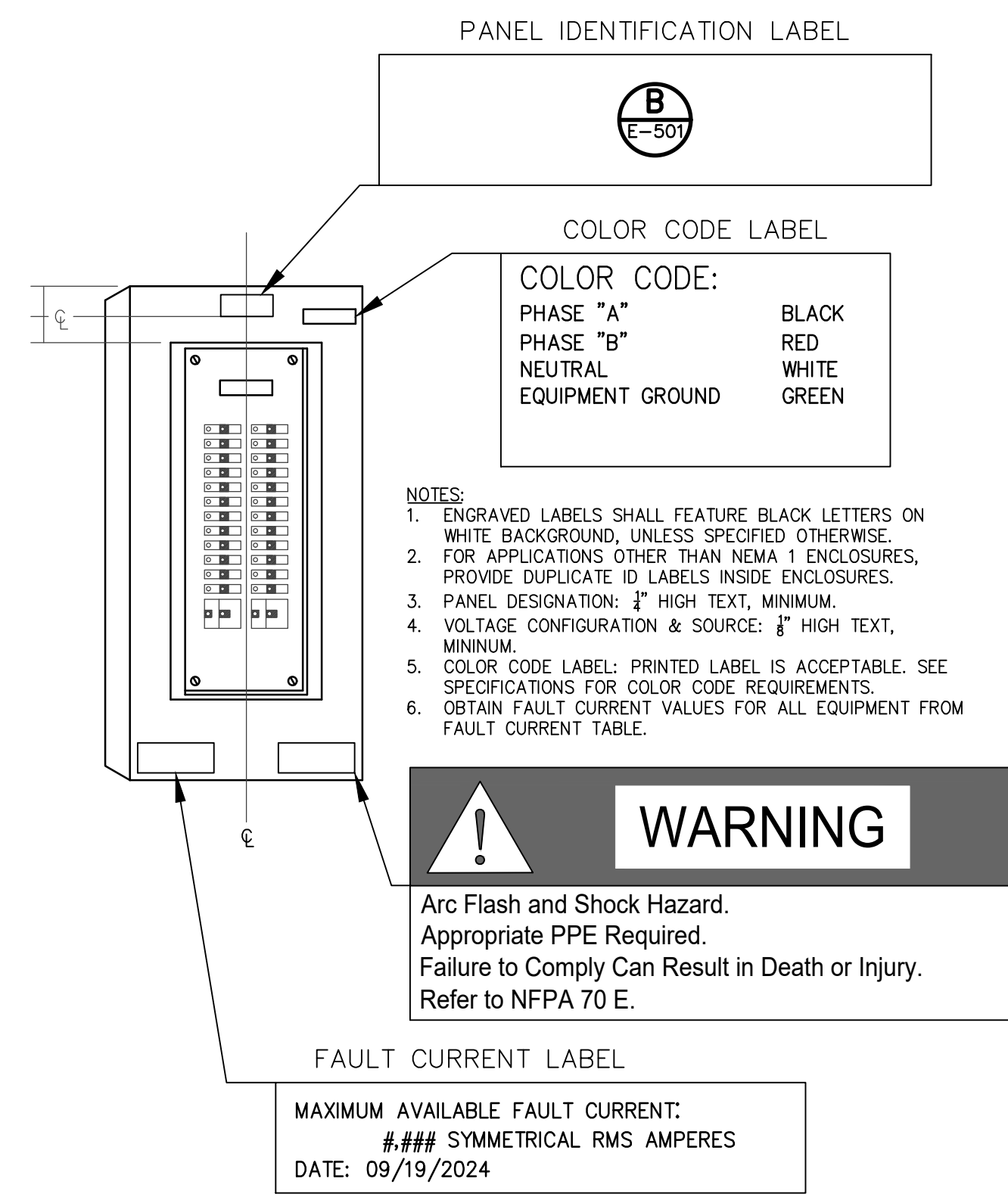
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DATE 01/17/2025
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SHEET TITLE

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NOTES, AND
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SHEET NUMBER

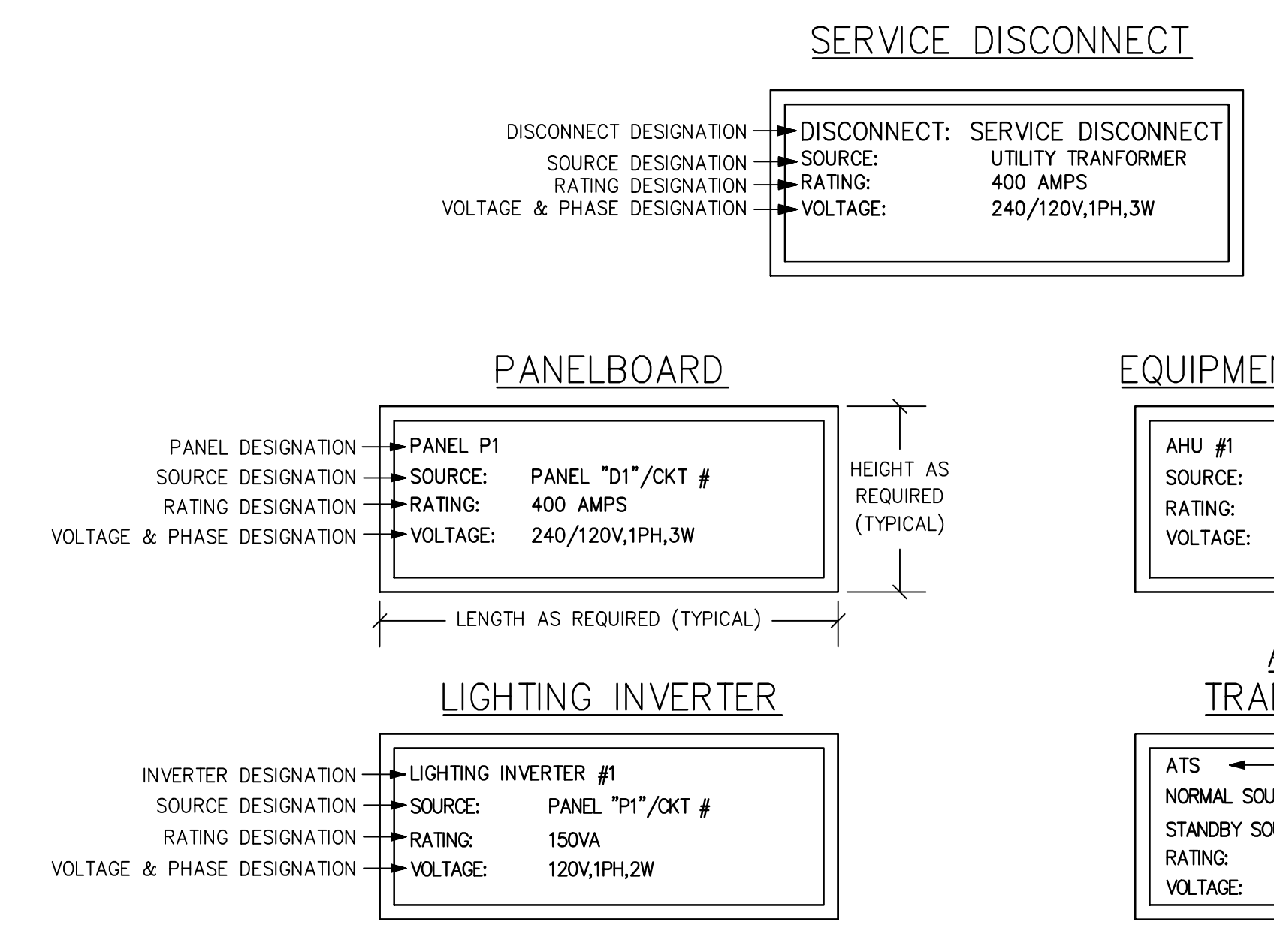
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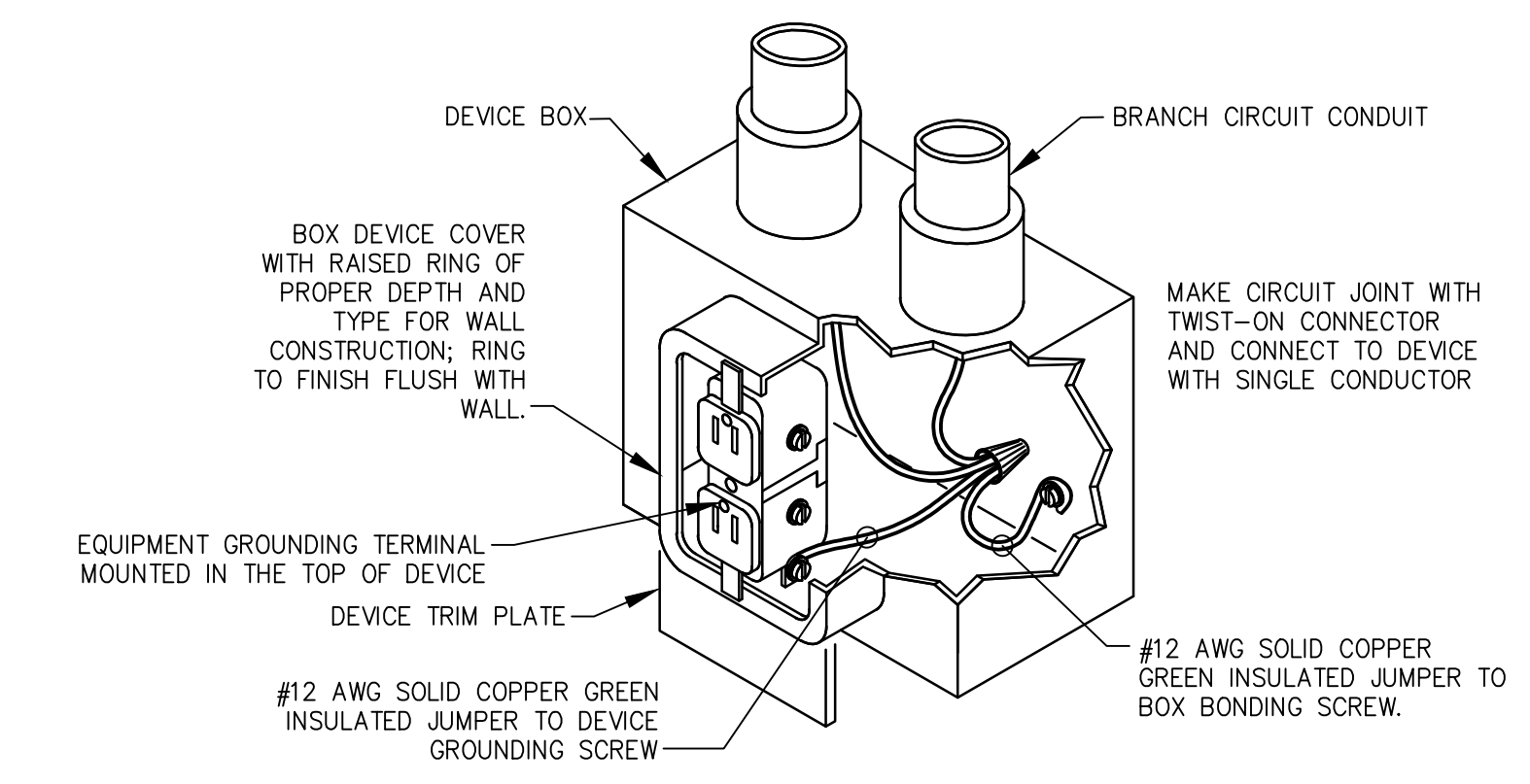
A TYPICAL PANELBOARD IDENTIFICATION
E-501 NO SCALE

FAULT CURRENT SCHEDULE

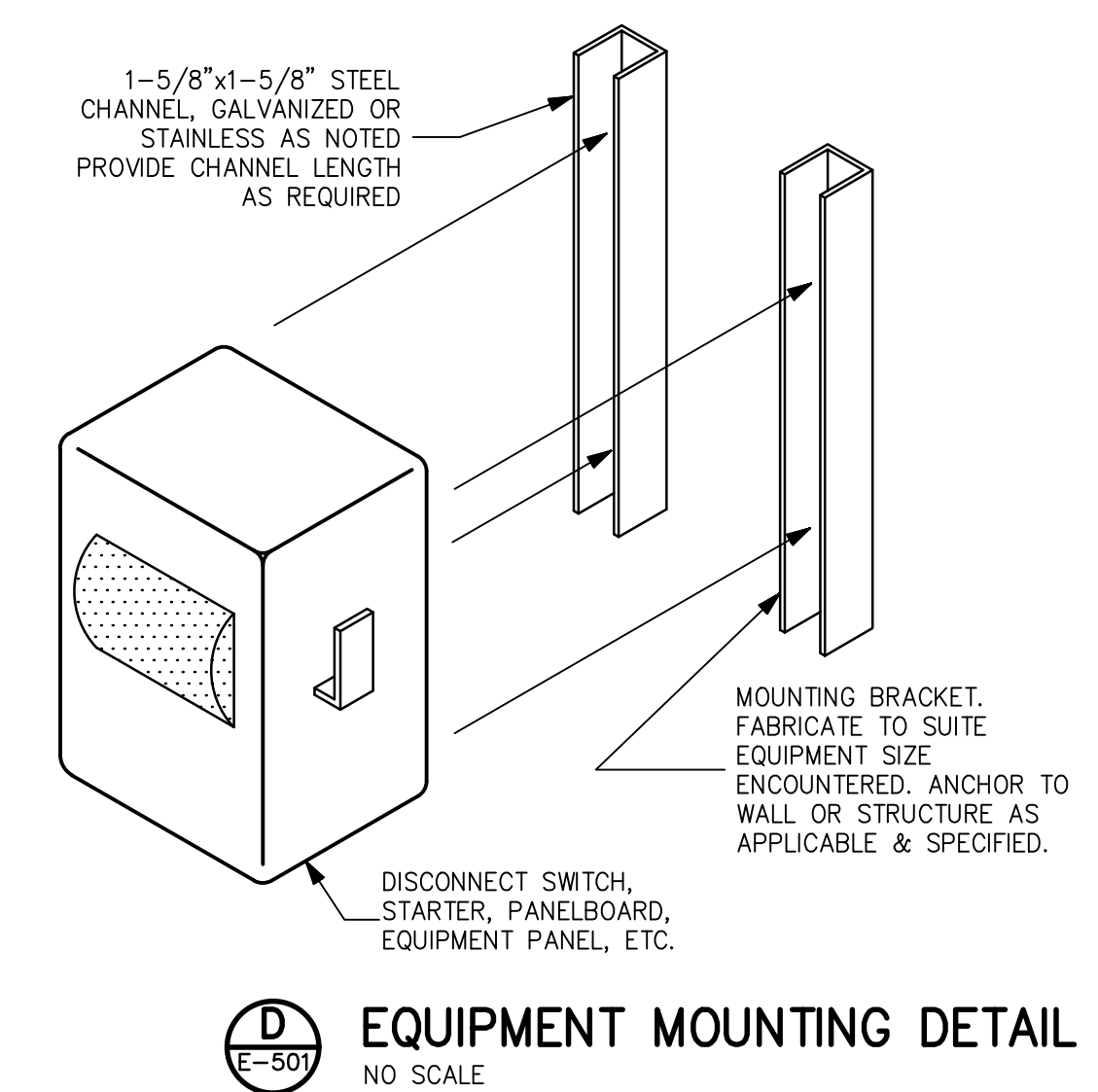
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ATS	14,773
D1	14,243
D2	11,021
P2	10,442
SPD-M2	5,501
P1	13,205
SPD-M1	5,976



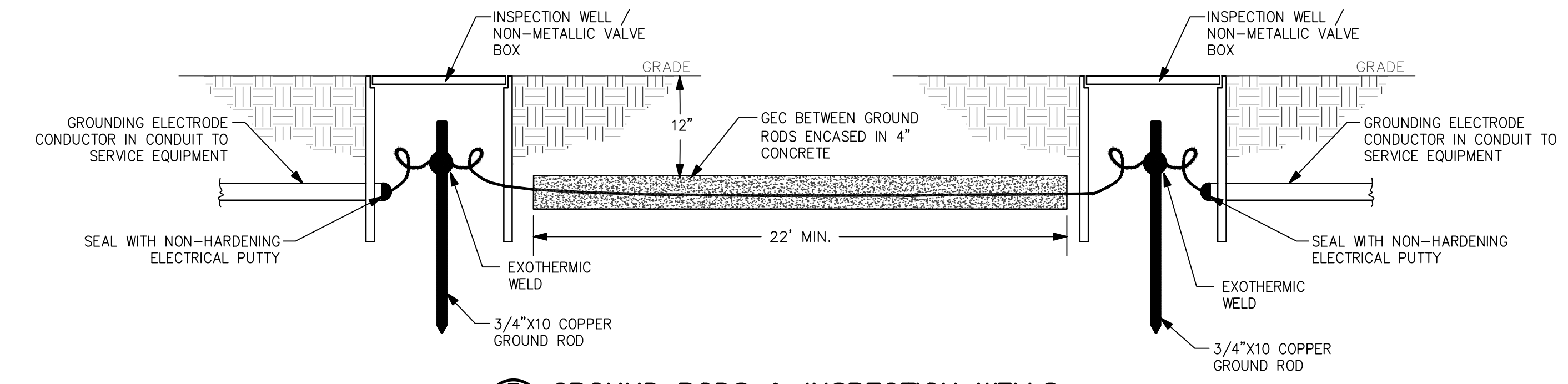
B TYPICAL NAMEPLATE DETAILS
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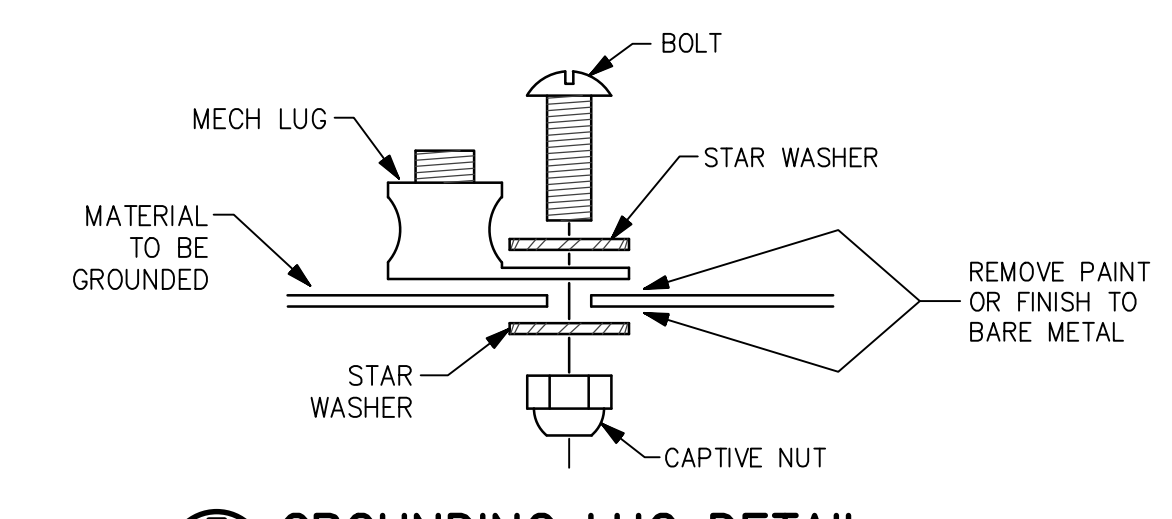
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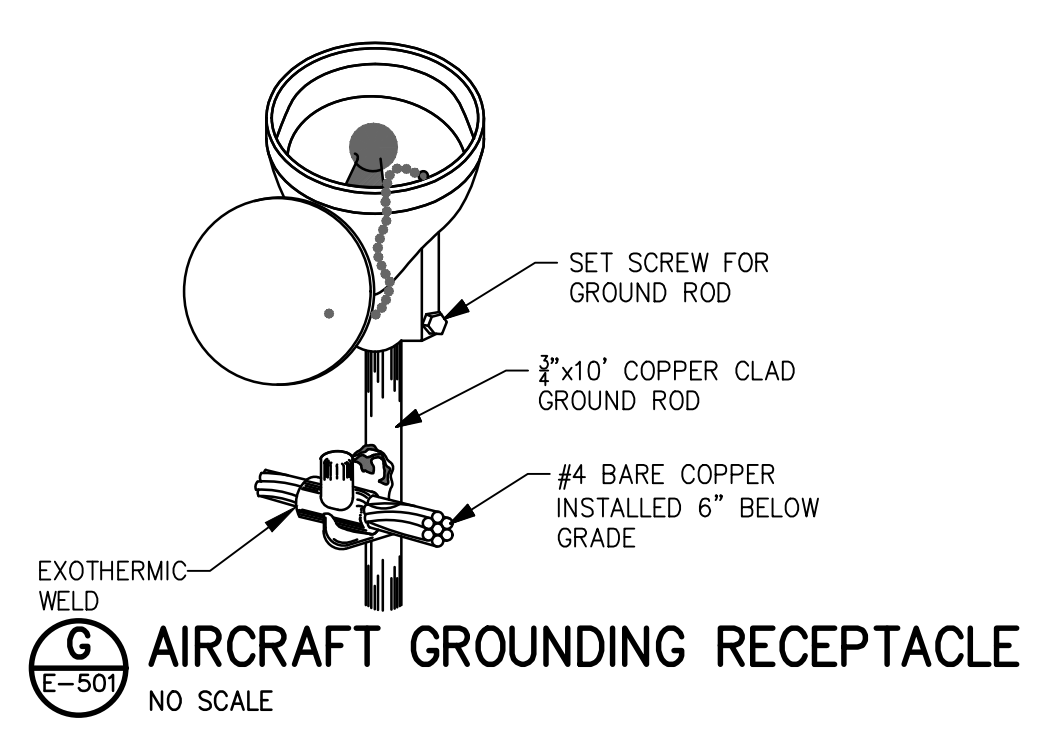
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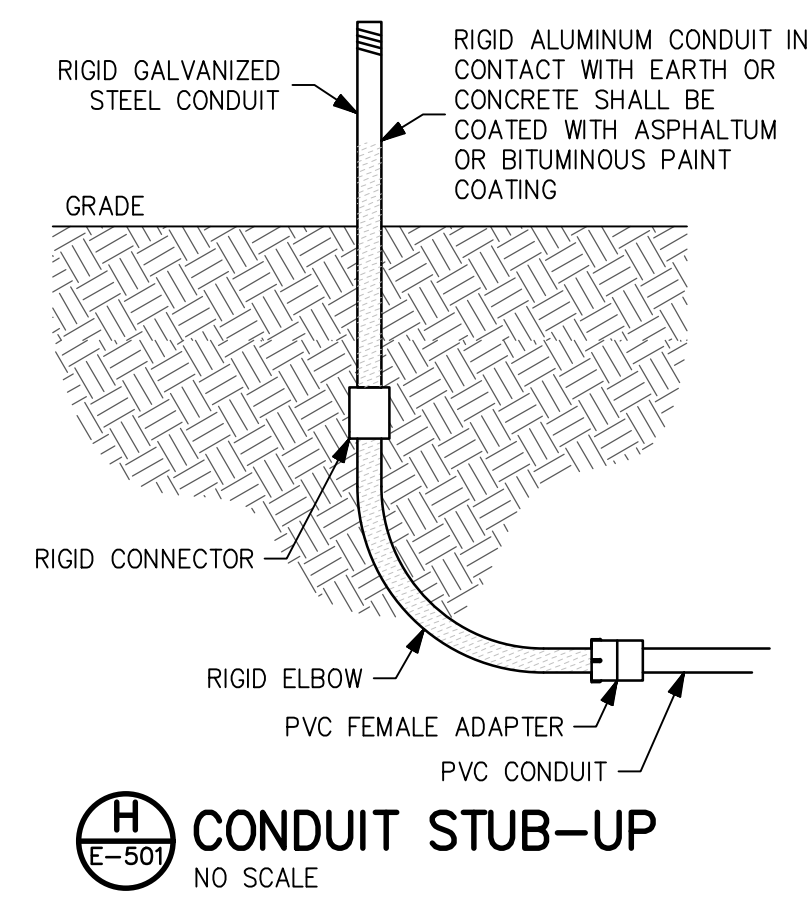
E GROUND RODS & INSPECTION WELLS
E-501 NO SCALE



