CITY OF JACKSONVILLE BEACH
10th Street South Infrastructure Improvements – Phase II
Bid Submittal - Specification Package

City Bid No: 2526-01
Bid Opening Date: December 10, 2025

September 2025

Prepared For:

City of Jacksonville Beach
1460-A Shetter Avenue
Jacksonville Beach, Florida 32250

Prepared By:

Four Waters Engineering
324 6th Avenue North
Jacksonville, Florida 32250

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SECTION 00010
INVITATION TO BID

CITY OF JACKSONVILLE BEACH
Jacksonville Beach, FL

Sealed bids in triplicate, subject to the terms and conditions specified in this invitation, will be received until 2:00 p.m., December 10, 2025, and then opened publicly by the Property & Procurement Division, 1460A Shetter Avenue, 1st Floor, Jacksonville Beach, Florida, 32250 for furnishing the following:

BID INVITATION NO: 2526-01 10th Street South Infrastructure Improvements – Phase II

Bid documents will be available on the City of Jacksonville Beach's website https://fl-jacksonvillebeach.civicplus.com/Bids.aspx. Bid packages may also be purchased from the Engineer, Four Waters Engineering, Inc., 324 6th Avenue North, Jacksonville Beach, FL 32250, upon receipt of $100.00 per set, non-refundable.

Please submit triplicate completed Bid Proposal Forms in one sealed envelope clearly marked with bid number and bid name. Place the sealed envelope within another sealed envelope clearly marked in the same manner as the first envelope. This is done to prevent accidental opening of the sealed bids in our mailroom.

No verbal interpretations will be made of any documents. Requests for such interpretations shall be made in writing via email at Purchasing@jaxbchfl.net no later than **November 28, 2025**. It is the respondent's responsibility to ensure that all queries submitted for interpretation are received and addressed by the City no later than **December 3, 2025**. Questions which are not acknowledged by the City prior to **November 28, 2025** will not be considered for addendum issuance. All interpretations will be in the form of an addendum and will be published on the Bid/RFP/RFQ section of the City's website https://www.jacksonvillebeach.org/Bids.aspx.

If you require further information regarding this bid, please contact the Property and Procurement Division at Purchasing@jaxbchfl.net.

CITY OF JACKSONVILLE BEACH

Luis Flores
Property & Procurement Division
1460A Shetter Avenue, Jacksonville Beach, FL 32250

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SECTION 00020
ADVERTISEMENT FOR BIDS

The City of Jacksonville Beach is inviting qualified contractors to bid for the construction of watermain, gravity sewer, forcemain, and stormwater improvements as well as streetscaping. The work consists of furnishing all labor, equipment and materials for the installation of 2,373 linear feet (LF) of 8" PVC (DR-18) watermain by open cut with 53 LF of 6" PVC (DR-18) watermain and 33 LF of 12" PVC (DR-18) watermain by open cut for cross-street connections, 431 LF of 8" FPVC (DR-11) watermain by HDD, 1,821 LF of 16" PVC (DR-14) forcemain by open cut, 645 LF of 16" HDPE (DR-11) forcemain by HDD, 1099 LF of 15" PVC stormwater pipe, 1051 LF of 18" PVC stormwater pipe, 753 LF of 24" PVC stormwater pipe, replacing seven (7) sanitary sewer manholes, and rehabilitation of various sizes of gravity main by Cured-In-Place Pipe (CIPP) and open cut methods including demolition of portions of the existing sidewalk and driveways as well as the demolition of the existing pavement and construction of sidewalks, driveways, and paving.

Bids shall be submitted to the Property & Procurement Agent for the City of Jacksonville Beach, on BID forms furnished for that purpose in accordance with the contract documents, drawings and specifications. Drawings and specifications will also be available through the City of Jacksonville Beach's website at http://www.jacksonvillebeach.org/government/departments/finance/bidrfp-rfq-listings.

Deadline for the receipt of sealed bids has been set for **December 10, 2025, at 2:00 p.m.** Send sealed bids by mail to Property & Procurement Division, 1460A Shetter Avenue, 1st Floor, Jacksonville Beach, Florida 32250. No bid will be considered unless sealed and filed with the City of Jacksonville Beach, Purchasing & Procurement Division, prior to the time set forth above and accompanied by the bidders bond, payable to the City of Jacksonville Beach, Florida for five percent (5%) of the amount of the bid; to be forfeited as liquidated damages in the event that the bid is accepted and the bidder fails to enter promptly into a written contract and furnish the required performance bond and insurance certificates. Bids arriving after the designated time will be returned unopened.

No bids shall be withdrawn for a period of ninety (90) days after the opening of bids. The owner reserves the right to reject any or all bids and to waive any informality in any bid and to readvertise for bids.

BIDS must be submitted in a sealed envelope and be marked on the outside of the envelope:

SEALED BID

FOR: City Bid No: 2526-01 10th Street South Infrastructure Improvements - Phase II

BID OPENING DATE: December 10, 2025

SECTION 00200
INSTRUCTIONS AVAILABLE TO BIDDERS

1.1 PROJECT DESCRIPTION

A. The work of this project consists of furnishing all labor, materials, equipment, tools, transportation, services and incidentals and of performing all work necessary for the installation of 2,373 linear feet (LF) of 8" PVC (DR-18) watermain by open cut with 53 LF of 6" PVC (DR-18) watermain and 33 LF of 12" PVC (DR-18) watermain by open cut for cross-street connections, 431 LF of 8" FPVC (DR-11) watermain by HDD, 1,821 LF of 16" PVC (DR-14) forcemain by open cut, 645 LF of 16" HDPE (DR-11) forcemain by HDD, 1099 LF of 15" PVC stormwater pipe, 1051 LF of 18" PVC stormwater pipe, 753 LF of 24" PVC stormwater pipe, replacing seven (7) sanitary sewer manholes, and rehabilitation of various sizes of gravity main by Cured-In-Place Pipe (CIPP) and open cut methods including demolition of portions of the existing sidewalk and driveways as well as the demolition of the existing pavement and construction of sidewalks, driveways, and paving, and all necessary appurtenances complete, in place, and ready for service in accordance with the Drawings and Specifications prepared therefor by Four Waters Engineering, Inc. and entitled:

Bid No: 2526-01
10th Street South Infrastructure Improvements – Phase II

B. The project is located in Jacksonville Beach.

1.2 DEFINED TERMS

A. Terms used in the Instruction to Bidders are defined and have the meanings assigned to them in the General Conditions.

1.3 COPIES OF BIDDING DOCUMENTS

A. Only complete sets of Bidding Documents will be issued and shall be used in preparing Bids. Neither the CITY nor the ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets.

B. Completed sets of Bidding Documents may be obtained in the manner and at the location stated in the Advertisement for Bids. The deposit is non-refundable.

1.4 QUALIFICATIONS OF BIDDERS

A. Each bid must contain either evidence of the Bidder's qualifications to do business in the area where the projects are located or covenant to obtain such qualifications prior to award of Contract.

B. To demonstrate his qualifications to perform the Work, each bidder will be required to provide evidence as to his previous successful contractual and technical experience in similar work including references, description, and volume of present commitments, evidence of possession of, or covenant to obtain prior to award of Contract, valid state, county, and local licenses covering all operations and all areas of political jurisdiction involved in the Work of this project and such other data as may be requested by the CITY. The apparent low Bidder may be required to provide evidence as to his financial status prior to the project being awarded by the city council.

C. Contractor must be able to exhibit to the City of Jacksonville Beach that he can perform a minimum of 30% of the total contract work with their own labor work force.

1.5 DISQUALIFICATIONS OF BIDDERS

A. One Proposal: Only one Proposal from an individual firm, partnership, or corporation under the same or under different names will be considered. If it is believed that a Bidder is interested in more than one Proposal for the work involved, all Proposals in which such a Bidder is interested will be rejected.

B. Collusion Among Bidders: If it is believed that collusion exists among the Bidders, the Proposals of all participants in such collusion will be rejected, and no participants in such collusion will be considered in future Proposals for the same work.

1.6 EXAMINATION OF SITE CONDITIONS

A. Each Bidder, by and through the submission of his Bid, agrees that he shall be held responsible for having theretofore examined the site, the location of all proposed work and for having satisfied himself from his own personal knowledge and experience or professional advice as to the character and location of the site, the nature of the ground, surface and subsurface, the water elevations, location of buried utilities, and any other conditions surrounding and affecting the work, any obstructions, the nature of any existing construction, and all other physical characteristics of the job, in order that he may include in the prices which he bids all costs pertaining to the work and thereby provide for the satisfactory completion thereof, including the removal, relocation, or replacement of any objects or obstruction which may be encountered in doing the proposed work.

B. Any records of contours, obstructions, and other subsurface investigations shown on the Drawings or included hereinafter, were made solely for design purposes for the work; and the CITY and his ENGINEER do not warrant, guarantee, or represent that said data is correct with respect to actual subsurface conditions; therefore, the Bidder, by and through the submission of his Bid, affirms that he has made, or has caused to be made, his own test holes and/or other investigations of such subsurface conditions and/or that he has otherwise satisfied himself with respect to such conditions; and, should the Bidder be awarded the Contract, he agrees that he will make no claims against the CITY or his ENGINEER if, in carrying out the work, he finds that the actual conditions do not conform to those indicated. The CITY will, upon request, provide each Bidder with reasonable access to the site to conduct such tests and investigations, as each Bidder deems necessary for submission of his Bid. If a Bidder obtains such access, he shall restore the site to the condition existing prior to conducting said tests and investigations.

C. The Bidder, in preparing his Bid, shall take into consideration that work by other contractors may be in progress at or near the site during the performance of the work to which the bid relates and that he will be expected, should he be awarded a Contract, to avoid interference with work done by such other contractors and to coordinate his work with other contractors at the site.

1.7 EXAMINATION OF CONTRACT DOCUMENTS

A. Each Bidder shall carefully examine the Drawings and Specifications and other contract documents and inform himself thoroughly regarding any and all conditions and requirements, including the construction schedule, that may in any manner affect cost, progress, or performance of the work to be performed under the Contract. Ignorance on the part of the CONTRACTOR will in no way relieve him of the obligations and responsibilities assumed under the Contract.

B. Should a Bidder find discrepancies or ambiguities in, or omissions from, the Drawings or Specifications, or should he be in doubt as to their meaning, he shall at once notify the ENGINEER.

1.8 INTERPRETATIONS, CLARIFICATIONS AND ADDENDA

No oral interpretations will be made to any Bidder as to the meaning of the Contract Documents. Any inquiry or request for interpretation by November 28, 2025, will be given consideration. All such changes or interpretations will be made in writing in the form of an addendum and, if issued, will be sent by available means to all known prospective Bidders prior to the established bid opening date. Each Bidder shall acknowledge receipt of such addenda in the space provided therefore in the Proposal form. In case any Bidder fails to acknowledge receipt of such addenda or addendum, his Bid will nevertheless be construed as though it had been received and acknowledged, and the submission of his Bid will constitute acknowledgement of the receipt of same. All addenda are a part of the Contract Documents, and each Bidder will be bound by such.

addenda, whether or not received by him. It is the responsibility of each Bidder to verify that he has received all addenda issued before Bids are opened.

1.9 INTERPRETATION OF QUANTITIES

In the case of unit price items, the quantities of work to be done and the materials to be furnished under this Contract, as given in the Proposal, are to be considered as approximate only and are to be used solely for the comparison of Bids received. The CITY and/or his ENGINEER do not expressly or by implication represent that the actual quantities involved will correspond exactly therewith; nor shall the Bidder plead misunderstanding or deception because of such estimate or quantities or of the character, location, or other conditions pertaining to the work. Payment to the CONTRACTOR will be made only for the actual quantities of work performed or material furnished in accordance with the Drawings and other Contract Documents, and it is understood that the quantities may be increased or diminished as provided in the General Conditions without in any way invalidating any of the unit or lump sum prices bid.

1.10 ALTERNATES

When certain items of equipment and/or materials are specified and/or described as the product of a particular manufacturer together with any required additional information such as model number, size or catalog number, only such specific items may be used in preparing the Bid.

1.11 GOVERNING LAWS AND REGULATIONS

A. The Bidder is required to be familiar with and shall be responsible for complying with all federal, state and local laws, ordinances, rules and regulations that in any manner affect the work.

B. The Bidder shall include in his bid prices all sales, consumer, use and other taxes required to be paid in accordance with the law of the place of the project.

1.12 PREPARATION OF BIDS

A. Signature of the Bidder: The Bidder must sign the Proposal forms in the space provided for the signature. If the Bidder is an individual, the words "doing business as _____", or "Sole Owner" must appear beneath such signature. In the case of a partnership, the signature of at least one of the partners must follow the firm name and the words "Member of the Firm" should be written beneath such signature. If the Bidder is a corporation, the title of the officer signing the Proposal on behalf of the corporation must be stated and evidence of his authority to sign the Proposal must be submitted. The Bidder shall state in the Proposal the name and address of each person interested therein.

B. Basis for Bidding: The price bid for each item shall be on a lump sum or unit price basis according to the form of the Proposal. The bid prices shall remain unchanged for the duration of the Contract and no claims for cost escalation during the progress of the work will be considered.

C. Price Bid: The total price bid for the work shall be the aggregate of the lump sum prices bid and/or unit prices multiplied by the appropriate estimated quantities for the individual items and shall be stated in figures in the appropriate place on the Proposal Form. In the event that there is a discrepancy on the Proposal Form due to unit price extensions or additions, the corrected extensions and additions shall be used to determine the project bid amount.

1.13 SUBMISSION OF BIDS

A. Each Proposal bid must be submitted on the Proposal Form as furnished, together with a suitable bid security as herein described.

B. The Proposal and bid security, if required, must be submitted in a sealed envelope, which shall be marked so as to clearly indicate its contents and the name of the Bidder. If forwarded by mail, the above-mentioned envelope shall be enclosed in another envelope addressed to the entity and address stated in the Advertisement for Bids, and preferably by special delivery, registered mail; if forwarded otherwise than by mail, it shall be delivered to the same address. Proposals will be received until the date and hour stated in the Advertisement for Bids.

C. Each Bidder must submit with his Proposal an accompanying letter in which he shall list the names and addresses of his major subcontractors together with the services they will supply. These subcontractors will be subject to review as to their competency by the CITY prior to award of Contract and shall be one of the considerations in determining the successful Bidder. After award of Contract, no change in subcontractors shall be made unless approved by the CITY after a request for such a change has been submitted in writing by the CONTRACTOR, which shall include the reasons for such request.

D. Each Bidder shall submit with his Proposal the required evidence of his qualifications and experience as outlined in Article 1.4. The apparent low Bidder may be required to provide evidence as to his financial status, previous successful contractual and technical experience in similar work including references, description, and volume of present commitments, evidence of possession of, or covenant to obtain prior to award of Contract, valid state, county, and local licenses covering all operations and all areas of political jurisdiction involved in the Work of this project and such other data as may be requested by the CITY.

1.14 BID SECURITY

A. Each Proposal must be accompanied by a cashier's check or Bid Bond in an amount not less than five percent (5%) of the amount of the Bid. The bid security of all Bidders will be returned within ten (10) days after the CITY and the accepted Bidder have executed the written Contract and the accepted Bidder has filed an acceptable bond. If ninety (90) days have passed after the date of the receipt of the Bids and no Contract has been awarded, the bid security of any Bidder will be returned on demand, provided that the Bidder has not been notified of the acceptance of his Bid.

B. Attorneys-in-Fact who sign Bid Bonds must file with such bonds a certified copy of their Power of Attorney to sign said Bonds.

C. Failure of the accepted Bidder to execute a Contract and file acceptable bonds as provided herein within ten (10) days after a written Notice of Award has been given shall be just cause for the annulment of the award and forfeiture of the bid security to the CITY, which forfeiture shall be considered not as a penalty, but in liquidations of damages sustained. Award may then be made to another Bidder, or all Bids may be rejected.

1.15 WITHDRAWAL OF BID

A. Any Bid may be withdrawn prior to the time scheduled in the Advertisement for Bids for the opening thereof. A Bid may also be withdrawn ninety (90) days after the date of the opening of the Bids, provided that the Bidder has not been notified that his Bid has been accepted.

1.16 MODIFICATION OF BIDS

A. Written bid modification will be accepted from Bidders if addressed to the entity and address indicated in the Advertisement for Bids and received prior to Bid due time and date.

B. A Bidder may modify his Bid by telegraphic communication at any time prior to the scheduled closing time for receipt of Bids, provided such telegraphic communication is received prior to the closing time, and provided further, that CITY is satisfied that a written communications of the telegraphic modification over the signature of the Bidder was mailed prior to the closing time. The telegraphic communication should not reveal bid price but should provide the addition or subtraction or other

modification so that the final prices or terms will not be known until the sealed Bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification.

1.17 RECEIPT AND OPENING OF BIDS

A. Bids will be received until the designated time and will be publicly opened and read aloud at the appointed time and place stated in the Advertisement for Bids. The person whose duty is to open them will decide when the specified time has arrived, and no Bids received thereafter will be considered. No responsibility will be attached to anyone for the premature opening of a Bid not properly addressed and identified. Bidders or their authorized agents are invited to be present.

1.18 DETERMINATION OF SUCCESSFUL BIDDER

A. For the purpose of award, the correct summation of the lump sum prices and/or of the products of the estimated quantities shown in the Proposal and the unit prices will be considered the Bid. The amounts then will be compared, and the results of such comparison made available to the public. Until the final award of the Contract, the CITY does not bind himself to accept the minimum Bid stated herein but reserves the right to reject any and all Bids and to waive technical errors and irregularities as may be deemed best for the interests of the CITY. Bids, which contain modifications, are incomplete, unbalanced, conditional, obscure, or which contain additions not requested or irregularities of any kind, or which do not comply in every respect with the Instructions to Bidders, and the Contract Documents, may be rejected at the option of the CITY. In project bids that have multiple parts and/or alternates, Bidders must submit a price for all parts/alternates within the bid proposal. The CITY may elect to award the contract based on the base bid and any alternate(s) in the best interest of the CITY.

1.19 AWARD OF CONTRACT

A. The CITY reserves the right to reject any or all Bids, or any part of any Bid and/or alternate(s), to waive any informality in any Bid, or to readvertise for all or part of the work contemplated. The CITY reserves the right, prior to award of Contract, to delete from the scope of the project any item or any combination of items from the total bid price for the project. If Bids are found to be acceptable by the CITY, written notice will be given to the lowest responsible Bidder of the acceptance of his Proposal and of the award of the Contract to him.

B. If a Bidder to whom a Contract is awarded forfeits his bid security and the award of the Contract is annulled, the CITY may then award the Contract to another Bidder, or the work may be readvertised or may be constructed by day labor as the CITY decides.

C. The Contract will be awarded to the lowest responsible qualified Bidder complying with the applicable conditions of the Contract Documents.

D. The ability of a Bidder to obtain a performance bond shall not be regarded as the sole test of such Bidder's competence or responsibility.

E. The CITY also reserves the right to reject the Proposal of a Bidder who has previously failed to perform properly or to complete Contracts of a similar nature on time.

1.20 EXECUTION OF CONTRACT

A. The Bidder to whom a Contract is awarded will be required to return to the CITY, three (3) executed counterparts of the prescribed Contract together with the required Performance and Payment Bonds and the required Certificates of Insurance within ten (10) days from the date of Notice of Acceptance of the Bidder's Proposal.

1.21 PERFORMANCE AND PAYMENT BONDS

A. Simultaneously with his delivery of the executed Contract to the CITY, a Bidder to whom a Contract has been awarded must deliver to the CITY executed Performance and Payment Bonds on the prescribed forms each in an amount of one-hundred percent (100%) of the total amount of the accepted Bid, as security for the faithful performance of his Contract and for the payment of all persons performing labor or furnishing materials in connection therewith. The Performance and Payment Bonds shall have as the surety thereon only such surety company or companies as are authorized to write bonds of such character and amount under the laws of the State of Florida and with a resident agent in the county in which the project is located. The Attorney-in-Fact, or other officer who signs the Performance and Payment Bonds for a surety company, must file with such bonds a certified copy of his Power-of-Attorney authorizing him to do so.

B. The Performance and Payment Bonds shall remain in force for one (1) year from the date of final acceptance of the work as a protection to the CITY against losses resulting from latent defects in materials or improper performance of work under Contract, which may appear or be discovered during that period.

C. Qualification of Sureties shall be as described in the General Conditions.

1.22 CERTIFICATES OF INSURANCE

Simultaneously with his delivery of the executed Contract to the CITY, the Bidder to whom a Contract has been awarded shall deliver to the CITY the required Certificate of Insurance and endorsements on the prescribed form certifying insurance coverage in amounts not less than the limits of liability and coverages provided in Section 500: Contract Agreement, or required by law, whichever is greater.

1.23 E-VERIFY/AUTHORIZED WORKER STATUS

Pursuant to Section 448.095, Florida Statutes, CONTRACTOR, and any subcontractor thereof, shall register with and use the E-Verify system to verify the work authorization status of all new employees of CONTRACTOR or subcontractor(s).

Should CONTRACTOR enter into a contract with a subcontractor for the work to be provided to the CITY herein, the subcontractor shall provide CONTRACTOR with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. CONTRACTOR shall maintain a copy of such affidavit for the duration of the contract.

The CITY, CONTRACTOR, or subcontractor who has a good faith belief that a person or an entity with which it is contracting has knowingly violated Section 448.09(1), Florida Statutes, shall terminate the contract with the person or entity in violation.

If the CITY has a good faith belief that a subcontractor has knowingly violated this Article, but CONTRACTOR otherwise complied with this Article, the CITY shall promptly notify CONTRACTOR and order CONTRACTOR to immediately terminate the contract with the subcontractor.

If this Agreement is terminated under this Article, it is not a breach of contract and may not be considered as such. If the CITY terminates this Agreement with CONTRACTOR under this Article, CONTRACTOR may not be awarded a public contract for at least one year after the date on which this Agreement is terminated. CONTRACTOR shall be liable for any additional costs incurred by the CITY as a result of the termination of this Agreement.

The CITY, CONTRACTOR, or subcontractor may file a cause of action with a circuit or county court to challenge termination under this Article no later than 20 calendar days after the date on which this Agreement was terminated.

1.24 PROHIBITION AGAINST CONSIDERING SOCIAL, POLITICAL, OR IDEOLOGICAL INTEREST

In accordance with Sec. 287.05701, F.S., the City may not request documentation of, consider, or give preference to a vendor based on a vendor's social, political, or ideological interest when determining if the vendor is a responsible vendor.

END OF SECTION

SECTION 00220
INFORMATION AVAILABLE TO BIDDERS

Utilities: Existing utilities have been shown on the Drawings insofar as information is reasonably available; however, it will be the Contractor's responsibility to preserve all existing utilities whether shown on the Drawings or not. If utility conflicts are encountered by the Contractor during construction, he shall give sufficient notice to the City so that he may make the necessary adjustments. Damage to any utilities, which, in the opinion of the City and Engineer, is caused by carelessness on the part of the Contractor, shall be repaired at the Contractor's expense. Any delays ensuing from this damage will be considered inexcusable. Utility contacts are listed in Section 1000: Project Requirements.