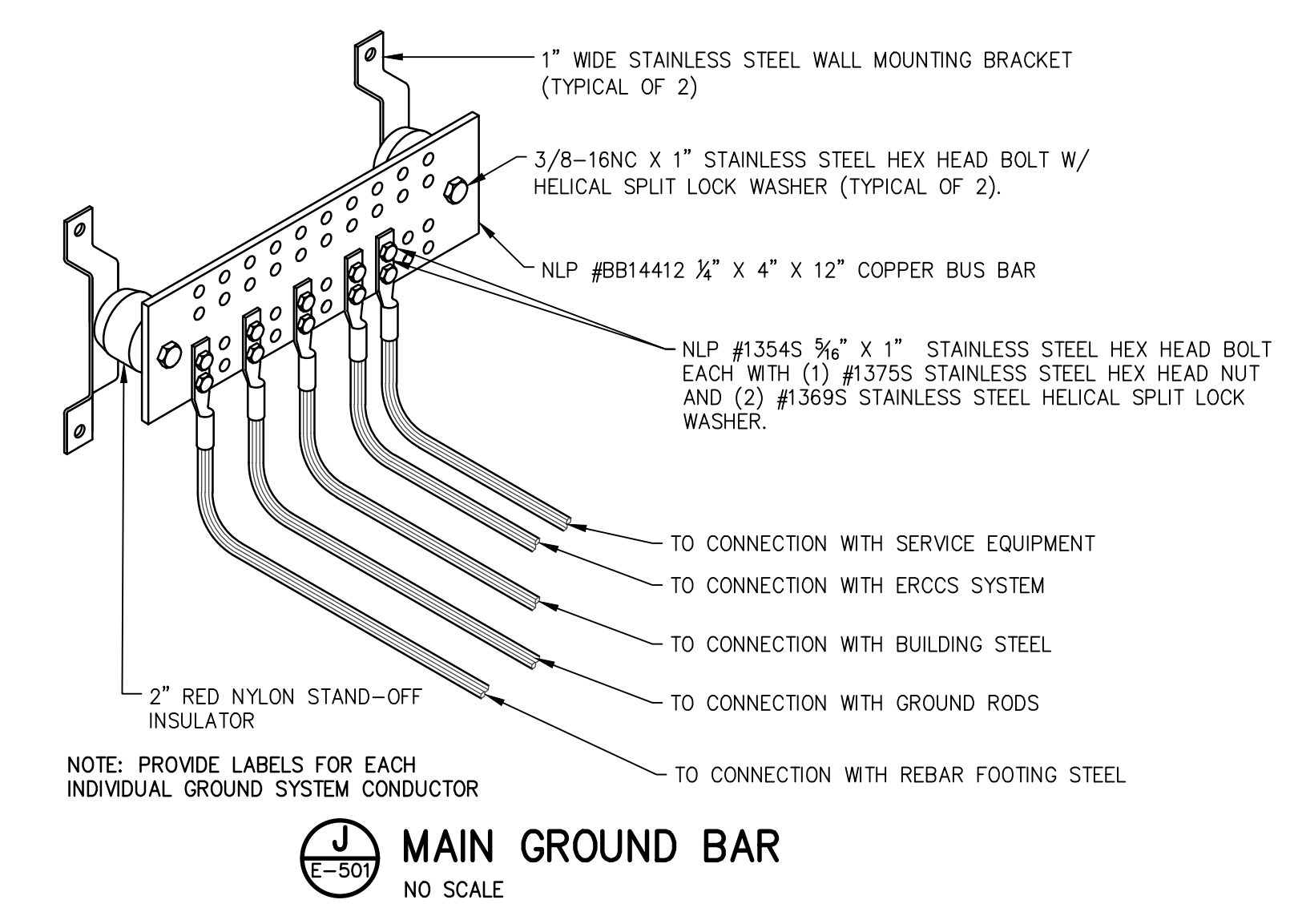
F GROUNDING LUG DETAIL
E-501 NO SCALE



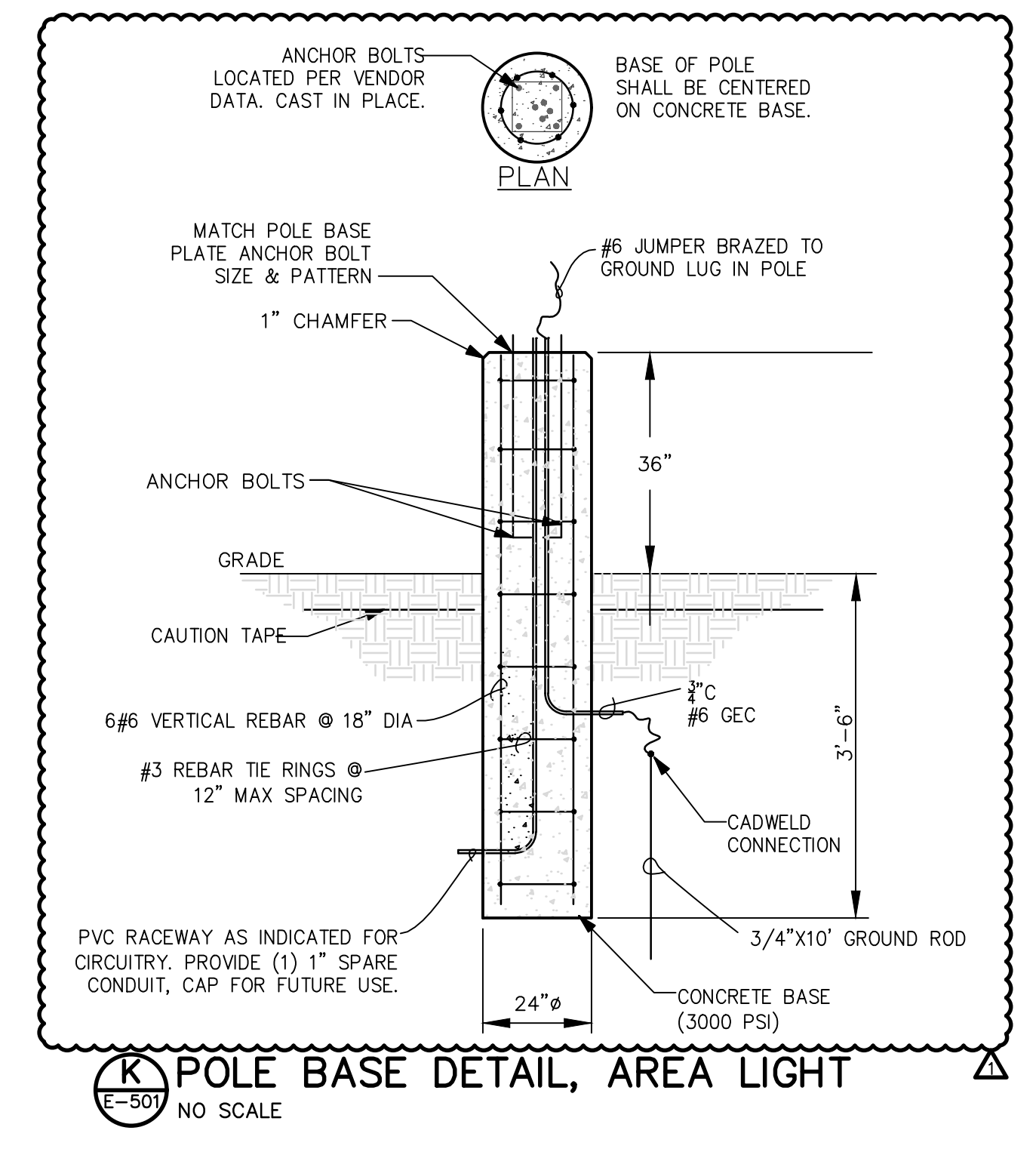
G AIRCRAFT GROUNDING RECEPTACLE
E-501 NO SCALE



H CONDUIT STUB-UP
E-501 NO SCALE



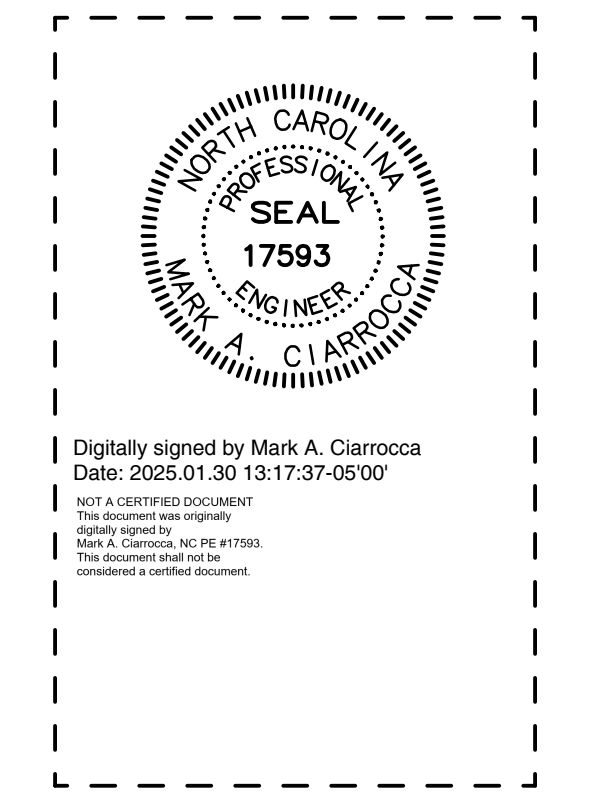
J MAIN GROUND BAR
E-501 NO SCALE



K POLE BASE DETAIL, AREA LIGHT
E-501 NO SCALE



Schedule 1:
2-Unit Box Hangar
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS
2/4/25 AD-01

DATE 01/17/2025
PROJECT NUMBER 3105-2401
SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER
E-501

SHEET INDEX

SCHEDULE 2A: T-HANGAR

GENERAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	G-100a	SCHEDULE 2A COVER SHEET
		01/17/2025	G-101a	SCHEDULE 2A SHEET INDEX

CIVIL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01-2025	VB-101	SURVEY CONTROL PLAN (SCHEDULE 2A)
		01-2025	CB-101	EXISTING CONDITIONS AND REMOVAL PLAN (SCHEDULE 2A)
		01-2025	CB-111	SITE LAYOUT PAVING AND MARKING PLAN (SCHEDULE 2A)
		01-2025	CB-121	GRADING & ELEVATION PLAN (SCHEDULE 2A)
		01-2025	CB-122	DRAINAGE PLAN (SCHEDULE 2A)
		01-2025	CB-141	SEDIMENTATION & EROSION CONTROL PLAN (SCHEDULE 2A)
		01-2025	CB-171	10- UNIT T-HANGAR LAYOUT AND FOUNDATION PLAN (SCHEDULE 2A)
		01-2025	CB-172	T-HANGAR DETAILS (SHEET 1 OF 2) (SCHEDULE 2A)
		01-2025	CB-173	T-HANGAR DETAILS (SHEET 2 OF 2) (SCHEDULE 2A)
		01-2025	CB-401	TYPICAL PAVEMENT SECTIONS (SCHEDULE 2A)
		01-2025	CB-510	PAVING DETAILS (SCHEDULE 2A)
		01-2025	CB-520	DRAINAGE DETAILS (SCHEDULE 2A)
		01-2025	CB-540	SEDIMENTATION & EROSION CONTROL DETAILS - 1 (SCHEDULE 2A)
		01-2025	CB-541	SEDIMENTATION & EROSION CONTROL DETAILS - 2 (SCHEDULE 2A)
		01-2025	CB-542	SEDIMENTATION & EROSION CONTROL DETAILS - 3 (SCHEDULE 2A)

WATER & SEWER

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
1	02-03-2025	01-2025	CB-160	UTILITY NOTES
1	02-03-2025	01-2025	CB-161	UTILITY PLAN (SCHEDULE 2A)
1	02-03-2025	01-2025	CB-560	UTILITY DETAILS (SHEET 1 OF 3)
1	02-03-2025	01-2025	CB-561	UTILITY DETAILS (SHEET 2 OF 3)
1	02-03-2025	01-2025	CB-562	UTILITY DETAILS (SHEET 3 OF 3)

ARCHITECTURAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	A-102a	T-HANGAR TOILET - SCHEDULE 2A

PLUMBING

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	P-101A	T-HANGAR PLUMBING PLANS (SCHEDULE 2A)

MECHANICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	M-102A	MECHANICAL T-HANGAR TOILET - SCHEDULE 2A

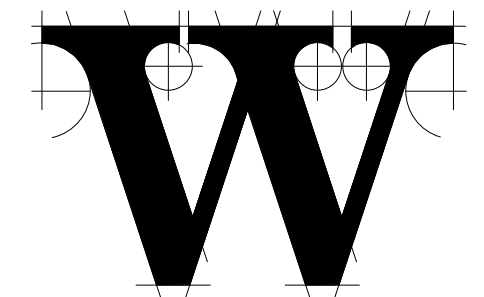
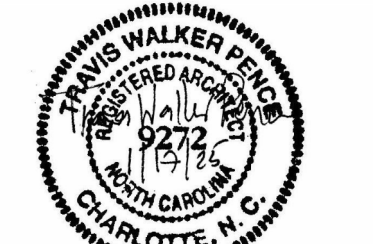
ELECTRICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	E-001A	ELECTRICAL NOTES, LEGENDS AND SCHEDULES
		01/17/2025	E-101A	ELECTRICAL PLANS
		01/17/2025	E-501A	ELECTRICAL DETAILS
		01/17/2025	E-502A	ELECTRICAL DETAILS
		01/17/2025	E-601A	ELECTRICAL SCHEDULE AND RISER



Schedule 2A: T-Hangar

Lumberton, NC 28358



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REVISIONS

DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

SCHEDULE 2A
SHEET INDEX

SHEET NUMBER

G-101a

GENERAL NOTES:

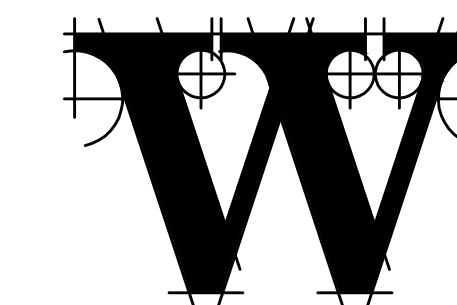
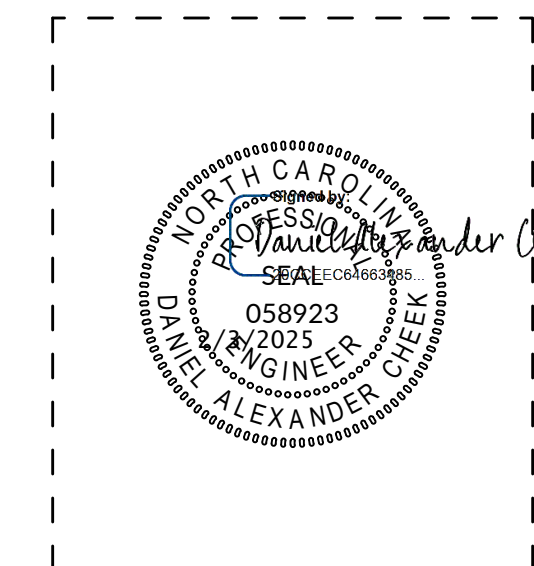
1. THE WORK SPECIFIED IN THESE PLANS IS CONSIDERED INCIDENTAL AND NECESSARY FOR THE COMPLETION OF THE WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAYMENT MADE FOR THE WORK SPECIFIED ON THIS SHEET UNLESS SPECIFICALLY CALLED OUT IN THE BID SCHEDULE AND MEASUREMENT AND PAYMENT SECTION OF THE SPECIFICATIONS.
2. **EXISTING SITE CONDITIONS:** THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE EXISTING SITE CONDITIONS PRIOR TO BIDDING THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A WORKABLE SITE CONDITION DURING THE EXECUTION OF THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL DISTURBED AREAS TO ORIGINAL OR BETTER CONDITIONS AS APPROVED BY THE OWNER.
3. THE CONTRACTOR SHALL HAVE A COMPLETE SET OF CONTRACT DOCUMENTS AS WELL AS ALL PERMIT APPROVALS AND EASEMENTS ON THE JOB SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS WITH MINIMUM DISTURBANCES TO THE EXISTING WATER DISTRIBUTION AND SEWER COLLECTION SYSTEMS.
5. THE CONTRACTOR IS RESPONSIBLE TO CONSTRUCT THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS IN A MANNER TO MAINTAIN WATER SERVICE TO PROPERTIES AFFECTED BY THE PROJECT.
6. THE CONTRACTOR SHALL COORDINATE SERVICE INTERRUPTIONS WITH THE CITY OF LUMBERTON AND THE ENGINEER.
7. THE CONTRACTOR SHALL FOLLOW OSHA GUIDELINES REGARDING TRENCHING AND EXCAVATION SAFETY AND SHALL INCORPORATE APPROPRIATE SAFETY MEASURES AS NECESSARY TO MEET COMPLIANCE.
8. CONSTRUCTION AND MATERIAL SPECIFICATIONS SHALL CONFORM TO ALL STATE OF NORTH CAROLINA MINIMUM REQUIREMENTS AND THE CONTRACT DOCUMENTS REQUIREMENTS, WHICHEVER IS MORE STRINGENT.
9. ALL SHOP DRAWINGS MUST BE REVIEWED AND APPROVED BY ENGINEER BEFORE EQUIPMENT AND MATERIALS ARE ORDERED.
10. CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND UTILITIES. KNOWN EXISTING UTILITIES HAVE BEEN LOCATED FROM THE INFORMATION AVAILABLE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCURATELY LOCATE BOTH HORIZONTALLY AND VERTICALLY ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE NC ONE CALL CENTER AT 800.652.9949. ALL COSTS ASSOCIATED WITH ANY DAMAGE TO KNOWN OR UNKNOWN EXISTING UTILITIES RESULTING FROM THE CONTRACTOR 'S FAILURE TO ADEQUATELY PROTECT THE EXISTING UTILITIES DURING CONSTRUCTION SHALL BE BORNE SOLELY BY THE CONTRACTOR.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATION OF EXISTING UTILITIES IF REQUIRED DURING INSTALLATION OF NEW WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAY ITEM FOR THIS WORK UNLESS SPECIFICALLY CALLED OUT IN THE BID FORM. ANY RELOCATION OF EXISTING UTILITIES MUST BE COORDINATED WITH THE AFFECTED UTILITY COMPANY.
12. CONTRACTOR SHALL MAKE EVERY EFFORT TO SAVE PROPERTY IRONS, MONUMENTS, OTHER PERMANENT POINTS AND LINES OF REFERENCE AND CONSTRUCTION STAKES. A REGISTERED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE SHALL REPLACE PROPERTY IRONS, MONUMENTS, AND OTHER PERMANENT POINTS OF REFERENCE DISTURBED BY THE CONTRACTOR.
13. CONTRACTOR SHALL CLEAR AND GRUB ALL UTILITY EASEMENTS, AS DIRECTED BY THE OWNER, TO INSTALL NEW UTILITIES. CONTRACTOR SHALL ONLY CLEAR THE MINIMUM ALONG THE PROPOSED ALIGNMENTS.
14. THE CONTRACTOR SHALL SUPPORT ALL UTILITY POLES AS NECESSARY. THE CONTRACTOR SHALL COORDINATE UTILITY POLE SUPPORT WITH THE APPROPRIATE UTILITY COMPANIES. ALL UTILITY POLES AND GUY WIRES INTERFERING WITH CONSTRUCTION SHALL BE RELOCATED WITH UTILITY COMPANY COORDINATION.
15. CONTRACTOR SHALL RESTORE/REPLACE ALL SIGNS, MAILBOXES, ETC. ENCOUNTERED DURING CONSTRUCTION TO ORIGINAL CONDITION.
16. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO THE EXISTING GRADE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
17. ALL DITCHES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION OR BETTER. ALL DITCHES SHALL BE LINED WITH EROSION CONTROL MATTING TO ESTABLISH VEGETATION.
18. ALL EXCAVATED MATERIAL SHALL BE PLACED WITHIN THE LIMITS OF DISTURBANCE DURING UTILITY INSTALLATION. THE CONTRACTOR SHALL PROVIDE THE NECESSARY SEDIMENT AND EROSION CONTROL MEASURES TO CONTROL RUN-OFF. ALL EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED OF LEGALLY.
19. THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN ALL NECESSARY EROSION CONTROL MEASURES WHETHER OR NOT SHOWN ON THE PLANS TO PROTECT ADJACENT CREEKS, RIVERS, ROADWAYS, ETC. FROM SILTATION AND EROSION.
20. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND SHALL INSTALL TRAFFIC SAFETY MEASURES IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AT NO ADDITIONAL COST TO THE OWNER.
21. PRESENCE OF OWNERS' REPRESENTATIVE AT WORK SITE DOES NOT LESSEN THE CONTRACTOR RESPONSIBILITY FOR CONFORMING TO APPROVED CONSTRUCTION PLANS AND/OR SPECIFICATIONS. SHOULD THE ENGINEER OR INSPECTOR ACCEPT MATERIALS OR WORK THAT DOES NOT CONFORM WITH APPROVED PLANS OR SPECIFICATIONS, WHETHER FROM LACK OF DISCOVERY OR FOR ANY OTHER REASON, SHALL IN NO WAY PREVENT LATER REJECTION OR CORRECTIONS TO MATERIALS OR WORK WHEN DISCOVERED. CONTRACTOR TO HAVE NO CLAIM FOR LOSSES SUFFERED DUE TO ANY NECESSARY REMOVALS OR REPAIRS RESULTING FROM UNSATISFACTORY WORK. ANY WORK THAT HAS BEEN COVERED WITHOUT INSPECTOR APPROVAL SHALL BE UNCOVERED AND BE MADE AVAILABLE FOR OBSERVATION AT CONTRACTOR EXPENSE.
22. CONTRACTOR SHALL PROVIDE PROPER OIL POLLUTION PREVENTION MEASURES TO MINIMIZE THE IMPACT OF DIESEL FUEL TO THE ENVIRONMENT AT NO ADDITIONAL COST TO THE OWNER. MEASURES SHALL BE IN ACCORDANCE WITH STATE AND LOCAL LAWS.
23. CONTRACTOR TO RESTORE ALL DISTURBED DRIVEWAYS/ROADS TO ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER. ALL DRIVEWAYS SHALL BE REPAIRED AS SOON AS CONSTRUCTION HAS PASSED. A MINIMUM OF 6" OF CABC SHALL BE USED FOR TEMPORARY REPAIR ON ASPHALT AND CONCRETE DRIVEWAYS UNTIL PERMANENT REPAIR CAN BE COMPLETED, AND A MINIMUM OF 6" OF CABC SHALL BE USED AS PERMANENT REPAIR ON GRAVEL DRIVEWAYS.
24. MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES AT ALL TIMES AND PROVIDE MINIMUM 48 HOUR NOTICES PRIOR TO DISTURBANCE OF ACCESS TO THESE SITES. SECURE CONSTRUCTION SITE AT END OF WORK DAILY AND BACKFILL OR COVER EXCAVATIONS WITH STEEL PLATE SUITABLE FOR VEHICULAR TRAFFIC. MAINTAIN AND IMMEDIATELY RESTORE UTILITY SERVICES, TELEPHONE, NATURAL GAS OR INTERNET IF DAMAGED TO ADJACENT PROPERTIES.
25. POSITIVE DRAINAGE TO BE PROVIDED FOR ALL AREAS THROUGHOUT CONSTRUCTION.
26. THE CONTRACTOR SHALL INCLUDE IN THE COST OF THE PROPOSED UTILITIES, ALL SHEETING, SHORING, ROADWAY PLATING, PROTECTIVE PLATING, AND TEMPORARY AND/OR PERMANENT RESTORATION AS SHOWN IN THE CONTRACT DOCUMENTS.
27. PIPE TRENCHES TO BE NO STEEPER THAN 1:1 FROM EDGE OF EXISTING PAVEMENT.
28. COMPLETELY REMOVE UNSTABLE AND/OR ORGANIC MATERIAL ("MUCK") ENCOUNTERED IN TRENCHES OR IN ROADWAYS AND REPLACE WITH SUITABLE MATERIAL AND COMPACT AS SPECIFIED.
29. PROVIDE FOR AND MAINTAIN SAFETY MEASURES NECESSARY FOR PROTECTION OF ALL PERSONS ON WORK SITE AND FULLY COMPLY WITH ALL LAWS, REGULATIONS, AND BUILDING CODE REQUIREMENTS TO PREVENT ACCIDENT OR INJURY TO PERSONS ON OR ABOUT LOCATION OF WORK, INCLUDING ALL APPLICABLE PROVISIONS OF OSHA REGULATIONS. BARRICADE ALL WALKS, ROADS, AND AREAS TO KEEP PUBLIC AWAY FROM CONSTRUCTION. ALL TRENCHES, EXCAVATIONS, OR OTHER HAZARDS IN VICINITY OF WORK TO BE WELL BARRICADED, AND PROPERLY LIGHTED AT NIGHT.
30. DURING CONSTRUCTION IF CONCRETE THRUST BLOCKS ARE FOUND ALONG THE PROPOSED ALIGNMENT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF CONCRETE INTERFERING WITH THE PROPOSED ALIGNMENT.
31. HORIZONTAL DATUM IS NAD 83(2011).
32. VERTICAL DATUM IS NAVD 88.
33. FINAL CONNECTIONS OF PROPOSED WATER MAINS ARE TO BE MADE AFTER THE PROPOSED WATER MAIN PASSES PRESSURE TESTING AND BACTERIA TESTING, AND AFTER FINAL APPROVAL BY THE CITY OF LUMBERTON.

RELATION OF WATER MAINS TO NON-POTABLE WATER MAINS

1. FOR THE PURPOSES OF THIS RULE, SEWER SHALL MEAN ANY EXISTING OR PROPOSED GRAVITY OR FORCE MAIN USED TO CONVEY SANITARY OR INDUSTRIAL PROCESS WASTE.
2. LATERAL SEPARATION OF SEWERS AND WATER MAINS. WATER MAINS SHALL BE LAID AT LEAST 10 FEET Laterally FROM EXISTING OR PROPOSED SEWERS, UNLESS LOCAL CONDITIONS OR BARRIER PREVENT 10-FOOT LATERAL SEPARATION, IN WHICH CASE:
 - A. THE WATER MAIN SHALL BE LAID IN SEPARATE TRENCH, WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER; OR
 - B. THE WATER MAIN SHALL BE LAID IN THE SAME TRENCH AS THE SEWER, WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
3. CROSSINGS. A WATER MAIN THAT CROSSES A SEWER SHALL BE LAID A MINIMUM VERTICAL DISTANCE OF 18 INCHES FROM THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER, EITHER ABOVE OR BELOW THE SEWER, WITH PREFERENCES TO THE WATER MAIN LOCATED ABOVE THE SEWER. ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
4. WATER MAINS AND STORM SEWER PIPES. PIPES CARRYING STORM DRAINAGE SHALL BE SEPARATED FROM WATER MAINS IN ACCORDANCE WITH SECTION 3 OF THIS RULE, 12 INCHES.
5. WATER MAINS AND RECLAIMED WATER DISTRIBUTION LINES. WATER MAINS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM OR AT LEAST 18 INCHES ABOVE WATER PIPES CARRYING TREATED AND DISINFECTED WASTEWATER IN RECLAIMED WATER DISTRIBUTION LINES. CROSSINGS SHALL BE MADE IN ACCORDANCE WITH SECTION 3 OF THIS RULE.
6. SPECIAL CONDITIONS. IF AN ENGINEER DEMONSTRATES IT IS IMPRACTICABLE TO MAINTAIN THE SEPARATION DISTANCES REQUIRED BY THIS RULE, TAKING INTO CONSIDERATION FEASIBILITY, COST, AND THE FACTORS SET FORTH IN THIS PARAGRAPH, THE DEVIATION MAY BE APPROVED ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA AND ALTERNATIVE CONSTRUCTION CRITERIA PROVIDED BY THE DESIGN ENGINEER. DATA AND ALTERNATIVE CONSTRUCTION CRITERIA SUBMITTED BY THE DESIGN ENGINEER TO JUSTIFY THE DEVIATION MUST DESCRIBE:
 - A. 1) THE RATIONALE FOR DETERMINING THAT SEPARATION CRITERIA DESCRIBED IN THIS RULE ARE IMPRACTICABLE;
 - B. 2) THE EXTENT OF THE DEVIATION FROM SEPARATION CRITERIA IN THIS RULE;
 - C. 3) A CONSIDERATION OF PIPE MATERIALS, PRESSURE RATINGS, TYPE OF JOINTS FOR WATER MAIN AND NON-POTABLE WATER MAIN, AND SOIL CONDITIONS;
 - D. 4) THE ABILITY TO PROVIDE ADEQUATE WORK SPACE TO REPAIR OR REPLACE PIPE SEGMENTS OR OTHER UTILITY INFRASTRUCTURE WITHOUT CAUSING DAMAGE TO OR OTHERWISE COMPROMISING THE INTEGRITY OF PIPES; AND
 - E. 5) THE RATIONALE FOR DETERMINING THAT THE DEVIATION WILL NOT RESULT IN UNREASONABLE RISK TO PUBLIC HEALTH.