END OF SECTION

SECTION 00300
BID PROPOSAL FORM

Date: _____

Proposal of Bidder: _____

Business Address: _____

_____

Project Name:
City Bid No: 2526-01 10th Street South Infrastructure Improvements – Phase II, City of Jacksonville Beach, FL

To: City of Jacksonville Beach
Purchasing Department
1460A Shetter Avenue
Jacksonville Beach, Florida 32250

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal, as principal or principals, is or are named herein and that no other person than herein mentioned has any interest in the Proposal of the Contract to which the work pertains; that this Proposal is made without connection or arrangement with any other person, company, or parties making a bid or proposal and that the Proposal is in all respects fair and made in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and that from personal knowledge and experience, or that he has made sufficient test holes and/or other subsurface investigations to fully satisfy himself that such site is a correct and suitable one for this work and he assumes full responsibility therefor; that he has examined the Drawings and Specifications for the work and from his own experience or from professional advice that the Drawings and Specifications are sufficient for the work to be done and he has examined the other Contract Documents and all addenda relating thereto, and that he has satisfied himself fully, relative to all matters and conditions with respect to the work to which this Proposal pertains.

The Bidder proposes and agrees, if this Proposal is accepted, to contract with the City of Jacksonville Beach, Florida, in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, and labor and to perform all work necessary to complete the work specified in the Proposal and other Contract Documents.

The Bidder further proposes and agrees to comply in all respects with the time limits for commencement and completion of the work as stated in the Contract Form.

The Bidder further agrees that the deductions for liquidated damages, as stated in the Contract Form, constitute fixed, agreed, and liquidated damages to reimburse the City for additional costs to the City resulting from the work not being completed within the time limit stated in the Contract Form.

The Bidder further agrees to execute a contract and furnish satisfactory Performance and Payment Bonds, each in the amount of one-hundred percent of the Contract price, and the required Certificates of Insurance, within ten consecutive calendar days after written notice being given by the City of the award of the Contract, and the undersigned agrees that in case of failure on his part to execute the said Contract and Performance and Payment Bonds within the ten consecutive calendar days after the award of the Contract, the bid guarantee accompanying his bid and the money payable thereon shall be paid to the City as liquidation of damages sustained by the City; otherwise, the bid guarantee shall be returned to the undersigned after the Contract is signed and the Performance and Payment Bonds are filed.

The undersigned agrees to accept in full compensation for completion of the project in full compliance with the Contract Documents, the total of the lump sum prices and extended unit prices for the items named in the following schedule. It is understood that the unit prices quoted or established for a particular item are to be used for computing the amount to be paid to the Contractor, based on the quantities actually constructed as determined by the applicable measurement and payment portion of the specifications.

Bidder's General Contractor's License No._____

Bidder's Underground Utility License No._____

Authorized Company Representative Signature: _____

Name and Address of Surety or Sureties who will sign Bonds:

Performance Bond _____
_____
_____

Payment Bond _____
_____
_____

For authorized addition or deletion of quantities of work items to/from those indicated by the contract documents, the above unit prices shall apply.

Acknowledgement is hereby made of the following Addenda received since issuance of Plans and Specifications:

Addendum No._____ Dated:_____ Addendum No._____ Dated:_____

Addendum No._____ Dated:_____ Addendum No._____ Dated:_____

Addendum No._____ Dated:_____ Addendum No._____ Dated:_____

Bid Document Checklist: The following documents are to be completed, signed and submitted as part of the Project Bid Proposal Documents. Failure to provide the listed documents may be cause for rejection of the submitted bid.

- **[ ] Section 00301–A Subcontractor Listing**
- **[ ] Section 00301–B Required Disclosure**
- **[ ] Section 00301-C Letter of Compliance with the Florida Trench Safety Act**
- **[ ] Section 00301-D Bid Award Notice**
- **[ ] Section 00301-E Signed Drug-free Workplace Compliance Form**
- **[ ] Section 00301-F Non-Bankruptcy Affidavit**
- **[ ] Section 00301-G Certification Pursuant to Florida Statute §287.135**
- **[ ] Section 00301-H Suspension & Debarment Pursuant to Florida Statute §287.1351, Executive Orders 12549 and 12689, 2 C.F.R. Part 180**
- **[ ] Section 00301-I Anti-Human Trafficking**

- **[ ] Section 00410 - Bid Bond**
- **[ ] Section 00480 - Signed Non-collusion Affidavit**
- **[ ] Copy of Occupational License**
- **[ ] Completed and Signed W-9 Form – may be obtained online from www.irs.gov**
- **[ ] Documentation to demonstrate his qualifications to perform the work as required in Section 00200 – Instructions Available to Bidders, Section 1.4 – Qualifications Of Bidders, Paragraph B.**

Please check off each document and attach to the Bid Proposal Form.

BID SCHEDULE

CITY OF JACKSONVILLE BEACH
10th STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II

BASE BID

Water Main Items

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
1	12" Sleeve & Connect to Exist. 12" WM w/ Joint Restraints	2	EA		
2	8" Sleeve & Connect to Exist. 8" WM w/ Joint Restraints	5	EA		
3	6" Sleeve & Connect to Exist. 6" WM w/ Joint Restraints	5	EA		
4	8" Gate Valve w/ Box & Cover	20	EA		
5	6" Gate Valve w/ Box & Cover	7	EA		
6	1/2" Temporary Sample Tap	23	EA		
7	12" PVC (DR18) WM by Open Cut	33	LF		
8	8" PVC (DR18) WM by Open Cut	2373	LF		
9	8" FPVC (DR11) WM by HDD	431	LF		
10	6"PVC (DR-18) WM by Open Cut	53	LF		
11	4" PVC (DR-18) WM by Open Cut	3	LF		
12	3" PVC (DR-18) WM by Open Cut	9	LF		
13	2" PVC (SCH 80) WM by Open Cut	123	LF		
14	12" 45° DI MJ Bend w/ Joint Restraints	8	EA		
15	8" 11.25˚ DI MJ Bend w/ Joint Restraints	2	EA		
16	8" 22.5˚ DI MJ Bend w/ Joint Restraints	2	EA		
17	8" 45˚ DI MJ Bend w/ Joint Restraints	72	EA		
18	8" 90˚ DI MJ Bend w/ Joint Restraints	1	EA		
19	6" 90˚ DI MJ Bend w/ Joint Restraints	1	EA		
20	6" 45° DI MJ Bend w/ Joint Restraints	12	EA		
21	3" 45˚ DI MJ Bend w/ Joint Restraints	2	EA		
22	2" 90˚ PVC Bend	1	EA		

23	8"x8" DI MJ Tee w/ Joint Restraints	5	EA		
24	8"x6" DI MJ Tee w/ Joint Restraints	9	EA		
25	8"x4" DI MJ Tee w/ Joint Restraints	1	EA		
26	8"x2" Tap and Saddle w/ Stainless Steel Double Strap	1	EA		
27	6"x6" DI MJ Tee w/ Joint Restraints	1	EA		
28	8"x12" DI MJ Reducer	2	EA		
29	8"x6" DI MJ Reducer	1	EA		
30	4"x3" DI MJ Reducer	1	EA		
31	8" Cap / Plugged Dead End Mechanical Restraint	2	EA		
32	2" Plugged Dead End Mechanical Restraint	1	EA		
33	Remove Hydrant Assembly	4	EA		
34	Install New Hydrant Assembly	5	EA		
35	Service Connection Replacement (Single)	48	EA		
36	Corrosion Coupon (8" WM)	1	EA		
37	Abandon Existing 8" WM by Cut, Grout Fill, and Cap	2140	LF		
38	Abandon Existing 8" WM by Cut and Removal	695	LF		
39	Adjust Exist. Valve Box & Cover	48	EA		
40	Water Meter Removal & Replacement	1	EA		

Water Main Items Subtotal _____

Sewage Force Main Items

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
41	16" PVC (DR18) FM by Open Cut	1821	LF		
42	16" FPVC (DR18) FM by HDD	645	LF		
43	16" 45˚ DI MJ Bend w/ Joint Restraints	12	EA		
44	16" 22.5˚ DI MJ Bend w/ Joint Restraints	2	EA		
45	16" 11.25˚ DI MJ Bend w/ Joint Restraints	9	EA		
46	16" Gate Valve w/ Box & Cover	3	EA		
47	16" Sleeve & Connect to Exist. 16" FM w/ Joint Restraints	2	EA		
48	Low Profile Air Release Valve	3	EA		
49	Corrosion Coupon (16" FM)	1	EA		
50	Abandon Existing 16" FM by Cut and Removal	1702	LF		
51	Abandon Existing 16" FM by Cut, Grout Fill, and Cap	744	LF		

Sewage Force Main Items Subtotal _____

Gravity Sewer Items

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
52	12" CIPP Lining	350	LF		
53	8" PVC (SDR26) GS (0'-4' Depth)	1111	LF		
54	8" PVC (SDR26) GS (4'-6' Depth)	42	LF		
55	Connect New 8" GS to Exist. 8" GS	12	EA		
56	Connect New 8" GS to Exist. Manhole	7	EA		
57	Connect Exist. 8" GS to New Manhole	13	EA		
58	4' Dia. Manhole (0'-4' Depth) Type C	6	EA		
59	4' Dia. Manhole (4'-6' Depth) Type C	1	EA		
60	Line Existing Manhole	7	EA		
61	Remove Manhole Below Grade	9	EA		
62	Restore Service Lateral After 8" PVC Install	23	EA		
63	Remove 8" Gravity Sewer Below Grade	1147	LF		
64	Grout Fill 6" Gravity Sewer Below Grade	71	LF		
65	Grout Fill 8" Gravity Sewer Below Grade	78	LF		
66	Adjust Exist. Manhole Frame & Cover (Allowance)	10	EA		
	Gravity Sewer Items Subtotal				

Stormwater Items

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
67	City Std. Curb Inlet (4'-6' Depth)	23	EA		
68	City Std. Type "J" Manhole	3	EA		
69	City Std. Type "C" Inlet (4'-6' Depth)	8	EA		
70	15" PVC Storm Drain Pipe	1099	LF		
71	18" PVC Storm Drain Pipe	1051	LF		
72	24" PVC Storm Drain Pipe	753	LF		
73	Connect Prop. 15" PVC to Exist Inlet	1	EA		
74	Connect Prop. 24" PVC to Exist Manhole	3	EA		
75	Remove Exist. Inlet	10	EA		
76	Remove Existing Stormwater Pipe Below Grade	1135	LF		
77	24" 45° DI MJ Bend w/ Joint Restraints	4	EA		
78	24" PVC (DR18) FM by Open Cut	20	LF		
79	24" Sleeve & Connect to Exist. 24" FM w/ Joint Restraints	2	EA		
	Stormwater Items Subtotal				

Roadway, Excavating, Grassing, Pavement, Etc. Items

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
80	Asphalt Concrete, Type SP-9.5 (1" Thick)	5003	SY		
81	6" Compacted Limerock or Crushcrete Base	5003	SY		
82	12" Stabilized Subgrade	5003	SY		
83	Traffic Stripe Solid (Thermoplastic) (White) (24")	258	LF		
84	Traffic Stripe Solid (Thermoplastic) (Yellow) (6")	1403	LF		
85	Crosswalk Markings (Thermoplastic) (White) (12")	147	LF		
86	Remove Single Post Sign	35	EA		
87	New Single Post Sign	35	EA		
88	Mill Existing Asphalt and Resurface	13611	SY		
89	Regular Excavation and Fill	1	LS		
90	Sodding (Match Existing) Either St. Augustine or Bermuda	1	LS		
91	Misc. Concrete and Sidewalk Removal	1805	SY		
92	Concrete Driveway & Pavement Removal	1957	SY		
93	Gravel/Limerock Driveways Removal	1065	SY		
94	Brick Sidewalk/Driveway Removal and Installation	196	SY		
95	Curb & Gutter Removal	3099	LF		
96	Asphalt Pavement & Base Removal	4729	SY		
97	6" Thick Concrete Sidewalk with Fiber Mesh	2325	SY		
98	6" Thick Concrete Driveway & Parking Areas with Fiber Mesh	2567	SY		
99	Curb & Gutter (Incl. Drop, Median & Transitions)	10491	LF		
100	Valley Gutter	185	SY		
101	A-3 Sand (Allowance)	1000	CY		
102	Unsuitable Material Removal (Allowance)	1000	CY		
	Roadway, Excavating, Grassing, Pavement, Etc. Items Subtotal				

Payment & Performance Bond

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
103	Test Hole Allowance	1	LS	$25,000	$25,000
104	Payment & Performance Bond (1.5% of Subtotal)	1	LS		
	Payment & Performance Bond Subtotal				

BID PRICE – BASE BID (Items No. 1 through 104) _____

BID PRICE (Items No. 1 through 104) (In Words) _____

ALTERNATE ITEMS

PLEASE PROVIDE THESE PRICES AS SUBSTITUTION FOR THE EQUIVALENT IN LENGTH FOR ITEMS 70; 71 & 72.

No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
105	12”x18” ERCP Storm Drain Pipe	124	LF		
106	14”x23” ERCP Storm Drain Pipe	38	LF		
107	19”x30” ERCP Storm Drain Pipe	321	LF		
	Alternate Items Subtotal				

TOTAL ALTERNATE BID (TOTAL BASE BID + ALTERNATE BID TOTAL) (Items No. 1 through 107)

TOTAL ALTERNATE BID (Items No. 1 through 107) (In Words)

SECTION 00300A
SCOPE OF SERVICES

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. This Contract comprises the construction of the City of Jacksonville Beach, 10th Street South Infrastructure Improvements – Phase II, as shown on the Drawings and specified herein. The work consists of furnishing all labor, equipment and materials for the construction of the infrastructure improvements consisting of, but not limited to, the following:

1. Removal and replacement of the water distribution system and forcemain, rehabilitation of the existing sanitary sewer collection system, and construction of the roadway and stormwater improvements from 5th Avenue South to Beach Boulevard on 10th Street South and 11th Street South, as shown on the Drawings.

2. All site work, grading, fencing, site restoration, permits, site cleanup, demolition, temporary utilities, planting, and other miscellaneous appurtenances.

3. Collection and removal to an approved landfill all construction debris, trash, garbage, etc. that results from the Contractor's operations.

B. The Contractor shall furnish all labor, equipment, tools, services and incidentals to complete all Work required by these Specifications and as shown on the Drawings.

C. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration required as a result of damages caused during this construction.

D. All materials, equipment, skills, tools and labor which is reasonably and properly inferable and necessary for the proper completion of the Work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.

E. The Contractor shall comply with all Municipal, County, State, Federal, and other codes which are applicable to this Project.

1.02 CONTRACTOR'S USE OF PREMISES

The Contractor shall assume full responsibility for the protection and safekeeping of products and materials at the job site. If additional storage or work areas are required, they shall be obtained by the Contractor at no additional cost to the Owner.

1.03 WORK SEQUENCE

The Contractor shall establish his work sequence based on the use of sufficient crews to facilitate completion of construction and testing within the allotted Contract Time.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 00301-A
SUBCONTRACTOR LISTING

List proposed Subcontractors to be used for this Project regardless of racial or gender grouping in accordance with Section 00200 – Instructions to Bidders: Paragraph 1.13 – Submission of Bids. C. of the Contract Specifications.

Firm Name Address and Telephone number	Trade	Estimate Dollar Amount
*		$
*		$
*		$
*		$
*		$
*		$
*		$

Project Title: _____

Contractor: _____

Address: _____

City, State: _____

*Use additional sheets if necessary.

END OF SECTION

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SECTION 00301-B
REQUIRED DISCLOSURE

The following disclosure is of all material facts pertaining to any felony conviction or any pending felony charges in the last three (3) years in this State or any other state or the United States against (1) bidder, (2) any business entity related to or affiliated with bidder, or (3) any present or former owner of bidder or of any such related or affiliated entity. This disclosure shall not apply to any person or entity which is only a stockholder, which person or entity owns twenty (20) percent or less of the outstanding shares of a bidder whose stock is publicly owned and traded:

Signed: _____ Title: _____

Contractor: _____

END OF SECTION

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SECTION 00301-C
LETTER OF COMPLIANCE WITH
THE FLORIDA TRENCH SAFETY ACT

Date: _____

NAME OF BIDDER: _____

TO: _____, OWNER

_____

_____

RE: CITY BID NO. 2526-01 10th Street South Infrastructure Improvements – Phase II _____
(Contract Title)

GENTLEMEN:

This letter is written to give assurances that as Contractor for the above-noted construction, we will comply with the applicable trench safety standards during the Work of this Contract.

We have considered the costs per linear foot for Trench Safety Measures and the cost per square foot for special shoring requirements and have incorporated these costs into the various items on the Bid Form.

Consistent with the Florida, "Trench Safety Act", the following are separately stated components of the various items:

Trench Safety Measure Description	Unit of Price	Quantity	Unit of Price	Amount
A.				
B.				
C.				
D.				

In case quantities for Trench Safety Measures are understated, we shall provide the required quantities paid for by the margin already built into the Contract price, and in case quantities are overstated we will retain the excess amount and add it to changes in our margin. This provision shall in no way affect the Conditions of Contract relating to changes in the work or adjustments for differences between estimated Quantities in the Bid Form and measure-in-place completed work.

In case we subcontract any portion of the Work, which is subject to the "Trench Safety Act", we will be responsible for obtaining cost data and assurances of compliance with applicable trench safety standards from the subcontractor.

NAME OF BIDDER: _____

Sincerely,

_____, CONTRACTOR

_____
(Authorized Signature)

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City of Jacksonville Beach

1460A Shetter Avenue, Jacksonville Beach, FL 32250, (904) 247-6229

SECTION 00301-D
BID AWARD NOTICE FORM

****

ITEMS BELOW TO BE COMPLETED BY THE CITY OF JACKSONVILLE BEACH

****

NOTICE: Items 1 to 6 are to be completed by the Bidder. The Bidder to submit the form to the City along with the Bid Documents.

1. _____
   Company Name
2. _____
   Address
3. _____
   City, State and Zip

4. Attention: _____

5. Phone: _____ Fax: _____

6. E-mail address: _____

PLEASE PRINT CLEARLY

Bids were received and awarded for Bid No. 2526-01 per attached award memorandum and Bid tabulation sheet(s).

If awarded Bid please do not proceed with any orders or services prior to receiving an official City of Jacksonville Beach Purchase Order.

Thank you for your bid.

Sincerely,

CITY OF JACKSONVILLE BEACH

/s/Luis Flores
Purchasing & Procurement Division

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SECTION 00301-E
DRUG-FREE WORKPLACE COMPLIANCE FORM

IDENTICAL TIE BIDS - Preference shall be given to businesses with drug-free workplace programs. Whenever two or more bids, which are equal with respect to price, quality, and service, are received by the State or by any political subdivision for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none of the tied vendors have a drug-free workplace program. In order to have a drug-free workplace program, a business shall:

1) Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2) Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3) Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).

4) In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

5) Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

6) Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

_____
Vendor's Signature

END OF SECTION

This page is left blank intentionally.

SECTION 00301-F
NON-BANKRUPTCY AFFIDAVIT

STATE OF_____)

COUNTY OF_____)

_____is an officer and member of the firm of

_____, being first duly sworn, deposes and states that:

1. The subsequent certification statement is a true and accurate statement as of the date shown below.

2. The affiant understands that the intentional inclusion of false, deceptive or fraudulent statements on this Non-Bankruptcy Affidavit constitutes fraud; and, that the City of Jacksonville Beach, Florida, considers such action on the part of the affiant to constitute good cause for denial, suspension, revocation, disqualification, or rejection of the bid for CITY BID NO. 2526-01 – 10th Street South Infrastructure Improvements – Phase II.

3. Certification Statement: This is to certify that the aforementioned firm has not filed for bankruptcy in the past seven (7) years and that no owner/officer or principal of the aforementioned firm has filed for bankruptcy personally in the past seven (7) years or has been an owner/officer or principal of a firm which has filed for bankruptcy in the past seven (7) years.

_____

Affiant Signature

Sworn to before me this_____day of_____, 20_____by_____.
(Name of affiant)

He/She is personally known to me or has produced_____as identification.

_____

Signature of Notary

_____ _____

Notary's Printed Name Expiration of Notary's Commission

Affix Seal Here

END OF SECTION

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SECTION 00301-G

CERTIFICATION PURSUANT TO FLORIDA STATUTE §287.135

STATE OF _____)

COUNTY OF _____)

I, _____ on behalf of _____ certify
Print Name and Title Company Name

that _____:
Company Name

a. is not on the Scrutinized Companies that Boycott Israel List or engaged in a boycott of Israel. Pursuant to section 287.135, F.S., the City may immediately terminate this Agreement at its sole option if the Company is found to have submitted a false certification; or if the Company is placed on the Scrutinized Companies that Boycott Israel List or is engaged in the boycott of Israel during the term of the Agreement.

b. If this Agreement is for more than one million dollars, the Company certifies that it is also not on the Scrutinized Companies with Activities in Sudan, Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or engaged with business operations in Cuba or Syria as identified in section 287.135, F.S. Pursuant to section 287.135, F.S., the City may immediately terminate this Agreement at its sole option if the Company is found to have submitted a false certification; or if the Company is placed on the Scrutinized Companies with Activities in Sudan List, or Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or engaged with business operations in Cuba or Syria during the term of the Agreement.

c. As provided in subsection 287.135(8), F.S., if federal law ceases to authorize these contracting prohibitions, then they shall become inoperative.

END OF SECTION

SECTION 00301-H
SUSPENSION & DEBARMENT PURSUANT TO FLORIDA STATUTE §287.1351, Executive Orders 12549 and 12689, 2 C.F.R. Part 180

I, _____ on behalf of _____ certify
Print Name and Title Company Name

That _____:
Company Name

A. The prospective Vendor certifies that it and its principals (subcontractors and suppliers):
   a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or involuntarily excluded by any Federal, State, County, City of Town or other government agency;
   b. Have not within (36 months) period preceding this time, been convicted of or had a civil judgement entered against it for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal or State, City or Town of other local agency) transaction or contract; violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
   c. Are not presently indicated for otherwise criminally or civilly charged by a government entity (Federal, State or local) within commission of any of the offenses enumerated in paragraph (A)(2) of this certification; and
   d. Have not within (36) months period preceding this time, had one or more public contracts (Federal, State, City, or Town or other agency) terminated for cause or default.

B. Where the prospective Vendor is unable to certify to any of the statements in this certification, an authorized signatory to this proposal shall complete, sign and attach a detailed explanation.

_____ _____
Name and Position Date

_____
Signature

_____
Company Name

_____ _____
Street Address City, State and Zip Code

END OF SECTION

SECTION 00301-I
ANTI-HUMAN TRAFFICKING

AFFIDAVIT OF COMPLIANCE WITH SECTION 787.06(13)
FLORIDA ANTI-HUMAN TRAFFICKING PROVISIONS
(To be used when a contract is executed, renewed or extended)
(Required only for non-governmental vendors)

STATE OF _____

COUNTY OF _____

I, {full legal name} _____, swear and affirm that I am an officer or a representative of the Contractor and that _____does not use coercion for labor or services as those terms are defined in Section 787.06(13), Fla. Stat.