**Schedule 2A:
10-Unit T-Hangar**
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

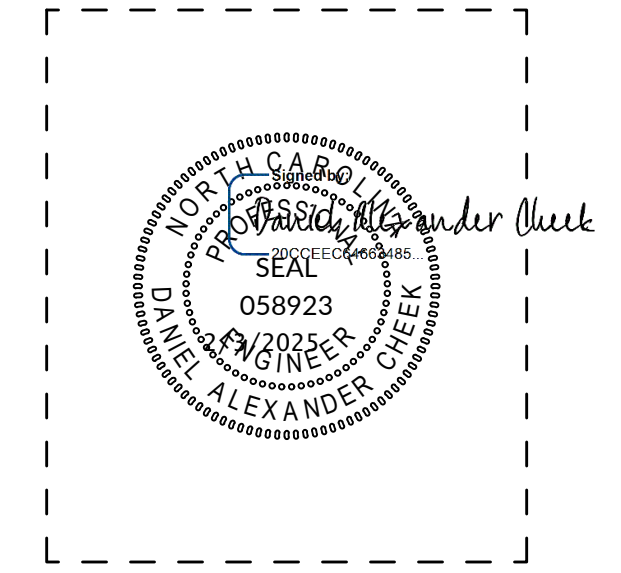
UTILITY NOTES

SHEET NUMBER

CB-160



Schedule 2A:
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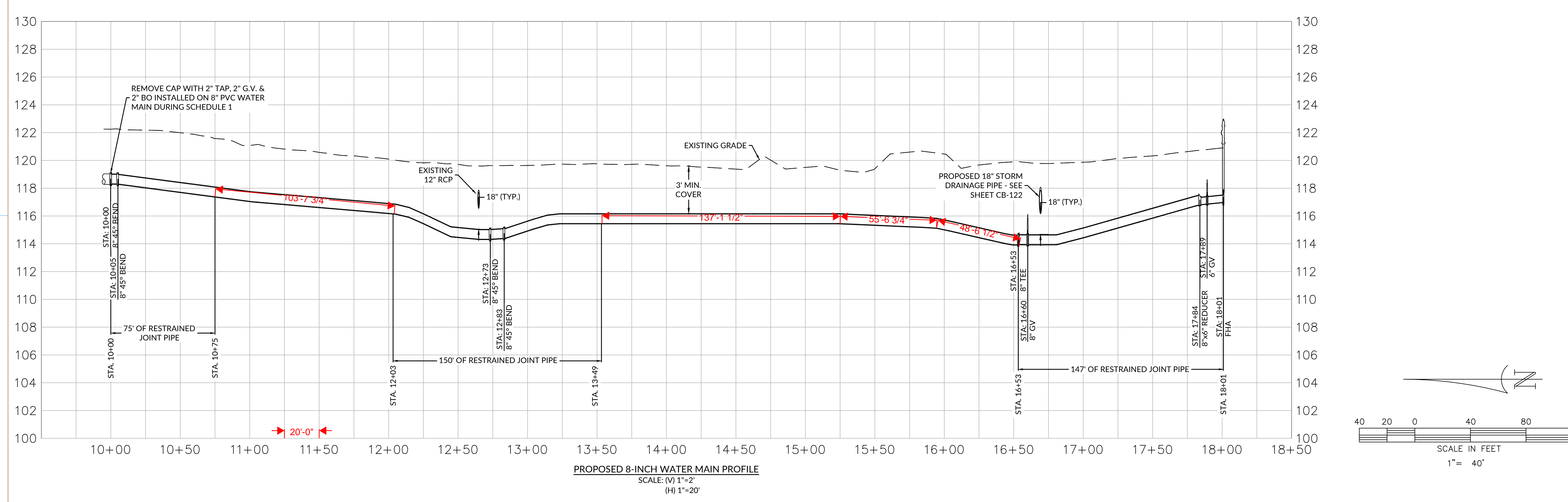
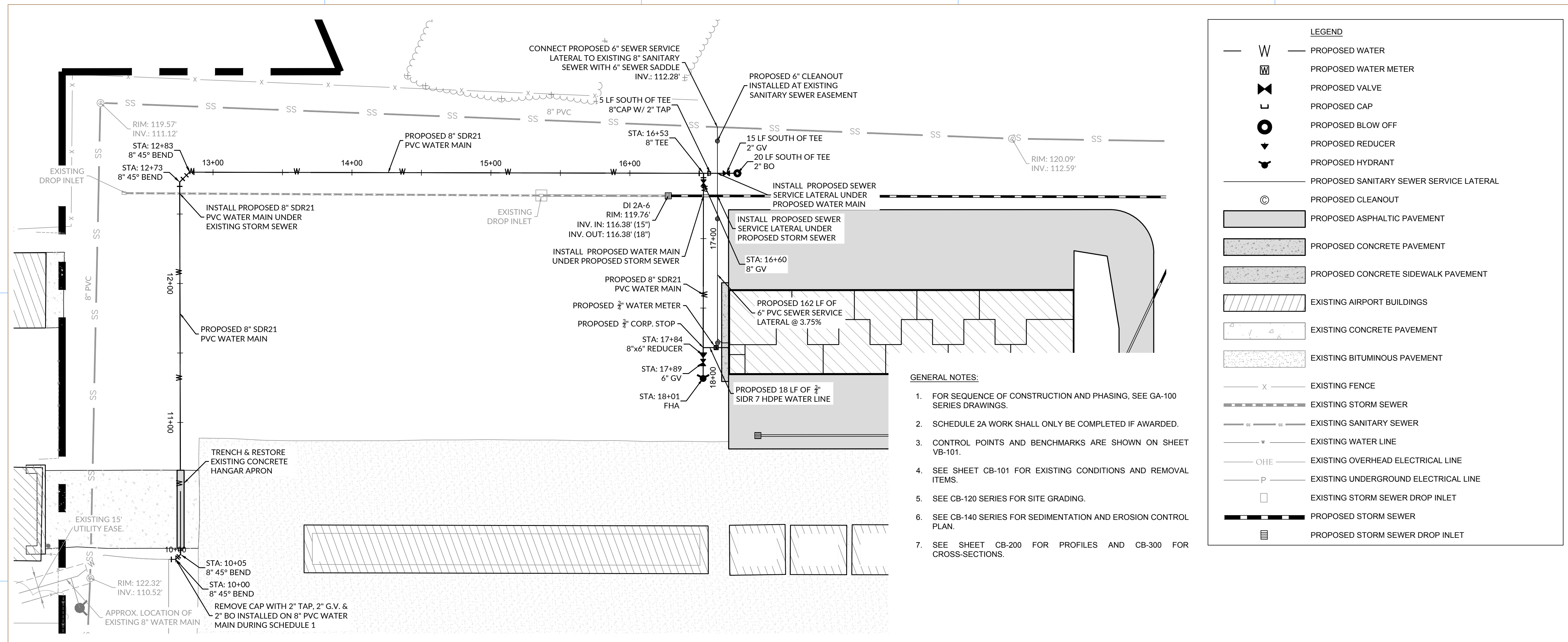
- 1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

**UTILITY PLAN
(SCHEDULE 2A)**

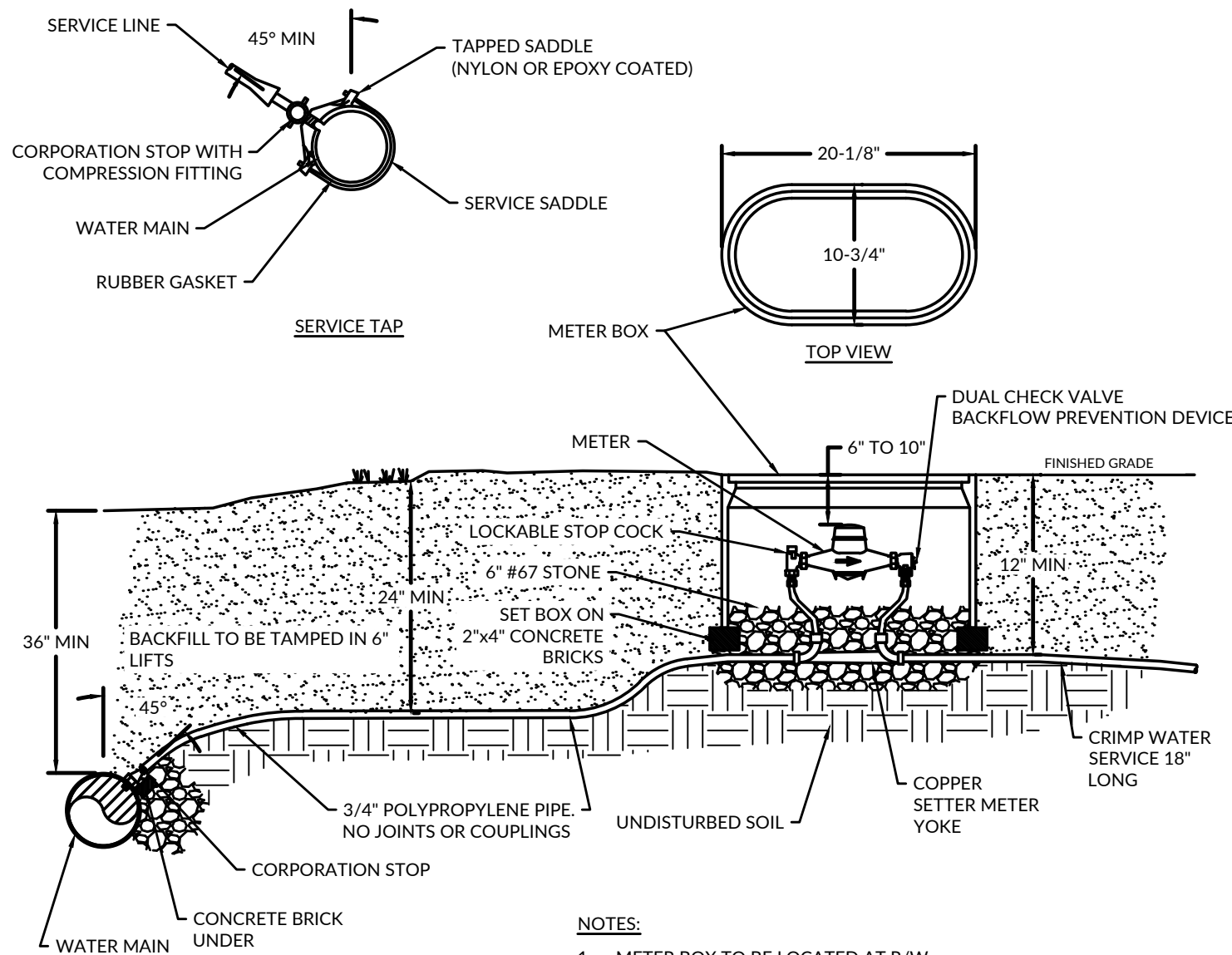
SHEET NUMBER

CB-161



NOTES:

1. SINGLE SS STRAP SADDLE FOR WATER MAINS 4" AND LESS.
2. DOUBLE SS STRAP SADDLE FOR WATER MAINS LARGER THAN 4".



NOTES:

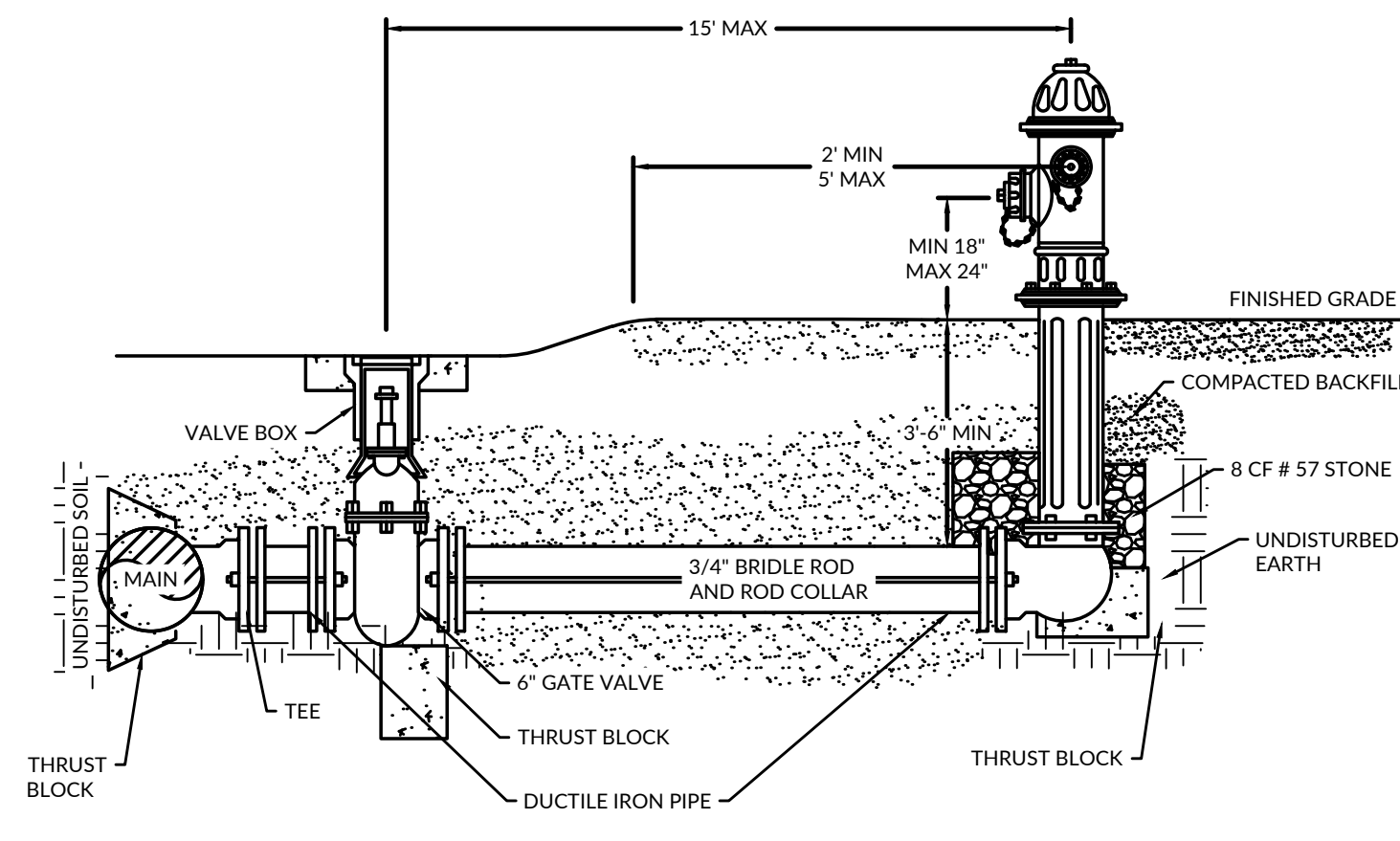
1. METER BOX TO BE LOCATED AT R/W.
2. ALL FITTINGS TO BE FLARED. COMPRESSION FITTINGS ARE NOT ALLOWED.
3. METER TO READ IN 100's OF GALLONS.
4. PLACE WASHED STONE UNDER AND AROUND PIPE TO PROTECT CORPORATION STOP.

TYPICAL WATER SERVICE

Scale:NTS

WATER DISTRIBUTION

C6051



NOTES:

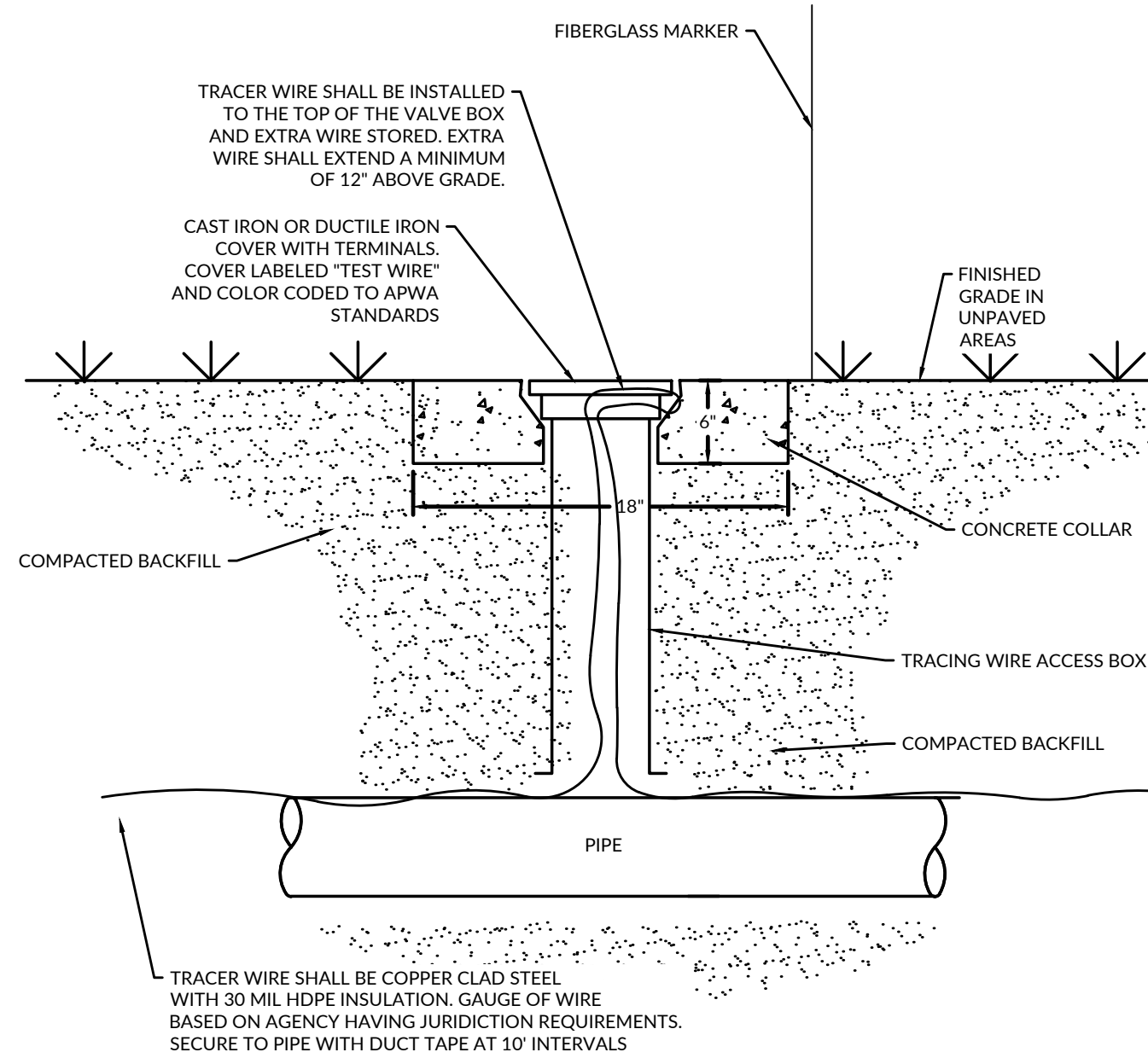
1. HYDRANT TO BE PLACED WITH PUMPER NOZZLE FACING THE CLOSEST EDGE OF PAVEMENT.
2. ALL JOINTS TO BE RESTRAINED BACK TO TEE. REFER TO AUTHORITY HAVING JURISDICTION FOR SPECIFIC RESTRAINT DETAIL AND REQUIREMENTS.
3. HYDRANT TO BE AMERICAN DARLING, UNLESS OTHERWISE INDICATED AND APPROVED BY OWNER

FIRE HYDRANT ASSEMBLY

Scale:NTS

WATER DISTRIBUTION

C6001

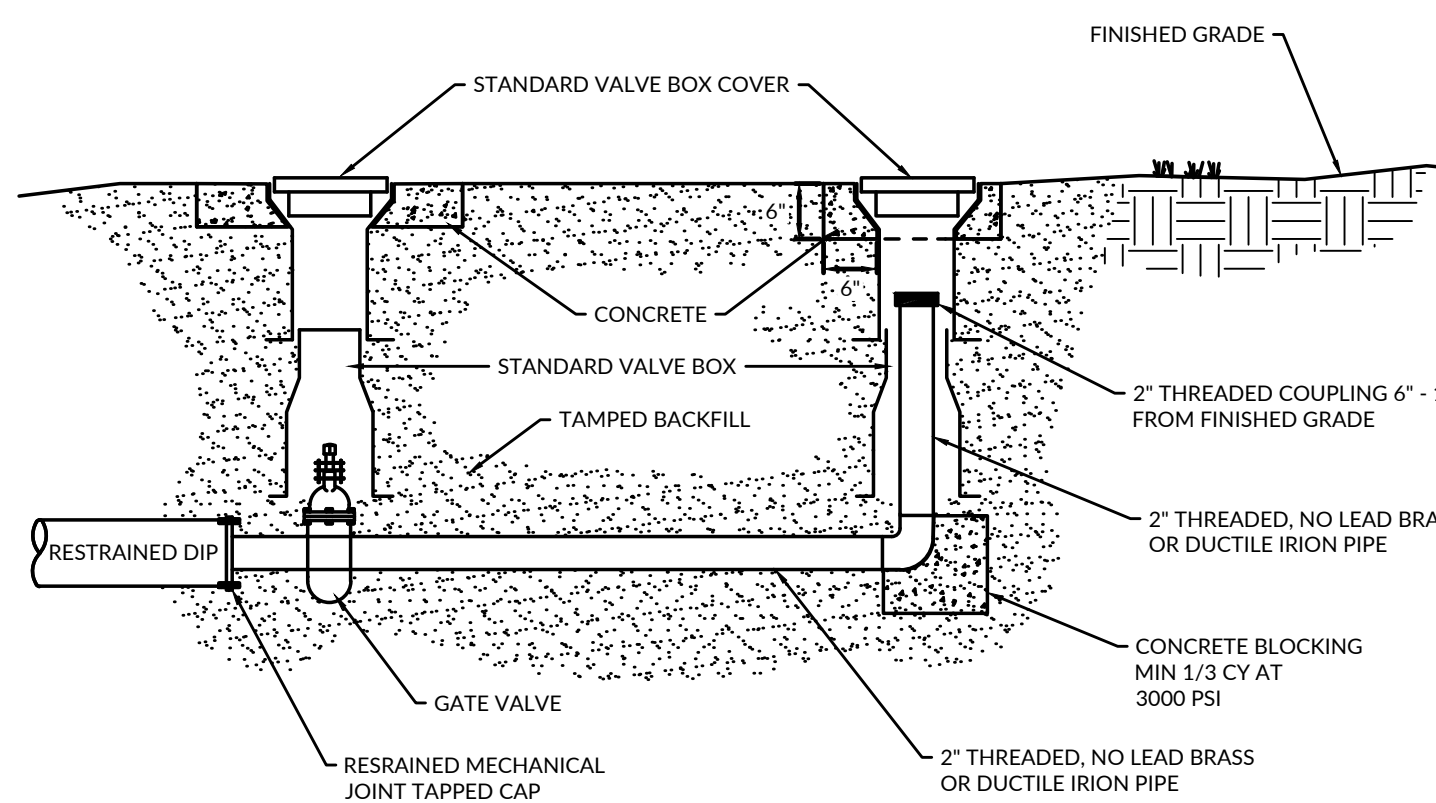


TRACING WIRE TESTING STATION

Scale:NTS

MISC - UTILITIES

C2551



BLOW-OFF 2 INCH ASSEMBLY

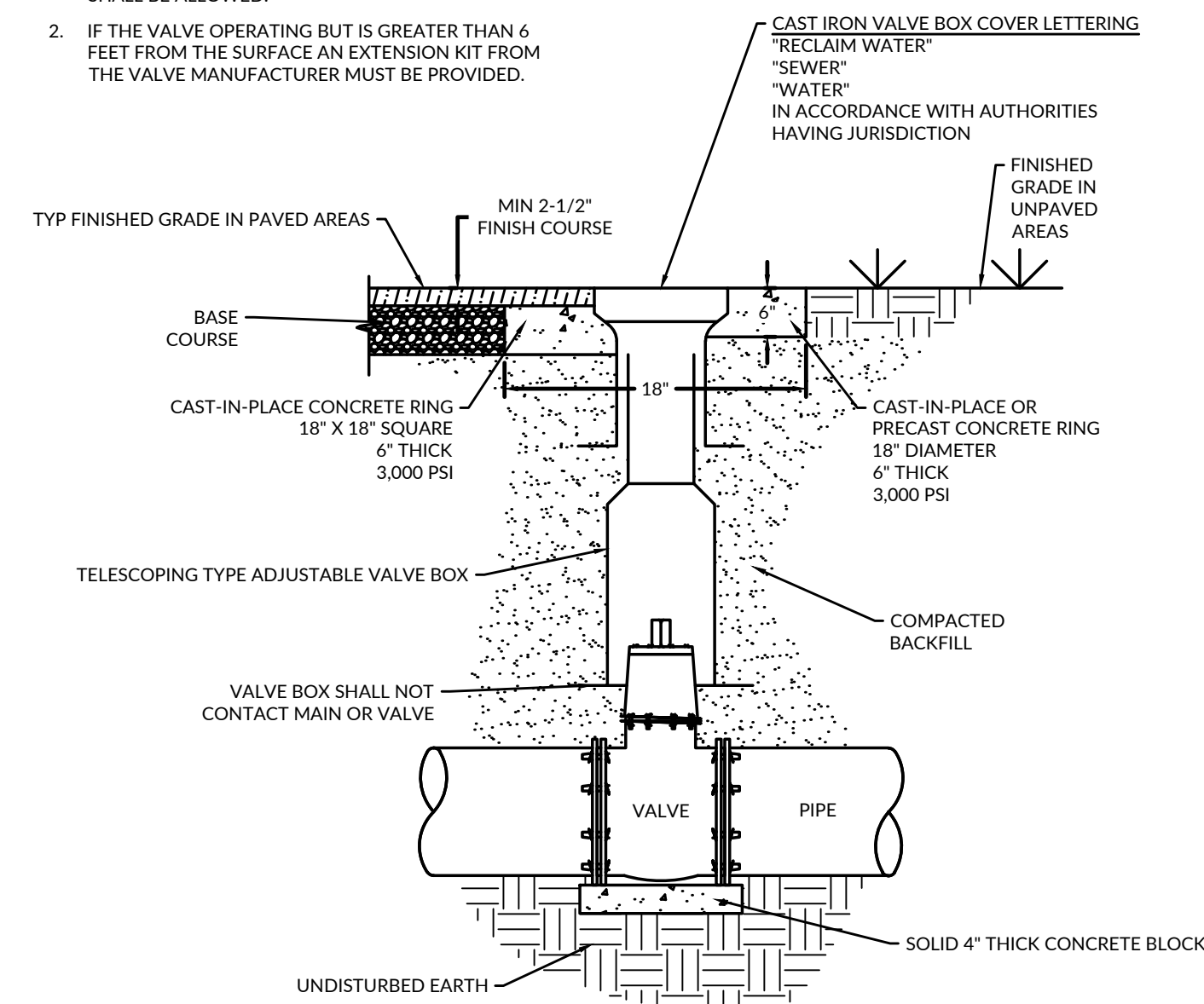
Scale:NTS

MISC - UTILITIES

CXxxx

NOTES:

1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. IF THE VALVE OPERATING BUT IS GREATER THAN 6 FEET FROM THE SURFACE AN EXTENSION KIT FROM THE VALVE MANUFACTURER MUST BE PROVIDED.