AFFIANT HEREBY CERTIFIES UNDER PENALTY OF PERJURY THAT THE STATEMENTS AND FACTS IN THIS AFFIDAVIT AND IN ANY ATTACHMENTS ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

Dated: _____

Signature of Affiant: _____

Sworn to or affirmed and signed before me on _____ by

_____ who is personally known to me or presented

_____, as identification.

Notary Public, State of _____

My commission expires: _____

END OF SECTION

SECTION 00410
BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,_____as Principal, and _____ as Surety, are hereby held and firmly bound unto the City of Jacksonville Beach as City in the penal sum of, (5 percent of the Contract Bid) _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, 20____.

The condition of the above obligation is such that whereas the Principal has submitted to the City a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the City of Jacksonville Beach,

CITY OF JACKSONVILLE BEACH
City Bid No. 2526-01
10th Street South Infrastructure Improvements – Phase II

NOW THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Principal shall not withdraw said bid within ninety (90) days after date of opening of the same, and shall within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the City in accordance with the bid as accepted, and give bonds with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract, then this obligation shall be void; otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be no way impaired or affected by an extension of the time within which the City may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this _____ day of _____, 20_____, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required.)
(If Corporation, Secretary only will attest and affix seal.)

PRINCIPAL:

_____
Name of Firm

WITNESSES:

_____

_____
Signature of Authorized Officer
(Affix Seal)

_____

_____
Title

Business Address

City State

SURETY:

WITNESS: Corporate Surety

Attorney-in-Fact
(Affix Seal)

Business Address

City State

Name of Local Insurance Agency

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the Principal, was then _____ of said corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said corporation by authority of its governing body.

(Corporate Secretary Seal)

STATE OF FLORIDA)
ss
COUNTY OF)

Before me, a Notary Public duly commissioned, qualified and acting, personally appeared _____ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the _____ and that he has been authorized by _____ to execute the foregoing bond on behalf of the Contractor named therein in favor of the City, the _____

Subscribed and sworn to before me this _____ day of _____, 20___, A.D.

(Attach Power-of-Attorney
to original Bid Bond)

Notary Public
State of Florida-at-Large

My Commission Expires: _____

END OF SECTION

SECTION 00480
NON-COLLUSION AFFIDAVIT

STATE OF_____)

COUNTY OF_____)

_____, being first duly sworn deposes and says that:

1. He (it) is the_____, of the Bidder that has submitted the attached Bid;

2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

3. Such Bid is genuine and is not a collusive or sham Bid;

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employee, or parties in interest, including this affidavit, have in any way, colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or the Bid price in any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of its agents, representatives, owners, employees or parties in interest, including his affidavit.

By: _____

Sworn and subscribed to before me this_____day of_____,

20___, in the State of_____, County of_____.

_____Notary Public

My Commission Expires: _____

END OF SECTION

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SECTION 00500
CITY/CONTRACTOR CONTRACT AGREEMENT

CONTRACT AGREEMENT for City Bid No. 2526-01 TITLE: 10th STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II
City of Jacksonville Beach, Property and Procurement

CONTRACT AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____ by and between the CITY OF JACKSONVILLE BEACH, FLORIDA, a municipality organized and existing under the laws of the State of Florida, hereinafter called CITY, and _____, hereinafter called CONTRACTOR:

WITNESSETH:

CITY and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1: Scope of Work

CONTRACTOR shall complete all work as specified or indicated in the Contract Documents. The Work is generally described as follows:

CITY BID NO. 2526-01

10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II
FOR
THE CITY OF JACKSONVILLE BEACH, FLORIDA.

All Work shall be performed in accordance with the Specifications titled "10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II." Services shall be for all materials, equipment and services, including labor to perform the installation, of which the requirements and scope of services is detailed in:

Exhibit "A", "Bid Form, Project Plans and Specifications, "10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II".

Article 2: CITY'S Responsibility

Access to Work Area: The CITY shall provide the CONTRACTOR access to all areas in which services are to be performed.

Article 3: Terms of Agreement

The CONTRACTOR shall complete the total contract within **four hundred and fifty (450)** consecutive calendar days after Notice to Proceed is given.

It is mutually agreed that time is of the essence and should the CONTRACTOR fail to complete the work within the specified time, or any authorized extension thereof, there shall be deducted from the compensation otherwise to be paid to the CONTRACTOR, and the CITY will retain the

amount of One Thousand Dollars ($1,000) per calendar day as fixed, agreed, and liquidated damages for each calendar day elapsing beyond the specified time for completion or any authorized extension thereof, which sum shall represent the actual damages which the CITY will have sustained by failure of the CONTRACTOR to complete the work within the specified time; it being further agreed that said sum is not a penalty, but is the stipulated amount of damages sustained by the CITY in the event of such default by the CONTRACTOR.

Article 4: Nonexclusive Contract

Nothing herein is intended nor shall be construed as creating any exclusive arrangement with the CONTRACTOR. This Contract shall not restrict the CITY from acquiring similar, equal or like goods and/or services from other entities or sources.

Article 5: Payment to Contractor

The CONTRACTOR agrees to provide services as described in the CONTRACT DOCUMENTS and comply with the terms therein.

5.1 *For Basic Services:* CITY shall pay CONTRACTOR for Contractual Services performed or furnished under the

Exhibit "A", "Bid Form, Project Plans and Specifications, "10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II."

5.2 *For Additional Services:* Notwithstanding the scope of work enumerated in

Exhibit "A", "Bid Form, Project Plans and Specifications, "10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II,"

The CONTRACTOR will, upon written request from the CITY, provide any and all other services normally falling within the services offered by the CONTRACTOR. In advance of performance of additional services, CITY and CONTRACTOR shall agree in writing to the additional services and negotiated price, consistent with the type of services requested.

5.3 *Invoices.*

A. *Preparation of Invoices*: Invoices will be prepared by CONTRACTOR in triplicate on AIA Documents G702 and G703 and submitted to CITY by CONTRACTOR unless otherwise agreed. The amount billed in each invoice will be calculated as set forth herein. Ten percent (10%) retainage will be held until such time as the project has been 50% completed at which time, the retainage will be reduced to 5% until all As-Built plans, Release of Liens and all other required close-out documents are provided to and approved by the CITY.

B. *Payment of Invoices:* Invoices are due and payable within 30 days of receipt.

C. *Disputed Invoices:* In the event of a disputed or contested invoice, only that portion so contested may be withheld from payment, and the undisputed portion will be paid.

5.4 *Payment Upon Termination:* In the event of termination, CONTRACTOR will be entitled to be paid for all services performed or furnished through the effective date of termination.

5.5 *Records of CONTRACTOR'S Cost:* Records of CONTRACTOR'S cost pertinent to CONTRACTOR'S compensation under this Agreement shall be kept in accordance with generally accepted accounting practices. Upon the CITY'S request, copies of such records will be made available by the CONTRACTOR to the CITY, at no cost to the CITY.

Article 6: Standards of Performance

CONTRACTOR and CITY shall comply with applicable Laws, Regulations, and CITY -mandated standards. This Agreement is based on these requirements as of its Effective Date and includes the attached:

Exhibit "A", "Bid Form, Project Plans and Specifications, "10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II."

Changes to these requirements after the Effective Date may be the basis for modifications to CONTRACTOR'S scope of work, times of performance, or compensation.

Article 7: Contractor as Independent Contractor

It is expressly agreed and understood that the CONTRACTOR is in all respects, an independent contractor as to the WORK and is in no respect an agent, servant, or employee of the CITY. This Agreement specifies the WORK to be done by the CONTRACTOR, but the method to be employed to accomplish the WORK shall be the responsibility of the CONTRACTOR.

Article 8: Subcontracting

CONTRACTOR may subcontract services to be performed hereunder with prior approval of the CITY. No such approval will be construed as making the CITY a party of or to such subcontract or subjecting the CITY to liability of any kind to any subcontract. No subcontract shall, under any circumstances, relieve the CONTRACTOR of its liability and obligation under this Agreement; and despite any such subcontracting, the CITY shall deal through the CONTRACTOR, and subcontractors will be dealt with as workers and representatives of the CONTRACTOR.

Article 9: Authorized Project Representatives

Upon the execution of this Agreement, CONTRACTOR and CITY shall designate specific individuals to act as representatives with respect to the services to be performed or furnished by CONTRACTOR and responsibilities of CITY under this Agreement. Such individuals shall have authority to transmit instructions, receive information, and render decisions relative to the WORK on behalf of each respective party.

Article 10: Inspection of Work

The CONTRACTOR shall furnish the CITY or the CITY'S representative with every reasonable opportunity for determining whether or not the WORK is performed in accordance with the requirements of this Agreement. The CITY may appoint persons to inspect the CONTRACTOR'S operations, equipment, and performance, and the CONTRACTOR shall permit these persons to make such inspections.

Article 11: Right to Require Performance

The failure of either the CITY or CONTRACTOR at any time to require performance by the other party of any provisions hereof shall in no way affect the right of the performing party thereafter to enforce the same. Nor shall waiver by such party of any breach of any provision hereof be taken or held to be a waiver of any succeeding breach of such provision or as a waiver of any provision itself.

Article 12: Extraordinary Occurrences

It is agreed that in no event shall the CITY or CONTRACTOR be liable or responsible to each other or to other persons for damages resulting from deficiencies or delays in the work herein provided for, where such deficiencies or delays result from Acts of God, fire, natural disaster, or any other cause not within reasonable control of the CITY or the CONTRACTOR. The CONTRACTOR recognizes the essential nature of the services to be performed hereunder and will use its best efforts to discharge its functions despite such extraordinary occurrences.

Article 13: Insurance

13.1 *Hold Harmless*: The CITY shall be held harmless against all claims for bodily injury, disease, death, personal injury, and damage to property or loss of use resulting there from, to the extent caused by the CONTRACTOR, unless such claims are a result of the CITY'S sole negligence.

13.2 *Payment on Behalf* of the CITY: The CONTRACTOR agrees to pay on behalf of the CITY, the CITY'S legal defense, for all claims described herein. Such payment on behalf of the CITY shall be in addition to all other legal remedies available to the CITY and shall not be considered to be the CITY's exclusive remedy.

13.3 *Loss Control/Safety*: Precaution shall be exercised at all times by the CONTRACTOR for the protection of all persons, employees, and property. The CONTRACTOR shall comply with all laws, regulations and ordinances related to safety and health, shall make special efforts to detect hazardous conditions, and shall take prompt action where loss control and safety measures should reasonably be expected.

13.4 *Proof of Carriage of Insurance & Naming CITY as Additional Insured.* The CONTRACTOR shall furnish the City with satisfactory proof of carriage of insurance required herein. The CONTRACTOR shall name the City of Jacksonville Beach (CITY) as additional insured on the CONTRACTOR's, and any sub-consultant's or sub-contractor's Public Liability, Property Damage and Comprehensive Automobile Liability Insurance Policies. The additional insured shall be provided the same coverage as the primary insured for losses arising from work performed by the CONTRACTOR or its sub-consultant's or subcontractor's. The proof of carriage or a copy of all policies shall be required prior to commencement of any work under this Contract.

The CITY may order work to be stopped if conditions exist that present immediate danger to persons or property. The CONTRACTOR acknowledges that such stoppage will not shift responsibility for any damages from the CONTRACTOR to the CITY.

13.5 *Insurance Requirements.* Basic Coverage's Required: During the term of this contract, the CONTRACTOR shall procure and maintain the following-described insurance and/or self-insurance except for coverage's specifically waived by the CITY. All policies and insurers must be acceptable to the CITY.

These insurance requirements shall not limit the liability of the CONTRACTOR. The CITY does not represent these types of amounts of insurance to be sufficient or adequate to protect the CONTRACTOR'S interests or liabilities but are merely minimums.

A. Workers Compensation Coverage is required.

The CONTRACTOR and all subcontractors shall purchase and maintain worker's compensation insurance for all workers compensation obligations imposed by state law with employers' liability limits of at least $100,000 each accident, $100,000 each employee and $500,000 policy limit for disease.

The CONTRACTOR and all subcontractors shall also purchase any other coverages required by law for the benefit of employees.

B. General Liability Coverage is required for all Contractors and Subcontractors.

Commercial General Liability in Occurrence Form.

Coverage A shall include Bodily Injury and Property Damage coverage for liability claims arising from premises, operations, contractual liability, independent Contractors, products and complete operations and including but not limited to coverage for claims resulting from explosion, collapse, or underground (x,c,u) exposures (if any).

Coverage B shall include personal injury and **is required**

Coverage C, medical payments **is not required**.

Amounts:	Bodily Injury:	$1,000,000	each occurrence
		$1,000,000	aggregate
	Property Damage:	$1,000,000	each occurrence
		$1,000,000	aggregate

C. Products and Completed Operations are required for Contractor and all Subcontractors.

Amounts:	$1,000,000	aggregate

D. Business Auto Liability Coverage is required for Contractor and all Subcontractors.

Business Auto Liability coverage is to include bodily injury and property damage arising out of ownership, maintenance, or use of any vehicle, including owned, non-owned and hired vehicles, and employee non-ownership use.

Amounts:	Bodily Injury:	$1,000,000	each occurrence
		$1,000,000	aggregate

Property Damage:	$1,000,000	each occurrence
	$1,000,000	aggregate

E. Professional Liability is not required.

F. Pollution Liability required of all Contractors and Subcontractors.

The CITY requires Pollution/Environmental Liability insurance covering cleanup costs including on-site discovery and third-party liability, on-site and off-site third party pollution liability coverage, and natural resources damage coverage.

Limits of Liability:	$1,000,000	each pollution event limit
	$1,000,000	aggregate policy limit

G. Excess or Umbrella Liability Coverage.

Umbrella Liability insurance is preferred, but an Excess Liability equivalent may be allowed. Whichever type of coverage is provided, it shall not be more restrictive than the underlying insurance policy coverage.

H. Claims Made Coverage – No Gap

If any of the required liability insurance is provided on a "claims made" form, such coverage shall extend for a period of not less than 36 months following completion of the contract. In the event of termination of a claims made policy, extended coverage may be provided by assurance that extended discovery coverage of at least 36 months will be purchased from the expiring insurer, or by assurance that the succeeding insurer will provide retroactive coverage with an inception date of at least on or before the effective date of this contract.

I. Certificates of Insurance

Required insurance shall be documented in Certificates of Insurance which provide that the CITY shall be notified at least thirty (30) calendar days in advance of cancellation, non-renewal, or adverse change.

New Certificates of Insurance are to be provided to the CITY at least fifteen (15) calendar days prior to coverage renewals.

If requested by the CITY, the CONTRACTOR shall furnish complete copies of the CONTRACTOR's insurance policies, forms, and endorsements.

For Commercial General Liability coverage, the CONTRACTOR shall, at the option of the CITY, provide an indication of the amount of claims, payments, or reserves chargeable to the aggregate amount of liability coverage. NOTE: Any subcontractors approved by the CITY shall be required to provide proof of insurance identical in amounts as required by the contact to perform related services. All coverages shall name the CITY as "additional insured".

Receipt of certificates or other documents of insurance or policies or copies of policies by the CITY, or by any of its representatives, which indicate less coverage than required will not constitute a waiver of the CONTRACTOR's obligation to fulfill the insurance requirements herein.

Article 14: Termination

The obligation to provide further services under this Agreement may be terminated:

14.1 *For cause.* By either the CITY or CONTRACTOR upon 30 days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party.

14.2 *For convenience.* By the CITY, effective upon the receipt of notice by CONTRACTOR. The CITY'S performance and obligation to pay under this Agreement is contingent upon an annual appropriation by the City Council.

Article 15: Indemnification

A: **General Indemnity.** To the fullest extent permitted by law, CONTRACTOR shall hold harmless, indemnify and pay on behalf of the CITY, CITY's officers, directors, partners, agents, contractors, and employees from and against any and all costs, losses, and damages, including claims for bodily injury, disease, death, personal injury and damage to property or loss of use resulting therefrom, and for professional liability, (including, but not limited to all fees and charges of contractors, architects, attorneys, and other professionals, and all court, arbitration, or other resolution costs) caused by the negligent acts or omissions of CONTRACTOR or CONTRACTOR's officers, directors, partners, agents, contractors, employees, and CONTRACTOR's consultants, agents, and contractors in the performance and furnishing of CONTRACTOR's services under this Agreement, unless such claims are a result of the CITY's sole negligence. Such payments on behalf of the CITY shall be in addition to all other legal remedies available to the CITY and shall not be considered to be the CITY's exclusive remedy.

B: **Copyright and Intellectual Property Rights.** At CONTRACTOR's expense as described herein, CONTRACTOR shall indemnify, defend and hold CITY and its affiliates and their respective directors, officers, employees, and contractors and agents harmless from and against any claims that any of the professional services allegedly infringe a patent, copyright, trademark, trade secrets or other intellectual property right by defending against such claim and paying all amounts that a court awards or that CONTRACTOR agrees to in settlement of such claim. CONTRACTOR shall also reimburse the CITY for all reasonable expenses incurred by the CITY in respect of each claim. To qualify for such defense and payment, CITY must: (i) give CONTRACTOR prompt written notice of such claim; and (ii) allow CONTRACTOR to control, and fully co-operate with CITY in the defense and all related negotiations. CONTRACTOR's obligation under this Section in conditional upon CITY's agreement that, if the professional services become, or in CONTRACTOR's opinion (as stated in writing to CITY by CONTRACTOR) is likely to become the subject of an infringement claim, then CITY shall permit CONTRACTOR, at CONTRACTOR's expense, either to procure the right for CITY to continue to use such intellectual property contained in the professional services or to replace or modify it so that it becomes non-infringing and retains in all material respects comparable functionality in

the CITY's environment. CONTRACTOR shall have no obligation with respect to any claim to the extent it is based on (i) CITY's use of the intellectual property contained in the professional services in violation of this Agreement; (ii) modifications or user-controlled features not authorized by CONTRACTOR; (iii) custom programming for which CONTRACTOR does not develop the specifications or where the code at issue is supplied by CITY. This subsection states CONTRACTOR's entire obligation regarding intellectual property right infringement.

Article 16: Notices

Any notice required under this Agreement will be in writing, addressed to the appropriate party at its address on the signature page and given personally, or by registered or certified mail postage prepaid, or by a commercial courier service. All notices shall be effective upon date of receipt.

Article 17: Survival

All express representations, indemnifications, or limitations of liability included in this Agreement will survive its completion or termination for any reason.

Article 18: Severability

Any provision or part of the agreement held to be void or unenforceable under any Laws or Regulations shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the CITY and CONTRACTOR, who agree that the Agreement shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

Article 19: Waiver

Non-enforcement of any provision by either party shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Agreement.

Article 20: Headings

The headings used in this Agreement are for general reference only and do not have special significance.

Article 21: Contract Documents

The Contract Documents which comprise the entire Agreement between the CITY and CONTRACTOR consist of the following, which are made a part thereof:

21.1 Contract Agreement (pages 1 to 14, inclusive).

21.2 **Exhibit "A", "Bid Form, Project Plans and Specifications, "**10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II" in total.

21.3 **Attachment "B":** Bid Proposal Packet submitted by Contractor in response to Exhibit "A", "Bid Form, Project Plans and Specifications, **"**10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS – PHASE II", including, but not limited to:

A. Addendum numbers ___ through ___ inclusive.

B. Change Orders, Field Orders or written amendments duly delivered after execution of Agreement.

C. All applicable provisions of State and Federal Law and any modification thereof and State of Florida Contract Provisions.

There are no Contract Documents other than those listed above in this Article 21. The Contract Documents may only be altered, amended, or repealed in accordance with the Terms and Conditions.

Article 22: Governing Law

This agreement shall be governed by the laws of the State of Florida. Both parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising in connection with this agreement. In the event of litigation arising out of this agreement, the prevailing party shall be entitled to the award of attorney's fees and costs at both the trial and appellate level.

Article 23: Materials and Services

The professional fees for the CONTRACTOR's services are set forth on the "Fee Schedule" as contained in the CONTRACTOR's submitted proposal and made part hereof.

Expenses for all work and services performed as provided within this Agreement will be estimated in advance and submitted to the CITY for approval prior to performance. Furthermore, any expenses above the initial estimated expenses must be approved in advance by the CITY.

Article 25: General Terms

The CONTRACTOR shall hold harmless and defend the CITY, its officers, agents, and employees from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description and all costs, including attorney fees, arising under this Agreement, including claims for property damage and claims for injury to or death of persons arising out of or occurring as a result of any act or omission of the CITY, its officers, agents, or employees in the performance of its obligation to the CITY, other than claims arising from the intentional or negligent acts or omissions of the CITY, its officers, agents, or employees.

The CONTRACTOR without exception shall indemnify and hold harmless the CITY, its officers, agents, and employees from liability of any nature or kind, including costs and expenses for, or on account of, any copyrighted, patented, or unpatented invention, process, or article manufactured or used in the performance of this Agreement, including use by the CITY.

It is agreed that all materials and information furnished to the CONTRACTOR by the CITY or to the CITY by the CONTRACTOR shall remain confidential, except to the extent that such materials and information have become a matter of public record, and such materials and information shall not be divulged except as required under this Agreement or by the Laws of the State of Florida.

Article 26. Public Records Law Chapter 119 Florida Statutes

The Parties acknowledge that the CITY is a governmental entity subject to the Florida Public Records Law, as governed by Chapter 119, Florida Statutes. In accordance with Section 119.0701, Florida Statutes, the following provisions are included in this contract:

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT THE CITY OF JACKSONVILLE BEACH, CITY CLERK'S OFFICE:

TELEPHONE NUMBER: 904-247-6250 EXT # 11
EMAIL ADDRESS: CITYCLERK@JAXBCHFL.NET
MAILING ADDRESS: 11 NORTH THIRD STREET
JACKSONVILLE BEACH, FL 32250

The CONTRACTOR must keep and maintain public records required by the CITY to perform the service. The CONTRACTOR acknowledges that upon request from the CITY, the CONTRACTOR must provide the CITY with a copy of the requested records or allow the record to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes, or as otherwise provided by law. The CONTRACTOR must ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if The CONTRACTOR does not transfer the records to the CITY. Upon completion of the contract, The CONTRACTOR shall transfer, at no cost to the CITY, all public records in their possession OR keep and maintain all public records required by the CITY to perform the service contemplated herein. If The CONTRACTOR transfers all public records to the CITY upon completion of the contract, The CONTRACTOR shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If The CONTRACTOR keeps and maintains the public records upon completion of the contract, The CONTRACTOR shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the CITY, upon request from the CITY, in a format that is compatible with the CITY's information technology systems.

The CONTRACTOR acknowledges that a request to inspect or copy public records relating to a CITY's contract for services must be made directly to the CITY. If the CITY does not possess the requested records, the CITY shall immediately notify The CONTRACTOR of the request, and The CONTRACTOR must provide the records to the CITY or allow the records to be inspected or copied within a reasonable time. If The CONTRACTOR fails to provide the public records to the CITY within a reasonable time it may be subject to penalties under s. 119.10, Florida Statutes. The CONTRACTOR acknowledges its potential liability pursuant to Section 119.0701(4), Florida Statutes, if the CITY has to seek legal action to compel The CONTRACTOR to produce public records relating to a CITY's contract for services.