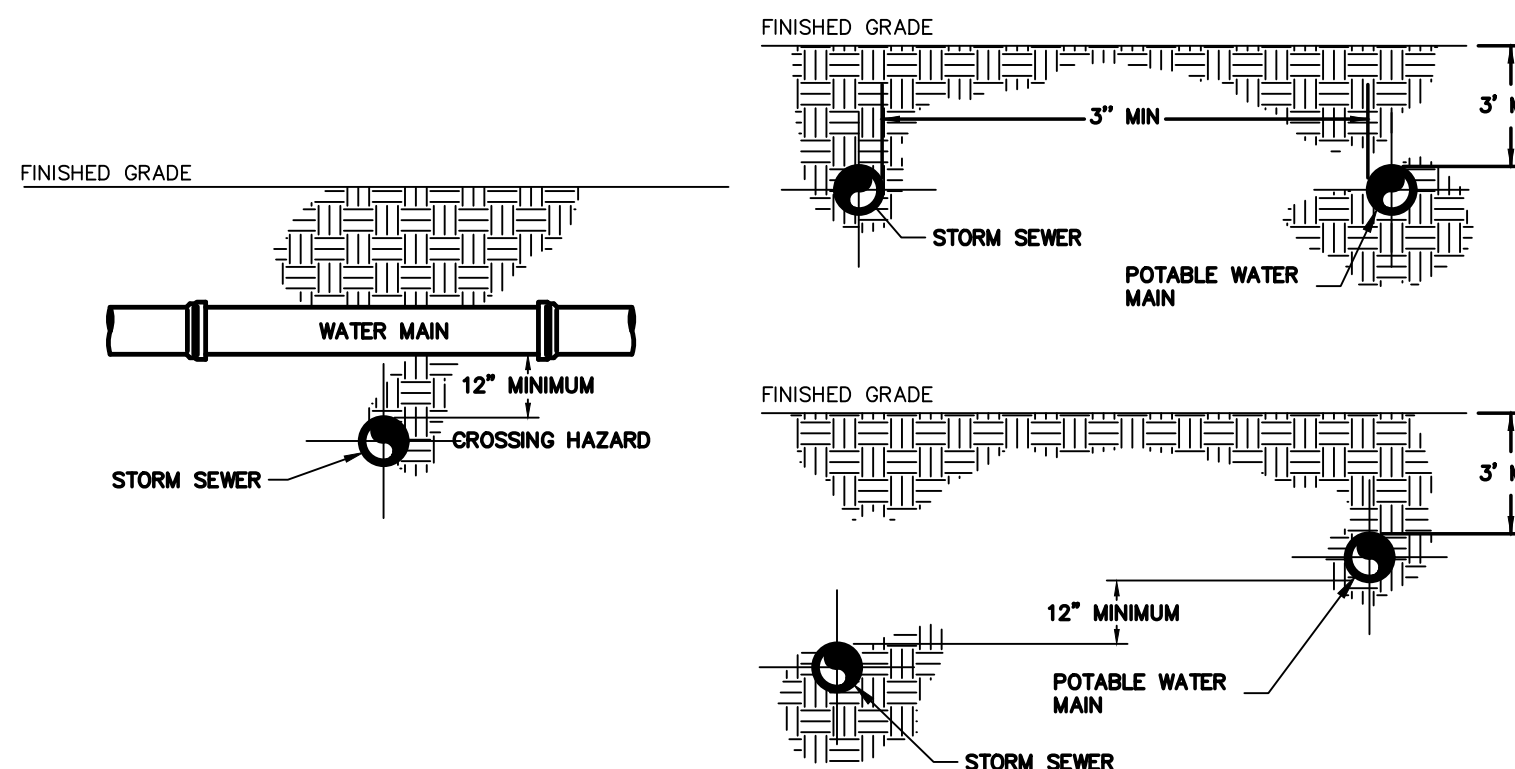


GATE VALVE AND VALVE BOX

Scale:NTS

MISC - UTILITIES

C2501



SANITARY GRAVITY, FORCE MAIN, REUSE MAIN, STORM SEWER, & POTABLE WATER MAIN SEPARATION NOTES & SOLUTIONS

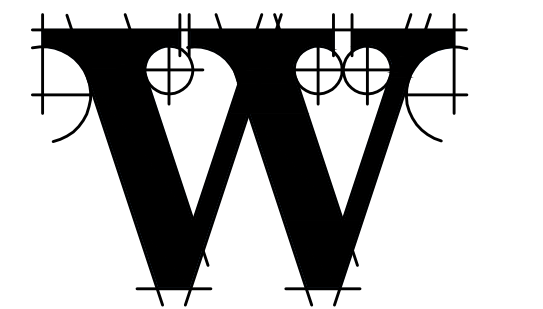
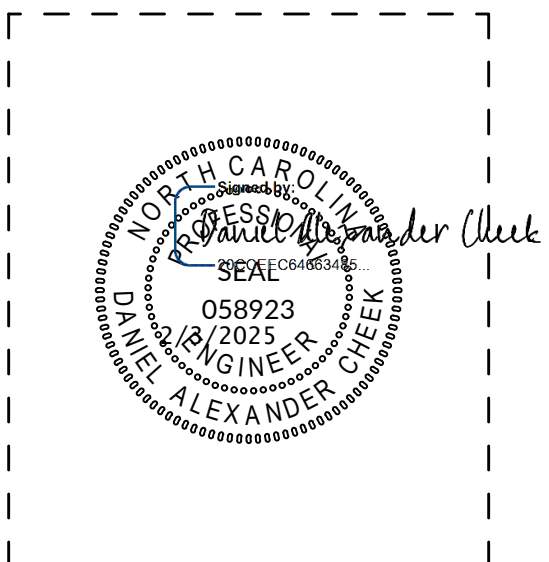
1. A MINIMUM HORIZONTAL SEPARATION OF THREE (3) FEET OUTSIDE TO OUTSIDE SHALL BE MAINTAINED BETWEEN WATER MAINS AND STORM SEWER LINES.
2. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SANITARY SEWER MANHOLE OR STORM SEWER STRUCTURE.
3. A MINIMUM VERTICAL SEPARATION OF TWELVE (12) INCHES OUTSIDE TO OUTSIDE SHALL BE MAINTAINED BETWEEN WATER MAIN AND STORM SEWER LINES.
4. SPECIAL STRUCTURAL SUPPORT OR CONCRETE SADDLES MAY BE NECESSARY AT THE CROSSING LOCATION.
5. IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE CROSSING HAZARD.
6. DEVIATIONS AND OTHER ALTERNATIVES SHALL BE CONSIDERED ON CASE-BY-CASE BASIS AND MUST RECEIVE SPECIFIC APPROVAL BY NCDENR PRIOR TO IMPLEMENTATION

UTILITY SEPARATION

NOT TO SCALE



**Schedule 2A:
10-Unit T-Hangar**
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

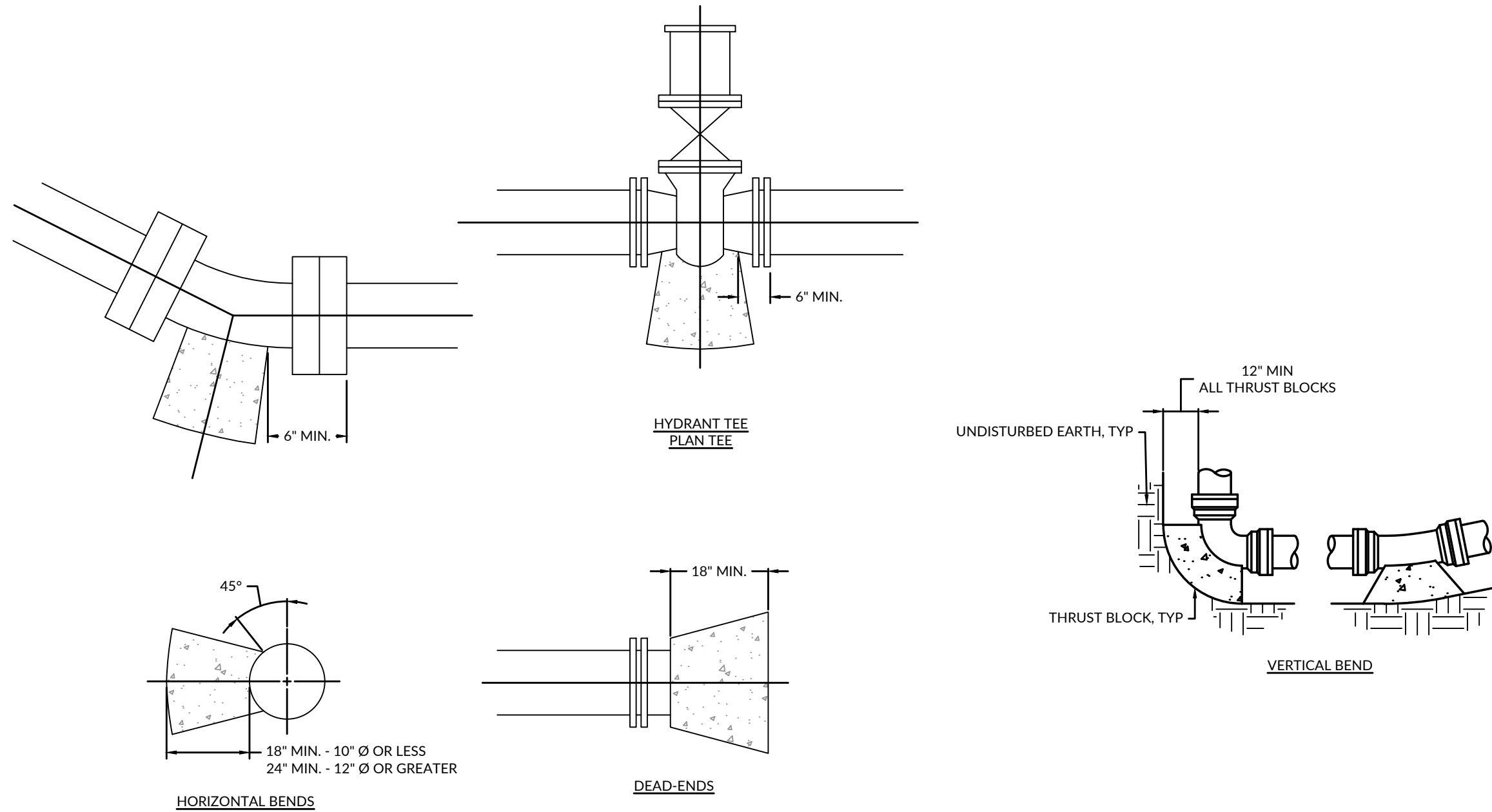
1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

**UTILITY DETAILS
(SHEET 1 OF 3)**

SHEET NUMBER

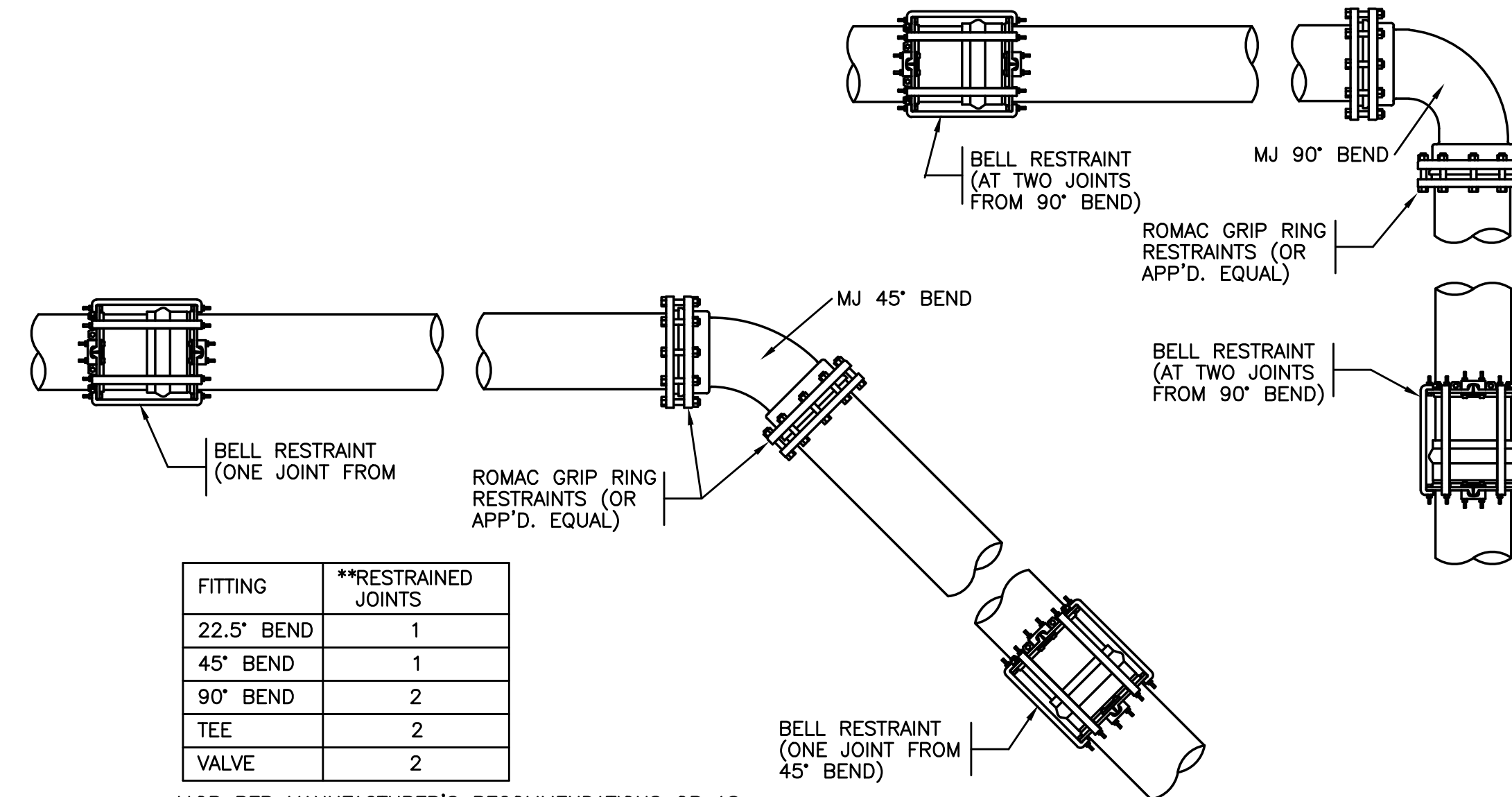
CB-560



- NOTES:
1. CONCRETE SHALL BE 3,000 psi.
 2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
 3. CONCRETE FOR THRUST BLOCKING SHALL BE KEPT FAIRLY DRY, THUS MAKING THE CONCRETE WEDGE SHAPE MORE EASILY FORMED WITH THE WIDEST PART (BLOCKING AREA) AGAINST UNDISTURBED SOIL.
 4. ALL PIPING AND ACCESSORIES TO BE WRAPPED WITH 10 mil. POLYETHYLENE PRIOR TO POURING BLOCKING.
 5. VOLUME OF THRUST BLOCKING SHALL BE AS SHOWN ON THE THRUST BLOCKING SCHEDULE.
 6. THRUST BLOCKS TO BE INSTALLED AT ALL LOCATIONS WHERE THRUST IS EXPECTED (i.e. BENDS, TEES, REDUCERS, DEAD ENDS, etc.).
 7. THRUST BLOCK IS TO BE POURED AGAINST UNDISTURBED EARTH.

THRUST DETAILS - PLUGS, TEES, & BENDS (1 OF 3)
Scale:NTS

UTILITY TRENCHES
C5022 (1 OF 3)



FITTING	**RESTRAINED JOINTS
22.5° BEND	1
45° BEND	1
90° BEND	2
TEE	2
VALVE	2

**OR PER MANUFACTURER'S RECOMMENDATIONS OR AS SHOWN ON PLANS, WHICHEVER IS MORE STRINGENT

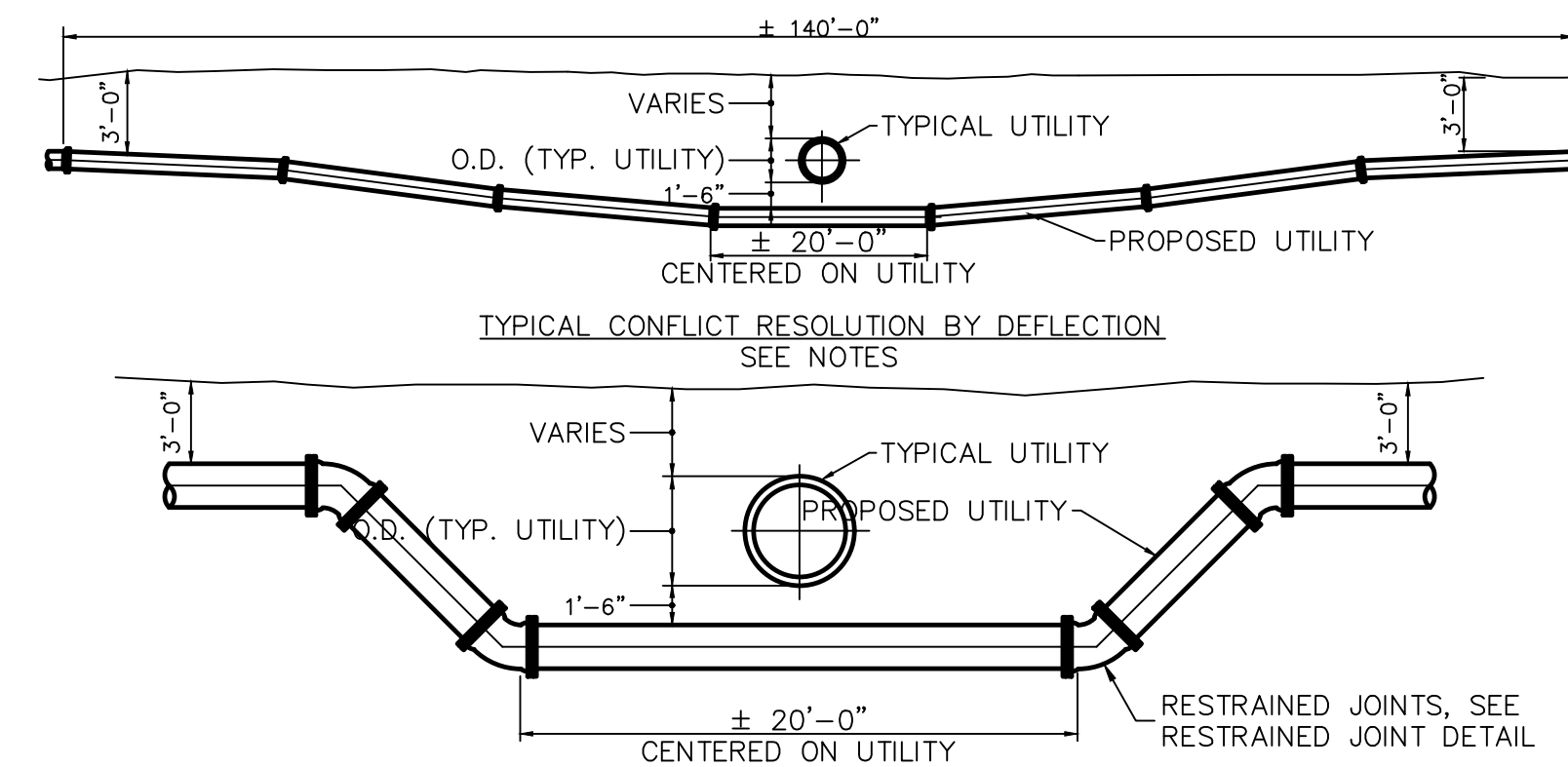
NOTE:
RESTRAINTS SHALL BE INCLUDED FOR ALL VALVES AND TEES AS SPECIFIED IN THE TABLE OR AS SHOWN ON PLANS, WHICHEVER IS MORE STRINGENT.

FITTING AND JOINT RESTRAINT
NOT TO SCALE

Test Pressure	Bend Thrust Block Bearing Areas									
	200 psi		Soil Bearing Capacity							
	Factor of Safety	1.5	Quicksand Very Poor	Gravel/Coarse Sand	Soft Clay	Sand Clean Dry	Moderately Dry Clay	Dry Clay Always Dry	Rock Poor	Rock Poor
Pipe Size	Fitting	Thrust	Blocking Area							
1.5 in	11.25	69 lbs	0.10 sf	0.06 sf	0.05 sf	0.03 sf	0.02 sf	0.01 sf	0.01 sf	
	22.50	138 lbs	0.21 sf	0.13 sf	0.10 sf	0.05 sf	0.03 sf	0.02 sf	0.02 sf	
	45.00	270 lbs	0.41 sf	0.25 sf	0.20 sf	0.10 sf	0.07 sf	0.05 sf	0.04 sf	
	90.00	500 lbs	0.75 sf	0.47 sf	0.37 sf	0.19 sf	0.12 sf	0.09 sf	0.07 sf	
2 in	11.25	123 lbs	0.18 sf	0.12 sf	0.09 sf	0.05 sf	0.03 sf	0.02 sf	0.02 sf	
	22.50	245 lbs	0.37 sf	0.23 sf	0.18 sf	0.09 sf	0.06 sf	0.05 sf	0.04 sf	
	45.00	481 lbs	0.72 sf	0.45 sf	0.36 sf	0.18 sf	0.12 sf	0.09 sf	0.07 sf	
	90.00	888 lbs	1.33 sf	0.83 sf	0.67 sf	0.33 sf	0.22 sf	0.17 sf	0.13 sf	
3 in	11.25	277 lbs	0.42 sf	0.26 sf	0.21 sf	0.10 sf	0.07 sf	0.05 sf	0.04 sf	
	22.50	553 lbs	0.83 sf	0.52 sf	0.41 sf	0.21 sf	0.14 sf	0.10 sf	0.08 sf	
	45.00	1,081 lbs	1.62 sf	1.01 sf	0.81 sf	0.41 sf	0.27 sf	0.20 sf	0.16 sf	
	90.00	1,998 lbs	3.00 sf	1.87 sf	1.50 sf	0.75 sf	0.50 sf	0.30 sf	0.30 sf	
4 in	11.25	492 lbs	0.74 sf	0.46 sf	0.37 sf	0.18 sf	0.12 sf	0.09 sf	0.07 sf	
	22.50	980 lbs	1.47 sf	0.92 sf	0.74 sf	0.37 sf	0.25 sf	0.18 sf	0.15 sf	
	45.00	1,923 lbs	2.88 sf	1.80 sf	1.44 sf	0.72 sf	0.48 sf	0.36 sf	0.29 sf	
	90.00	3,553 lbs	5.33 sf	3.33 sf	2.66 sf	1.33 sf	0.89 sf	0.63 sf	0.53 sf	
6 in	11.25	1,108 lbs	1.66 sf	1.04 sf	0.83 sf	0.42 sf	0.28 sf	0.21 sf	0.17 sf	
	22.50	2,205 lbs	3.31 sf	2.07 sf	1.65 sf	0.83 sf	0.55 sf	0.41 sf	0.33 sf	
	45.00	4,226 lbs	6.49 sf	4.06 sf	3.24 sf	1.62 sf	1.08 sf	0.81 sf	0.65 sf	
	90.00	7,993 lbs	11.99 sf	7.49 sf	5.99 sf	3.00 sf	2.00 sf	1.50 sf	1.20 sf	
8 in	11.25	1,970 lbs	2.95 sf	1.85 sf	1.48 sf	0.74 sf	0.49 sf	0.37 sf	0.30 sf	
	22.50	3,923 lbs	5.88 sf	3.68 sf	2.94 sf	1.47 sf	0.98 sf	0.74 sf	0.59 sf	
	45.00	7,690 lbs	11.54 sf	7.21 sf	5.77 sf	2.88 sf	1.92 sf	1.44 sf	1.15 sf	
	90.00	14,210 lbs	21.32 sf	13.32 sf	10.66 sf	5.33 sf	3.55 sf	2.66 sf	2.13 sf	
10 in	11.25	3,078 lbs	4.62 sf	2.89 sf	2.31 sf	1.15 sf	0.77 sf	0.58 sf	0.46 sf	
	22.50	6,126 lbs	9.19 sf	5.74 sf	4.59 sf	2.30 sf	1.53 sf	1.15 sf	0.92 sf	
	45.00	12,016 lbs	18.02 sf	11.27 sf	9.01 sf	4.51 sf	3.00 sf	2.25 sf	1.80 sf	
	90.00	22,209 lbs	33.30 sf	20.82 sf	16.65 sf	8.33 sf	5.55 sf	4.16 sf	3.33 sf	
12 in	11.25	4,432 lbs	6.65 sf	4.15 sf	3.32 sf	1.66 sf	1.11 sf	0.83 sf	0.66 sf	
	22.50	8,821 lbs	13.23 sf	8.27 sf	6.62 sf	3.31 sf	2.21 sf	1.65 sf	1.32 sf	
	45.00	17,303 lbs	25.96 sf	16.22 sf	12.98 sf	6.49 sf	4.33 sf	3.24 sf	2.60 sf	
	90.00	31,973 lbs	47.96 sf	29.97 sf	23.98 sf	11.99 sf	7.99 sf	5.99 sf	4.80 sf	
14 in	11.25	6,032 lbs	9.05 sf	5.66 sf	4.52 sf	2.26 sf	1.51 sf	1.13 sf	0.90 sf	
	22.50	12,007 lbs	18.01 sf	11.26 sf	9.00 sf	4.50 sf	3.00 sf	2.25 sf	1.80 sf	
	45.00	23,552 lbs	35.33 sf	22.08 sf	17.66 sf	8.83 sf	5.89 sf	4.42 sf	3.53 sf	
	90.00	43,518 lbs	65.28 sf	40.80 sf	32.64 sf	16.32 sf	10.88 sf	8.16 sf	6.53 sf	
16 in	11.25	7,879 lbs	11.82 sf	7.39 sf	5.91 sf	2.95 sf	1.97 sf	1.48 sf	1.18 sf	
	22.50	15,682 lbs	23.52 sf	14.70 sf	11.76 sf	5.88 sf	3.92 sf	2.94 sf	2.35 sf	
	45.00	30,762 lbs	46.14 sf	28.84 sf	23.07 sf	11.54 sf	7.69 sf	5.77 sf	4.61 sf	
	90.00	56,840 lbs	85.26 sf	53.29 sf	42.63 sf	21.32 sf	14.21 sf	10.66 sf	8.53 sf	
18 in	11.25	9,972 lbs	14.96 sf	9.35 sf	7.48 sf	3.74 sf	2.49 sf	1.87 sf	1.50 sf	
	22.50	19,848 lbs	29.77 sf	18.61 sf	14.89 sf	7.44 sf	4.96 sf	3.72 sf	2.98 sf	
	45.00	38,933 lbs	58.40 sf	36.50 sf	29.20 sf	14.60 sf	9.73 sf	7.20 sf	5.84 sf	
	90.00	71,938 lbs	107.91 sf	67.44 sf	53.95 sf	28.98 sf	17.98 sf	13.49 sf	10.77 sf	

THRUST DETAILS - PLUGS, TEES, & BENDS (2 OF 3)
Scale:NTS

UTILITY TRENCHES
C5022 (2 OF 3)



- NOTES:
1. THIS DETAIL SHALL BE USED TO AVOID EXISTING UTILITIES THAT ARE SHOWN ON THE DRAWINGS.
 2. PIPE DEFLECTION MUST NOT EXCEED MANUFACTURER'S RECOMMENDATION.

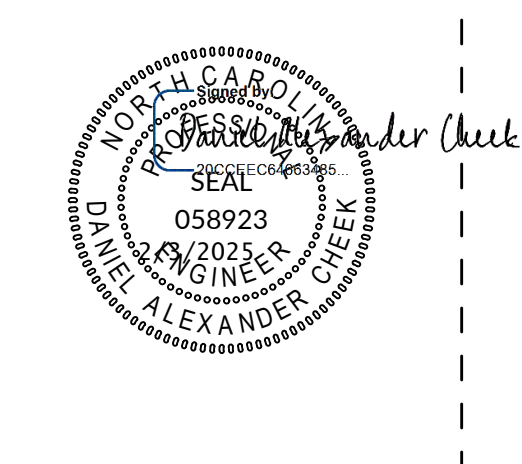
- NOTES:
1. THIS DETAIL SHALL BE USED UNDER THE FOLLOWING CONDITIONS:

- 1.A. WHERE IT IS SPECIFICALLY SHOWN ON THE DRAWINGS
- 1.B. WHEN UTILITIES NOT SHOWN ON THE PLAN, ARE ENCOUNTERED.

CONFLICT RESOLUTION BY DEFLECTION OR FITTINGS
NOT TO SCALE



Schedule 2A:
10-Unit T-Hanger
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

1 - ADDENDUM #1

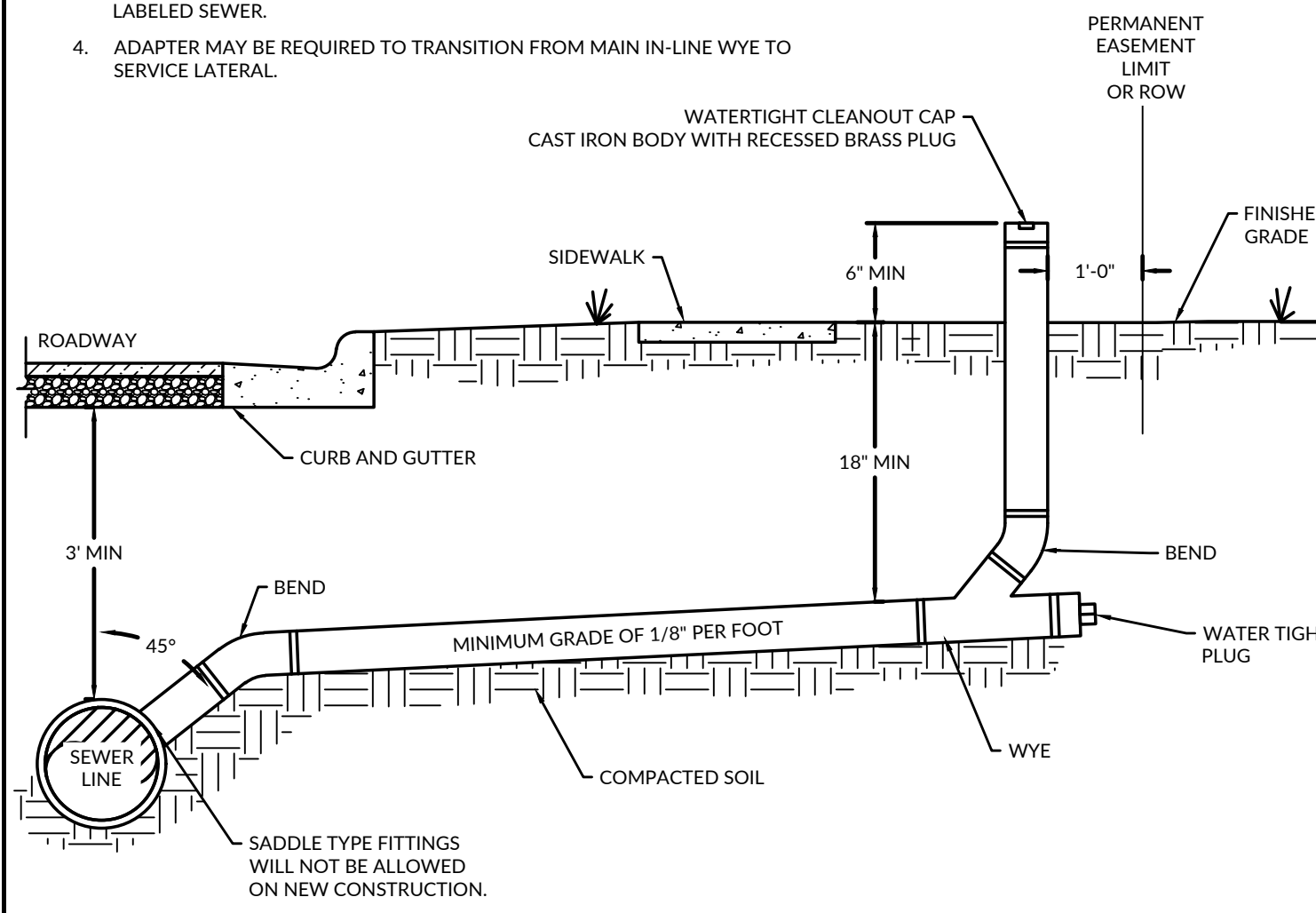
DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

UTILITY DETAILS (SHEET 2 OF 3)

SHEET NUMBER
CB-561

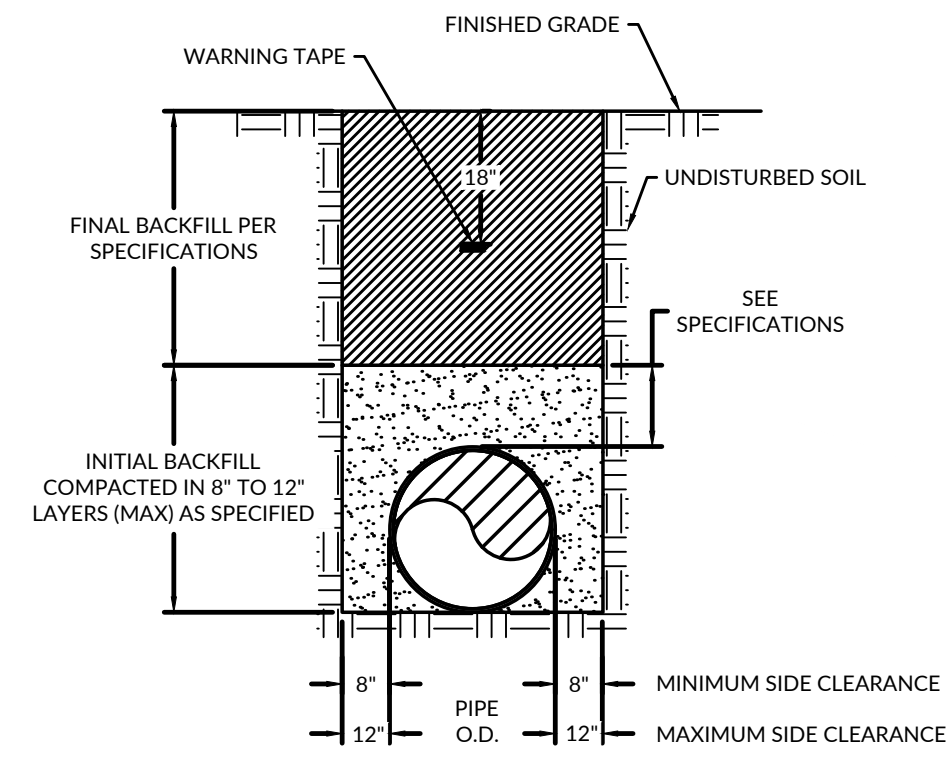
NOTES:

- SANITARY SEWER SERVICES WHICH ARE 8 TO 14 FEET DEEP SHALL REQUIRE BEDDING IN ACCORDANCE WITH BEDDING DETAIL FOR FLEXIBLE PIPE.
- SERVICES OVER 14' AND UNDER 3' DEEP SHALL BE DIP.
- ENTIRE SERVICE SHALL BE SAME MATERIAL UNLESS IN PAVED AREAS (WHERE THE WYE, BEND AND RISER MUST BE DUCTILE IRON). WHEN CLEANOUT IS IN PAVEMENT IT MUST BE INSTALLED INSIDE A VALVE BOX WITH COVER LABELED SEWER.
- ADAPTER MAY BE REQUIRED TO TRANSITION FROM MAIN IN-LINE WYE TO SERVICE LATERAL.

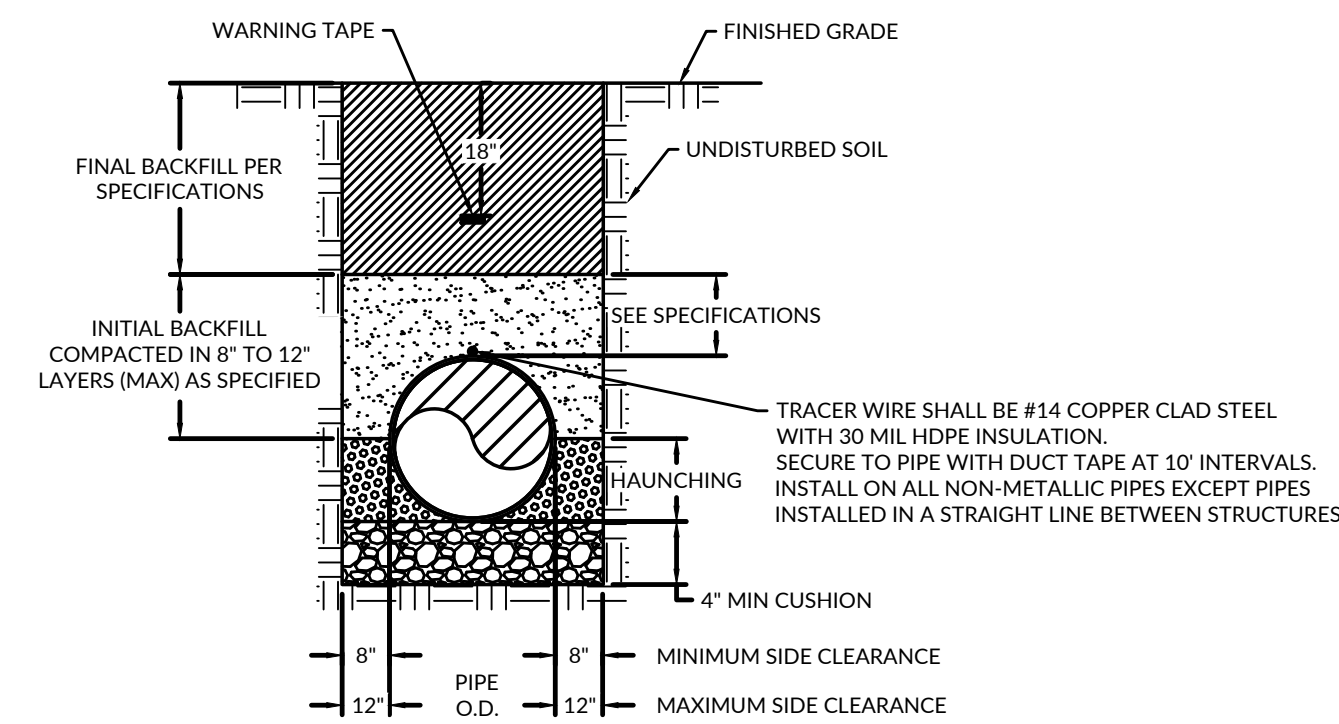


SANITARY SEWER TAP AND SERVICE
Scale: NTS

WASTEWATER COLLECTION SYSTEMS
C7032



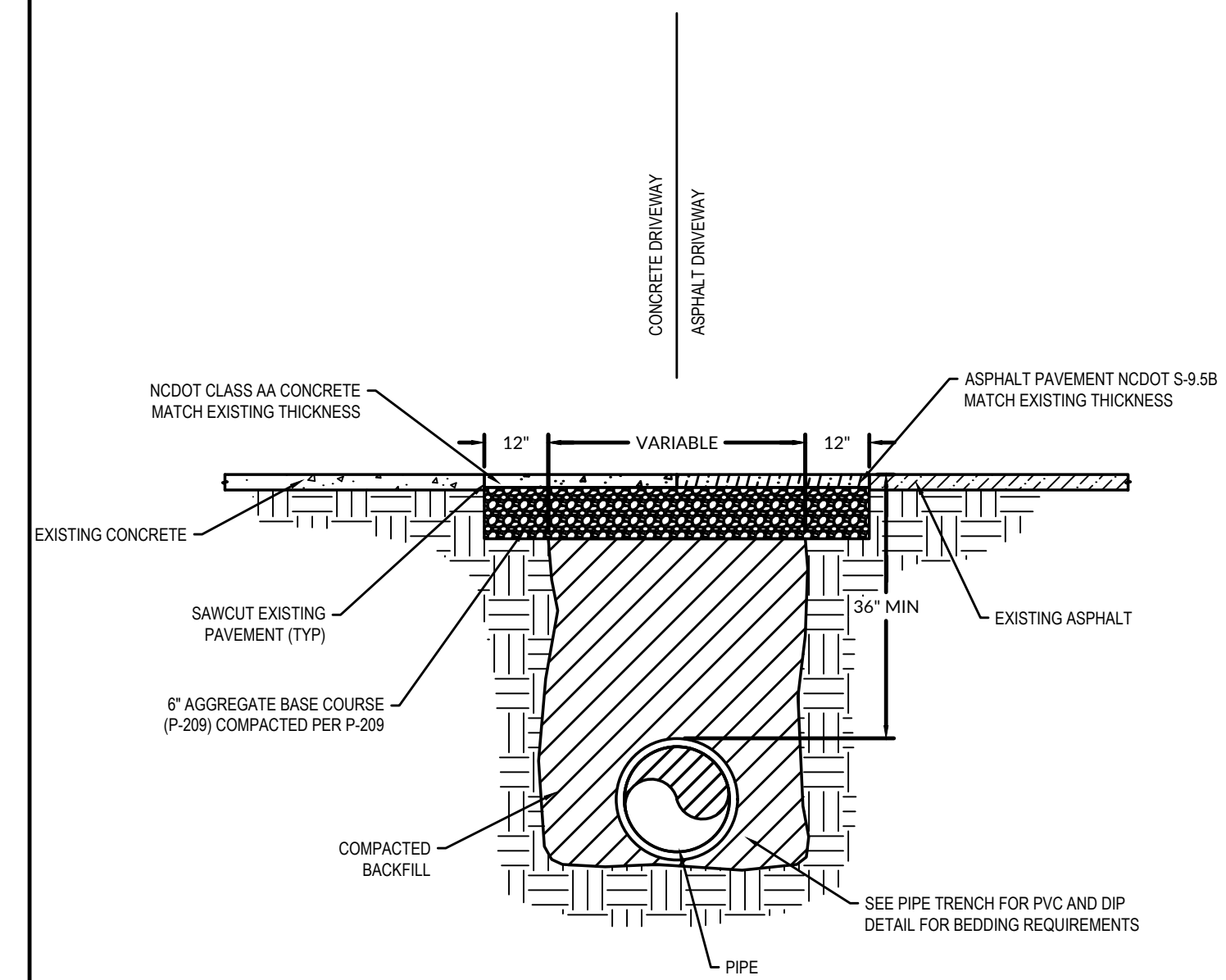
BEDDING REQUIRED FOR DIP



BEDDING REQUIRED FOR PVC

PIPE TRENCH FOR PVC AND DIP
Scale: NTS

UTILITY TRENCHES
C5001



NOTE:

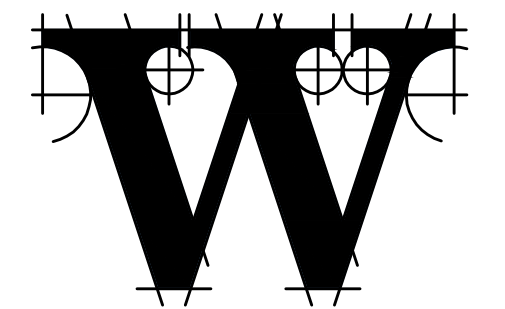
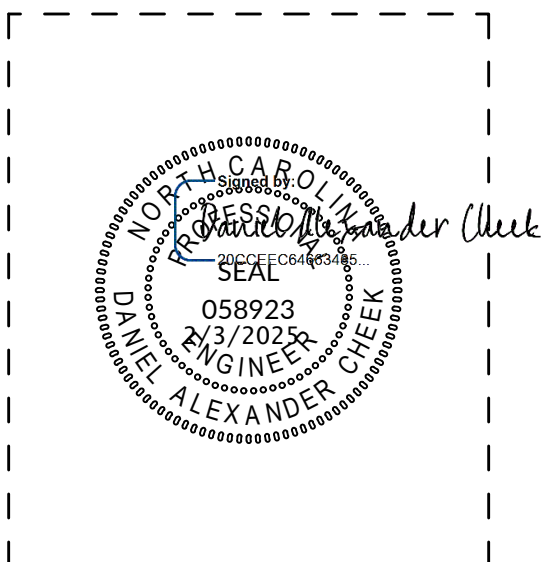
- ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF 7 DAYS FROM THE DATE THE CUT IS MADE. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM ENGINEER.

CONCRETE/ASPHALT DRIVEWAY REPAIR

NOT TO SCALE
C301
201-11-9



Schedule 2A:
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Lumberton, NC 28358



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REVISIONS

- 1 - ADDENDUM #1

DATE: JANUARY 2024
PROJECT NUMBER: 3105-2401
SHEET TITLE:

UTILITY DETAIL
(SHEET 3 OF 3)

SHEET NUMBER

CB-562

SHEET INDEX SCHEDULE 2B: T-HANGAR

GENERAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	G-100b	SCHEDULE 2B COVER SHEET
		01/17/2025	G-101b	SCHEDULE 2B SHEET INDEX

CIVIL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01-2025	VC-101	SURVEY CONTROL PLAN (SCHEDULE 2B)
		01-2025	CC-101	EXISTING CONDITIONS AND REMOVAL PLAN (SCHEDULE 2B)
		01-2025	CC-111	SITE LAYOUT PAVING AND MARKING PLAN (SCHEDULE 2B)
		01-2025	CC-121	GRADING & ELEVATION PLAN (SCHEDULE 2B)
		01-2025	CC-122	DRAINAGE PLAN (SCHEDULE 2B)
		01-2025	CC-141	SEDIMENTATION & EROSION CONTROL PLAN (SCHEDULE 2B)
		01-2025	CC-171	12- UNIT T-HANGAR LAYOUT AND FOUNDATION PLAN (SCHEDULE 2B)
		01-2025	CC-172	T-HANGAR DETAILS (SHEET 1 OF 2) (SCHEDULE 2B)
		01-2025	CC-173	T-HANGAR DETAILS (SHEET 2 OF 2) (SCHEDULE 2B)
		01-2025	CC-401	TYPICAL PAVEMENT SECTIONS (SCHEDULE 2B)
		01-2025	CC-510	PAVING DETAILS (SCHEDULE 2B)
		01-2025	CC-520	DRAINAGE DETAILS (SCHEDULE 2B)
		01-2025	CC-540	SEDIMENTATION & EROSION CONTROL DETAILS - 1 (SCHEDULE 2B)
		01-2025	CC-541	SEDIMENTATION & EROSION CONTROL DETAILS - 2 (SCHEDULE 2B)
		01-2025	CC-542	SEDIMENTATION & EROSION CONTROL DETAILS - 3 (SCHEDULE 2B)

WATER & SEWER

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
1	02-03-2025	01-2025	CC-160	UTILITY NOTES
1	02-03-2025	01-2025	CC-161	UTILITY PLAN (SCHEDULE 2B)
1	02-03-2025	01-2025	CC-560	UTILITY DETAILS (SHEET 1 OF 3)
1	02-03-2025	01-2025	CC-561	UTILITY DETAILS (SHEET 2 OF 3)
1	02-03-2025	01-2025	CC-562	UTILITY DETAILS (SHEET 3 OF 3)

ARCHITECTURAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	A-102b	T-HANGAR TOILET - SCHEDULE 2B

PLUMBING

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	P-101B	T-HANGAR PLUMBING PLANS (SCHEDULE 2B)

MECHANICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	M-102B	MECHANICAL T-HANGAR TOILET - SCHEDULE 2B

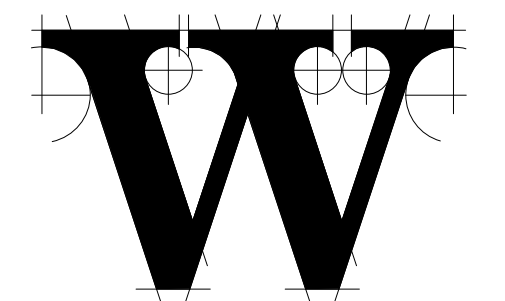
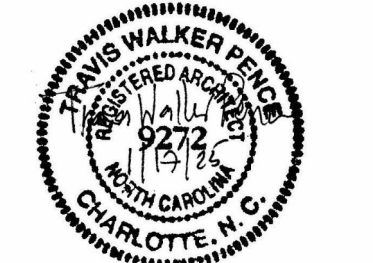
ELECTRICAL

REV.	CURRENT REVISION DATE	ORIGINAL ISSUANCE DATE	SHEET NO.	SHEET NAME
		01/17/2025	E-001B	ELECTRICAL NOTES, LEGENDS
		01/17/2025	E-102B	ELECTRICAL PLANS
		01/17/2025	E-501B	ELECTRICAL DETAILS
		01/17/2025	E-502B	ELECTRICAL DETAILS
		01/17/2025	E-601B	ELECTRICAL SCHEDULE AND RISER



Schedule 2B: T-Hangar

Lumberton, NC 28358



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REVISIONS

DATE 01/17/2025
PROJECT NUMBER 2024
SHEET TITLE

**SCHEDULE 2B
SHEET INDEX**

SHEET NUMBER

G-101b

GENERAL NOTES:

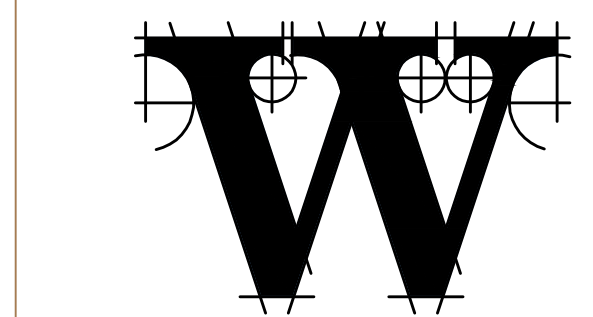
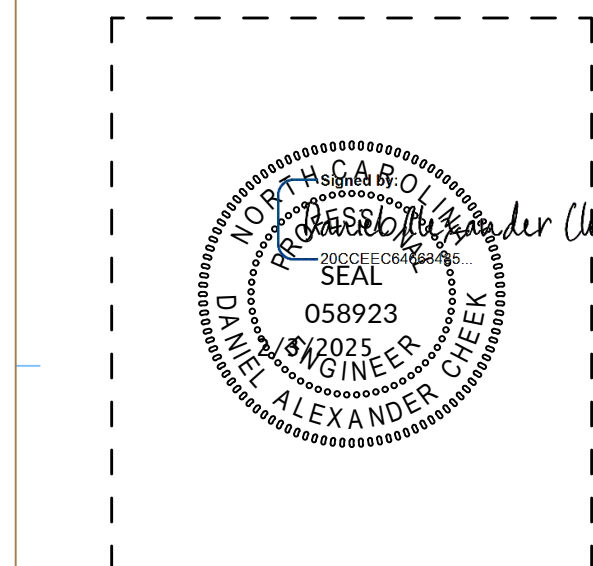
1. THE WORK SPECIFIED IN THESE PLANS IS CONSIDERED INCIDENTAL AND NECESSARY FOR THE COMPLETION OF THE WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAYMENT MADE FOR THE WORK SPECIFIED ON THIS SHEET UNLESS SPECIFICALLY CALLED OUT IN THE BID SCHEDULE AND MEASUREMENT AND PAYMENT SECTION OF THE SPECIFICATIONS.
2. **EXISTING SITE CONDITIONS:** THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE EXISTING SITE CONDITIONS PRIOR TO BIDDING THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A WORKABLE SITE CONDITION DURING THE EXECUTION OF THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL DISTURBED AREAS TO ORIGINAL OR BETTER CONDITIONS AS APPROVED BY THE OWNER.
3. THE CONTRACTOR SHALL HAVE A COMPLETE SET OF CONTRACT DOCUMENTS AS WELL AS ALL PERMIT APPROVALS AND EASEMENTS ON THE JOB SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTING THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS WITH MINIMUM DISTURBANCES TO THE EXISTING WATER DISTRIBUTION AND SEWER COLLECTION SYSTEMS.
5. THE CONTRACTOR IS RESPONSIBLE TO CONSTRUCT THE PROPOSED WATER AND SEWER SYSTEM IMPROVEMENTS IN A MANNER TO MAINTAIN WATER SERVICE TO PROPERTIES AFFECTED BY THE PROJECT.
6. THE CONTRACTOR SHALL COORDINATE SERVICE INTERRUPTIONS WITH THE CITY OF LUMBERTON AND THE ENGINEER.
7. THE CONTRACTOR SHALL FOLLOW OSHA GUIDELINES REGARDING TRENCHING AND EXCAVATION SAFETY AND SHALL INCORPORATE APPROPRIATE SAFETY MEASURES AS NECESSARY TO MEET COMPLIANCE.
8. CONSTRUCTION AND MATERIAL SPECIFICATIONS SHALL CONFORM TO ALL STATE OF NORTH CAROLINA MINIMUM REQUIREMENTS AND THE CONTRACT DOCUMENTS REQUIREMENTS, WHICHEVER IS MORE STRINGENT.
9. ALL SHOP DRAWINGS MUST BE REVIEWED AND APPROVED BY ENGINEER BEFORE EQUIPMENT AND MATERIALS ARE ORDERED.
10. CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND UTILITIES. KNOWN EXISTING UTILITIES HAVE BEEN LOCATED FROM THE INFORMATION AVAILABLE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCURATELY LOCATE BOTH HORIZONTALLY AND VERTICALLY ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE NC ONE CALL CENTER AT 800.652.9949. ALL COSTS ASSOCIATED WITH ANY DAMAGE TO KNOWN OR UNKNOWN EXISTING UTILITIES RESULTING FROM THE CONTRACTOR 'S FAILURE TO ADEQUATELY PROTECT THE EXISTING UTILITIES DURING CONSTRUCTION SHALL BE BORNE SOLELY BY THE CONTRACTOR.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATION OF EXISTING UTILITIES IF REQUIRED DURING INSTALLATION OF NEW WORK. THERE WILL BE NO ADDITIONAL OR SEPARATE PAY ITEM FOR THIS WORK UNLESS SPECIFICALLY CALLED OUT IN THE BID FORM. ANY RELOCATION OF EXISTING UTILITIES MUST BE COORDINATED WITH THE AFFECTED UTILITY COMPANY.
12. CONTRACTOR SHALL MAKE EVERY EFFORT TO SAVE PROPERTY IRONS, MONUMENTS, OTHER PERMANENT POINTS AND LINES OF REFERENCE AND CONSTRUCTION STAKES. A REGISTERED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE SHALL REPLACE PROPERTY IRONS, MONUMENTS, AND OTHER PERMANENT POINTS OF REFERENCE DISTURBED BY THE CONTRACTOR.
13. CONTRACTOR SHALL CLEAR AND GRUB ALL UTILITY EASEMENTS, AS DIRECTED BY THE OWNER, TO INSTALL NEW UTILITIES. CONTRACTOR SHALL ONLY CLEAR THE MINIMUM ALONG THE PROPOSED ALIGNMENTS.
14. THE CONTRACTOR SHALL SUPPORT ALL UTILITY POLES AS NECESSARY. THE CONTRACTOR SHALL COORDINATE UTILITY POLE SUPPORT WITH THE APPROPRIATE UTILITY COMPANIES. ALL UTILITY POLES AND GUY WIRES INTERFERING WITH CONSTRUCTION SHALL BE RELOCATED WITH UTILITY COMPANY COORDINATION.
15. CONTRACTOR SHALL RESTORE/REPLACE ALL SIGNS, MAILBOXES, ETC. ENCOUNTERED DURING CONSTRUCTION TO ORIGINAL CONDITION.
16. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO THE EXISTING GRADE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
17. ALL DITCHES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION OR BETTER. ALL DITCHES SHALL BE LINED WITH EROSION CONTROL MATTING TO ESTABLISH VEGETATION.
18. ALL EXCAVATED MATERIAL SHALL BE PLACED WITHIN THE LIMITS OF DISTURBANCE DURING UTILITY INSTALLATION. THE CONTRACTOR SHALL PROVIDE THE NECESSARY SEDIMENT AND EROSION CONTROL MEASURES TO CONTROL RUN-OFF. ALL EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND DISPOSED OF LEGALLY.
19. THE CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN ALL NECESSARY EROSION CONTROL MEASURES WHETHER OR NOT SHOWN ON THE PLANS TO PROTECT ADJACENT CREEKS, RIVERS, ROADWAYS, ETC. FROM SILTATION AND EROSION.
20. CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND SHALL INSTALL TRAFFIC SAFETY MEASURES IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AT NO ADDITIONAL COST TO THE OWNER.
21. PRESENCE OF OWNERS' REPRESENTATIVE AT WORK SITE DOES NOT LESSEN THE CONTRACTOR RESPONSIBILITY FOR CONFORMING TO APPROVED CONSTRUCTION PLANS AND/OR SPECIFICATIONS. SHOULD THE ENGINEER OR INSPECTOR ACCEPT MATERIALS OR WORK THAT DOES NOT CONFORM WITH APPROVED PLANS OR SPECIFICATIONS, WHETHER FROM LACK OF DISCOVERY OR FOR ANY OTHER REASON, SHALL IN NO WAY PREVENT LATER REJECTION OR CORRECTIONS TO MATERIALS OR WORK WHEN DISCOVERED. CONTRACTOR TO HAVE NO CLAIM FOR LOSSES SUFFERED DUE TO ANY NECESSARY REMOVALS OR REPAIRS RESULTING FROM UNSATISFACTORY WORK. ANY WORK THAT HAS BEEN COVERED WITHOUT INSPECTOR APPROVAL SHALL BE UNCOVERED AND BE MADE AVAILABLE FOR OBSERVATION AT CONTRACTOR EXPENSE.
22. CONTRACTOR SHALL PROVIDE PROPER OIL POLLUTION PREVENTION MEASURES TO MINIMIZE THE IMPACT OF DIESEL FUEL TO THE ENVIRONMENT AT NO ADDITIONAL COST TO THE OWNER. MEASURES SHALL BE IN ACCORDANCE WITH STATE AND LOCAL LAWS.
23. CONTRACTOR TO RESTORE ALL DISTURBED DRIVEWAYS/ROADS TO ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER. ALL DRIVEWAYS SHALL BE REPAIRED AS SOON AS CONSTRUCTION HAS PASSED; A MINIMUM OF 6" OF CABC SHALL BE USED FOR TEMPORARY REPAIR ON ASPHALT AND CONCRETE DRIVEWAYS UNTIL PERMANENT REPAIR CAN BE COMPLETED, AND A MINIMUM OF 6" OF CABC SHALL BE USED AS PERMANENT REPAIR ON GRAVEL DRIVEWAYS.
24. MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES AT ALL TIMES AND PROVIDE MINIMUM 48 HOUR NOTICES PRIOR TO DISTURBANCE OF ACCESS TO THESE SITES. SECURE CONSTRUCTION SITE AT END OF WORK DAILY AND BACKFILL OR COVER EXCAVATIONS WITH STEEL PLATE SUITABLE FOR VEHICULAR TRAFFIC. MAINTAIN AND IMMEDIATELY RESTORE UTILITY SERVICES, TELEPHONE, NATURAL GAS OR INTERNET IF DAMAGED TO ADJACENT PROPERTIES.
25. POSITIVE DRAINAGE TO BE PROVIDED FOR ALL AREAS THROUGHOUT CONSTRUCTION.
26. THE CONTRACTOR SHALL INCLUDE IN THE COST OF THE PROPOSED UTILITIES, ALL SHEETING, SHORING, ROADWAY PLATING, PROTECTIVE PLATING, AND TEMPORARY AND/OR PERMANENT RESTORATION AS SHOWN IN THE CONTRACT DOCUMENTS.
27. PIPE TRENCHES TO BE NO STEEPER THAN 1:1 FROM EDGE OF EXISTING PAVEMENT.
28. COMPLETELY REMOVE UNSTABLE AND/OR ORGANIC MATERIAL ("MUCK") ENCOUNTERED IN TRENCHES OR IN ROADWAYS AND REPLACE WITH SUITABLE MATERIAL AND COMPACT AS SPECIFIED.
29. PROVIDE FOR AND MAINTAIN SAFETY MEASURES NECESSARY FOR PROTECTION OF ALL PERSONS ON WORK SITE AND FULLY COMPLY WITH ALL LAWS, REGULATIONS, AND BUILDING CODE REQUIREMENTS TO PREVENT ACCIDENT OR INJURY TO PERSONS ON OR ABOUT LOCATION OF WORK, INCLUDING ALL APPLICABLE PROVISIONS OF OSHA REGULATIONS. BARRICADE ALL WALKS, ROADS, AND AREAS TO KEEP PUBLIC AWAY FROM CONSTRUCTION. ALL TRENCHES, EXCAVATIONS, OR OTHER HAZARDS IN VICINITY OF WORK TO BE WELL BARRICADED, AND PROPERLY LIGHTED AT NIGHT.
30. DURING CONSTRUCTION IF CONCRETE THRUST BLOCKS ARE FOUND ALONG THE PROPOSED ALIGNMENT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF CONCRETE INTERFERING WITH THE PROPOSED ALIGNMENT.
31. HORIZONTAL DATUM IS NAD 83(2011).
32. VERTICAL DATUM IS NAVD 88.
33. FINAL CONNECTIONS OF PROPOSED WATER MAINS ARE TO BE MADE AFTER THE PROPOSED WATER MAIN PASSES PRESSURE TESTING AND BACTERIA TESTING, AND AFTER FINAL APPROVAL BY THE CITY OF LUMBERTON.