Article 27: Dispute Resolution

27.1 CITY and CONTRACTOR agree to negotiate all disputes between them in good faith for a period of 30 days from the date of notice prior to exercising their rights under other provisions of this Agreement, or under law.

27.2 This Section shall survive completion or termination of this Agreement.

Article 28: E-Verify/Authorized Worker Status

28.1 Pursuant to Section 448.095, Florida Statutes, CONTRACTOR, and any subcontractor thereof, shall register with and use the E-Verify system to verify the work authorization status of all new employees of CONTRACTOR or subcontractor(s).

28.2 Should CONTRACTOR enter into a contract with a subcontractor for the work to be provided to the CITY herein, the subcontractor shall provide CONTRACTOR with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. CONTRACTOR shall maintain a copy of such affidavit for the duration of the contract.

28.3 The CITY, CONTRACTOR, or subcontractor who has a good faith belief that a person or an entity with which it is contracting has knowingly violated Section 448.09(1), Florida Statutes, shall terminate the contract with the person or entity in violation.

27.4 If the CITY has a good faith belief that a subcontractor has knowingly violated this Article, but CONTRACTOR otherwise complied with this Article, the CITY shall promptly notify CONTRACTOR and order CONTRACTOR to immediately terminate the contract with the subcontractor.

28.5 If this Agreement is terminated under this Article, it is not a breach of contract and may not be considered as such. If the CITY terminates this Agreement with CONTRACTOR under this Article, CONTRACTOR may not be awarded a public contract for at least one year after the date on which this Agreement is terminated. CONTRACTOR shall be liable for any additional costs incurred by the CITY as a result of the termination of this Agreement.

28.6 The CITY, CONTRACTOR, or subcontractor may file a cause of action with a circuit or county court to challenge termination under this Article no later than 20 calendar days after the date on which this Agreement was terminated.

---------- NOTHING ELSE FOLLOWS ON THIS PAGE ----------

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One counterpart each has been delivered to CITY and CONTRACTOR. All portions of the Contract Document have been signed or identified by CITY and CONTRACTOR on their behalf.

This agreement will be effective on _____.

CITY: CITY OF JACKSONVILLE BEACH, FLORIDA

BY: _____
Christine Hoffman, Mayor

BY: _____
Mike Staffopoulos, City Manager

ATTEST: _____ Date Signed: _____
Molly Alleger, City Clerk

CONTRACTOR:_____

BY:_____

PRINTED NAME: __

TITLE:_____

(CORPORATE SEAL)

ATTEST: _____ Date Signed: _____

PRINTED NAME: _____

AGENT FOR SERVICE OF PROCESS

CITY:	**CONTRACTOR:**
Address for Giving Notices:	Address for Giving Notices:
City of Jacksonville Beach	
1460A Shetter Avenue	
Jacksonville Beach, Florida 32250	
Designated Representative (Article 9):	Designated Representative (Article 9):
Name: Dennis Barron, MBA	Name:
Title: COJB Director of Public Works	Title:
Phone Number: (904) 247-6272	Phone Number:

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SECTION 00610
PERFORMANCE BOND

STATE OF FLORIDA)
ss
COUNTY OF)

KNOW ALL MEN BY THESE PRESENTS that _____ _____ as Principal, hereinafter called CONTRACTOR, _____ _____ as Surety, hereinafter called Surety, are held and firmly bound unto the CITY of Jacksonville Beach as Obligee, hereinafter called CITY, in the amount of _____ Dollars ($) equal to 100% of the total contract price, for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated _____, 20____, entered into a Contract with CITY for:

CITY OF JACKSONVILLE BEACH
Bid Number: 2526-01
10th Street South Infrastructure Improvements – Phase II

in accordance with Drawings and Specifications prepared by Four Waters Engineering, Inc., which Contract is by reference made a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the Principal shall in all respects promptly and faithfully perform and comply with the terms and conditions of said Contract and his obligations thereunder and shall indemnify the CITY and the Consulting Engineer and save either or all of them harmless against and from all costs, expenses and damages arising from the performance of said Contract or the repair of any work thereunder, then this obligation shall be void; otherwise, this Bond shall remain in full force and effect, in accordance with the following terms and conditions:

A. The Principal and Surety jointly and severally agree to pay the CITY any difference between the sum to which the said Principal would be entitled on the completion of the Contract, and that sum which the CITY may be obliged to pay for the completion of said work by Contract or otherwise, and any damages, direct or indirect or consequential, which the said CITY may sustain on account of such work, or on account of the failure of said CONTRACTOR to properly and in all things, keep and execute all of the provisions of said Contract.

B. And this Bond shall remain in full force and effect for a period of one (1) year from the date of acceptance of the project by the CITY and shall provide that the CONTRACTOR guarantees to repair or replace for said period of one (1) year all work performed and materials and equipment furnished that were not performed or furnished according to the terms of the Contract, and shall make good, defects thereof which have become apparent before the expiration of said period of one (1) year. If any part of the project, in the judgment of the CITY, for the reasons above stated needs to be replaced, repaired or made good during that time, the CITY shall so notify the CONTRACTOR in writing. If the CONTRACTOR refuses or neglects to do such work within five (5) days from the date of service of such Notice, the CITY shall have the work done by others and the cost thereof shall be paid by the CONTRACTOR or his Surety.

C. And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive Notice of any change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

D. All Bonds shall be in the form prescribed by the Contract Documents or other form approved by Owner. All else notwithstanding, the terms of all Payment Bonds shall be substantially in the form prescribed by Chapter 255, Florida Statutes. All Bonds shall be executed by Contractor and a Surety licensed to transact such business in the State of Florida and named on the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular Number 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. The Surety shall have an A.M. Best Financial Performance rating of no less than "A-." Contractor will cause the Bonds to be recorded with the Clerk of the Circuit Court in the county in which the Work is to be performed. Failure of the Contractor to deliver required Bonds in the form prescribed may constitute an event justifying termination for cause. The expense for all Bonds shall be Contractor's responsibility.

IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this _____ day of _____ 20____, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).
(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

_____

_____(Affix
Signature of Authorized Officer Seal)

WITNESSES:

_____ _____
Title

_____ _____
Business Address

_____ _____
City State

SURETY:

_____
Corporate Surety

WITNESS:

_____ _____ (Affix
Attorney-in-Fact Seal)

_____
Business Address

_____
City State

_____
Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the Principal, was then _____ of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

_____
Secretary (Corporate Seal)

STATE OF FLORIDA)
ss
COUNTY OF)

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared _____ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the _____ and that he has been authorized by _____ to execute the foregoing bond on behalf of the CONTRACTOR named therein in favor of the _____.

Subscribed and sworn to before me this ____ day of _____, 20___, A.D.

(Attach Power of Attorney)

_____
Notary Public
State of Florida-at-Large

My Commission Expires: _____

END OF SECTION

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SECTION 00620
PAYMENT BOND

STATE OF FLORIDA)
ss
COUNTY OF)

KNOW ALL MEN BY THESE PRESENTS that _____ _____ as Principal, hereinafter called CONTRACTOR, and as Surety, hereinafter called Surety, are held and firmly bound unto CITY of Jacksonville Beach, as Obligee, hereinafter called CITY, in the amount of _____ Dollars ($_____) in lawful money of the United States, equal to one hundred percent (100%) of the total Contract price for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated _____, 20____, entered into a Contract with CITY for:

CITY OF JACKSONVILLE BEACH
Bid Number: 2526-01
10th Street South Infrastructure Improvements – Phase II

In accordance with Drawings and Specifications prepared by Four Waters Engineering, Inc., which Contract is by reference made a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the Principal shall promptly make payments to all claimants, as herein below defined, then this obligation shall be void; otherwise, this Bond shall remain in full force and effect, subject to the following terms and conditions:

A. A claimant is defined as any person supplying the Principal with labor, material, and supplies, used directly or indirectly by the said Principal or any subcontractor in the prosecution of the work provided for in said Contract, and is further defined in Section 713.01 of the Florida Statutes.

B. The above-named Principal and Surety hereby jointly and severally agree with the CITY that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after performance of the labor or after complete delivery of materials and supplies by such claimant, may sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The CITY shall not be liable for the payment of any costs or expenses of any such suit.

C. No suit or action shall be commenced hereunder by any claimant:

1. Unless the claimant, other than one having a direct contract with the Principal, shall within forty-five (45) days after beginning to furnish labor, materials, or supplies for the prosecution of the work, furnish the Principal with a notice that he intends to look to this bond for protection.

2. Unless the claimant, other than one having a direct contract with the Principal, shall within ninety (90) days after such claimant's performance of the labor or complete delivery of materials and supplies, deliver to the Principal written notice of the performance of such labor or delivery of such material and supplies and the nonpayment, therefore.

3. After the expiration of one (1) year from the performance of the labor or completion of delivery of the materials and supplies; it being understood, however, that if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof such limitations shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

4. Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

D. The Principal and the Surety, jointly and severally, shall repay the CITY any sum which the CITY may be compelled to pay because of any lien for labor or materials furnished for any work included in or provided by said Contract.

E. The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration of or addition to the terms of the Contract or to the work to be performed thereunder, or the Specifications applicable thereto shall in any way affect its obligations on this Bond and the Surety hereby waives notice of any such change, extension of time, alterations of or addition to the terms of the Contract, or to the work or to the Specifications.

F. All Bonds shall be in the form prescribed by the Contract Documents or other form approved by Owner. All else notwithstanding, the terms of all Payment Bonds shall be substantially in the form prescribed by Chapter 255, Florida Statutes. All Bonds shall be executed by Contractor and a Surety licensed to transact such business in the State of Florida and named on the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular Number 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. The Surety shall have an A.M. Best Financial Performance rating of no less than "A-." Contractor will cause the Bonds to be recorded with the Clerk of the Circuit Court in the county in which the Work is to be performed. Failure of the Contractor to deliver required Bonds in the form prescribed may constitute an event justifying termination for cause. The expense for all Bonds shall be Contractor's responsibility.

IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this day of_____20____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).
(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

_____

_____
Signature of Authorized Officer (Affix Seal)

WITNESSES:

_____
Title

_____
Business Address

_____
City State

_____

_____

SURETY:

_____
Corporate Surety

WITNESS:

_____

_____(Affix
Attorney-in-Fact Seal)

_____
Business Address

_____
City State

_____
Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

I,_____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that_____who signed the said bond on behalf of the Principal, was then _____of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

_____
Secretary (Corporate Seal)

STATE OF FLORIDA)
ss
COUNTY OF)

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared _____to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the_____and that he has been authorized by_____to execute the foregoing bond on behalf of the CONTRACTOR named therein in favor of the_____.

Subscribed and sworn to before me this_____day of _____ 20____, A.D.

(Attach Power of Attorney)

_____
Notary Public
State of Florida-at-Large

My Commission Expires:_____

END OF SECTION

SECTION 00630
INSURANCE REQUIREMENTS

INSURANCE REQUIREMENTS

GENERAL PROVISIONS

Hold Harmless: The City shall be held harmless against all claims for bodily injury, disease, death, personal injury, and damage to property or loss of use resulting there from, to the extent caused by the Contractor, unless such claims are a result of the City's sole negligence.

Payment on Behalf of the City: The Contractor agrees to pay on behalf of the City, the City's legal defense, for all claims described herein.

Such payment on behalf of the City shall be in addition to all other legal remedies available to the City and shall not be considered to be the City's exclusive remedy.

Loss Control/Safety: Precaution shall be exercised at all times by the Contractor for the protection of all persons, employees, and property. The Contractor shall comply with all laws, regulations and ordinances related to safety and health, shall make special efforts to detect hazardous conditions, and shall take prompt action where loss control and safety measures should reasonably be expected.

PROOF OF CARRIAGE OF INSURANCE & NAMING CITY AS ADDITIONAL INSURED

The Contractor shall furnish the City with satisfactory proof of carriage of insurance required herein. The Contractor shall name the City of Jacksonville Beach (City) as additional insured on the Contractor's, and any sub-consultant's or sub-contractor's Public Liability, Property Damage and Comprehensive Automobile Liability Insurance Policies. The additional insured shall be provided the same coverage as the primary insured for losses arising from work performed by the Contractor or its sub-consultant's or sub-contractor's. The proof of carriage or a copy of all policies shall be required prior to commencement of any work under this Contract.

The City may order work to be stopped if conditions exist that present immediate danger to persons or property. The Contractor acknowledges that such stoppage will not shift responsibility for any damages from the Contractor to the Organization.

INSURANCE REQUIREMENTS:

Insurance Requirements:

Basic Coverages Required: During the term of this contract, the Contractor shall procure and maintain the following-described insurance and/or self-insurance except for coverages specifically waived by the City. All policies and insurers must be acceptable to the City.

These insurance requirements shall not limit the liability of the Contractor. The City does not represent these types of amounts of insurance to be sufficient or adequate to protect the Contractor's interests or liabilities but are merely minimums.

Worker's Compensation Coverage is **required**.

The Contractor shall purchase and maintain worker's compensation insurance for all worker's compensation obligations imposed by state law and employer's liability limits of at least $100,000.00 each

accident, $100,000.00 each employee and $500,000.00 policy limit for disease.

The Contractor shall also purchase any other coverages required by law for the benefit of employees.

General Liability Coverage is **required.**

Commercial General Liability in Occurrence Form.

Coverage A shall include premises, operations, independent Contractors, and property damage resulting from explosion, collapse, or underground (x,c,u) exposures.

Coverage B shall include personal injury and is **required.**

Coverage C, medical payments is **not required**.

Amounts:	Bodily Injury:	$1,000,000	each occurrence
		$1,000,000	aggregate
	Property Damage:	$1,000,000	each occurrence
		$1,000,000	aggregate

Products and Completed Operations are **required.**

Amounts:	$1,000,000	aggregate

Business Auto Liability Coverage is **required.**

Business Auto Liability Coverage is to include bodily injury and property damage arising out of ownership, maintenance or use of any auto, including owned, non-owned and hired automobiles and employee non-ownership use.

Amounts: Same as General Liability

Professional Liability **NOT REQUIRED.**

Professional liability coverage shall include liability for the providing or failure to provide professional services.

Pollution Liability **REQUIRED** of all Contractors and Subcontractors.

Pollution/Environmental Liability insurance covering cleanup costs including on-site discovery and third-party liability, on-site and off-site third-party pollution liability coverage, and natural resources damage coverage.

Limits of Liability:	$1,000,000	each pollution event limit
	$1,000,000	aggregate policy limit

Excess or Umbrella Liability Coverage.

Umbrella Liability insurance is preferred, but an Excess Liability equivalent may be allowed. Whichever type of coverage is provided, it shall not be more restrictive than the underlying insurance policy coverages.

Claims Made Coverage – No Gap

If any of the required liability insurance is provided on a "claims made" form, such coverage shall extend for a period of not less than 36 months following completion of the contract. In the event of termination of a claims made policy, extended coverage may be provided by assurance that extended discovery coverage of at least 36 months will be purchased from the expiring insurer, or by assurance that the succeeding insurer will provide retroactive coverage with an inception date of at least on or before the effective date of this contract.

Certificates of Insurance.

Required insurance shall be documented in Certificates of Insurance which provide that the City shall be notified at least 30 days in advance of cancellation, nonrenewal or adverse change.

New Certificates of Insurance are to be provided to the City at least 15 days prior to coverage renewals.

If requested by the City, the Contractor shall furnish complete copies of the Contractor's insurance policies, forms and endorsements.

For Commercial General Liability coverage, the Contractor shall, at the option of the City, provide an indication of the amount of claims, payments, or reserves chargeable to the aggregate amount of liability coverage. NOTE: Any subcontractors approved by the City shall be required to provide proof of insurance identical in amounts as required by the contract to perform related services. All coverages shall name the City as "additional insured".

Receipt of certificates or other documents of insurance or policies or copies of policies by the City, or by any of its representatives, which indicate less coverage than required will not constitute a waiver of the successful proposer(s)' obligation to fulfill the insurance requirements herein.

END OF SECTION

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SECTION 00700
GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Addenda	Written or graphic instruments issued prior to the opening of Bids, which clarify, correct or change the bidding documents or the Contract Documents.
Agreement	The written agreement between CITY and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.
Application for Payment	The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.
Bid	The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
Bidding Documents	The Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).
Bonds	Bid, performance and payment bonds and other instruments of security.
Change Order	A document which is signed by CONTRACTOR and CITY and directs or authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.
Contract Documents	The Bidding Documents, Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.
Contract Price	The moneys payable by CITY to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1, in the case of Unit Price Work).
Contract Time	The number of days (computed as provided in paragraph 16.2) or the date stated in the Agreement for the completion of the Work.
CONTRACTOR	The person, firm or corporation with whom CITY has entered into the Agreement.
Defective	An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by CITY at Substantial Completion in accordance with paragraph 14.8 or 14.10).
Drawings	The drawings which show the character and scope of the Work to be performed, and which have been prepared or approved by ENGINEER, and are referred to in the Contract Documents.
Effective Date of the Agreement	The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
ENGINEER	The person, firm or corporation named as such in the Agreement, or as otherwise designated by the CITY.
Field Order	A written order issued by ENGINEER which orders minor changes in the Work in

	accordance with paragraph 9.5 but which does not involve a change in the Contract Price or Contract Time.
General Requirements	Sections of Division 1 of the Specifications.
Laws and Regulations; Laws or Regulations	Laws, rules, regulations, ordinances, codes and/or orders.
Notice of Award	The written notice to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, CITY will sign and deliver the Agreement.
Notice to Proceed	A written notice given to CONTRACTOR fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR'S obligations under the Contract Documents.
CITY	The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.
Partial Utilization	Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.
Project	The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.
Project Manual	The title of the bound documentary information prepared for a construction project and includes bidding requirements, conditions of contract and product specifications.
Resident Project Representative	The authorized representative of ENGINEER or CITY who is assigned to the site or any part thereof.
Shop Drawings	All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.
Specifications	Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.
Subcontractor	An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.
Substantial Completion	The point at which, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, that it can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.
Supplementary Conditions	The part of the Contract Documents which amends or supplements these General Conditions.
Supplier	A manufacturer, fabricator, supplier, distributor, material man or vendor.
Underground Facilities	All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.
Unit Price Work	Work to be paid for on the basis of unit prices.
Work	The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the act of and results of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.
Work Directive Change	A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement ordering an addition, deletion or revision in the Work, or responding to

differing or unforseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment — A written amendment of the Contract Documents, signed by CITY and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or nontechnical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2 - PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to CITY, CONTRACTOR shall also deliver to CITY such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2 CITY shall furnish to CONTRACTOR up to five copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.3 The Contract Time shall commence to run on the date indicated in the Notice to Proceed. In no event will the starting date included in the Notice to Proceed be later than the seventy-fifth day after the Effective Date of the Agreement.

Starting the Project:

2.4 CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no work shall be done at the site prior to the date on which the Contract Time commences to run.

Before Starting Construction:

2.5 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to CITY or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6 Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2 a preliminary schedule of Shop Drawing submissions; and

2.6.3 a preliminary schedule of values for all of the Work, which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work, which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7 Before any Work at the site is started, CONTRACTOR shall deliver to CITY, with a copy to ENGINEER, certificates showing the existence of insurance (and other evidence of insurance required by CITY and/or the Contract Documents) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4.

Preconstruction Conference:

2.8 Before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Finalizing Schedules:

2.9 At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefor. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submission. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3 - CONTRACT DOCUMENTS, INTENT, AMENDING, REUSE

Intent:

3.1 The Contract Documents comprise the entire agreement between CITY and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of CITY, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provision of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4. The Agreement shall take precedence over all Contract Documents. The various Contract Documents shall be given precedence, in case of conflicts, error or discrepancy as follows:

Agreement Modifications, Agreement, Technical Specifications, Supplementary Conditions, General Conditions, and Drawings. In the event of inconsistencies in the same order of precedence, the more expensive and/or stringent will be required. Full size details shall take precedence over scale drawings and large-scale drawings shall take precedence over small scale drawings. Dimensions given in figures shall take precedence over scaled dimensions. Actual job dimensions shall take precedence over scale and figure dimensions on the drawings.

3.3 If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and, before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to CITY or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

Amending and Supplementing Contract Documents:

3.4 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.4.1 a Written Amendment,

3.4.2 a Change Order (pursuant to paragraph 10.4), or

3.4.3 a Work Directive Change (pursuant to paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5. In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.5.1 a Field Order (pursuant to paragraph 9.5),

3.5.2 ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or

3.5.3 ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6 Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with CITY shall have or acquire any title to or CITYship rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of CITY and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1 CITY shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by CITY, unless otherwise provided in the Contract Documents. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or

storage of materials and equipment.

4.2 Physical Conditions:

4.2.1 Explorations and Reports:

Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes including means, methods, techniques, sequences and procedures of construction. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

4.2.2 Existing Structures:

Reference is made to the Supplementary Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3 Report of Differing Conditions:

If CONTRACTOR believes that:

4.2.3.1 any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2 any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify CITY and ENGINEER in writing about the inaccuracy or difference.

4.2.4 ENGINEER's Review:

ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise CITY in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5 Possible Document Change:

If ENGINEER concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change in the Contract Documents is required, a Work Directive Change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences or the inaccuracy of difference.

4.2.6 Possible Price and Time Adjustments:

In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract

Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If CITY and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefore as provided in Articles 11 and 12.

4.3 Physical Conditions -- Underground Facilities:

4.3.1 Shown or Indicated:

The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to CITY or ENGINEER by the CITYs of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1 CITY and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and,

4.3.1.2 CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the CITYs of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2 Not Shown or Indicated:

If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the CITY of such Underground Facility and give written notice thereof to that CITY and to CITY and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraphs 6.20.

Reference Points:

4.4 CITY will provide engineering surveys to establish reference points for construction as indicated on the Drawings which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements, Division I), shall protect and preserve the established reference points and shall make no changes or relocations without prior written approval of CITY. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grade or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5 - BONDS AND INSURANCE

Performance and Other Bonds:

5.1 CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes

due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by the Contract Documents.

5.1.1 The following requirements shall be met by all surety companies furnishing bid, performance, payment or other type of bonds:

5.1.1.1. The Surety shall be rated as "A" or better as to General Policyholders Rating and Class X or better as to Financial Category by Best's Key Rating Guide, published by Alfred M. Best Company, Inc., of 75 Fulton Street, New York, New York, 10038.

5.1.1.2. The Surety shall be listed on the U. S. Department of Treasury, Fiscal Service, Bureau of Government Financial Operations, Circular 570 (latest Revision) entitled, "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" and be authorized to do business in the state where the Project is located.

5.1.1.3. All Surety Companies are subject to approval and may be rejected by the CITY without cause, in the same manner that bids may be rejected.

5.1.2 Limitations: Bonding Limits or Bonding Capacity refer to the limit or amount of Bond acceptable on any one risk.

5.1.2.1. The bonding limit of the Surety shall not exceed ten percent (10%) of the policyholder surplus (capital and surplus) as listed by the aforementioned Best's Key Rating Guide, on any one risk (penalty or amount of any one bond).

5.1.3 Requirements:

5.1.3.1. Policy Holders Surplus is required to be five (5) times the amount of any one bond.

5.1.3.2. The Agent countersigning the bond shall be resident in the County where the Project is located and/or other counties that are acceptable to the CITY.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to CITY.

Contractor's Liability Insurance:

5.3 CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

5.3.1 Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.3 Claims for damages because of bodily injury, sickness or disease, or death of any CONTRACTOR's

employees;

5.3.4 Claims for damages insured by personal injury liability coverage which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

5.3.5 Claims for damages other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6 Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7 Claims for damages because of bodily injury or death of any person or property damage arising out of the CITYship, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days' prior written notice has been given to CITY and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish CITY with evidence of continuation of such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

5.4 The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

Property Insurance:

5.5 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of CITY, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured's or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.6 CONTRACTOR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of CITY, CONTRACTOR, Subcontractors, ENGINEER AND ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.7 All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and

maintained by CONTRACTOR in accordance with paragraphs 5.5 and 5.6 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to CITY by certified mail and will contain waiver provisions in accordance with paragraph 5.10.2.

5.8 CITY shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.9 If CITY requests in writing that other special insurance be included in the property insurance policy, CONTRACTOR shall, if possible, include such insurance and cost thereof will be charged to CITY by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, CONTRACTOR shall in writing advise CITY whether or not such other insurance has been procured by CONTRACTOR.

Waiver of Rights:

5.10.1. CITY and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.5 and 5.6 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, ENGINEER, ENGINEER's consultants and all other parties named as insured's in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of CITY, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insureds.

5.10.2 CITY and CONTRACTOR intend that any policies provided in response to paragraphs 5.5 and 5.6 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insured's or additional insured's, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant, CITY will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Acceptance of Insurance:

5.11 If CITY has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR on the basis of its not complying with the Contract Documents, CITY shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to CITY in accordance with paragraph 2.7. CONTRACTOR shall provide to the CITY such additional information in respect of insurance provided as the CITY may reasonably request. Failure by CITY to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the CONTRACTOR as complying with the Contract Documents.

Partial Utilization - Property Insurance:

5.12. If CITY finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, methods, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

6.2 CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to CITY and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without CITY's written consent given after prior written notice to ENGINEER.

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, startup, and completion of the Work.

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty of authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provision of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Item:

6.7.1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted

by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with CITY for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.2 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed, or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. CITY may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse CITY for the charges of ENGINEER and ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to CITY and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom CITY or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to CITY in advance of the specified date prior to the Effective Date of the Agreement for acceptance by CITY and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, CITY's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by CITY or ENGINEER

of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of CITY or ENGINEER to reject defective Work.

6.9 CONTRACTOR shall be fully responsible to CITY for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between CITY or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of CITY or ENGINEER to pay or to see to the payment of any money's due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.10 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of CITY and ENGINEER and contains waiver provisions as required by paragraph 5.10. CONTRACTOR shall pay each Subcontractor a just share of any insurance money received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.5 and 5.6.

Patent Fees and Royalties:

6.12 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of CITY or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by CITY in the Contract Documents. CONTRACTOR shall indemnify and hold harmless CITY and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. CITY shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility CITYs for connections to the Work, and CITY shall pay all charges of such utility CITYs for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither CITY nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2 If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.15 CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project, which are applicable during the performance of the Work.

Use of Premises:

6.16 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area or to the CITY or occupant thereof on any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against CITY or ENGINEER by any such CITY or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold CITY and ENGINEER harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against CITY or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

6.17 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulation of waste materials, rubbish, and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish, and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by CITY. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19 CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for CITY. Final acceptance of the project will be withheld until delivery of the documents is made to the ENGINEER.

Safety and Protection:

6.20 CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

6.20.1 all employees on the Work and other persons and organizations who may be affected thereby:

6.20.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify CITYs of adjacent property and of Underground Facilities and utility CITYs when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of CITY or ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to CITY and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21 CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to CITY.

Emergencies:

6.22 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or CITY, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, eight copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. Shop Drawings submitted without this stamp or specific written indication will be returned without action. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and

similar data to enable ENGINEER to review the information as required.

6.24 CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1 Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26 ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals. Shop Drawings and submittal data will be reviewed two times, thereafter all further review time will be charged to the CONTRACTOR.

6.27 ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28 Where a Shop Drawing or sample is required by Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29 CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with CITY. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and CITY may otherwise agree in writing.

Indemnification:

6.30 To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless CITY and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses

and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss, or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31 In any and all claims against CITY or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32 The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7 - OTHER WORK

Related Work at Site:

7.1 CITY may perform other work related to the Project at the site with CITY's own forces, have other work performed by utility CITYs or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work.

7.2 CONTRACTOR shall afford each utility CITY and other contractor who is a party to such a direct contract (or CITY, if CITY is performing the additional work with CITY's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility CITYs and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between CITY and such utility CITYs and other contractors.

7.3 If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility CITY (or CITY), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4 If CITY contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime

contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither CITY nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8 - CITY'S RESPONSIBILITIES

8.1 CITY shall issue all communications to CONTRACTOR through ENGINEER.

8.2 CITY shall furnish the data required of CITY under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.3 CITY's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to CITY's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.4 CITY is obligated to execute Change Orders as indicated in paragraph 10.4.

8.5 CITY's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.6 In connection with CITY's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with CITY's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

CITY's Representative:

9.1 ENGINEER will be CITY's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as CITY's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of CITY and ENGINEER.

Visits to Site:

9.2 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in substantial accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for CITY a greater degree of confidence that the Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep CITY informed of the progress of the Work and will endeavor to guard CITY against defects and deficiencies in the Work.

Project Representation:

9.3 If CITY and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If CITY designates another agent to represent CITY at the site who is not ENGINEER's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents, which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on CITY, and on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or 12.

Rejecting Defective Work:

9.6 ENGINEER will have authority to disapprove or reject Work, which ENGINEER believes to be defective (see 13.14) and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed. ENGINEER shall notify the CONTRACTOR in writing of any disapproval and/or rejection.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.28 inclusive.

9.8 In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9 In connection with ENGINEER's responsibilities in respect of Applications for Payment, etc., see Article 14.

Determination for Unit Prices:

9.10 ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon CITY and CONTRACTOR, unless, within ten days after the date of any such decision, either CITY or CONTRACTOR delivers to the other party to the Agreement and to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to CITY or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by CITY or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13 Neither Engineer's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14 Whenever in the Contract Documents the term "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 and 9.16.

9.15 ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Without invalidating the Agreement and without notice to any surety, CITY may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2 If CITY and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefore as provided in Article 11 or Article 12.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22.

10.4 CITY and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1 changes in the Work which are ordered by CITY pursuant to paragraph 10.1, are required because of acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14, or are agreed to by the parties:

10.4.2 changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3 changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11; provided that, in lieu of executing any such Change Order (or Written Amendment), an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5 If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11 - CHANGES OF THE CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if CITY and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit price to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.2, inclusive).

11.3.2 By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3 On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by CITY, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5;

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by CITY and CONTRACTOR. Payroll costs for

employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise, and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by CITY.

11.4.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless CITY deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to CITY. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to CITY, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by CITY, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to CITY who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 Cost of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements, approved by CITY with the advise of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work. Rental of Contractor's or other's equipment at the site shall be for hours used only.

11.4.5.4 Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5 Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6 Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work provided they have resulted from causes other than the negligence of

CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of CITY. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5 The term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4 - all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6 The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2 a fee based on the following percentages of the various portions of the Cost of the Work;

11.6.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen percent;

11.6.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent; and if a subcontract is on the basis of Cost of the Work plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

11.6.2.3 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5, and 11.5;

11.6.2.4 the amount of credit to be allowed by CONTRACTOR to CITY for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's Fee by an amount equal to ten percent of the net decrease; and

11.6.2.5 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4 inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8 It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2 CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work:

11.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10

11.9.2 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

ARTICLE 12 - CHANGE OF CONTRACT TIME

12.1 The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by ENGINEER in accordance with paragraph 9.11 if CITY and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by CITY or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3 All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall exclude recovery for damages for delay by either party.

ARTICLE 13 - WARRANTY AND GUARANTEE: TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to CITY that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 ENGINEER and ENGINEER's representatives, other representatives of CITY, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspections:

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4 If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefore, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with CITY's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by CITY (unless otherwise specified).

13.5 All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to CITY and CONTRACTOR (or by ENGINEER if so specified).

13.6 If any Work (including the work of others) that is to be inspected, tested or approved is covered without written

concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.7 Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work:

13.8 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observations and replaced at CONTRACTOR's expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if required (including but not limited to fees and charges of engineers, architects, attorneys and other professionals).

CITY May Stop the Work:

13.10 If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, CITY may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of CITY to stop the Work shall not give rise to any duty on the part of CITY to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with non-defective Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

One Year Correction Period:

13.12 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall promptly, without cost to CITY and in accordance with CITY's written instructions, either correct such defective Work, or, if it has been rejected by CITY, remove it from the site and replace it with non-defective Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, CITY may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so, provided in the Specifications or by Written Amendment.

Acceptance of Defective Work:

13.13 If, instead of requiring correction or removal and replacement of defective Work, CITY prefers to accept it, CITY may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to CITY's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness and to include but not limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and CITY shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, CITY may make a claim therefor as provided in Article 11. If acceptance occurs after such a recommendation, an appropriate amount will be paid by CONTRACTOR to CITY.

CITY May Correct Defective Work:

13.14 If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraphs 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, CITY may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph CITY shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, CITY may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which CITY has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow CITY, CITY's representatives, agents and employees such access to the site as may be necessary to enable CITY to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of CITY in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and CITY shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, CITY may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by CITY of CITY's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2 At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of

materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that CITY has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect CITY's interest therein, all of which will be satisfactory to CITY. The amount of retainage with respect to progress payments will be 10 percent except as otherwise provided in the Supplementary Conditions.

CONTRACTOR's Warranty of Title:

14.3 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to CITY no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4 ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to CITY or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by CITY to CONTRACTOR.

14.6 ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to CITY that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such representations to CITY. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such an extent as may be necessary in ENGINEER's opinion to protect CITY from loss because:

14.7.1 the Work is defective, or completed Work has been damaged requiring correction or replacement,

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3 CITY has been required to correct defective Work or complete Work in accordance with paragraph 13.14, or

14.7.4 of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

CITY may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against CITY on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling CITY to a set-off against the amount recommended, including liability for liquidated damages payable by the CONTRATOR, but CITY must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action.

Substantial Completion:

14.8 When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify CITY

and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, CITY, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to CITY a tentative certificate of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. CITY shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to CITY notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of CITY's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to CITY and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from CITY. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to CITY and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between CITY and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless CITY and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on CITY and CONTRACTOR until final payment.

14.9 CITY shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but CITY shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10 Use by CITY of any finished part of the Work, which has specifically been identified in the Contract Documents, or which CITY, ENGINEER and CONTRACTOR agree constitutes a separately functioning and useable part of the Work that can be used by CITY without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 CITY at any time may request CONTRACTOR in writing to permit CITY to use any such part of the Work which CITY believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to CITY and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify CITY and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, CITY, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify CITY and CONTRACTOR in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.10.2 CITY may at any time request CONTRACTOR in writing to permit CITY to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter CITY, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to CITY and ENGINEER that such part of the Work

is not ready for separate operation by CITY, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to CITY and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between CITY and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon CITY and CONTRACTOR at the time when CITY takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, CITY shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3 No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.14 in respect of property insurance.

Final Inspection:

14.11 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with CITY and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.12 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents - all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to CITY) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by CITY, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which CITY or CITY's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to CITY to indemnify CITY against any Lien.

Final Payment and Acceptance:

14.13 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to CITY for payment. Thereupon ENGINEER will give written notice to CITY and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after presentation to CITY of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by CITY to CONTRACTOR.

14.14 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, CITY shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by CITY for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

CONTRACTOR's Continuing Obligation:

14.15 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by CITY to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by CITY, nor any act of acceptance by CITY nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of defective Work by CITY will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16 The making and acceptance of final payment will constitute:

14.16.1 a waiver of all claims by CITY against CONTRACTOR, except claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by CITY of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and

14.6.2 a waiver of all claims by CONTRACTOR against CITY other than those previously made in writing and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

CITY May Suspend Work:

15.1 CITY may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

CITY May Terminate:

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2 if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3 if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5 if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as revised from time to time);

15.2.7 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents.

CITY may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which CITY has paid CONTRACTOR but which are stored elsewhere, and finish the Work as CITY may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to CITY. Such costs incurred by CITY will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph CITY shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by CITY, the termination will not affect any rights or remedies of CITY against CONTRACTOR than existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by CITY will not release CONTRACTOR from liability.

15.4 Upon seven days' written notice to CONTRACTOR and ENGINEER, CITY may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court costs).

CONTRACTOR May Stop Work or Terminate:

15.5 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by CITY or under an order of court or other public authority, or ENGINEER fails to act on any Application for

Payment within thirty days after it is submitted, or CITY fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to CITY and ENGINEER, terminate the Agreement and recover from CITY payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition, and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or CITY has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to CITY and ENGINEER stop the Work until payment of all amounts then due. The provision of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with CITY.

ARTICLE 16 - MISCELLANEOUS

Giving Notice:

16.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

16.2.1 When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

16.2.2 A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

16.3 Should CITY or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 16.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

16.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3, and 15.2 and all of the rights and remedies available to CITY and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

END OF SECTION

SECTION 00800
SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 NOTICES

A. In conformance with the requirements of the General Conditions all notices or other papers required to be delivered by the Contractor to the City shall be delivered to the office of the City Engineer, Public Works Department, 1460A Shetter Ave, Jacksonville Beach, Florida (32250).

1.2 LAYING OUT THE WORK

A. Prior to commencement of construction the Engineer will have established horizontal control throughout the site, which the Contractor shall use in laying out the work. The Contractor shall be responsible for establishing all lines and grades together with all reference points as required by the various trades for all work under this Contract. All required layouts shall be done using competent and experienced personnel under the supervision of a Land Surveyor registered in the State of Florida.

B. The Contractor shall provide all labor and instruments and stakes, templates, and other materials necessary for marking and maintaining all lines and grades. The lines and grades shall be subject to any checking the City or Engineer may decide necessary.

C. No separate cost item is provided for laying out the work, the cost of which shall be included in the unit prices for items in the Proposal.

D. No additional payment will be made for work completed at night such as water main or forcemain connections required to be made at night to minimize disruption to residents or sewer main services.

1.3 CONTRACTOR'S OFFICE - N/A

A. The Contractor shall provide and maintain an office with telephone facilities where he or a responsible representative of his organization may be reached at any time while work is in progress.

1.4 OBSTRUCTIONS

A. All water pipes, sanitary sewer pipes, storm drains, forcemains, gas or other pipes, telephone or power cables or conduits, curbs, sidewalks, all house services, and all other obstructions, whether or not shown, shall be temporarily removed from, or supported across utility line excavations. Where it is necessary to temporarily interrupt house or business services, the Contractor shall notify the City or occupant, both before the interruption and again immediately before service is resumed. Before disconnecting any pipes or cables, the Contractor shall obtain permission from the City or shall make suitable arrangements for their disconnection by the City. The Contractor shall be responsible for any damage to any such pipes, conduits or cables, and shall restore them to service promptly as soon as the work has progressed past the point involved. Approximate locations of known water, sanitary, drainage, power and telephone installations along the route of new pipelines or in the vicinity of new work are shown but must be verified in the field by the Contractor. The Contractor shall uncover these pipes, ducts, cables, etc., carefully by hand, prior to installing new utility lines. Any discrepancies or necessary changes may be made to permit the installation of new pipes. These conditions are supplemental to general requirements elsewhere in these specifications. Where fences, walls or other man-made obstructions exist illegally in the public right-of-way, the City shall have them removed upon adequate prior notice by the Contractor.

1.5 DAMAGE TO EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall be responsible for and make good all damage to pavement beyond the limits of this Contract, buildings, telephone or other cables, water pipes, sanitary pipes, survey monuments, or other structures which may be encountered, whether or not shown on the Drawings.

B. Information shown on the Drawings as to the location of existing utilities has been prepared from the most reliable data available to the Engineer. This information is not guaranteed, however, and it shall be the Contractor's responsibility to determine the location, character, and depth of any existing utilities. He shall assist the utility companies by every means possible to determine said locations. Extreme caution shall be exercised to eliminate any possibility of any damage to utilities resulting from his activities.

C. The Contractor shall be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind, and appurtenances thereto met with during the progress of the work.

D. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation, and reconstruction of such items called for on the drawings or specified shall be included in the various Contract Items and no separate payments will be made therefor.

E. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc., and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility.

F. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.

G. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction shall be made to the satisfaction of the City and to the satisfaction of the Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Engineer.

1.6 ADJUSTMENTS OF UTILITY CASTINGS, COVERS AND BOXES

A. All existing utility castings, including valve boxes, junction boxes, manholes, hand holes, pull boxes, inlets, and similar structures in the areas of construction that are to remain in service shall be adjusted by the Contractor to bring them flush with the surface of the finished work.

1.7 TESTS

A. The Contractor will pay for all required tests including pressure leakage tests. Generally, tests will be concrete, LBR proctors, compaction and density tests, and pressure leakage tests. On pipe, the manufacturer's or supplier's certificate that the material meets the requirements of the specification will be accepted subject to verification by the City's Engineer. Water required for leakage tests shall be furnished and paid for the by Contractor.

1.8 RECORD DRAWINGS

A. During the entire construction operation, the Contractor shall maintain records of all deviations from the Drawings and Specifications and shall prepare therefrom "record" drawings showing correctly and accurately all changes and deviations from the work made during construction to reflect the work as it was

actually constructed. These drawings shall conform to recognized standards of drafting, shall be neat and legible. Upon completion of the project, the "record" drawings shall be submitted to the Engineer on AutoCAD, Release 2016 or latest version used by City. All inverts and locations shall be certified by a Land Surveyor registered in Florida. Final As-builts which have been reviewed and approved by the Engineer shall be submitted to the Jacksonville Beach Public Works Department in the following formats:

2 digital copies AutoCAD, 2016 or latest version used by City
2 CDs/DVDs/Flash Drives with PDF files of signed and sealed digital copies
2 signed and sealed full size original paper copies

1.9 SUBSURFACE INVESTIGATION

A. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the nature and location of the work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the ground water conditions, the character of equipment and facilities needed preliminary to and during execution of the work, the general and local conditions, and all other matters which can in any way affect the work under this contract. The prices established for the work to be done will reflect all costs pertaining to the work. Any claims for extras based on substrata or ground water table conditions will not be allowed.

1.10 WORK SCHEDULES AND OVERTIME

A. No work shall be done between the hours of 8:00 p.m. and 8:00 a.m., nor on Saturday, Sunday, or legal holidays observed by the City in any case, without the City's written approval.

B. The normal work shift for the City's Inspector shall be 8 hours. Any excess during the permissible 12-hour work period, or on Saturday, Sunday, or legal holidays shall be considered overtime, and shall be paid for by the Contractor. If permission is obtained from the City to work between 8:00 p.m. and 8:00 a.m., the Contractor shall bear all expenses for inspection and testing which shall be required. Such overtime inspection expenses will be recovered by deductions from periodic partial payments.

1.11 CITY'S PROJECT REPRESENTATIVE

A. A City's Project Representative will be assigned to all utility projects.

B. The Project Representative shall inspect all construction and materials, and shall inspect preparation, fabrication or manufacture of components, and materials and supplies.

C. The Project Representative is <u>not</u> authorized to revoke, alter or waive any requirements of the specifications, but is authorized and expected to call to the attention of Engineer and/or Contractor any failure of work or materials to conform to the Drawings and Specifications. Inspectors shall have no authority to permit deviation from or to modify any of the provisions of the Drawings or Specifications without the written permission or instruction of the City with the concurrence of the Engineer, or to delay the Contractor by failure to observe the materials and work with reasonable promptness.

D. The Project Representative shall have the authority to reject materials or suspend the work until questions of issue can be resolved to the City's satisfaction.

E. The Project Representative shall in no case act as foreman, give advice or perform other duties for the Contractor nor interfere with the management of the work.

F. Project Representative will make routine passes to inspect such items as thrust blocks, materials on site, and clearances between conflicting lines. Scheduled inspections are also required for jacking and boring operations, stream or ditch crossings, and any time a connection is to be made to the City's system.

1.12 SURFACE RESTORATION

A. Disturbed surfaces shall be restored to equal or better condition than the original. Where detailed, the Drawings show minimum requirements.

B. For driveways and public roads, restoration to the City's highway standards is the minimum requirement.

1.13 NOTIFICATION TO LOCAL RESIDENTS

A. At least five (5) days before the start of construction, the Contractor shall notify local residents along the route of the project of the work to be performed by distributing a flyer describing the work to be performed.

1.14 MODIFICATIONS TO THE GENERAL CONDITIONS, SECTION 00700

A. Article 1:

1. Whenever the term ENGINEER is used, it is construed to mean ARCHITECT/ENGINEER where the contract involves a building.

2. CITY'S REPRESENTATIVE: A person appointed by the City to observe the work performed and the materials furnished by the Contractor. Unless otherwise stated, the person will be an employee of the City, not the ENGINEER.

3. PROJECT REPRESENTATIVE: Same as CITY'S REPRESENTATIVE.

B. Article 2:

1. Amend paragraph 2.8 to read as follows:

Before Contractor starts the Work at the site, a conference attended by City, Contractor, Engineer and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

C. Article 5:

1. Amend paragraph 5.1.1.1 to read as follows:

The Surety shall be rated as no less than “A-“ or better as to General Policyholders Rating and Class X or better as to Financial Category by Best’s Key Rating Guide, published by Alfred M. Best Company, Inc., of 75 Fulton Street, New York, New York, 10038.

D. Article 6:

1. Amend paragraph 6.7.3 to read as follows:

Engineer will be allowed a reasonable time within which to evaluate each proposed substitute. City will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without City's prior written acceptance, which will be evidenced by either a Change Order or an approved Shop Drawing. City may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute. Engineer will record time required by Engineer and Engineer's consultants in evaluating substitutions proposed by Contractor and in making

changes in the Contract Documents occasioned thereby. Whether or not City accepts a proposed substitute, Contractor shall reimburse City for the charges of Engineer and Engineer's consultants for evaluating each proposed substitute.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 00844
APPLICATION FOR PAYMENT

The Application for Payment shall be made on an original AIA Document G702 and G703. Contractor shall attach supporting documentation to this form as necessary.

END OF SECTION

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SECTION 01000
PROJECT REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

B. Work Includes:

1. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the work. The Contractor shall obtain and pay for all necessary local building permits. The Contractor shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the City's Representative, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made, therefore.

3. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials, and equipment, prior approval of the City's Representative notwithstanding.

4. The Contractor shall restore all private property damaged by construction to its original condition as soon as practical. In addition, access to businesses located adjacent to the project site must be maintained at all times.

5. The Contractor shall make exploratory excavations at all intersections of proposed work and existing utilities. If there is a potential conflict, the Contractor is to notify the Engineer immediately. Information on the obstruction to be furnished by the Contractor shall include: location, elevation, utility type, material, and size.