RELATION OF WATER MAINS TO NON-POTABLE WATER MAINS

1. FOR THE PURPOSES OF THIS RULE, SEWER SHALL MEAN ANY EXISTING OR PROPOSED GRAVITY OR FORCE MAIN USED TO CONVEY SANITARY OR INDUSTRIAL PROCESS WASTE.
2. LATERAL SEPARATION OF SEWERS AND WATER MAINS. WATER MAINS SHALL BE LAID AT LEAST 10 FEET Laterally FROM EXISTING OR PROPOSED SEWERS, UNLESS LOCAL CONDITIONS OR BARRIER PREVENT 10-FOOT LATERAL SEPARATION, IN WHICH CASE:
 - A. THE WATER MAIN SHALL BE LAID IN SEPARATE TRENCH, WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER; OR
 - B. THE WATER MAIN SHALL BE LAID IN THE SAME TRENCH AS THE SEWER, WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
3. CROSSINGS. A WATER MAIN THAT CROSSES A SEWER SHALL BE LAID A MINIMUM VERTICAL DISTANCE OF 18 INCHES FROM THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER, EITHER ABOVE OR BELOW THE SEWER, WITH PREFERENCES TO THE WATER MAIN LOCATED ABOVE THE SEWER. ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
4. WATER MAINS AND STORM SEWER PIPES. PIPES CARRYING STORM DRAINAGE SHALL BE SEPARATED FROM WATER MAINS IN ACCORDANCE WITH SECTION 3 OF THIS RULE, 12 INCHES.
5. WATER MAINS AND RECLAIMED WATER DISTRIBUTION LINES. WATER MAINS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM OR AT LEAST 18 INCHES ABOVE WATER PIPES CARRYING TREATED AND DISINFECTED WASTEWATER IN RECLAIMED WATER DISTRIBUTION LINES. CROSSINGS SHALL BE MADE IN ACCORDANCE WITH SECTION 3 OF THIS RULE.
6. SPECIAL CONDITIONS. IF AN ENGINEER DEMONSTRATES IT IS IMPRACTICABLE TO MAINTAIN THE SEPARATION DISTANCES REQUIRED BY THIS RULE, TAKING INTO CONSIDERATION FEASIBILITY, COST, AND THE FACTORS SET FORTH IN THIS PARAGRAPH, THE DEVIATION MAY BE APPROVED ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA AND ALTERNATIVE CONSTRUCTION CRITERIA PROVIDED BY THE DESIGN ENGINEER. DATA AND ALTERNATIVE CONSTRUCTION CRITERIA SUBMITTED BY THE DESIGN ENGINEER TO JUSTIFY THE DEVIATION MUST DESCRIBE:
 - A. 1) THE RATIONALE FOR DETERMINING THAT SEPARATION CRITERIA DESCRIBED IN THIS RULE ARE IMPRACTICABLE;
 - B. 2) THE EXTENT OF THE DEVIATION FROM SEPARATION CRITERIA IN THIS RULE;
 - C. 3) A CONSIDERATION OF PIPE MATERIALS, PRESSURE RATINGS, TYPE OF JOINTS FOR WATER MAIN AND NON-POTABLE WATER MAIN, AND SOIL CONDITIONS;
 - D. 4) THE ABILITY TO PROVIDE ADEQUATE WORK SPACE TO REPAIR OR REPLACE PIPE SEGMENTS OR OTHER UTILITY INFRASTRUCTURE WITHOUT CAUSING DAMAGE TO OR OTHERWISE COMPROMISING THE INTEGRITY OF PIPES; AND
 - E. 5) THE RATIONALE FOR DETERMINING THAT THE DEVIATION WILL NOT RESULT IN UNREASONABLE RISK TO PUBLIC HEALTH.



**Schedule 2B:
12-Unit T-Hangar**
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

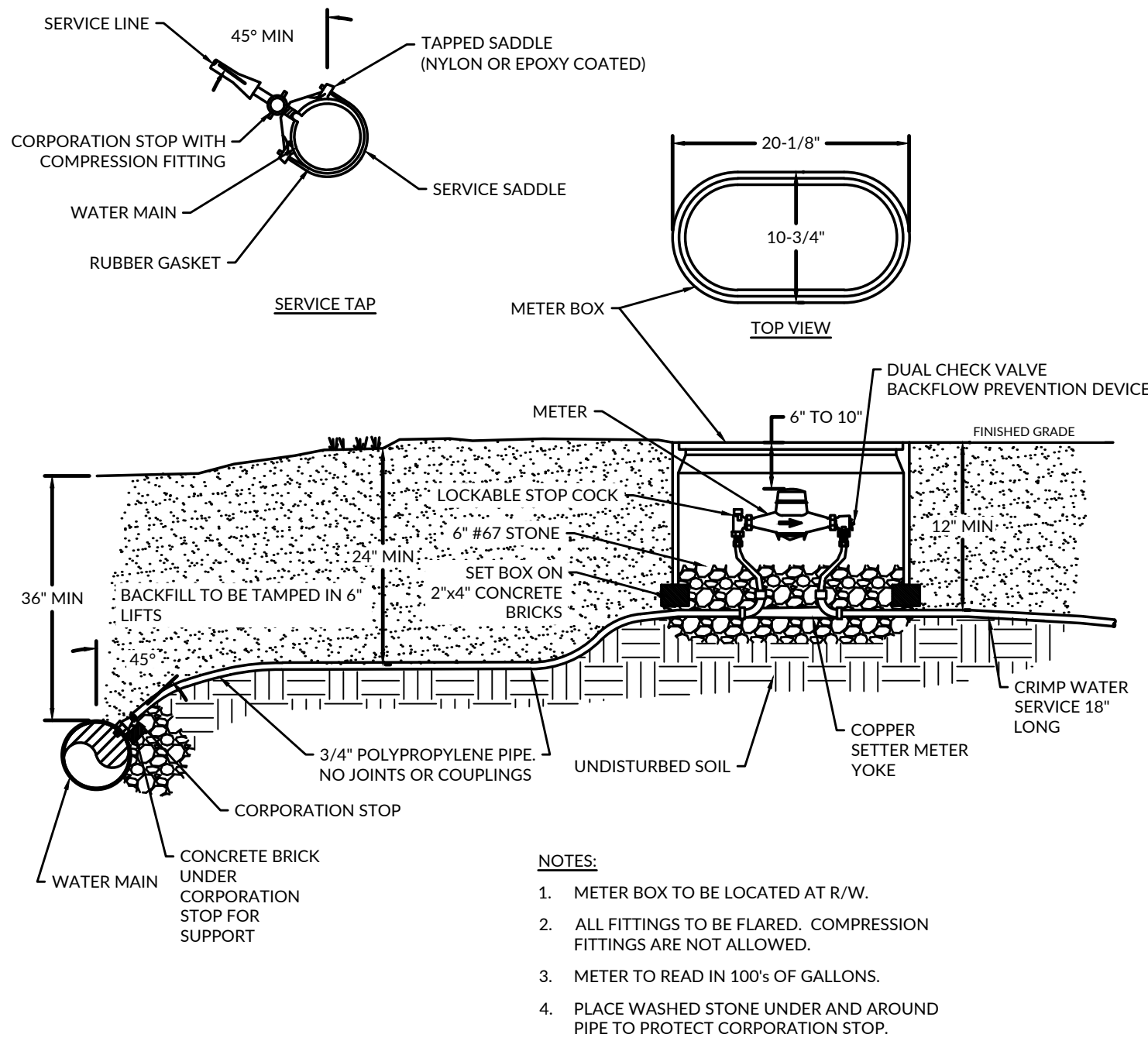
UTILITY NOTES

SHEET NUMBER

CC-160

NOTES:

1. SINGLE SS STRAP SADDLE FOR WATER MAINS 4" AND LESS.
2. DOUBLE SS STRAP SADDLE FOR WATER MAINS LARGER THAN 4".



NOTES:

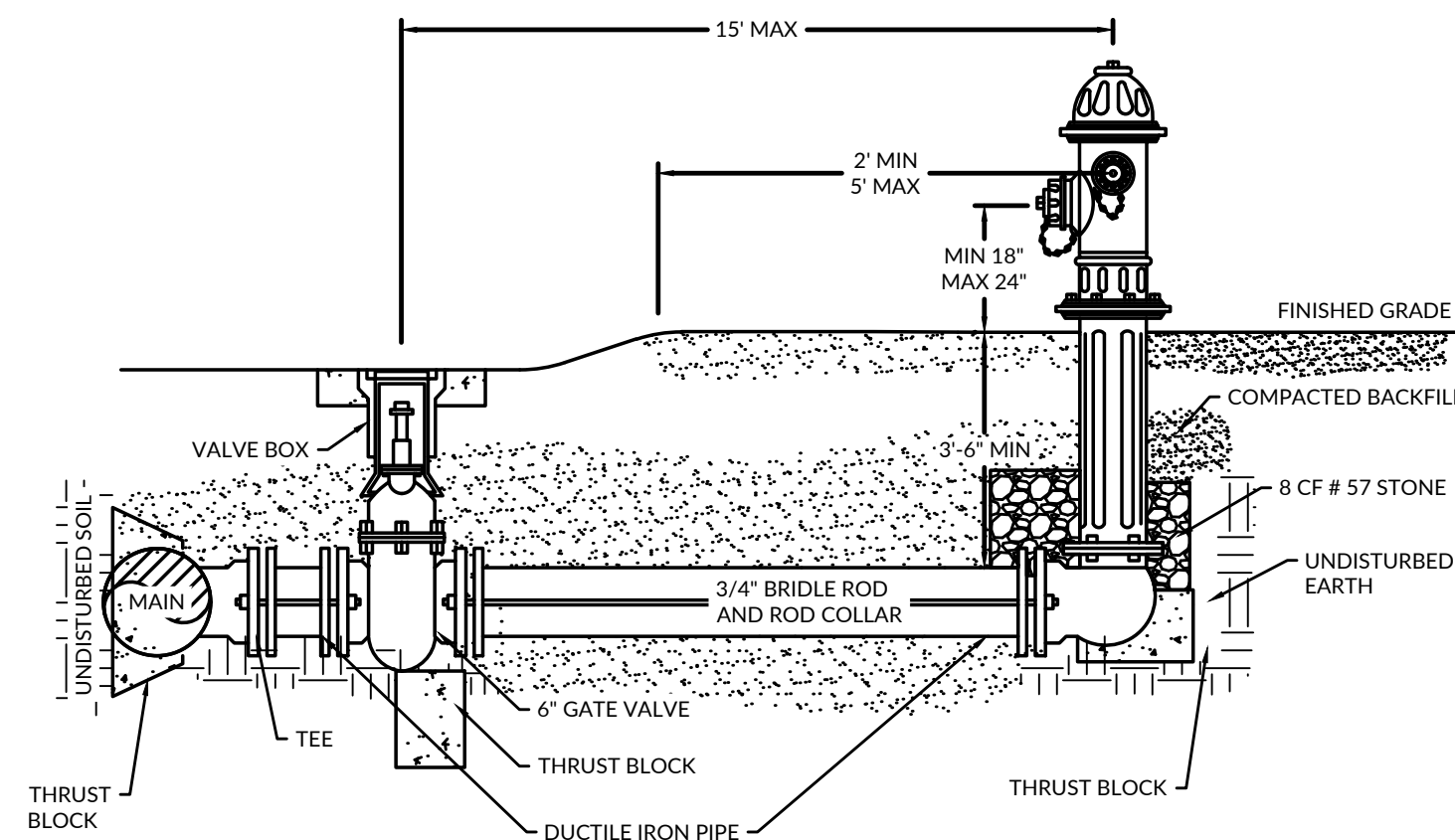
1. METER BOX TO BE LOCATED AT R/W.
2. ALL FITTINGS TO BE FLARED. COMPRESSION FITTINGS ARE NOT ALLOWED.
3. METER TO READ IN 100's OF GALLONS.
4. PLACE WASHED STONE UNDER AND AROUND PIPE TO PROTECT CORPORATION STOP.

TYPICAL WATER SERVICE

Scale:NTS

WATER DISTRIBUTION

C6051



NOTES:

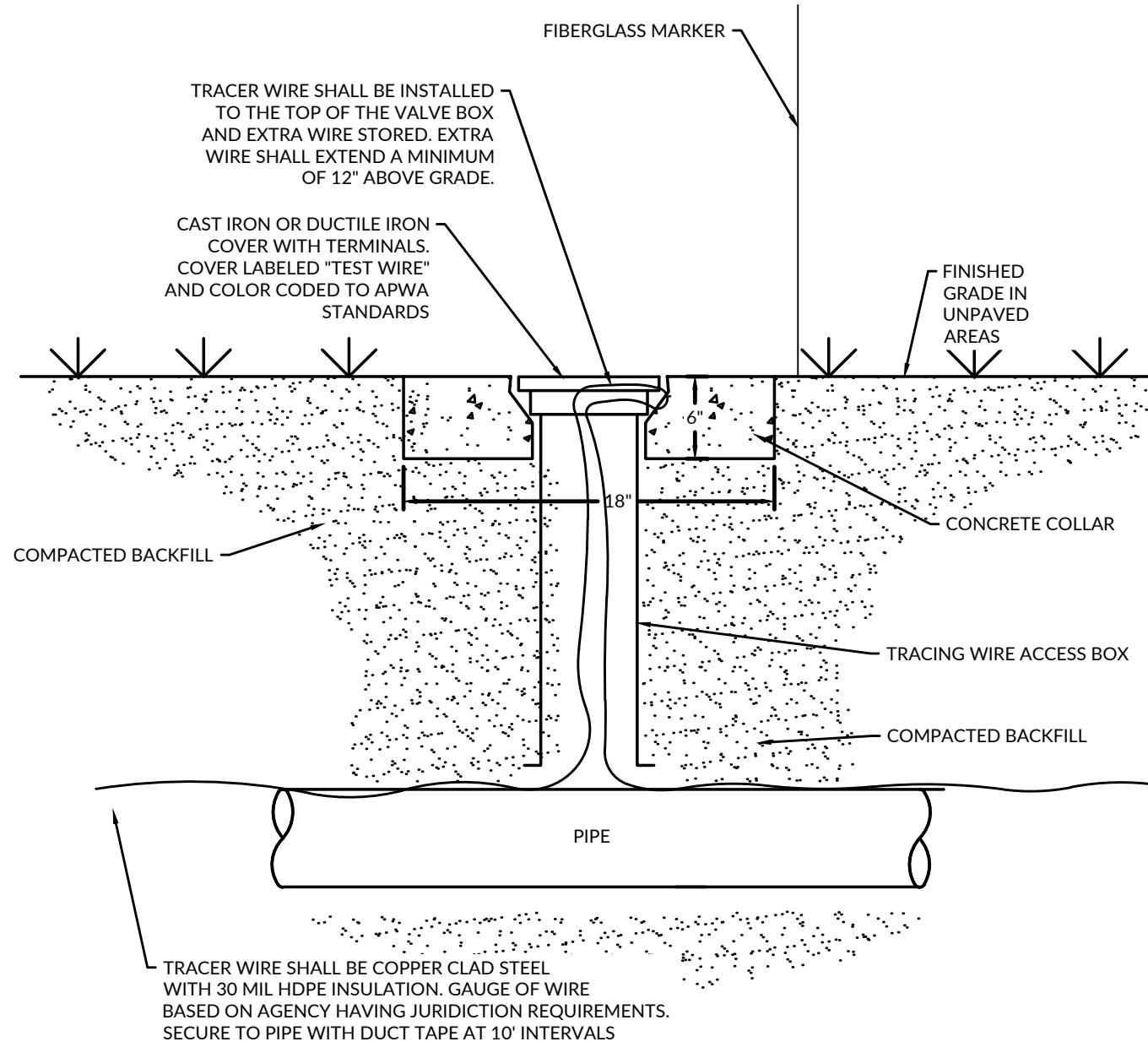
1. HYDRANT TO BE PLACED WITH PUMPER NOZZLE FACING THE CLOSEST EDGE OF PAVEMENT.
2. ALL JOINTS TO BE RESTRAINED BACK TO TEE. REFER TO AUTHORITY HAVING JURISDICTION FOR SPECIFIC RESTRAINT DETAIL AND REQUIREMENTS.
3. HYDRANT TO BE AMERICAN DARLING, UNLESS OTHERWISE INDICATED AND APPROVED BY OWNER

FIRE HYDRANT ASSEMBLY

Scale:NTS

WATER DISTRIBUTION

C6001

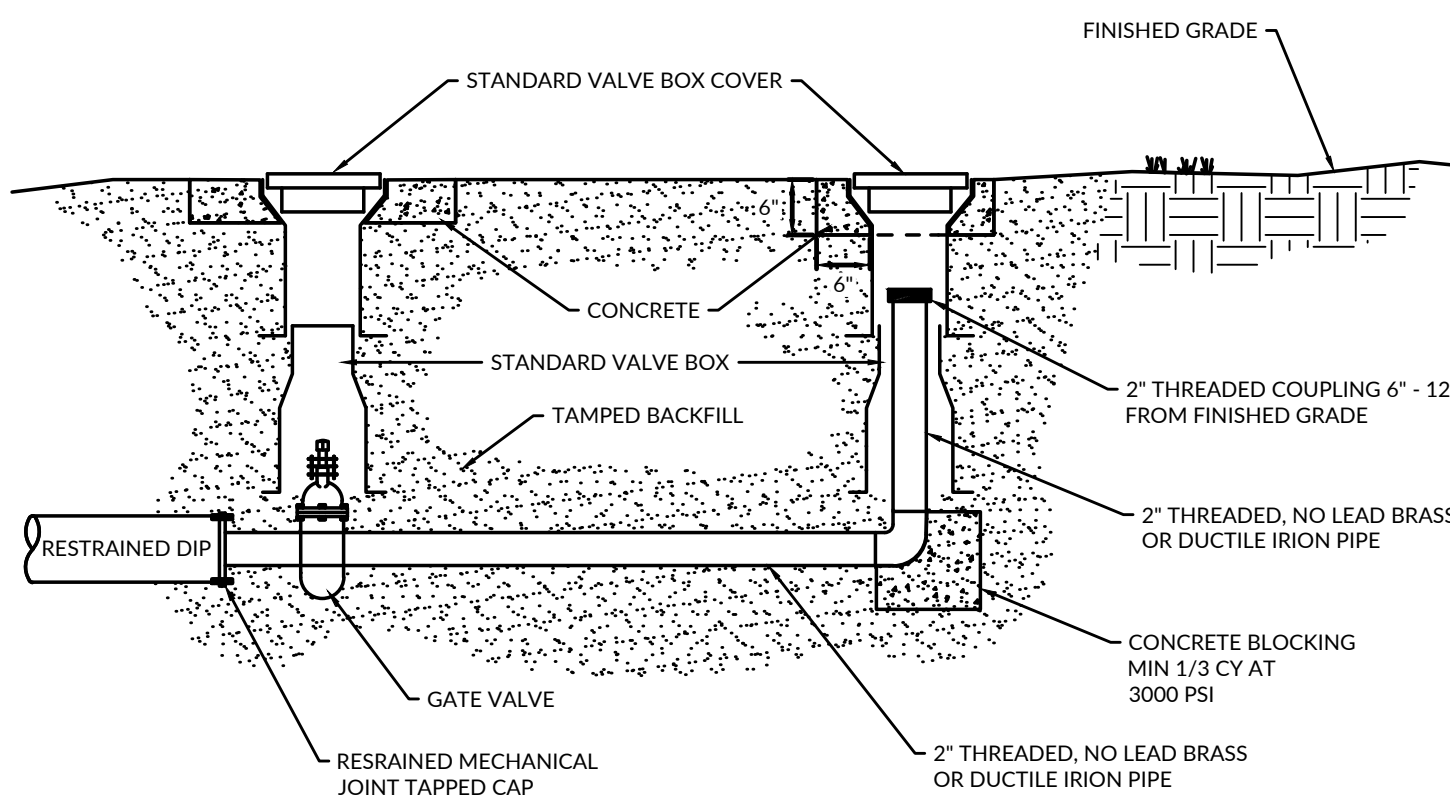


TRACING WIRE TESTING STATION

Scale:NTS

MISC - UTILITIES

C2551



BLOW-OFF 2 INCH ASSEMBLY

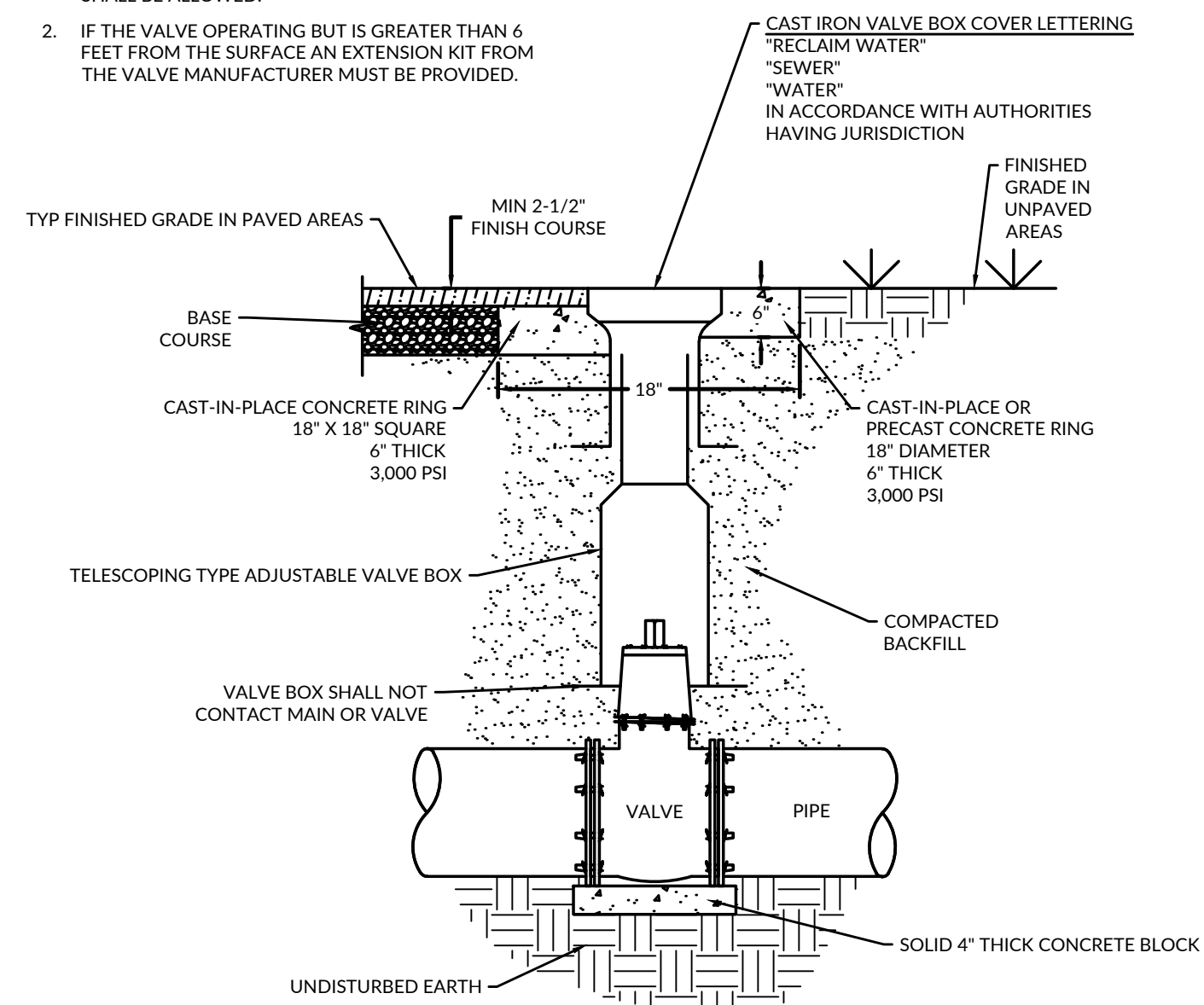
Scale:NTS

MISC - UTILITIES

CXxxx

NOTES:

1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. IF THE VALVE OPERATING BUT IS GREATER THAN 6 FEET FROM THE SURFACE AN EXTENSION KIT FROM THE VALVE MANUFACTURER MUST BE PROVIDED.