6. The Contractor shall pay for all inspections during the progress of the Work required by the City of all existing public utilities paralleling or crossing the Work, as shown on the Drawings. All such inspection fees shall be considered as part of the general cost of doing the Work and shall be included in the lump sum price as provided in the bid form for the Contract.

7. The Contractor is responsible for managing all utility coordination, including, but not limited to, the following:

    a. Ensuring that all utility coordination and activities are conducted in accordance with the requirements of the Contract Documents.
    b. Scheduling and attending utility meetings, preparing and distributing minutes of all utility meetings, and ensuring expedient follow-up on all unresolved issues.

c. Identifying and coordinating the execution and performance under any agreement that is required for any utility work needed within the Project.
d. Resolving utility conflicts.
e. Obtaining and maintaining all appropriate "Sunshine State One Call of Florida" tickets.
f. Performing Constructability Reviews of plans prior to construction activities with regard to the installation, removal, temporary removal, de-energizing, deactivation, relocation, or adjustment of utilities.

The following Utilities have been identified in the project area: Beaches Energy Services (electric), City of Jacksonville Beach Water and Sewer services, City of Jacksonville Beach Storm Water, AT&T telecommunication, Comcast cable/telecommunication, Crown Castle fiber optic cable, Ferrellgas gas lines, IQ Fiber fiber optic cable, irrigation water system and electric controls.

C. Public Utility Installations and Structures:

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the City, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.

2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy, and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

3. The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.

4. Public utility installations or structures owned or controlled by the City or other governmental body which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made, therefore.

5. Where public utility installations of structures owned or controlled by the City or other governmental body are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided in the Agreement.

6. The Contractor shall, at all times in performance of the work, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage, or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate

fully with the owner thereof to that end.

7. The Contractor shall give written notice to City and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the work.

8. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the owners of such utilities.

1.2 DRAWINGS AND PROJECT MANUAL

A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small-scale drawings.

B. Copies Furnished to Contractor:

1. After the Contract has been executed, the Contractor will be furnished with three (3) complete printed sets of drawings (24 inches by 36 inches), one (1) complete set of reproducible drawings in PDF file (24 inches by 36 inches), three (3) complete printed sets of Project Manuals (including Contract Requirements and Specifications) and all Addenda, and one (1) PDF of Project Manuals (including Contract Requirements and Specifications) and all Addenda.

2. The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for their work. All copies of the Contract Documents shall be printed from the reproducible sets furnished to the Contractor. All costs of reproduction and printing shall be borne by the Contractor.

C. Supplementary Drawings:

1. When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and the Contractor will be furnished with one (1) complete set of reproducible drawings in PDF file (24 inches by 36 inches) and one (1) PDF of the related specifications.

2. The Supplementary Drawings shall be binding upon the Contractor with the same force as the Contract Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

D. Contractor to Check Drawings and Data:

1. The Contractor shall verify all dimensions, quantities, and details shown on the Drawings, Supplementary Drawings, schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered.

2. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done

under the Contract.

E. Specifications: The Technical Specifications consist of three (3) parts: General, Products and Execution. The General part of a section contains General Requirements, which govern the work. Products and Execution Parts modify and supplement the General Requirements by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent:

1. All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, the interpretation of these Specifications shall be made upon that basis.

1.3 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. The names of proposed manufacturers, material suppliers and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before Shop Drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a minimum of five (5) years to demonstrate its satisfactory performance.

2. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request and at the Engineer's option, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

3. Any two (2) or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

4. Major pieces of equipment are listed in the Bid Proposal and are required to be named as part of said Bid Proposal.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time.

2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

2. Spare parts shall be furnished as specified herein and as recommended by the manufacturer necessary for the operation of the equipment, not including materials required for routine maintenance.

3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rate data.

D. Service of Manufacturer's Engineer:

1. The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation, the equipment in conformity with the Contract Documents.

2. After the equipment is placed in permanent operation by the City, the Contractor shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition and shall instruct operating personnel as may be designated by the City in the proper operation and maintenance of such equipment.

1.4 INSPECTION AND TESTING

A. General:

1. For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests, and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Three (3) copies of the reports shall be submitted, and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

2. If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

3. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with the recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

4. The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.

2. The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the Contract price.

3. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

C. Inspection of Materials:

1. The Contractor shall give notice in writing sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the City will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture.

2. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture:

1. When inspection is waived or when the City so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents.

2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

E. Shop Tests:

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.

2. No such equipment or materials shall be shipped to the work site until the Engineer notifies the Contractor, in writing, that the results of such tests are approved.

3. Four (4) copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and/or independent laboratory, shall be submitted to the Engineer for approval.

4. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

F. Start Up Tests:

1. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment. The equipment manufacturer shall conduct start-up tests for their equipment.

2. If the start-up tests disclose any equipment furnished under this Contract, which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

G. Demonstration Tests:

1. Upon completion of the work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to demonstration tests as specified or required to provide compliance with the Contract Documents.

2. The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all demonstration tests, at no additional cost to the City. The furnishing Contractor shall assist in the demonstration tests as applicable.

H. Final Inspection: During such final inspections, the work shall be clean and free from standing water. In no case will the final estimate be prepared until the Contractor has complied with all requirements set forth and the Engineer and City have made their final inspection with the Contractor of the entire work and are satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

1.5 TEMPORARY STRUCTURES

A. Temporary Fences: If during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall provide a suitable temporary fence at his own expense.

B. Responsibility for Temporary Structures: In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation and will indemnify and save harmless the City from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.6 TEMPORARY SERVICES

A. Accident Prevention:

1. Precautions shall be exercised at all times for the protection of person and property. The safety provisions of applicable laws, building and construction codes shall be observed.

2. The Contractor shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the contract work. Hours and Safety Standards Act (PL 91- 54), except where state and local safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, shall be complied with.

B. First Aid: The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when persons are employed on the work.

1.7 LINES AND GRADES

A. Grade:

1. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the Engineer. The full responsibility for keeping alignment and

grade shall rest upon the Contractor.

2. The Engineer will establish benchmarks and base line controlling points. Reference marks for lines and grades as the work progresses will be located by the Contractor to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

B. Surveys:

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials.

2. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies.

3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the survey, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review by the Engineer.

C. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments and benchmarks made or established on the work, bear the cost of re-establishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes, and marks.

2. The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, shall bear the cost of re-establishing them if disturbed or destroyed.

1.8 ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility:

1. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work.

2. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract items and no separate payments will be made there for.

3. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility.

4. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.

5. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by video tape, conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions

disturbed by the construction shall be made to the satisfaction of the City. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the City.

6. Prior to the beginning of any excavations, the Contractor shall advise the Engineer of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

B. Protection of Trees: All trees and shrubs shall be adequately protected by the Contractor per the requirements of the Contract Documents and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by the Contractor or his employees shall be replaced by him with new stock of similar size and age, at its proper season and at the sole expense of the Contractor.

C. Lawn Areas: Lawn areas shall be left in as good condition as before the start of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod. Before beginning construction, Contractor shall prepare a video tape along the path of construction showing the date, time, and right-of-way conditions for submission to the Engineer.

D. Restoration of Fences:

1. Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work.

2. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the City.

3. Other than those areas of the project where fencing is specifically called for removal and replacement with new fencing, the cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract item or items, or if no specific item is provided therefore, as part of the overhead cost of the work, and no additional payment will be made therefor.

E. Restoration of Irrigation Sprinkler Systems:

1. Contractor shall contact each property owner along the route of new piping and construction and locate any existing irrigation/sprinkler systems. Contractor shall be responsible for the repair/replacement of any damaged irrigation/sprinkler systems on private property or City right-of-ways due to work being performed by Contractor or subcontractors. The Contractor shall have three (3) working days to repair the damaged irrigation/sprinkler system from the date of damage. If the irrigation/sprinkler system has not been repaired within the three (3) working days, the Engineer/City will notify the Contractor in writing that the Contractor has five (5) additional days in which to repair the damaged irrigation/sprinkler system or the City will authorize the property owner of said damage area to have the system repaired by an independent irrigation/sprinkler company and that cost will be deducted from the Contractor's final contract price.

1.9 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights:

1. During the prosecution of the work, the Contractor shall install and maintain at all times such barriers and lights as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and safety personnel at all

places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public.

B. Noise:

1. The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing equipment shall be maintained with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. The Contractor shall construct sound barriers as necessary to eliminate noise.

2. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

3. Except in the event of an emergency, no work shall be done between the hours of 8:00 p.m. and 8:00 a.m., or on Sundays or legal holidays without written permission of the City. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the City shall be obtained before starting such items of the work.

C. Access to Public Services: Neither the materials excavated nor the materials or equipment used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves, manholes, etc.

D. Dust Prevention: The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads clean and/or construction areas sprinkled with water at all times.

1.10 CUTTING AND PATCHING:

A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Drawings and Specifications.

B. The work must be done by competent workmen skilled in the trade required by the restoration.

1.11 CLEANING

A. During Construction:

1. During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the City, such material, debris, or rubbish constitutes a nuisance or is objectionable.

2. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops. Contractor shall be responsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof.

B. Final Cleaning:

1. At the conclusion of the work, all erection equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

2. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operation

condition.

1.12 MISCELLANEOUS

A. Protection Against Siltation and Bank Erosion:

1. The Contractor shall arrange his operations and construct erosion control devices to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage channels.

2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the Engineer, which results from his construction operations.

B. Protection of Wetland Areas:

1. The Contractor shall properly dispose of all surplus material, including soil, in accordance with local, state and federal regulations.

2. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection or the St. Johns River Water Management District.

C. Existing Facilities: The work shall be so conducted to maintain existing facilities in operation insofar as is possible.

D. Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfection, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

E. Cooperation with Other Contractors and Forces:

1. During progress of work under this Contract, it may be necessary for other Contractors and persons employed by the City to work in or about the project.

2. The City reserves the right to put such other Contractors to work and to afford such access to the Site of the Work to be performed hereunder at such times as the City deems proper.

3. The Contractor shall not impede or interfere with the work of such other Contractors engaged in or about the work and shall so arrange and conduct his work that such other Contractors may complete their work at the earliest date possible.

F. Construction shall be conducted and shall result in construction of the improvements of this project in full accordance with the conditions of the Permits granted for the Project.

G. The work of others may interface with the work by the Contractor. The Contractor is responsible to meet and coordinate this work with that of others so that the City obtains a safe, efficient, timely completion of all work constructed. No additional time or compensation will be granted for this coordination of efforts.

PART 2- PRODUCTS (NOT USED)

PART 3- EXECUTION (NOT USED)

END OF SECTION

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SECTION 01025
MEASUREMENT AND PAYMENT

1.1 GENERAL

A. The CONTRACTOR shall receive and accept the compensation provided in the Proposal and the Contract as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the Engineer, or from the action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the CITY.

B. The prices stated in the proposal include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and specified herein. The basis of payment for an item at the unit price shown in the proposal shall be in accordance with the description of that item in this Section.

C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for any item of work has not been established by the Bid Form or Payment Items, he shall include the cost for that work in some other applicable bid item, so that his proposal for the project does reflect his total price for completing the work in its entirety.

1.2 MEASUREMENT

The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the CITY, in accordance with the applicable method of measurement therefor contained herein. A representative of the CONTRACTOR shall witness all field measurements.

1.3 PAYMENT ITEMS

A. Maintenance Of Traffic: Measurement of various items for Maintenance of Traffic will not be made for payment and all items shall be included in the unit price of materials installed.

B. Color Audio-Video Taping: Measurement for pre-construction color audio-video taping will not be made for payment and all items shall be included in the unit price of materials installed.

C. Construction Photographs: Measurement for construction photographs will not be made for payment and all items shall be included in the unit price of materials installed.

D. Temporary Erosion Control: Measurement for temporary erosion control will not be made or payment and shall be included in the unit price of materials installed.

E. As-Built Drawings: Measurement for As-Built drawings will not be made for payment and shall be included in the unit price of materials installed.

F. Construction of Roadway Related Pay Items:

1. Asphaltic Concrete (S-III) Surface Course:

a. Measurement of S-III asphaltic concrete surface course will be the actual area of the

surface course placed, not to exceed the maximum trench width plus the added width of surfacing as shown on the Drawings.

b. Payment for S-III asphaltic concrete surface course for pavement restoration will be made at the Contract unit price per square yard for the respective thickness, which price shall be full compensation for all necessary preparation, tack coat, placing and compaction of surface course, all necessary labor, materials, equipment, and transportation. All thicknesses of asphaltic concrete surface courses will be classified under this item for payment purposes.

2. Limerock or Crushcrete Sub-Base:

a. Measurement of sub-base will be the actual square yards of compacted sub-base placed.

b. Payment for sub-base will be made at the Contract unit price per square yard which shall be full compensation for all necessary preparation, placing and compaction, all necessary labor, equipment, and transportation.

3. Stabilized Subgrade:

a. Measurement of stabilized subgrade will be the actual square yards of compacted stabilized subgrade placed.

b. Payment for compacted stabilized subgrade will be made at the Contract unit price per square yard which shall be full compensation for all necessary preparation, placing and compaction, all necessary labor, equipment, and transportation.

4. Pavement Markings: Measurement and payment of thermoplastic pavement markings will be based on the actual quantity installed and accepted and paid for in linear feet.

5. Single Post Sign, Remove, New, or Relocate: Measurement and payment of the removal, installation, or relocation of single post signs will be paid for as each based on the actual number relocated, installed, or removed.

6. Milling of Existing Asphalt:

a. Measurement shall be the number of square yards of existing asphalt milled as shown on the drawings.

b. Payment shall include all labor, equipment, materials, maintenance of traffic, and incidentals necessary to perform the work.

7. Manhole Frame and Cover Adjustment (Contingency):

a. Measurement for payment of Manhole Frame and Cover Adjustment shall be the actual count of manholes where the frame and cover was physically adjusted (vertically) to new finish grade as shown on the drawings. Where applicable, payment will be compensation in full for removal of the existing manhole frame and cover, and removal/disposal of debris, removing/replacing all necessary grade adjustment including new manhole frame and cover and roadway patch work (where applicable).

b. Payment shall be at the unit price set forth in the contract documents and shall constitute full compensation for all items of work including all required removal of grassing;

excavation; dewatering; native soil backfill and/or A-3 soil material to fill voids; furnishing and placing steel decking over excavations; all sheeting, shoring, and bracing required to maintain excavations in safe condition; protecting existing structures, utilities and property both public and private; placing and removing all traffic signs and barriers, and maintaining traffic (MOT); cleaning up the site; furnishing all material, labor, tools, and equipment and all incidental and related work required to complete the work of the item unless indicated otherwise on the Contract Documents.

8. Valve Box & Cover Adjustment (Contingency):

   a. Measurement for payment of Water or Gas Valve Box and Cover Adjustment (if shown on the drawings) shall be the actual count of valves where the box and cover was physically adjusted (vertically) to new finish grade as shown on the drawings. Where applicable, payment will be compensation in full for removal of the existing valve box and cover, and removal/disposal of any debris, removing/replacing all necessary grade adjustment including new valve box and cover (if noted) and roadway patch work (where applicable).

   b. Payment shall be at the unit price set forth in the contract documents and shall constitute full compensation for all items of work including all required removal of grassing; excavation; dewatering; native soil backfill and/or A-3 soil material to fill voids; furnishing and placing steel decking over excavations; all sheeting, shoring, and bracing required to maintain excavations in a safe condition; protecting existing structures, utilities and property both public and private; placing and removing all traffic signs and barriers, and maintaining traffic (MOT); cleaning up the site; furnishing all material, labor, tools and equipment, and all incidental and related work required to complete the work of the item unless indicated otherwise on the Contract Documents.

G. Stormwater Related Pay Items:

1. Inlet:

   a. Measurement for payment of inlets will be the number of each type of inlet constructed and accepted. Measurement of inlet depth shall be the vertical distance from the top of the inlet rim to the lowest invert or flow line of the finished inlet.

   b. Payments for inlets will be made at the Contract unit price for each type of inlet constructed which price and payment shall be full compensation for all excavation, dewatering and sheeting, concrete, masonry, frames, and grates, backfill, and all other work required or specified for their satisfactory installation.

2. Furnish & Install Storm Manhole:

   a. Measurement for payment of manholes will be the number of each type constructed and accepted. Measurement of manhole depth shall be the vertical distance from the top of the manhole rim to the lowest invert or flow line of the finished manhole.

   b. Payment for manholes will be made at the Contract unit price for each type of manhole constructed which price and payment shall be full compensation for all excavation, dewatering and sheeting, concrete, masonry, frames and covers, backfill and all other work required or specified for their satisfactory installation.

3. Storm Water Line:

a. Measurement of storm water line shall be the horizontal distance in linear feet measured along the centerline of the pipe, from the inside edge of inlets or manholes or to the end of the line, for the respective sizes and stage depth of sewer. The stage depth of sewers will be measured from the existing ground or pavement surface over the pipe centerline to the invert or flow line of the storm water by vertical ordinates spaced not more than 50 feet apart.

b. Payment for storm water line will be made at the Contract unit price per linear foot for the respective size, type, and stage depth which price and payment shall be full compensation for all mobilization, pre-construction video, construction photographs, connections to new inlets or manholes, clearing, grubbing, excavation, dewatering, sheeting, pipe bedding, backfill and compaction, removal and replacement of existing fencing, for all pipe and other materials, testing, post video taping of the new gravity system piping, cleaning of the new gravity system piping, for all equipment, for all existing shrubbery, fencing, sprinkler systems, and miscellaneous landscaping disturbed by construction, and all other work necessary to complete the installation as specified.

c. Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

4. Connect Proposed to Existing Storm Water/Structures/Roof Drain Systems: Payment for connection to existing storm water/structures/roof drain system will be made at the Contract unit price for each item, which price and payment shall be full compensation for all equipment, exposing manhole, inlet, pipe, backfill and compaction, connection of proposed pipe to existing manhole, inlet, or pipe, testing the connection, and any additional materials needed to make the connection.

5. Removal of Existing Stormwater Inlet/Manholes/Headwalls:

a. Measurement for removal of existing stormwater inlets/manholes/headwalls shall be the number of inlets/manholes/headwall structures removed. Payment for removal of existing stormwater inlets/manholes/ headwalls will be made at the Contract unit price which price and payment shall be full compensation for all mobilization, clearing, grubbing, excavation, dewatering, sheeting, structure removal and disposal, backfill and compaction, testing, for all equipment, for all existing shrubbery, fencing, and miscellaneous landscaping disturbed by construction, and all other work necessary to complete the removal as specified.

b. Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

6. Removal of Existing Stormwater Pipe Below Grade:

a. Measurement for removal of existing stormwater pipe below grade shall be the length of stormwater pipe removed. Payment for removal of existing stormwater pipe will be made at the Contract unit price which price and payment shall be full compensation for all mobilization, clearing, grubbing, excavation, dewatering, sheeting, structure removal and disposal, backfill and compaction, testing, for all equipment, for all existing shrubbery, fencing, and miscellaneous landscaping disturbed by construction, and all other work necessary to complete the removal as specified.

b. Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

H. Excavating, Backfilling, & Compacting Related Pay Items:

1. Fill Material (A-3 Sand) Compacted in Place (Contingency): Payment for placement of suitable material (A-3 Sand) compacted in place shall be made at the Contract unit price per cubic yard (compacted in-place survey volume) for the item, which price and payment shall be full compensation for all tools, equipment, labor, transportation, fill material, placement, and compaction of material to final grades shown on Contract Drawings, and all work necessary to complete the item as specified. Prior to the authorization by the Engineer for the delivery of A-3 sand for fill material, the Contractor shall utilize any excess suitable Regular Excavated Fill Material on the site as replacement fill in areas where unsuitable material has been removed and requires replacement fill material. The replacement of excess suitable fill material from the on-site location will be at no additional cost to the City. No payment will be made unless the placement of suitable material is directed by the Engineer.

2. Unsuitable Material Removal (Contingency): Payment for removal of unsuitable material in place shall be made at the Contract unit price per cubic yard (in-place survey volume) for the item, which price and payment shall be full compensation for all tools, equipment, labor, transportation, and all work necessary to complete the item as specified. No payment will be made unless the removal of unsuitable material is directed by the Engineer.

3. Excavation and Fill: Regular Excavation and Fill shall be in accordance with Section 02200 of these specifications, except as modified herein. Regular Excavation and Fill shall include excavation, hauling and disposal of suitable and unsuitable material for all planned construction, including, but not limited to, roadways, ponds, and dewatering to the final grade shown on the plans. Regular Excavation and Fill shall also include the excavation, hauling, and disposal of unsuitable material below the final grade shown on the plans (limits of under-cut) and backfill with suitable material, when the limits of unsuitable material (limits of under-cut) are shown on the plans. Fill or embankment for roadway and ponds shall be placed in accordance with the grades and sections as shown on the plans, or as directed by the Engineer, and shall also be included and paid for at the Lump Sum Price for Regular Excavation and Fill. Costs for hauling and disposal of unsuitable materials that are excavated to the final grade shown on the plans, or to under-cut levels as shown on the plans, shall be included in the Lump Sum Price for Regular Excavation and Fill. Payment for backfill to construct drainage structures and pipes shall be included in the unit bid prices for those items and shall include all material within the construction trench, from the bottom of the structure or pipe to the top of the stabilized sub-grade.

I. Water Main Related Pay Items:

1. New Water Main Connections:

   a. The number of watermain connections of each of the types and sizes to be paid for will be determined by the actual number of connections installed and accepted.

   b. Payment for Water Main Connections will be made at the Contract unit price per each for the respective types and sizes, which price shall be full compensation for furnishing and installing sleeves/couplings, joint restraints, connection to the watermain, and other incidentals necessary to complete this item.

2. Transfer Existing Water Service:

   a. The number of service transfer connections of each of the types and sizes to be paid for will be determined by the actual number of services installed and accepted.

b. Payment for New Water Main Service Transfer Connections will be made at the Contract unit price per each for the respective types and sizes, which price shall be full compensation for the removal of the old service and furnishing and installing service saddle, connection to the watermain, water service tubing/piping, corporation stop, valves, fittings and curb stop, connection to the existing water service meter and other incidentals necessary to complete this item.

3. Furnish & Install Gate Valve / Tapping Sleeve & Valves:

a. Measurement for payment of gate valves and tapping sleeve and valves will be the number of each type and size constructed and accepted.

b. Payment for gate valves and tapping sleeves and valves will be made at the Contract unit price per each for each gate valve constructed which price and payment shall be full compensation for all excavation, tapping the existing water main, stainless steel tapping sleeve, restraints, dewatering and sheeting, concrete, valve box and cover, backfill testing, and all other work required or specified for their satisfactory installation.