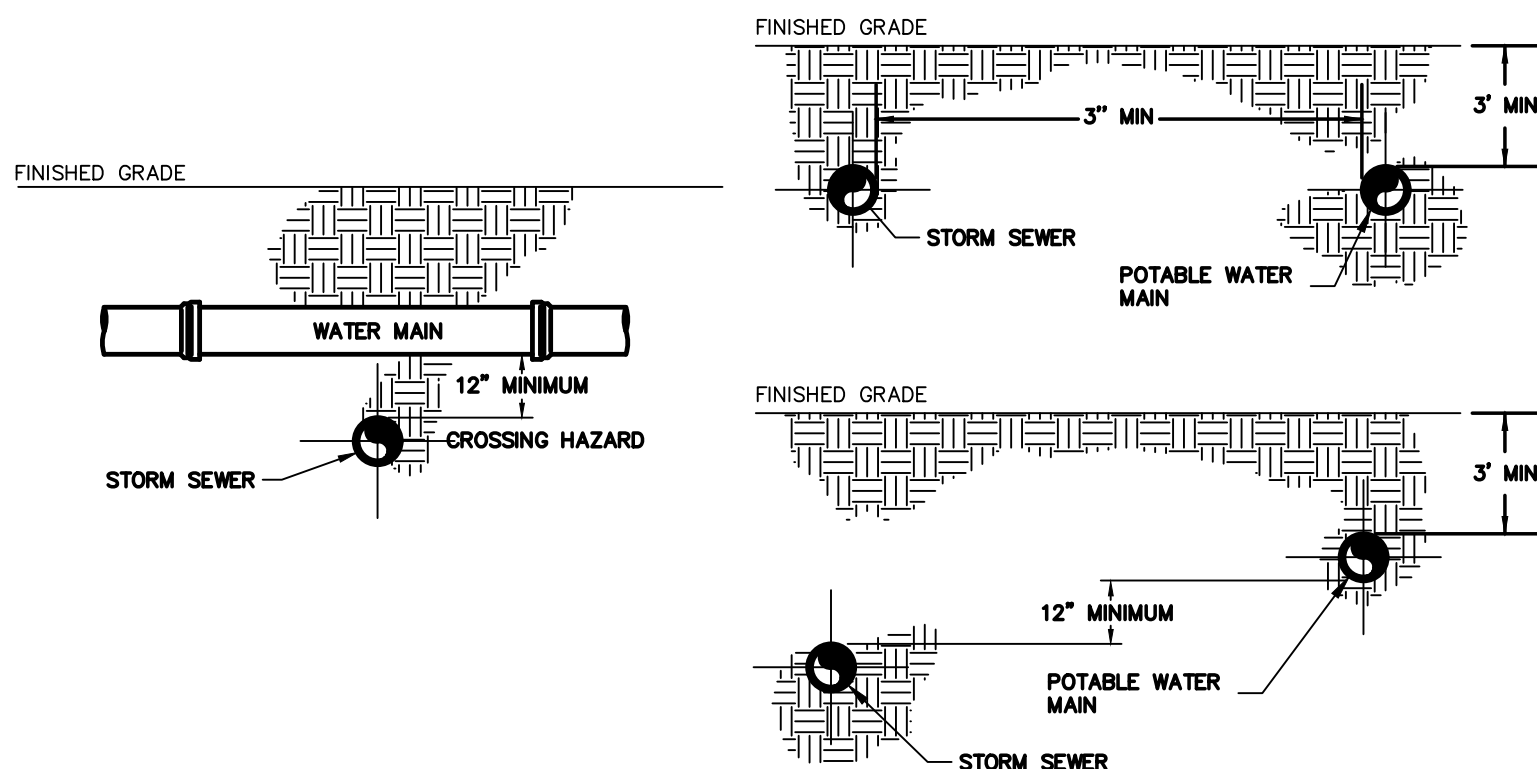


GATE VALVE AND VALVE BOX

Scale:NTS

MISC - UTILITIES

C2501



SANITARY GRAVITY, FORCE MAIN, REUSE MAIN, STORM SEWER, & POTABLE WATER MAIN SEPARATION NOTES & SOLUTIONS

1. A MINIMUM HORIZONTAL SEPARATION OF THREE (3) FEET OUTSIDE TO OUTSIDE SHALL BE MAINTAINED BETWEEN WATER MAINS AND STORM SEWER LINES.
2. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SANITARY SEWER MANHOLE OR STORM SEWER STRUCTURE.
3. A MINIMUM VERTICAL SEPARATION OF TWELVE (12) INCHES OUTSIDE TO OUTSIDE SHALL BE MAINTAINED BETWEEN WATER MAIN AND STORM SEWER LINES.
4. SPECIAL STRUCTURAL SUPPORT OR CONCRETE SADDLES MAY BE NECESSARY AT THE CROSSING LOCATION.
5. IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE CROSSING HAZARD.
6. DEVIATIONS AND OTHER ALTERNATIVES SHALL BE CONSIDERED ON CASE-BY-CASE BASIS AND MUST RECEIVE SPECIFIC APPROVAL BY NCDENR PRIOR TO IMPLEMENTATION

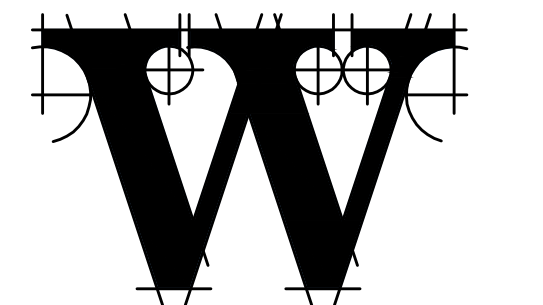
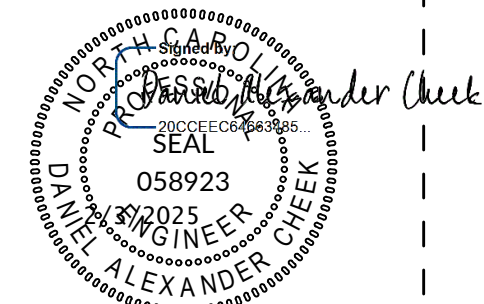
UTILITY SEPARATION

NOT TO SCALE



**Schedule 2B:
12-Unit T-Hangar**

Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

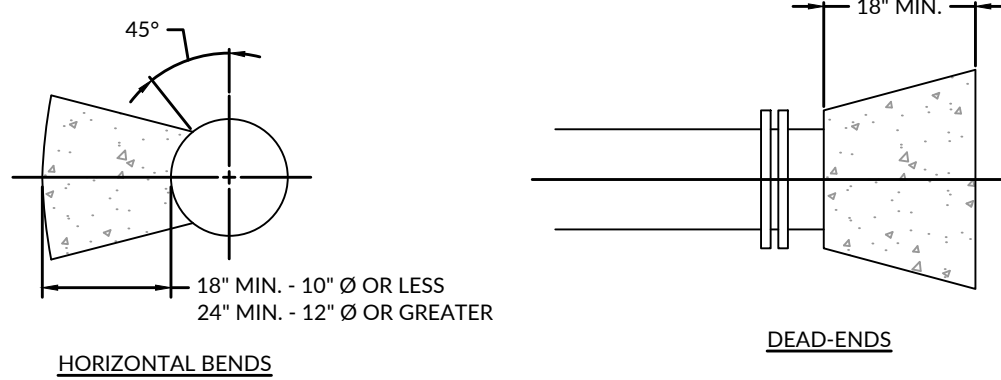
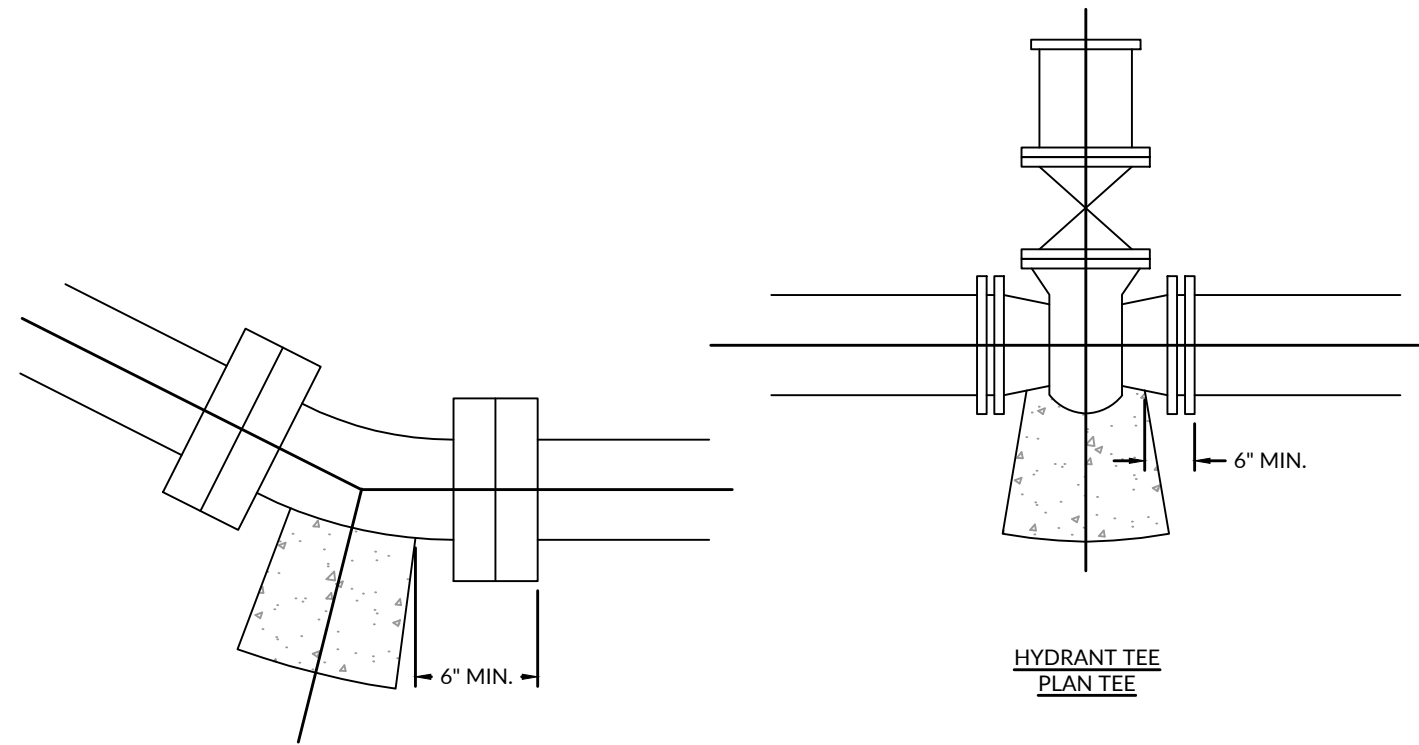
1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

**UTILITY DETAILS
(SHEET 1 OF 3)**

SHEET NUMBER

CC-560



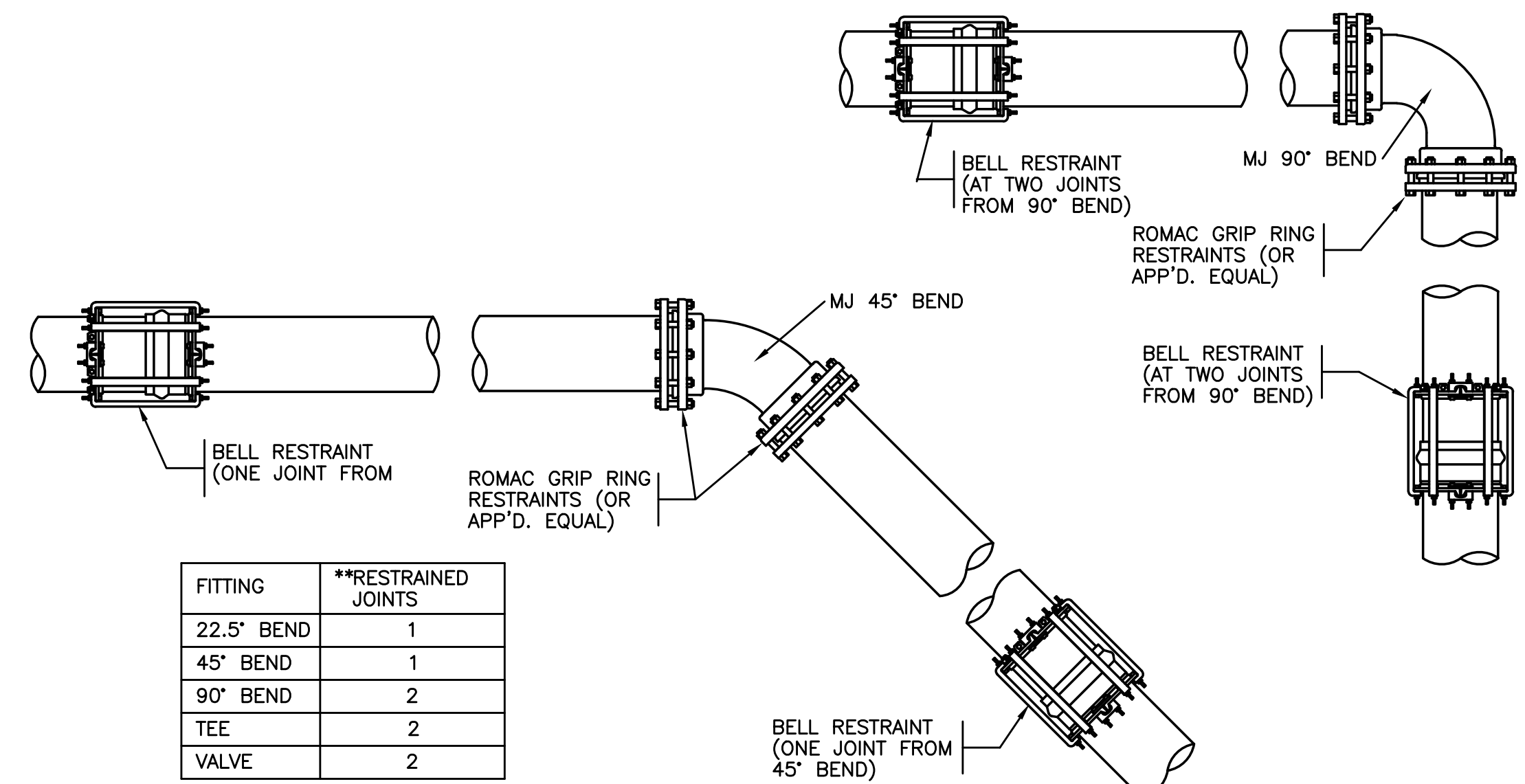
- NOTES:
- CONCRETE SHALL BE 3,000 PSI.
 - CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
 - CONCRETE FOR THRUST BLOCKING SHALL BE KEPT FAIRLY DRY, THUS MAKING THE CONCRETE WEDGE SHAPE MORE EASILY FORMED WITH THE WIDEST PART (BLOCKING AREA) AGAINST UNDISTURBED SOIL.
 - ALL PIPING AND ACCESSORIES TO BE WRAPPED WITH 10 mil. POLYETHYLENE PRIOR TO POURING BLOCKING.
 - VOLUME OF THRUST BLOCKING SHALL BE AS SHOWN ON THE THRUST BLOCKING SCHEDULE.
 - THRUST BLOCKS TO BE INSTALLED AT ALL LOCATIONS WHERE THRUST IS EXPECTED (i.e. BENDS, TEES, REDUCERS, DEAD ENDS, etc.).
 - THRUST BLOCK IS TO BE POURED AGAINST UNDISTURBED EARTH.

THRUST DETAILS - PLUGS, TEES, & BENDS (1 OF 3)

UTILITY TRENCHES

Scale:NTS

C5022 (1 OF 3)



FITTING	**RESTRAINED JOINTS
22.5° BEND	1
45° BEND	1
90° BEND	2
TEE	2
VALVE	2

**OR PER MANUFACTURER'S RECOMMENDATIONS OR AS SHOWN ON PLANS, WHICHEVER IS MORE STRINGENT

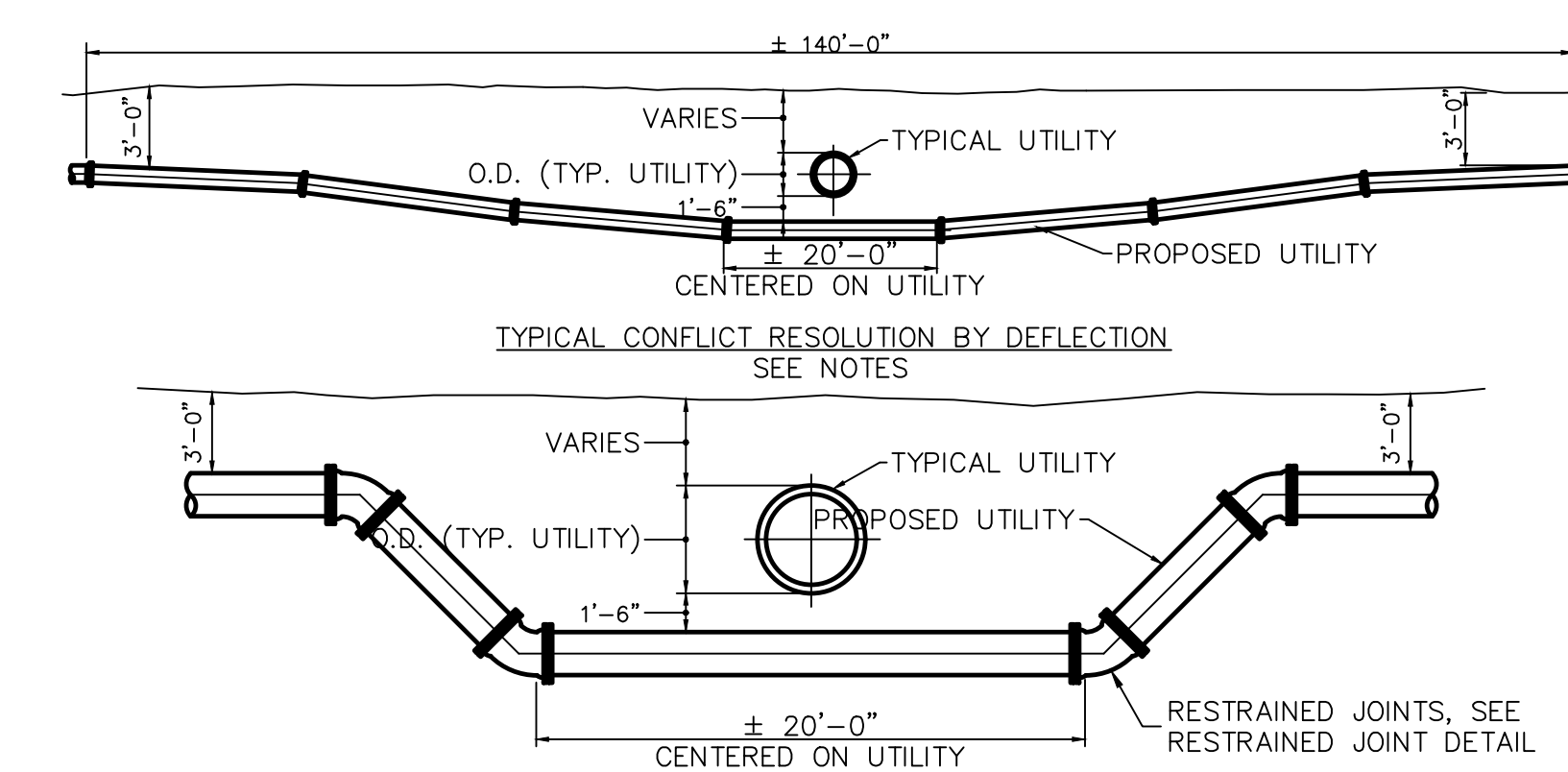
NOTE: RESTRAINTS SHALL BE INCLUDED FOR ALL VALVES AND TEES AS SPECIFIED IN THE TABLE OR AS SHOWN ON PLANS, WHICHEVER IS MORE STRINGENT.

FITTING AND JOINT RESTRAINT

NOT TO SCALE

Test Pressure	Bend Thrust Block Bearing Areas									
	200 psi		Soil Bearing Capacity							
	Factor of Safety	1.5	Quicksand Very Poor	Gravel/Coarse Sand	Soft Clay	Sand Clean Dry	Moderately Dry Clay	Dry Clay Always Dry	Rock Poor	Rock Poor
Pipe Size	Fitting	Thrust	Blocking Area							
1.5 in	11.25	69 lbs	0.10 sf	0.06 sf	0.05 sf	0.03 sf	0.02 sf	0.01 sf	0.01 sf	
2 in	11.25	123 lbs	0.18 sf	0.12 sf	0.09 sf	0.05 sf	0.03 sf	0.02 sf	0.02 sf	
3 in	11.25	277 lbs	0.42 sf	0.26 sf	0.21 sf	0.10 sf	0.07 sf	0.05 sf	0.04 sf	
4 in	11.25	492 lbs	0.74 sf	0.46 sf	0.37 sf	0.18 sf	0.12 sf	0.09 sf	0.07 sf	
6 in	11.25	990 lbs	1.47 sf	0.92 sf	0.74 sf	0.37 sf	0.25 sf	0.18 sf	0.15 sf	
8 in	11.25	1,970 lbs	2.95 sf	1.85 sf	1.48 sf	0.74 sf	0.49 sf	0.37 sf	0.30 sf	
10 in	11.25	3,078 lbs	4.42 sf	2.89 sf	2.31 sf	1.15 sf	0.77 sf	0.58 sf	0.46 sf	
12 in	11.25	4,432 lbs	6.65 sf	4.15 sf	3.32 sf	1.66 sf	1.11 sf	0.83 sf	0.66 sf	
14 in	11.25	6,032 lbs	9.05 sf	5.66 sf	4.52 sf	2.26 sf	1.51 sf	1.13 sf	0.90 sf	
16 in	11.25	7,879 lbs	11.82 sf	7.39 sf	5.91 sf	2.95 sf	1.97 sf	1.48 sf	1.18 sf	
18 in	11.25	9,972 lbs	14.96 sf	9.35 sf	7.48 sf	3.74 sf	2.49 sf	1.87 sf	1.50 sf	

Test Pressure	Plug, Tee, & Wye Thrust Block Bearing Areas								
	200 psi		Soil Bearing Capacity						
	Factor of Safety	1.5	Quicksand Very Poor	Gravel/Coarse Sand	Soft Clay	Sand Clean Dry	Moderately Dry Clay	Dry Clay Always Dry	Rock Poor
Branch Size	Thrust	Blocking Area							
1.5 in	353 lbs	0.53 sf	0.33 sf	0.26 sf	0.13 sf	0.09 sf	0.07 sf	0.05 sf	
2 in	628 lbs	0.94 sf	0.59 sf	0.47 sf	0.24 sf	0.16 sf	0.12 sf	0.09 sf	
3 in	1,413 lbs	2.12 sf	1.32 sf	1.06 sf	0.53 sf	0.35 sf	0.26 sf	0.21 sf	
4 in	2,512 lbs	3.77 sf	2.36 sf	1.88 sf	0.94 sf	0.63 sf	0.47 sf	0.38 sf	
6 in	5,652 lbs	8.48 sf	5.30 sf	4.24 sf	2.12 sf	1.41 sf	1.06 sf	0.85 sf	
8 in	10,048 lbs	15.07 sf	9.42 sf	7.54 sf	3.77 sf	2.51 sf	1.88 sf	1.51 sf	
10 in	15,700 lbs	23.55 sf	14.72 sf	11.78 sf	5.89 sf	3.93 sf	2.94 sf	2.36 sf	
12 in	22,608 lbs	33.91 sf	21.20 sf	16.96 sf	8.48 sf	5.65 sf	4.24 sf	3.39 sf	
14 in	30,772 lbs	46.16 sf	28.85 sf	23.08 sf	11.54 sf	7.69 sf	5.77 sf	4.62 sf	
16 in	40,192 lbs	60.29 sf	37.68 sf	30.14 sf	15.07 sf	10.05 sf	7.54 sf	6.03 sf	
18 in	50,868 lbs	76.30 sf	47.69 sf	38.15 sf	19.08 sf	12.72 sf	9.54 sf	7.63 sf	



- NOTES:
- THIS DETAIL SHALL BE USED TO AVOID EXISTING UTILITIES THAT ARE SHOWN ON THE DRAWINGS.
 - PIPE DEFLECTION MUST NOT EXCEED MANUFACTURER'S RECOMMENDATION.
- NOTES:
- THIS DETAIL SHALL BE USED UNDER THE FOLLOWING CONDITIONS:
- WHERE IT IS SPECIFICALLY SHOWN ON THE DRAWINGS
 - WHEN UTILITIES NOT SHOWN ON THE PLAN, ARE ENCOUNTERED.

CONFLICT RESOLUTION BY DEFLECTION OR FITTINGS

NOT TO SCALE

THRUST DETAILS - PLUGS, TEES, & BENDS (2 OF 3)

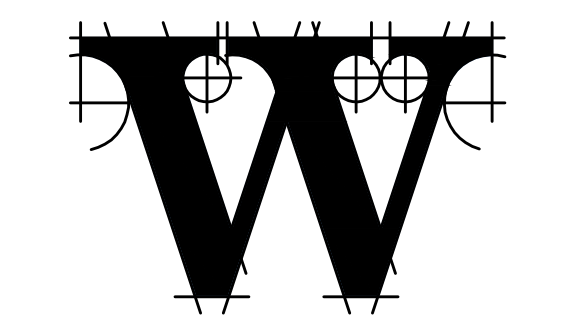
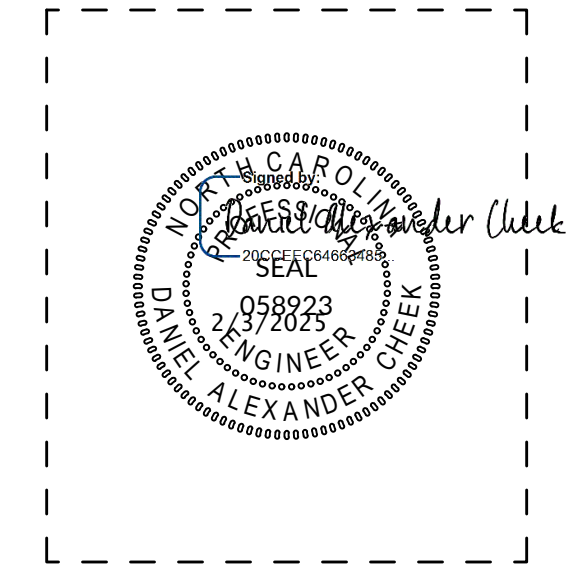
UTILITY TRENCHES

Scale:NTS

C5022 (2 OF 3)



**Schedule 2B:
12-Unit T-Hanger**
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

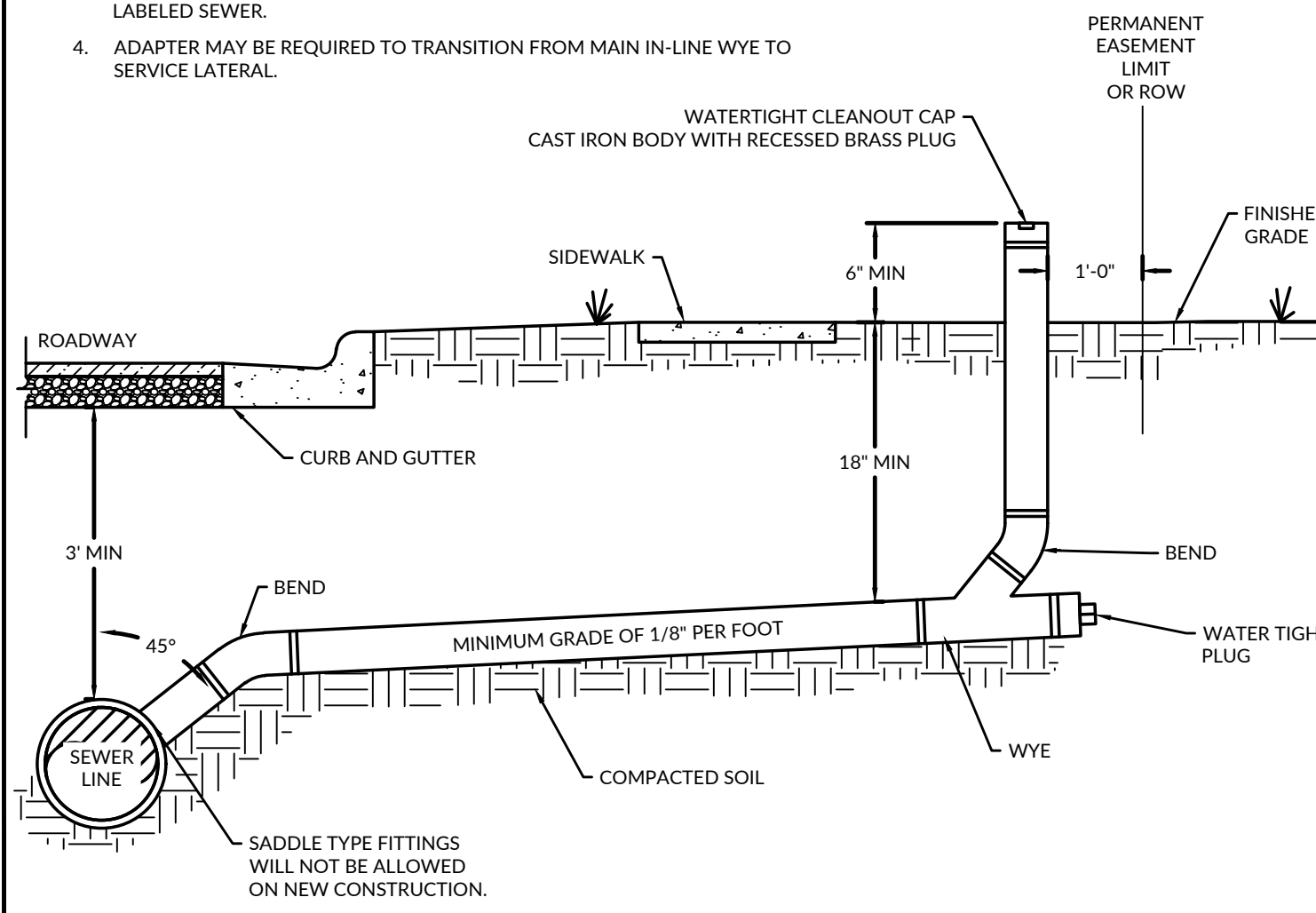
**UTILITY DETAILS
(SHEET 2 OF 3)**

SHEET NUMBER

CC-561

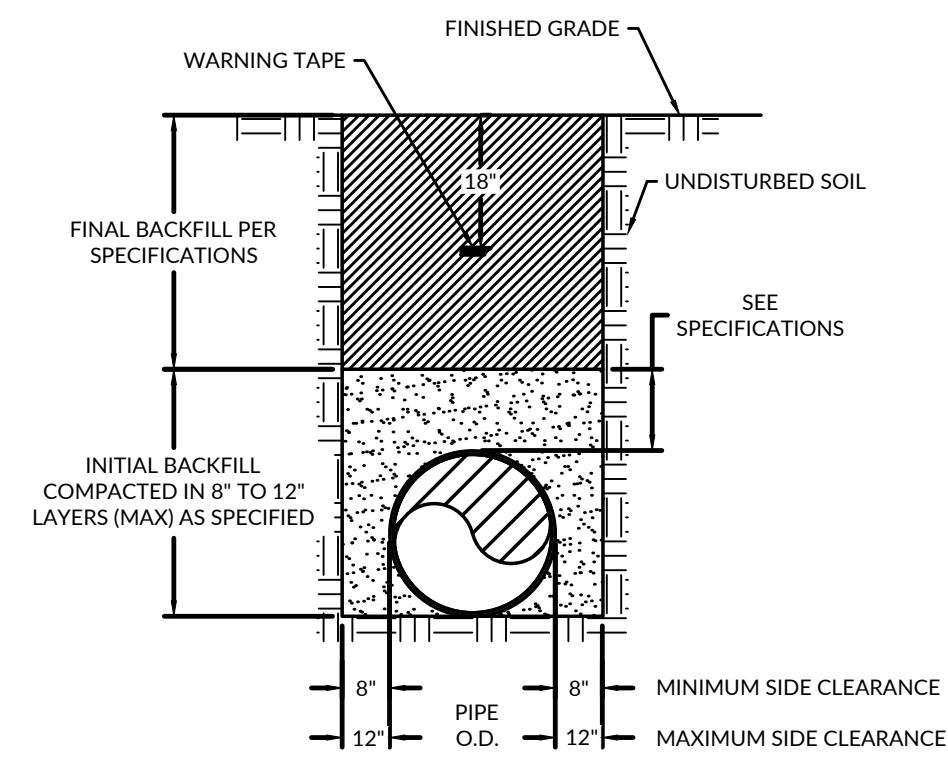
NOTES:

1. SANITARY SEWER SERVICES WHICH ARE 8 TO 14 FEET DEEP SHALL REQUIRE BEDDING IN ACCORDANCE WITH BEDDING DETAIL FOR FLEXIBLE PIPE.
2. SERVICES OVER 14" AND UNDER 3' DEEP SHALL BE DIP.
3. ENTIRE SERVICE SHALL BE SAME MATERIAL UNLESS IN PAVED AREAS (WHERE THE WYE, BEND AND RISER MUST BE DUCTILE IRON). WHEN CLEANOUT IS IN PAVEMENT IT MUST BE INSTALLED INSIDE A VALVE BOX WITH COVER LABELED SEWER.
4. ADAPTER MAY BE REQUIRED TO TRANSITION FROM MAIN IN-LINE WYE TO SERVICE LATERAL.