4. Furnish & Install Ductile Iron, PVC, and HDPE Water Mains:

a. Measurement of Ductile Iron, PVC, and HDPE water mains shall be the horizontal distance in linear feet measured along the centerline of the pipe.

b. Payment for Ductile Iron, PVC, and HDPE water main will be made at the Contract unit price per linear foot for the respective size and type which price and payment shall be full compensation for all mobilization, pre-construction video, construction photographs, clearing, grubbing, excavation, dewatering, sheeting, bell restraints, temporary sample taps, pipe bedding, backfill and compaction, for all pipe and other materials, testing, disinfection, for all equipment for all existing shrubbery, fencing, sprinkler systems, and miscellaneous landscaping disturbed by construction, and all other work necessary to complete the installation as specified.

c. Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

5. Furnish & Install Ductile Iron/PVC (MJ) Pipe Fittings for Water Mains:

a. Measurement of Ductile Iron/PVC (MJ) pipe fittings of each type and size of fitting installed and accepted.

b. Payment for Ductile Iron/PVC (MJ) pipe fittings for each type of pipe will be made at the Contract unit price per each for the item satisfactorily installed, and such payment shall include full compensation for all fittings, other materials, supports, joining, and all equipment and all other work necessary to complete an acceptable installation. All work associated with excavation, backfill, restoration, testing, disinfection, and joint restraints.

6. Water Main Corrosion Coupon

a. Measurement will be for each corrosion coupon provided for the appropriate type and size of pipe.

b. Payment for water main corrosion coupon will be made at the Contract unit price per each for the item, which price and payment shall be full compensation for removing the

coupon, testing the coupon, all equipment and all other work necessary to complete the work.

7. Water Meter Box & Cover – Removal & Replacement with Copolymer (Contingency):

   a. All existing meter boxes that are not copolymer-type meter boxes, as described in the Contract Documents, shall be replaced with copolymer-type meter boxes. Measurement will be for each meter box & cover removed and replaced shall be the exact number of boxes removed and replaced as approved by the CITY..

   b. Payment for meter box & cover removal and replacement will be made at the Contract unit price per each, for the item, which price and payment shall be full compensation for the removal and proper disposing of the existing meter box & cover, furnishing & installing a new Copolymer meter box & cover and all equipment and all other work necessary to complete the work not limited to excavation, backfill, and restoration.

J. Gravity Sewer Related Pay Items:

1. Sewer Piping:

   a. Measurement of new sewers for payment will be the horizontal distance between manholes with no deduction made for those spaces occupied by manholes, tees, or other appurtenances. The depth of cut of sewers will be measured from existing grade elevations along the center line of the pipe, taken on fifty-foot stations, down to the sewer invert elevation. The depth of cut will be divided into steps: first step – 2 to 4 feet, second step – 4 to 6 feet, and so on, at 2-foot intervals, unless otherwise specified in the Contract Documents. The method of measurement will be the same for each of the specified pipe materials.

   b. Payment for sewers will be at the unit price stated in the Contract for the size and class of pipe, type of material, and depth of sewer actually installed, measured as previously specified. The unit prices set forth in the Contract will constitute full compensation for excavation; native soil backfilling; de-watering; sheeting and shoring, driven and pulled; drag shields for trenches of all depths; placing and removing all traffic signs and barriers and maintaining traffic; furnishing, laying, jointing, and testing the sewers plus all incidental work including all labor, materials, tools, and equipment. The unit price will also include stoppers for all ends of pipe and fittings, and transition couplings.

2. Transfer Existing Sewer Service at Sewer Main: Payment will be made for each sewer service transferred at the Contract unit price for the service transfers actually installed as shown on the Contract drawings. The unit prices set forth in the Contract will constitute full compensation for excavation; native soil backfilling; de-watering; sheeting and shoring, driven and pulled; drag shields for trenches of all depths and furnishing and installing service transfers of all depths. Payment will consist of the cost of the tee/wye or saddle, service piping to make the transfer to existing service, and connection to the existing service. The unit price shall also be full compensation for locating existing service piping and all incidental work including all labor, materials, tools, and equipment.

3. Service Connections at Sewer Manhole: Payment will be made for each sewer service connecting to a manhole at the Contract unit price for the type and size of the service connection actually installed as shown on the Contract drawings. The unit prices set forth in the Contract will constitute full compensation for excavation; native soil backfilling; de-watering; sheeting and shoring, driven and pulled; drag shields for trenches of all depths and furnishing and installing service transfers of all depths. Payment will consist of the cost of coring the manhole, the rubber boot, service piping and fittings from the manhole to the right of way line or to the existing connection point as indicated on the drawings. The unit price shall also be full

compensation for locating, removing, and disposing of the existing service piping and all incidental work including all labor, materials, tools, and equipment.

4. Sewer Piping Connections: Payment will be made for each connection to existing piping furnished and installed at the Contract unit price for the type and size of the connection actually installed as shown on the Contract drawings. The unit prices set forth in the Contract will constitute full compensation for excavation; native soil backfilling; dewatering; sheeting and shoring, driven and pulled; drag shields for trenches of all depths and furnishing and installing connections of all depths. Payment will consist of the cost of fittings and additional piping needed to make the connection. The unit price shall also be full compensation for all incidental work including all labor, materials, tools, and equipment.

5. Cured-In-Place Pipe (CIPP):

   a. Measurement of new CIPP sewer liner for payment will be the horizontal centerline distance between manholes with no deduction made for those spaces occupied by manholes, tees, wyes, or other appurtenances.

   b. Payment for new CIPP sewer liner will be the unit price stated in the Contract for the size (diameter in inches) of sewer pipe to be lined, thickness of liner and type of liner material actually installed, measured as previously as specified. The unit prices set forth in the Contract will constitute full compensation for placing and removing all temporary traffic signs and barriers and maintaining traffic throughout the CIPP liner installation timeframe. The unit price shall also include the costs associated with performing the initial cleaning and televising of the existing gravity sewer main to be lined; removing any existing sewer service hammer taps; performing bypass pumping of raw sewage; pulling, inflating, and curing the CIPP liner through the existing gravity sewer main; re-televising the new CIPP liner where active sewer services previously existed; and all incidental work associated with installing the new CIPP liner including labor, supervision, materials, tools, and equipment.

K. Sewage Manholes Related Pay Items

1. Construct Sewage Manhole: The depth of the manhole will be measured vertically from the top of the manhole frame to the invert at the center of the manhole bottom. Payment for new sewage manholes will be in accordance with the unit price in the Contract. Prices for manholes will be the installed price, complete, for the type and depth of manhole. Prices will be full compensation for furnishing and installing the manhole including all required removal of grassing; excavation; de-watering; native soil backfilling; all sheeting, shoring, and bracing required to maintain excavation in a safe condition; protecting existing structures, utilities, and property; placing and removing all traffic signs and barriers and maintaining traffic; cleaning up the site; furnishing all labor, materials, tools, and equipment for manhole construction, including manhole, frames, covers, inside or outside drops, connections to manhole, forcemain connection and specialty coating, and all work appurtenant thereto, but exclusive of, stub-outs.

2. Lining Existing Sewage Manholes: Payment for lining existing sewage manholes will be in accordance with the unit price in the Contract. Prices for lining of existing manholes will be the installed price, complete for each manhole lined. Prices will be full compensation for furnishing and installing lining in existing manholes including all required cleaning; plugging, bypass pumping; protecting existing structures, utilities, and property; placing and removing all traffic signs and barriers and maintaining traffic; cleaning up the site; furnishing all labor, materials, tools and equipment for manhole lining, and for all work appurtenant thereto.

3. Abandonment/Remove Existing Sewage Manhole: Measurement for payment of abandonment or removal of existing manhole shall be the actual physical number of manholes abandoned or removed as called for on the Contract Drawings or as approved by the Engineer. Payment for manholes abandoned or removed shall be at the unit price set forth in the Contract Documents. Payment will be compensation in full for complete abandonment or removal of the manhole ad transportation and disposal of the debris; sealing any and all pipes leading in and out of the structure; excavation; backfilling; compacting; native backfill and/or ASSHTO A-3 soil fill material in the void left by abandoning or removing the structure; placing and removing all traffic signs and barriers and maintaining traffic.

4. Connection to Existing Sewage Manhole/Wet Well: Payment for standard connections, drop connections, service connections, and forcemain connections to existing manholes/wet wells will be at the unit price set forth in the contract for the size and type of connection. The unit price will constitute compensation in full for each connection actually furnished and installed including excavation; native soil backfill; compaction; coring; piping; fittings; grouting and repair to existing manhole wall section; bypass pumping; placing and removing all traffic signs and barriers and maintaining traffic plus all incidental work including all labor, materials, tools, and equipment.

5. Connection to Proposed Sewage Manhole/Wet Well: Payment for standard connections, drop connections, service connections, and forcemain connections to proposed manholes/wet wells will be at the unit price set forth in the Contract for the size and type of connection. The unit price will constitute compensation in full for each connection actually furnished and installed including excavation; native soil backfill; compaction; coring; piping; fittings; grouting; bypass pumping; placing and removing all traffic signs and barriers and maintaining traffic plus all incidental work including all labor, materials, tools, and equipment.

L. Demolition and Abandonment Related Pay Items:

1. Abandonment of Piping by Plugging: Payment for excavating and plugging ends of abandoned pipe with a plugged fitting will be at the unit price set forth in the Contract Documents for each plug actually installed as indicated on the drawings or as directed by the Engineer. Payment shall be full compensation for removal of grassing; excavating; plugging, backfilling, and compacting, as required, for a complete abandonment.

2. Abandonment of Piping by Grout Filling: Payment for excavating and grout filling abandoned mains shall be at the per linear foot unit price as set forth in the Contract Documents. Payment for grout filling sewer laterals shall be included in the per foot price of grout filling gravity sewer main. Payment will be compensation in full for removal of grassing; excavating as required; grout; grout filling; backfilling and compacting; as required, for a complete abandonment.

3. Remove Pipe Below Grade: Payment for removing pipe (including asbestos pipe) below grade shall be at the linear foot unit price as set forth in the Contract Documents for each linear foot of pipe actually removed. Payment will be compensation in full for removal of grassing; excavating; removal of piping; transporting and disposal of the pipe and appurtenances; backfill and compacting as required, including additional fill materials needed as required to fill void from removing pipe.

M. Grassing & Sodding: The unit price as lump sum as set forth in the Contract for sodding, sprigging or seeding, and mulching shall constitute full compensation for furnishing and installing, fertilizing, watering, and maintaining the sodding, sprigging or seeding, and mulching. If a planted area must be replanted due to the Contractor's negligence, excessive amount of damage for type of construction, or

failure to provide routine maintenance of the area, such replacement shall be at the Contractor's expense.

N. Pavement, Sidewalk, Driveway, & Curb and Gutter Related Pay Items

1. Removal of Misc. Concrete and Sidewalk: Payment for the removal of concrete sidewalk shall be at the square yard unit price set forth in the Contract Documents and shall include and be full compensation for complete removal and disposal of sidewalk, including handicap ramps. Payment for sidewalk removal shall be the actual square yards of sidewalk removed.

2. Removal of Concrete Driveway and Pavement: Payment for the removal of concrete driveway and pavement shall be at the square yard unit price set forth in the Contract Documents for concrete driveway removal. Payment shall include and be full compensation for complete removal and disposal of the driveway. Payment for driveway removal shall be the actual square yards of driveway removed.

3. Removal of Curb & Gutter: Payment for the removal of curb and gutter shall be at the linear foot unit price set forth in the Contract Documents and shall include and be full compensation for complete removal and disposal of curb and gutter. Payment for curb and gutter shall be the actual linear feet of curb and gutter removed.

4. Removal of Asphalt Pavement: Payment for the removal of asphalt pavement shall be at the square yard unit price set forth in the Contract Documents for asphalt pavement removal. Payment shall include and be full compensation for complete removal and disposal of pavement and any underlying base material. Payment for pavement removal shall be the actual square yards of pavement removed.

5. Installation of Concrete Sidewalk: Payment for the installation of concrete sidewalk (including handicap ramps) shall be at the square yard unit price set forth in the Contract Documents and shall include preparation and construction of new sidewalk including forming and vibrating (if required). Payment for the concrete sidewalk shall be the actual square yards of sidewalk installed. Sidewalk installation shall include handicap ramps and related detectable warning surface. No separate pay item for the construction of handicap ramps or related detectable warning surface will be allowed. No payment shall be made for the sidewalk through concrete driveways.

6. Installation of Concrete Driveways and Parking Areas: Payment for the installation of concrete driveways and parking areas shall be at the square yard unit price set forth in the contract documents for the type to be installed. Payment shall include preparation and construction of driveway and parking areas including forming and vibrating (if required). Payment for driveway and parking areas shall be the actual square yards of each type installed.

7. Installation of Curb & Gutter: Payment for the installation of curb and gutter shall be at the linear foot unit price set forth in the contract documents for the type of curb and gutter to be installed. Payment shall include preparation and construction of curb and gutter including forming and vibrating (if required). Payment for curb and gutter shall be the actual linear feet of each type of curb and gutter installed.

8. Installation of Concrete: Payment for the installation of concrete (including valley gutters) shall be at the square yard unit price set forth in the Contract Documents and shall include preparation and construction of new concrete including forming and vibrating (if required). Payment for the concrete shall be the actual square yards of concrete installed.

O. Maintenance of Traffic (Included in Unit Price/Lump Sum Bid Items): Maintenance of traffic shall be defined by FY 2024-25 FDOT Standard Specifications for Road and Bridge Construction, the most recent FDOT Roadway and Traffic Design Standards, the Manual on Uniform Traffic Control Devices (M.U.T.C.D.), published by the Federal Highway Administration, and the City Traffic Specifications. Additionally, the Contractor shall comply with the maintenance of Traffic Plans contained in the Contract Documents. It is understood that providing for such local traffic will require some inconvenience to the users, but such inconvenience must be kept to an absolute minimum. Ingress and egress shall be provided at all times for local residents. Any deviation from the Maintenance of Traffic Plans such as Construction Zone Signing, Barricades, Warning Devices, Temporary Striping, Signalized Intersections, etc. must be approved by the Engineer. The City Traffic Engineer shall be notified, and approval shall be obtained 48 hours in advance of such deviation. Maintenance of traffic includes but is not limited to Signing, Barricades, Warning Devices, Temporary Striping, Temporary Pavement, and Temporary Drainage as shown in the plans. Maintenance of traffic also includes utilization of law enforcement for traffic control, if required, as needed or as requested by the City.

P. As-Builts (Included in Unit Price/Lump Sum Bid Items): Payment for as-builts will be included in the lump sum/unit prices as seen in the bid proposal form and shall be full compensation for performing the as-built survey and all labor, equipment, transportation, and all operations necessary to prepare the as-builts.

Q. Temporary Erosion Control (Included in Unit Price/Lump Sum Bid Items): This item shall include, but not be limited to, sandbagging, silt screens, hay bales, temporary grassing, sediment basins, and sediment checks deemed necessary by the Contractor and/or the Engineer. Payment for temporary erosion control shall be included in the lump sum/unit price bid items as seen in the bid proposal form. The execution of this work by the Contractor is to be done on a proactive basis.

R. Sewage Forcemain Related Pay Items:

1. Remove Sewage Forcemain Pipe Below Grade: Payment for removing pipe (including asbestos pipe) below grade shall be at the linear foot price as set forth in the Contract Documents for each linear foot pipe actually removed. Payment will be compensation in full for removal of grassing; excavating; removal of piping; transporting and disposal of the pipe and appurtenances; backfill and compacting as required, including additional fill materials needed as required to fill void from removing pipe.

2. Furnish & Install Ductile Iron, PVC, and HDPE Sewage Forcemains:

   a. Measure of Ductile Iron, PVC, and HDPE sewage forcemains shall be the horizontal distance in linear feet measured along the centerline of the pipe.

   b. Payment for Ductile Iron, PVC, and HDPE sewage forcemain will be made at the Contract unit price per linear foot for the respective size and type which price and payment shall be full compensation for all mobilization, pre-construction video, construction photographs, clearing, grubbing, excavation, dewatering, sheeting, bell restraints, temporary sample taps, pipe bedding, backfill and compaction, for all pipe and other materials, testing, disinfection, for all equipment, for all existing shrubbery, fencing, sprinkler systems, and miscellaneous landscaping disturbed by construction, and all other work necessary to complete the installation as specified.

   c. Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

3. Furnish & Install Gate Valve / Tapping Sleeve & Valves:

a. Measurement for payment of gate valves and tapping sleeve and valves will be the number of each type and size constructed and accepted.

b. Payment for gate valves and tapping sleeves and valves will be made at the Contract unit price per each for each gate valve constructed which price and payment shall be full compensation for all excavation, tapping the existing water main, stainless steel tapping sleeve, restraints, dewatering and sheeting, concrete, valve box and cover, backfill testing and all other work required or specified for their satisfactory installation.

4. Furnish & Install Ductile Iron / PVC (MJ) Pipe Fittings for Sewage Forcemains:

a. Measurement of ductile iron/PVC (MJ) pipe fittings of each type and size of fitting installed and accepted.

b. Payment for ductile iron/PVC (MJ) pipe fittings for each type of pipe will be made at the Contract unit price per each for the item satisfactorily installed, and such payment shall include full compensation for all fittings, other materials, supports, joining, and all equipment and all other work necessary to complete an acceptable installation. All work associated with excavation, backfill, restoration, testing, disinfection, and joint restraints.

5. Sewage Forcemain Corrosion Coupon

a. Measurement will be for each corrosion coupon provided for the appropriate type and size of pipe.

b. Payment for water main corrosion coupon will be made at the Contract unit price per each for the item, which price and payment shall be full compensation for removing the coupon, testing the coupon, all equipment, and all other work necessary to complete the work.

S. Test Hole Allowance: A test hole allowance has been provided for the Contractor to take test holes before construction and address any conflicts that might arise as a result of the findings. Payment of the allowance shall be for the cost of the Subcontractor to perform the work with no more than a 5% markup by the Contractor.

T. Any construction or restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense.

END OF SECTION

SECTION 01050
FIELD ENGINEERING

PART I - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Provide and pay for field engineering services for Project.

1. Survey work required in execution of Project.

2. Civil, structural or other professional engineering services specified or required to execute Contractor's construction methods.

3. The method of field staking for the construction of the work shall be at the option of the Contractor. The Owner has provided the engineering surveys necessary to establish reference points which in his judgement are necessary to enable the Contractor to proceed with his work.

4. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.

5. The Contractor shall be held responsible for the preservation of all stakes and marks. If any stakes or marks are carelessly or willfully disturbed by the Contractor, the Contractor shall not proceed with any work until he has established such points, marks, lines and elevations as may be necessary for the prosecution of the Work.

6. The Contractor shall retain the services of a registered land surveyor licensed in the State of Florida to identify existing control points and maintain a survey during construction.

B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.

2. Scope of Services: Section 00300A.

3. Project Record Documents: Section 01720.

1.02 QUALIFICATIONS OF SURVEYOR OR ENGINEER

A. Qualified engineer or registered land surveyor, acceptable to the Owner and the Engineer.

B. Registered professional engineer of the discipline required for the specific service on the Project, currently licensed in the State of Florida.

1.03 SURVEY REFERENCE POINTS

A. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.

1. Make no changes or relocations without prior written notice to the Engineer.

2. Report to the Engineer when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

3. Require a surveyor to replace Project control points which may be lost or destroyed at no additional cost to the Owner. Establish replacement based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

A. Establish a minimum of two (2) permanent benchmarks on site, referenced to data established by survey control points.

1. Record locations, with horizontal and vertical data, on Project Record Documents.

B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:

1. Site improvements:

a. Stakes for grading, fill, and topsoil replacement.

b. Utility slopes and invert elevations.

2. Batter boards for structure.

3. Building foundation, column locations and floor levels.

4. Controlling lines and levels required for mechanical and electrical trades.

C. From time to time, verify layouts by the same methods.

1.05 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. At the end of the project, submit a certified site survey at 1-inch equals 30 feet scale on reproducible tracing sheets 24-inch by 36-inch, indicating the building corners and location of all structures.

C. At the end of the project, submit a certified survey at the same scale as the Engineer's line drawings indicating elevations and geometry at maximum 10-foot intervals and at all turning points.

1.06 SUBMITTALS

A. Submit the name and address of Surveyor and Professional Engineer to the Engineer.

B. On request of the Engineer, submit documentation to verify accuracy of field engineering work.

C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance with the Contract Documents, or if not in conformance, certify as to variances from the Contract Documents.

D. Submit drawings showing locations of all structures constructed. This drawing shall be included with the Project Record Documents.

SECTION 01050
FIELD ENGINEERING

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01065
PERMITS & FEES

PART 1 - GENERAL

A. The Contractor shall obtain and pay for all permits and licenses related to his work, including but not limited to, Duval County Permitting and the City of Jacksonville Beach, as provided for in Section 00700: General Conditions except as otherwise provided herein.

B. Permits by Owner: The Owner prior to the advertisement of the project has applied for permits with the following agencies:

St. Johns River Water Management District Exemption Verification

Florida Department of Transportation Utility Accommodation Permit

(Refer to Table 01065A for permit information.)

C. Dewatering Permit: Within fourteen (14) calendar days of issuance of Notice to Proceed, the Contractor shall submit a dewatering plan for construction. This plan will be used in support of the Contractor's application for a permit from St. Johns River Water Management District (SJRWMD) for said project and shall outline means of dewatering for construction, water control and disposal, water quality protection, the means and methods of construction for the project, restoration of the site, and other pertinent information that may be required by SJRWMD. Consult with SJRWMD and include their requirements for additional information in the dewatering plan.

D. Contractor shall submit a NOI (Notice of Intent) to FDEP regarding a generic permit for stormwater discharge prior to construction. Additionally, the Contractor shall provide the City of Jacksonville Beach with a copy of the submittal package.

Table 01065A
PERMIT INFORMATION

The following permits have been obtained or will be obtained by the Owner prior to construction:

Permit	Permit No.	Issue Date
St. Johns River Water Management District Exemption Verification	18166-24	8/1/2025
FDOT Utility Accommodation Permit	2025-H-294-00345	8/20/2025

END OF SECTION

SECTION 01100
SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.1 PUBLIC NUISANCE

A. The Contractor shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.

B. Sound levels measured by the Engineer or City's personnel shall not exceed 70 dBA 7:00 a.m. to 10:00 p.m. and 65 dBA from 10:00 p.m. to 7:00 a.m. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Sound levels in excess of these values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or City for excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to, completion dates and bid amounts.

C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.2 SUSPENSION OF WORK

During inclement weather, all work, which might be damaged or rendered inferior by such weather conditions, shall be suspended. The orders and decisions of the Engineer as to suspensions shall be final and binding. During suspension of the work from any cause, the work shall be suitably covered and protected so as to preserve it from injury by the weather or otherwise; and, if the Engineer shall so direct, rubbish and surplus materials shall be removed.

1.3 SPECIAL REQUIREMENTS

The following requirements shall govern:

A. No additional payment will be made for pumping or other difficulties encountered due to water.

B. The Contractor shall, prior to interrupting a utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes, contact the City and make arrangements for the interruption, which will be satisfactory to the City.

C. All equipment delivered to the job site shall be properly protected from dirt, dust, dampness, water and any other condition detrimental to the life of the equipment from the date of delivery to the time that control of the equipment is assumed by the City. If any equipment is delivered to the job site before any building thereon is enclosed, it shall be housed in a temporary, structurally rigid, watertight enclosure.