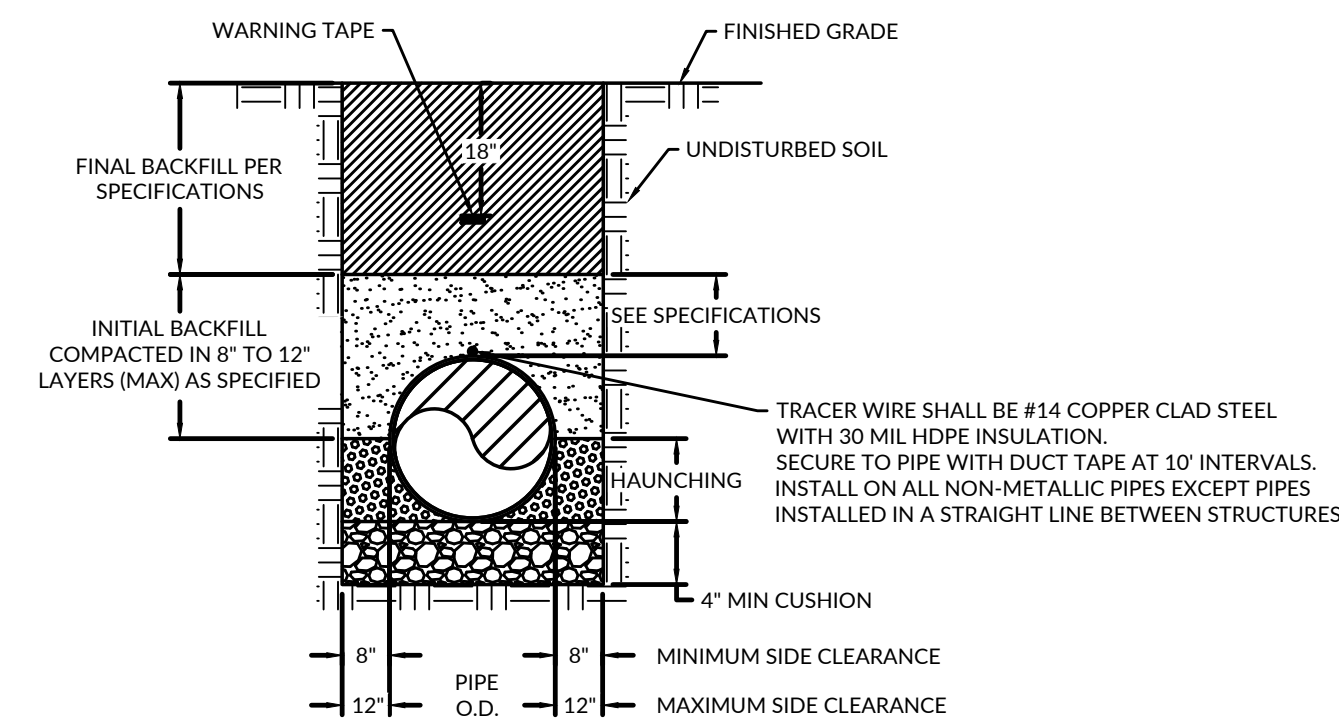


SANITARY SEWER TAP AND SERVICE
Scale: NTS

WASTEWATER COLLECTION SYSTEMS
C7032



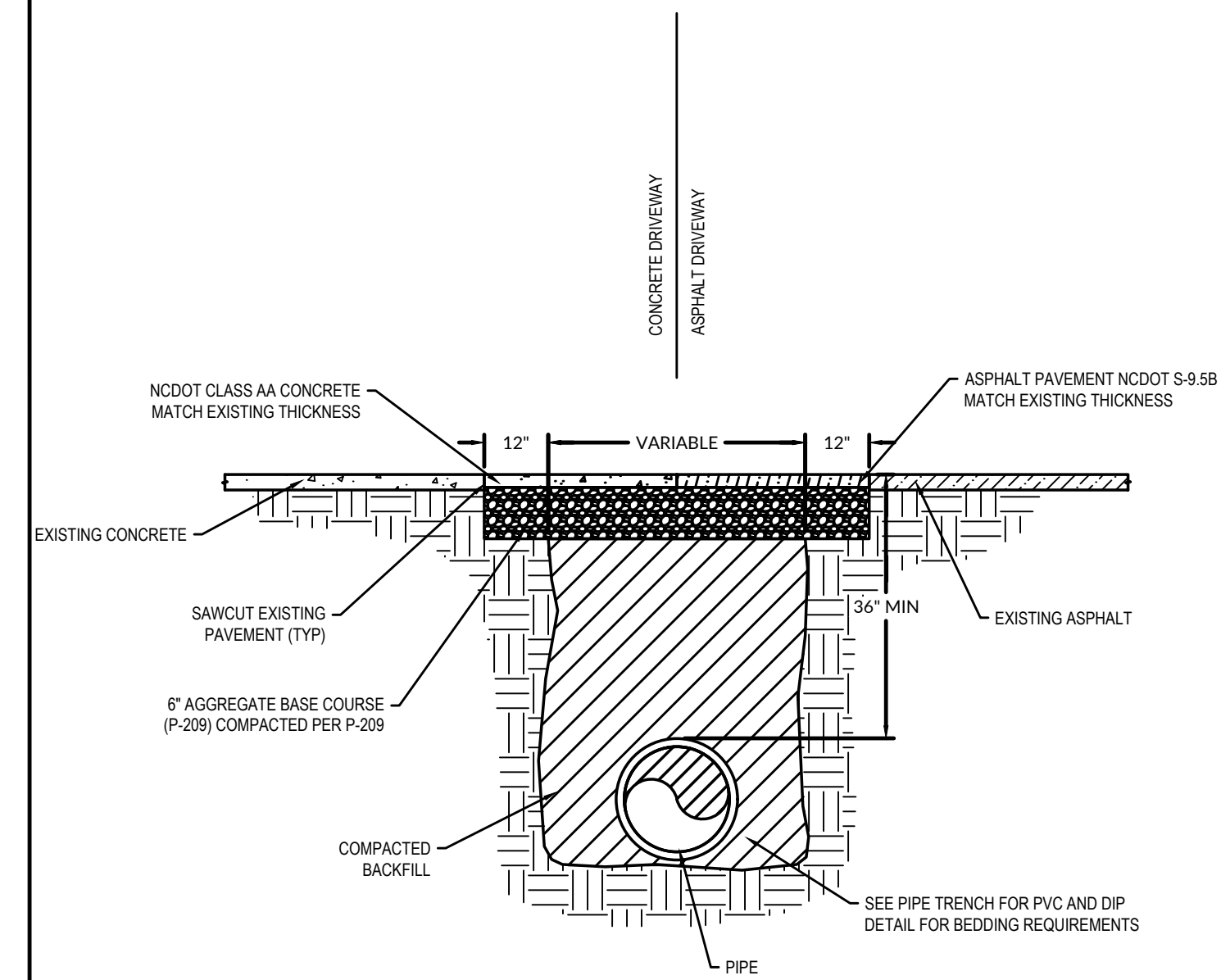
BEDDING REQUIRED FOR DIP



BEDDING REQUIRED FOR PVC

PIPE TRENCH FOR PVC AND DIP
Scale: NTS

UTILITY TRENCHES
C5001



NOTE:

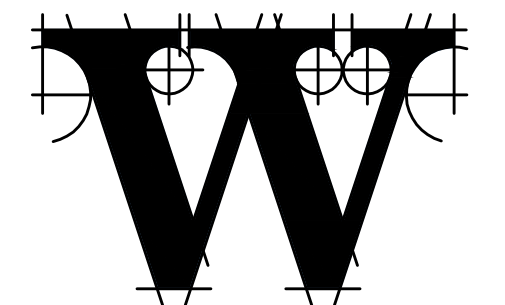
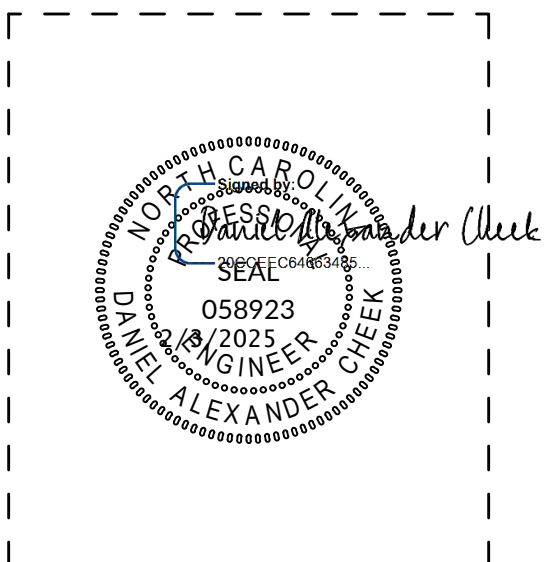
1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF 7 DAYS FROM THE DATE THE CUT IS MADE. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM ENGINEER.

CONCRETE/ASPHALT DRIVEWAY REPAIR

NOT TO SCALE
C301
201-11-9



Schedule 2B:
12-Unit T-Hangar
Lumberton Regional Airport
Lumberton, NC 28358



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REVISIONS

1 - ADDENDUM #1

DATE JANUARY 2024
PROJECT NUMBER 3105-2401
SHEET TITLE

UTILITY DETAILS
(SHEET 3 OF 3)

SHEET NUMBER

CC-562

Memorandum

To: Interested Parties

From: Eric Stumph, P.E., Talbert & Bright, Inc.

RE: Pre-Bid Meeting
Lumberton Regional Airport
T-Hangar and 2-Unit Box Hangar
TBI No. 3105-2401

Date: Thursday, January 30, 2025

1. Welcome/Sign-in Sheet

A Pre-bid Meeting for the subject project was held on January 30, 2025, at 1:00 pm, at the Lumberton Regional Airport. Meeting attendees are listed on the attached pre-bid sign-in sheet. The Pre-bid Meeting was a non-mandatory meeting to discuss general requirements for the subject project. The following items were discussed.

2. Description of Work/Phasing

Work Scope

This project includes construction of a new 2-Unit Box Hangar with bid alternates to upfit the office spaces (Schedule 1) and a 10-Unit (Schedule 2A) or 12-Unit (Schedule 2B) T-Hangar with bid alternates for roof insulation and floor coatings, along with associated site improvements, at the Lumberton Regional Airport, Lumberton, North Carolina, as shown on the project plans.

Site Work – The site will be prepared for the new Box Hangar and T-Hangar as follows:

Demolition – Demolition work includes removal of existing bituminous and concrete pavement, drainage pipe and structure demolition and incidentals.

Haul Road or Construction Access on Existing Pavement – A Contractor optional gravel haul road may be constructed. Alternatively, contractor may opt to use existing taxilane pavement for ALL access to the site rather than installation of the haul route. See plans. Any damage from hauling operations would have to be repaired to the existing conditions prior to construction or better at the Contractor's expense.

Sedimentation and Erosion Control – The project includes installation of temporary silt fence, drop inlet protection, inlet protection, compost socks, seeding, mulching, dewatering bags and sodding as depicted on the Sedimentation and Erosion Control plans. A sedimentation and erosion control permit has been prepared and will be submitted to NCEDQ. Contractor will be responsible with

complying to the requirements of the permit including required inspections and record keeping.

Site Grading – The project will require stripping of topsoil and organics from the area under the proposed building, pavement and future pavements. Stripped topsoil should be temporarily stockpiled onsite and reused in the area outside of the areas of pavement and building.

Once stripping of the areas are completed, within the areas of pavement and buildings, the contractor shall prepare building pads and pavement subgrades as noted on the plans and in the specifications. Proof rolling, borrow embankment, dewatering, moisture conditioning and compaction requirements should be noted.

Site Drainage – Drainage installation includes new installation of new storm drainage pipes and structures as shown on the plans.

Pavement – Proposed asphalt pavement section consists of two 1.5" lifts of Bituminous Surface Course (NCDOT S9.5B) constructed on 6" crushed aggregate base course (P-209).

Concrete Pavement – Concrete pavement includes construction of the concrete pavement section for the new Box Hangar apron, patching the TLC Hangar apron (NCDOT Class Pavement) and new sidewalks (NCDOT Class A) at the box hangar and T-Hangar.

Lighting - A new pole mounted light installation is included at the 2-Unit box hangar. Lighting on exterior of 2-Unit Box Hangar and the T-Hangars. See electrical plans.

Utilities – The project includes extension of water and sewer to the new hangars. The final water and sewer utility plans and specifications will be issued by Addendum. Contractor to complete SUE Investigation so that any needed adjustments can be made.

2-Unit Box Hangar (Schedule 1 Drawings):

Schedule I includes construction of a 140' W x 65' D Pre-Engineered Metal Building Aircraft Storage Hangar. Hangar is comprised of 2 units divided by a framed wall. Corporate Hangar construction includes cast-in-place concrete foundations and concrete slabs sloped to trench floor drains in the center of each unit. Hangar doors shall be a 60' W x 18' H clear hydraulic hangar door as specified. Hangar includes exterior metal wall panels and roof panels, interior liner panels, reinforced vinyl-faced wall and roof insulation. Mechanical/Electrical/Plumbing (MEP) items include high-bay LED lighting, HVLS fans, utility sink and emergency eye wash station, grounding receptacles, and supply & exhaust fans from Hangar Bay. Base bid also includes construction of an attached 140' W x 20' D Pre-Engineered Metal Building Office area shell space, with cast-in-place concrete foundation and slab, exterior metal wall and roof panels, and exterior windows and doors. The Office area is also comprised of 2

units. Each unit contains a restroom to be included in the Base Bid. One unit has an electrical room to be included in the Base Bid. Contractor should pay attention to items such as the eyewash station, utility sink, hot water tank etc. which need to be included in the Base Bid cost for the Hangar.

Building Alternates – See Section 012300 Alternates

Add Alternate No. 1 (Left Unit) includes Office Area upfit work to provide interior walls, doors, ceilings, finishes, millwork, and associated Plumbing, Mechanical, and Electrical scope as shown on Drawings.

Add Alternate No. 2 (Right Unit) includes Office Area upfit work to provide interior walls, doors, ceilings, finishes, millwork, and associated Plumbing, Mechanical, and Electrical scope as shown on Drawings.

Add Alternate No. 3 includes an Owner's Preferred Alternate for the manufacturer of the hangar doors as indicated on the Drawings and Specifications.

Add Alternate No. 4 includes painting the interior exposed structural steel inside the hangar bays.

Add Alternate No. 5 includes a 3-part resinous flooring in the hangar bays in accordance with the Specifications.

Building Unit Prices – See Section 012200 Unit Prices

Unit Price Schedule 1 No. 1 includes a unit price in cubic yardage blended steel and concrete for adjustment of footings and pedestals between what is shown on the drawings and what is modified based on what is required to accommodate the building reactions provided by the metal building manufacturer.

Pre-Engineered Metal T-Hangar Building (Schedule 2A and 2B Drawings) –

The Contractor will be responsible for supplying a pre-engineered metal T-hangar building for the project (10-Unit or 12-Unit as awarded), designed in accordance with the North Carolina State Building Code and Local Building Code. Building shall be supplied providing the minimum clear opening width (44'-6") and height (14'-0") for each hangar bay as shown on the plans. Contractor will be required to submit shop drawings and design calculations for the pre-engineered metal building that have been sealed and signed by a Professional Engineer in the State of North Carolina. Upon review of the shop drawings by the Engineer, the contractor will be responsible for submitting the design documentation to City of Lumberton and Fire Marshal for final review and approval. It will be the sole responsibility of the contractor to obtain all required permits for construction of the new hangar. Hangar doors shall be electric bi-fold type. Design of the hangar doors shall be coordinated closely with the manufacturer of the building structural system. Each hangar door shall include a personnel door.

Fire Separations – Rated assembly fire separations are required, constructed of light gage steel framing and gypsum board.

Roof Insulation – Bid documents include a bid alternate for installation of roof insulation during the roof installation process.

Concrete Slab and Foundations – The concrete foundations shall be designed specifically for the column locations and reactions for the proposed pre-engineer metal building system to be installed. The plans provide a slab and foundations size for bidding purposes. If the size of the final foundation design varies from that shown in the project plans, there is a bid item to allow for payment of additional concrete as necessary based on a per cubic yard basis. Contractor will be required to submit shop drawings and design calculations for the concrete foundation and slab that have been sealed and signed by a Professional Engineer in the State of North Carolina.

Hangar Electrical – Electrical service to the new hangars will be provided by the City of Lumberton Electric Utility Department. Contractor is responsible for all coordination between the utility and the airport to provide service to the new hangars. Hangar electrical work includes providing power to new bi-fold electric doors, overhead lights and outlets in each hangar unit. Work also includes installation of exterior flood lights.

A bid alternate item is included in the project to cover any costs associated with the Emergency Responder Communication Coverage System as detailed on the plans and as described in specification 28 50 00. This bid alternate is included in the event that the system is required by the Fire Marshall.

Upfit T-Hangar Restroom and Electrical Room – A restroom and an electrical room area included in the base bid for the T-hangar.

T-Hangar Bid Alternates – Bid Alternates include a unit price to adjust reinforced concrete volumes if needed for the final foundation plan, the roof insulation, epoxy floor coating and the Emergency Responder System. Sealed foundation design required – see requirements in plans and in specifications Section PEB, Pre-Engineered Building (T-Hangar).

Phasing (See Phasing plan)

Contractors shall make sure they are very familiar with the project safety and phasing plan, all safety notes and the project phasing requirements. Construction needs to be accomplished while minimizing impacts to airport tenants. The project will require partial closure of the existing hangar access taxiway network for work within the Taxiway Object Free Area. Access to some existing hangar units will be restricted. Contractor will be required to work with the airport to provide access to adjacent hangar units by airport tenants as outlined on the plans. Contractor will be responsible for all lighted barricades during construction, including supplying, placing, removing, and maintaining barricades, lights, etc. as required for each phase of construction.

Contract Time

- Contract time for the Mobilization/Shop Drawings phase will be 30 calendar days.
- Contract time for Schedules 1 and 2A or 2B shall be 252 calendar days. If two schedules are awarded, the 252 calendar day contract time will run concurrently for both schedules. Materials delivery lead times and all construction activities are included in the 252 calendar day contract time.
- An additional 30 calendar days will be added for each Box Hangar Office Space Upfit Alternative awarded.
- Green (Work Area 1C), Magenta (Work Area 1D), Orange (Work Area 1E), Purple (Work Area 1G) and Red (Work Area 1H) – It is the intention to have good communication between the Contractor, the RPR and the Airport Management so that tenants can coordinate with the Airport. There will be times where the Contractor shall communicate that the area needs to be closed for certain work – and that information will need to be coordinated with the RPR & the Airport Management.

3. Other Construction Items

Survey Requirements

- Contractor needs to be fully aware of the survey requirements for the project. Refer to Specification Section PSP-15 and SUE Investigation PSP-41.

4. Bidding Procedures

- Bids Due on Tuesday, February 25, 2025, no later than 11:00 am (local time) to the Lumberton Regional Airport, Airport Terminal Conference Room, located at the 163 Airport Boulevard, Lumberton, NC 28358.
- Overnight Delivery may not arrive on time and late bids will not be opened. It is the contractor's responsibility to make sure their bid has been delivered no later than 11:00 am.
- Bid package should be sealed and the outside of the envelope shall contain bidder's name, license number and project name.
 - Appendix B filled out completely and signed.
 - Bid Form filled out completely, including unit prices written in words and numbers and extended totals provided for all items of work and signed. Bidder must provide unit prices for all items of work.

- MBE/WBE Participation is required with this project. MBE/WBE subcontractors who will be working on the project shall be listed in Appendix B and must be submitted with the bid.
- If the MBE/WBE Goal will not be met with the bid documents, the contractor shall refer to Section C of the bid documents and complete the good faith effort documents.
- Bid Bond or certified check made payable to City of Lumberton in the amount of 5% of the bidder's maximum bid price.
- All addendum issued for the project shall be signed and returned with the bid.
- All questions regarding the plans and specs shall be submitted in writing to Talbert & Bright, bids@tbiilm.com or estumph@tbiilm.com. Responses to questions will be issued by Addendum as necessary. Questions shall be submitted in writing no later than 5:00 pm on Thursday, February 13, 2025.
- All bidders shall hold a current license from the NC General Contractors License Board. License classification and financial limitation shall be appropriate for the project and license shall be current at the time of bid.
- All bids will remain valid for acceptance by the Owner for 120 calendar days after the day of the bid opening. An earlier award is anticipated. We have received a question about this being reduced – this will be addressed in the addendum.
- Contractors may request an electronic copy of the bid form by written request to bids@tbiilm.com

5. **MBE/WBE Requirements**

- **The project has a combined MBE/WBE goal of 5.0%.**
- All MBE/WBE contractors shall be certified by the North Carolina Department of Transportation as an MBE or WBE. The NCDOT has on file a list of certified firms which can be found on their website. NC HUB certification does not meet this requirement.
- Subcontractors being used to meet the goal must be certified as an MBE or WBE at the time of submission of the Bid.
- Bidder must submit their intentions to meet the MBE/WBE goals by submitting page B-19 and B-20 of Appendix B at the time of the bid. The bidder must also submit the Letter of Intent (page B-21 for each MBE/WBE subcontractor). The Letter of Intent must be submitted not later than 2:00 PM on the 5th calendar day following opening of bids and is not required with the bid.

- **If your MBE/WBE forms are left blank, your bid amount will not be read aloud, and the proposal will be returned to the bidder.**
- Material suppliers only count 60% towards the goal.
- Manufactures count 100% towards the goal.
- Subcontractors count 100% towards the goal.
- If the bidder will not meet the goal, the MBE/WBE Good Faith Effort paperwork in Appendix C must be completed and submitted. Beginning on page C-5 of Appendix C, the contractor must review and understand what factors will be used to determine if the bidder has made an adequate good faith effort. Good Faith Effort documentation shall be submitted no later than 2:00 PM on the 5th calendar day following opening of bids.
- Bidders shall make sure they understand all provisions included in Appendix C. This includes what happens if an MBE/WBE needs to be replaced during the project, what happens to MBE/WBE participation when the scope of work the MBE/WBE contractor will be performing changes, payments to DBE subcontractors, and reporting MBE/WBE participation during the construction phase of the project.
- Bidders should verify MBE/WBE certification for all subcontractors proposed to be used are certified at the time of bid opening. If the subcontractor loses certification the day before or day of bid, they will not be counted toward goal.

6. **Appendix D Requirements**

- The project will be state funded. Certain federal requirements apply to the work, as presented in Appendix D. Contractors shall familiarize themselves with the federal requirements included in Appendix D. These include but are not limited to:
 - Federal civil rights provisions.
- **The project is subject to state of North Carolina Buy American requirements, but not federal/FAA Buy American requirements.**

7. **Questions**

- Is there a drop-dead completion date?
 - *Response: No.*
- Is there a set time the 252 calendar days will start?
 - *Response: An NTP date will be coordinated between the Airport, Contractor and TBI following Contract Award.*

- What is the basis of award of the different Schedules of work and the Bid Alternate Items?
 - *Response: Low Bid for the combination of schedules and alternates that fits with the available funding and is in the best interest of the Owner.*
- Design & Footings for the Pre-Engineered T-Hangar Buildings does this require a structural engineer?
 - *Response: Yes, requires a structural engineer to design and seal the final foundation design.*
- Shop Drawings – what is your time clock?
 - *Response: It is anticipated that contracts will be awarded 30-60 days following bid opening. See previous answers regarding NTP and drop-dead date.*
- Could survey and SUE Investigation start without starting the construction time clock?
 - *Response: Yes.*
- Could the construction timeclock pause once utility work is completed?
 - *Response: Yes, though timing of pause must be coordinated in advance with the Owner following an approved schedule.*
- Restrictions – i.e. access to the site or restrictions due to schedule of the Airport?
 - *Response: Contractor will have access to the site 24-7, though there may be limited requests from the airport to accommodate aircraft access.*