D. From investigations, including surveys made at the site, it may be assumed that physical conditions are approximately as indicated on the Drawings, but the nature of the materials below the surface, or the depth to satisfactory foundations, are not guaranteed.

E. Certain information regarding the reputed presence, size, character and location of existing underground structures, pipes and conduits have been shown on the Contract Drawings. There is no certainty of the accuracy of this information, and the location of underground structures shown may be inaccurate and other obstructions than those shown may be encountered. The Contractor hereby distinctly agrees that the City and Engineer are not responsible for the correctness or sufficiency of the information given; that in no event is this information to be considered as a part of the Contract; and that consideration for equitable compensation will be made for conditions materially different from those shown on the Drawings, as determined by the City/Engineer.

1.4 PUMPING

A. The Contractor, with his own equipment, shall do all pumping necessary to prevent floatation of any part of the structures during construction operations.

B. The Contractor shall, for the duration of the contract and with his own equipment, pump out water, stormwater and wastewater, which may seep or leak into the structures. Operating areas shall be kept dry at all times. The extent of pumping required in non-operating areas will be determined by the Engineer.

1.5 FLORIDA DEPARTMENT OF TRANSPORTATION RIGHTS-OF-WAY

A. The Contractor shall strictly adhere to the requirements of the Florida Department of Transportation where construction work is in a right-of-way under the jurisdiction of the State of Florida.

B. The Contractor shall take care to avoid any unreasonable traffic conflicts due to the work in the road rights-of-way.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01340
SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer for review and approval, such Working Drawings, Shop Drawings, Test Reports and Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Working Drawings, Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

2. Within thirty (30) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary Data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite the final review of Shop Drawings.

3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the City and the Engineer. This log should include the following items:

   a. Submittal-Description and Number assigned.
   b. Date sent to Engineer.
   c. Date returned to Contractor (from Engineer).
   d. Status of Submittal (Approved, Approved as Noted, Revise and Resubmit, or Rejected).
   e. Date of Re-submittal and Return (as applicable).
   f. Date material release (for fabrication).
   g. Projected date of fabrication.
   h. Projected date of delivery to site.
   i. Status of O&M manuals submittal.
   j. Specification Section.
   k. Drawings Sheet Number.

1.2 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all Drawings, Data and Samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and Data shall bear the Contractor's stamp showing that they have been so checked. Shop Drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop Drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer.

B. Determine and verify:

1. Field measurements.
2. Field construction criteria.

3. Catalog numbers and similar data.
4. Conformance with Specifications.

C. The Contractor shall furnish the Engineer a schedule of Shop Drawings submittals fixing the respective dates for the submission of Shop and Working Drawings, the beginning of manufacture, testing, and installation of materials, supplies, and equipment. This schedule shall indicate those that are critical to the progress schedule.

D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer with approval.

E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.

F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:

1. Date.
2. Project Title and Number.
3. Contractor's name, address, phone and fax numbers.
4. The number of each Shop Drawing, Project Data, and Sample submitted.
5. Notification of Deviations from Contract Documents.
6. Submittal Log Number conforming to Specification Log Number.

G. The Contractor shall submit four (4) copies of descriptive or product Data submittals to complement Shop Drawings for the Engineer plus the number of copies which the Contractor requires returned. The Engineer will retain four (4) sets. All plot Shop Drawings shall be submitted with one (1) PDF file and four (4) sets of prints. The Engineer will review the plots and return to the Contractor the set of marked-up plots with appropriate review comments.

H. The Contractor shall be responsible for and bear all costs of damages, which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by the Engineer of the necessary Shop Drawings.

I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposed to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of Drawings and Specifications.

1.3 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of Shop Drawings, Data and Samples submitted by the Contractor will cover only general conformity to the Specifications, external connections, and dimensions which affect the installation. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:

1. As permitting any departure from the Contract requirements.
2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

If the drawings or schedules as submitted describe variations per Paragraph 1.2A. herein and show a departure from the Contract requirements which the Engineer finds to be in the interest of the City and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

C. When reviewed by the Engineer, each of the Shop Drawings will be identified as having received such a review being so stamped and dated. Shop Drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the Contractor for correction and re-submittal. Shop Drawings stamped "REJECTED" deviated so significantly from the Contract requirements that Contractor shall review Contract requirements and completely update submittal package and re-submit.

D. Re-submittals will be handled in the same manner as first submittals. On re-submittals the Contractor shall direct specific attention, in writing or on re-submittal Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

E. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

F. Shop Drawings and submittal Data shall be reviewed by the Engineer for each original submittal and first and second re-submittal; thereafter, review time for subsequent re-submittals shall be charged to the Contractor in accordance with the terms of the Engineer's Agreement with the City.

G. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

H. No partial submittals will be reviewed. Submittals which are not complete will be returned to the Contractor for re-submittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:

1. Systems.
2. Processes.
3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product Data, certifications and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

1.4 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for materials and equipment, which become an integral part of the project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, product, or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

D. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Project Title and Number.
2. Name of project building or structure.
3. Number and title of the Shop Drawing.
4. Date of Shop Drawing or revision.
5. Name of Contractor and Sub-Contractor submitting drawing.
6. Supplier/manufacturer.
7. Separate detailer when pertinent.
8. Specification title and number.
9. Specification section.
10. Application Contract Drawing Number.

E. If Shop Drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.

F. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

G. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

H. Only the Engineer will utilize the color "red" in marking Shop Drawing submittals.

1.5 WORKING DRAWINGS

A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.

B. Copies of Working Drawings as noted in Paragraph 1.5A. above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for work.

C. Working Drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, Working Drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the City and Engineer shall have no responsibility,

therefore.

1.6 SAMPLES

A. The Contractor shall furnish, for the approval of the Engineer, Samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on Samples. Materials or equipment for which Samples are required shall not be used in work until approved by the Engineer.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.
2. Full range of color, texture and pattern.
3. A minimum of two (2) Samples of each item shall be submitted.

C. Each Sample shall have a label indicating:

1. Name of Project.
2. Name of Contractor and Sub-Contractor.
3. Material or Equipment Represented.
4. Place of Origin.
5. Name of Producer and Brand (if any).
6. Location in Project.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of Samples containing the information required in paragraphs 1.6 B and C above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a Sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. Approved Samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in the work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense and if so requested at the time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01381
CONSTRUCTION AUDIO-VIDEO RECORDING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

Progress video tapes shall be made at periodic intervals, not to exceed 30 days, showing the extent and progress of the work performed as of that date. Video tapes shall be taken at each location of the work on the day ending the period for which partial payment is requested, during the development of stages and conditions of work, and as directed by the Engineer. Typical pipeline work shall be videotaped at different stages of construction at the direction of the Engineer.

A. Initial video tape inspection of existing conditions shall be taken no later than 14 calendar days after notice to proceed and prior to beginning of any construction.

B. At each specified time, take video tapes of each major area of work.

C. Final video tapes shall be submitted and approved by the Engineer/City prior to final acceptance and payment.

1.2 QUALITY ASSURANCE

A. Video Camera Operator: The operator may be an employee of the Contractor and must be completely familiar with the proper operation of the video recording device (digital camera) and how to create a DVD. Employ operator only after review of his qualifications by Engineer.

1.3 SUBMITTALS

A. Submit qualifications and experience record of operator.

B. DVDs shall be submitted to the Engineer at the time of each payment request and shall become the property of the City.

PART 2- PRODUCTS

2.1 VIDEO REPORT

A. Provide a high-quality DVD in an MPEG2 format video with a standard resolution of 720x480. Use a camera with lighting suitable to allow a clear picture of the entire project site.

2.2 DIGITAL FILE

A. Recording can also be completed, stored and submitted as a digital file in Microsoft, Windows, Quicktime or other formats with file extensions such as AVI, MOV, WMV, etc.

2.3 DIGITAL CAMERA

A. The video camcorder shall have a minimum resolution of 18.20 megapixels, sensor size 1/2.3-inch with an optical zoom; criteria based off Sony CyberShot DSC Wx500 but any approved equal is acceptable.

B. At the end of the project all DVDs with index based on elapsed time of tape shall become the property of the City.

PART 3 - EXECUTION

3.1 GENERAL

A. The following location information shall be provided on color audio-video tape recording.

1. Audio: Each recording shall begin with a verbal description of the current date, project name and municipality and be followed by the general location, name of the street, viewing side and direction of progress.

2. Video: Transparent information must appear on the viewing screen. This information will consist of the date and time of recording. The date information will contain the month, day, and year.

3. Digital: To preclude the possibility of tampering or editing in any manner, all video recordings by electronic means must display continuously and simultaneously generated transparent digital information to include the date and time of recording. The date information will include the month, day and year.

B. The taped coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio description. Audio description shall be made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, fences, curbs, ditches, roadways, landscaping, trees, culverts, headwalls, retaining walls, or buildings located within such zone of influence. Particular and detailed attention shall be given to any defects noted, such as cracks, disturbed areas, damaged items, or as may be required by the Engineer. It is the intent of this coverage to accurately and clearly document pre-existing conditions and especially any items that could result in construction claims. The excavation areas shall be physically marked with high visibility fluorescent paint prior to videotaping. The markings shall include the job number and stationing.

C. The zone of influence shall be defined as an area within 30 feet of the proposed work.

D. The Contractor shall be able to televise and tape areas with paved roads, along co-owned easements through parks, lawns, and open fields. If videotaping on private property, the Contractor shall give the City sufficient prior notice of such entry so that Owners may be advised of and their permission obtained for the work.

E. To produce the proper detail and perspective, adequate lighting will be required to fill in the shadow area caused by trees, utility poles, road signs and other such objects in residential areas or as directed by the Engineer.

F. Houses and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system, manholes on a sewer system and hydrants on a water system can be located by reference.

G. The rate of speed in the general direction of travel of the conveyance used during taping shall not exceed 48 feet per minute in residential areas, nor exceed 100 feet per minute in non-residential areas. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that during playback will produce clarity of the object viewed. The playback picture shall be in focus and be of extreme clarity at all times.

H. All taping shall be done during times of good visibility. No taping shall be done during periods of visible precipitation unless otherwise authorized by the Engineer.

I. The City shall have the authority to designate what areas may be omitted or added for audio-video coverage.

J. All DVDs shall be properly identified by DVD number, location and project name and municipality in a manner acceptable to the City.

K. A record of the contents of each DVD shall be supplied by an index sheet identifying each segment in the recording by location, i.e., street or road viewing, elapsed time of video (no counter numbers), viewing side, point starting from, traveling direction, and ending destination point.

L. Any portion of the recording not conforming to specifications shall be rejected.

M. Any recording not acceptable to the City shall be refilmed at no additional charge. The Contractor shall reschedule unacceptable coverage within five (5) days after being notified.

N. All recordings shall be performed by Contractor and reviewed and accepted prior to construction.

O. One (1) original and one (1) copy are to be provided. Original to City and copy to Engineer.

3.2 PROGRESS CONSTRUCTION VIDEO

A. Submit DVDs on a monthly basis to accompany each request for progress payment to the City and Engineer.

END OF SECTION

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SECTION 01500
TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: Provide temporary facilities required which may include but are not necessarily limited to the following:

1. Staging area use and maintenance
2. Temporary water service.
3. Temporary sanitary facilities.
4. Temporary electrical service.

1.2 STAGING AREA

A. The City will provide access to and may allow the Contractor, at the City's discretion, to use City owned property for use as a Staging Area. The Staging Area shall be used for Contractor employee parking, temporary storage of equipment, and materials related to the Contract.

1. The City has proposed the laydown yard for this project will be located at 508 10th Street South with access the site through the 5th Avenue South entrance. The Contractor to coordinate with the City regarding use of the laydown yard.

B. Construct a temporary 6-foot-high chain link fence around trailers and materials. Include privacy fabric, colored green, so that visibility through the fence is obstructed. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each workday.

1.3 TEMPORARY WATER

A. Provide temporary potable water service for use throughout the construction period.

1. Water for construction and well development purposes.

2. Water for other purposes.
   a. Testing.
   b. Temporary sanitary facilities.
   c. Cleaning.

B. Maintain adequate volume of water for all purposes.

C. Water source: Potable water may be obtained from the City of Jacksonville Beach water distribution system. Potable water used shall be separately metered and protected with approved back flow prevention devices. City will provide a hydrant meter. The City will not charge the Contractor for water used during construction operations.

D. Maintain strict supervision of use of temporary services.

1. Enforce conformance with applicable codes and standards.

2. Enforce sanitary practices.

3. Prevent waste of water.

4. Prevent the abuse of services.

E. Costs of installation and operation: Pay costs for installation, maintenance, and removal of pipe and equipment. The City will not charge the Contractor for water used during well drilling operations.

F. Requirements of regulatory agencies:

1. Obtain, pay for permits, fees, deposits required by governing authorities.

2. Comply with federal, state and local codes.

1.4 TEMPORARY ELECTRICITY

A. Furnish and install Temporary Electric Power Service for construction needs throughout construction period.

1. Power centers for miscellaneous tools and equipment used in construction work.

a. Locate so that power is available at any desired point with no more than 100 feet extension.

b. Provide weatherproof distribution boxes with grounded outlets.

c. Provide circuit breaker protection for all outlets.

d. Provide equipment grounding continuity for the entire system.

e. Users shall provide grounded, Underwriters Laboratories, Inc. (UL) approved extension cords from power center to point of operations.

2. Power for construction equipment.

a. Power for testing and checking equipment.

b. Power for welding units and for other equipment having special power requirements.

B. Capacity:

1. Adequate electrical service for construction use by all trades during construction period.

2. Notify the power company if unusually heavy loads such as welding, and other special power requirements, will be connected.

a. Provide special circuits for heavy load requirements.

b. Do not overload any circuit.

C. Power Source:

1. Supplier: City of Jacksonville Beach.

2. Provide power of correct voltage, phase and frequency, as required, to project site.

D. Maintain strict supervision of use of temporary services.

1. Enforce conformance with applicable standards.

2. Enforce safe practices.

3. Prevent abuse of services.

E. Costs of installation and operation: Pay costs of temporary electrical power used, including costs of installation, meter, maintenance, and removal of temporary services from point of connection.

F. Requirements of regulatory agencies:

1. Obtain and pay for permits as required by governing authorities.

2. Comply with applicable codes.

a. National Electrical Code.

b. National Electrical Safety Code.

c. National Fire Protection Association.

d. Federal, state, and local codes and utility company regulations.

1.5 TEMPORARY SANITARY FACILITIES

A. Provide temporary sanitary facilities at the job site. The location of the temporary facilities shall be agreeable to the City of Jacksonville Beach and shall not create a public nuisance.

1.6 TEMPORARY CHAIN LINK FENCING

A. Provide temporary chain link fencing panels with privacy screens along all construction sites, all open excavations and tunnels to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. Provide temporary chain link fencing panels surrounding the Contractor Staging area throughout the Contract. Specific fencing requirements are as described herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Materials may be new or used, but must be adequate for purpose required, sanitary, and must not violate requirements of applicable codes.

2.2 ELECTRICITY

A. Provide required facilities, including transformers, conductors, poles, conduits, raceways, breakers, fuses and switches.

B. Provide appropriate enclosures for the environment in which used, in compliance with NEMA standards.

2.3 TEMPORARY SANITARY FACILITIES

A. Toilet facilities

1. Portable chemical toilets.

2. Toilet tissue: Provide at each toilet, on suitable dispenser.

2.4 TEMPORARY FENCING

A. Chain Link Panel Fencing: Temporary panel fencing must be galvanized steel chain link panels 6 feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighed down using sandbags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a

minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

B. Privacy Screening:

1. Color: Green
2. Fence screen panels with 2" polypropylene webbing for edge reinforcement.
3. 3/8" brass grommets at 24" on center attach to fence with fence screen fasteners or galvanized hog rings
4. Material: Knitted high density polyethylene (HDPE)
5. Airflow. minimum: 300 cfm,
6. Filament Strength: 500 lbs/ft
7. Material Weight: 0.5 oz/ft^2
8. UV inhibitor composition: 1.5% Amplas CM111821 / 1.5% Equaster CM 106000
9. Flammability point: 364 °C
10. Shade / wind blockage, minimum: 85%

C. Acceptable screen: Fencescreen Privacy Plus or equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Install work in a neat and orderly manner.

B. Make structurally sound throughout.

C. Maintain to provide continuous service.

D. Modify and extend service as work progress requires.

3.2 STAGING AREA MAINTENANCE

A. Obtain City acceptance of Staging Area use before start of the Work and throughout the Contract. Comply with the City or Engineer's written direction for Staging Area use within 24 hours of receipt.

B. Document the Staging Area condition with photographs and prior to occupation. Submit a copy of the photographs to the Engineer and the City. Restore the Staging Area to its pre-construction condition at no additional expense to the City

C. Provide and maintain temporary fencing around the entire Staging Area throughout the Contract.

3.3 TEMPORARY WATER

A. Locate piping and outlets.

1. Provide service convenient to workstations.
2. Avoid interference with:
   a. Traffic and work areas.
   b. Materials handling equipment.
   c. Storage areas.

B. Do not run piping on floor or on ground.

C. When necessary to maintain pressure, provide temporary pumps, tanks, and compressors.

3.4 TEMPORARY ELECTRICITY

A. Service and distribution may be overhead or underground.

B. Locate to avoid interference with:

1. Traffic and work areas.
2. Cranes.
3. Material handling equipment.
4. Storage areas.

C. Do not run branch circuits on floor or on ground.

D. Wire all safety devices specified for final operation of equipment.

E. Check operation of safety devices.

3.5 TEMPORARY SANITARY FACILITIES

A. Portable toilets:

1. Erect securely and anchor to prevent dislocation.
2. Service as often as necessary to prevent accumulation of waste, and creation of unsanitary conditions.

B. Washing facilities: Provide faucet and drain facilities.

3.6 REMOVAL

A. Completely remove temporary materials and equipment upon completion of construction.

B. Clean and repair damage caused by installation and restore to specified or original condition.

3.7 TEMPORARY PROJECT OFFICE AND STORAGE AREA SITE

A. Contractor shall receive approval from City for any proposed location of temporary lay down yard and/or temporary job site trailer.

END OF SECTION

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SECTION 01568
TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work:

1. The Work specified in this Section consists of designing, providing, maintaining, and removing temporary erosion and sedimentation controls as necessary.

2. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering, and reseeding on-site surfaces and soil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the applicable regulations.

3. Temporary sedimentation controls include but are not limited to: silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the CITY.

4. CONTRACTOR is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

5. All soil erosion and sediment control activities, provisions and measures shall comply with the "State of Florida Erosion and Sediment Control Designer and Reviewer Manual", latest edition, and "Notice Of Intent To Use NPDES Generic Permit For Stormwater Discharge From Large And Small Construction Activities" (NOI) permit. CONTRACTOR shall be responsible for designing, providing and maintain effective erosion and sedimentation control during construction. The control must ensure erosion and sedimentation will either be eliminated or maintained within acceptable limits as established by the CITY.

6. The CONTRACTOR is responsible for obtaining the FDEP NOI. The CONTRACTOR shall prepare and submit the permit application and supporting documents including a Stormwater Pollution Prevention Plan (SWPPP) to receive an approved permit and shall follow the permit requirements including inspections and reporting for the entire length of the construction activities until a "NPDES Stormwater Notice Of Termination" (NOT) is submitted at the completion of the project after Owner and Engineer satisfaction of final completion.

PART 2 - PRODUCTS

2.1 EROSION CONTROL

A. Netting shall be fabricated of material acceptable to the CITY.

2.2 SEDIMENTATION CONTROL

A. Bales shall be clean, seed-free cereal hay type.

B. Netting shall be fabricated of material acceptable to the CITY.

C. Filter stone shall be crushed stone which conforms to Florida Department of Transportation (FDOT) specifications.

D. Concrete block shall be hollow, non-load bearing type.

E. Concrete - exterior grade not less than one inch thick.

PART 3 - EXECUTION

3.1 EROSION CONTROL

A. Minimum procedures for grassing are:

1. Scarify slopes to a depth of not less than 6 inches and remove large clods, rocks, stumps, roots larger than 1/2 inch in diameter, and debris.

2. Sow seed within 24 hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.

3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.

4. Apply netting over mulched areas on sloped surfaces.

5. Roll and water seeded areas in a manner, which will encourage sprouting of seeds and growing of grass. Reseed areas, which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.2 SEDIMENTATION CONTROL

Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Hay bales, which deteriorate, and filter stone, which is dislodged, shall be replaced.

3.3 PERFORMANCE

Should any of the temporary erosion and sediment control measures employed by the CONTRACTOR fail to produce results which comply with the requirements of the State of Florida, the CITY or Engineer, CONTRACTOR shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION

SECTION 01580

BYPASS PUMPING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall design and furnish all tools, supplies, materials, labor, equipment, power, and maintenance necessary for the installation, testing, placing into operation, maintaining, and monitoring of a temporary bypass pumping system for the purpose of diverting the existing sewer flows around work areas for the project. At no point during the setup, installation, operation, or demobilization of the temporary bypass pumping systems shall interruption of any pump stations and/or sewer collection systems be caused.

B. The design, installation, operation, and monitoring of the temporary bypass pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Owner and Engineer that it specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by the vendor's firm within the past ten years.

C. The bypass system shall meet the requirements of all Federal, State, and Local codes and regulatory agencies having jurisdiction.

D. Measurement and Payment: No separate payment shall be made for temporary bypass pumping operations. The cost of such operations shall be included in the unit price for installing the gravity system piping.

1.2 DEFINITIONS

A. "Interruption of pumping operations" is defined as any activity that will result in a change in the current method of operation. Contractor shall request such "interruption of pumping operations" from the Owner no less than ninety-six (96) hours in advance. The Owner may defer the request as allowed by Article 2.01 A. 4 of this Section.

B. "Partial Utilization", "Substantial Completion", and "Warranty Period for Items in Continuous Service": Refer to the "Contract Documents" for definition.

C. The terms "open, close, start, stop, operate, verify, energize, de-energize, transfer, switchover, etc." when used in conjunction with permanent equipment that is in-service or about to be placed in-service are understood to mean: Owner's operation or maintenance staff shall perform the operation upon written request from the Contractor.

D. The term "operational test" refers to the period of specified duration that the installed system is tested to verify operational integrity of a system prior to placing the system in-service. Operational testing requires that representatives of the equipment manufacturers be on-site for timely identification and resolution of system issues.

E. "Low Flow Period" refers to the time of day when the pump station flow rate reaches the diurnal minimum. It typically occurs between the hours of 3 AM and 7 AM.

1.3 SUBMITTALS

A. Bypass Pumping Plan: The Contractor shall submit to the Engineer detailed Drawings and shop

drawings outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. The plan will be signed and sealed by a Professional Engineer registered in the state of Florida for all bypassing operations necessary. The plan shall be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, connections, and all other incidental items necessary and/or required to insure proper protection of Owner facilities, including protection of the access and bypass pumping locations. No bypassing operations shall begin until all provisions and requirements have been reviewed and approved by the Owner and Engineer. The plan shall include, but is not limited to, the following details:

1. Detailed drawings showing all required equipment and staging areas for pumps within facility sites or right-of-way areas or other approved areas;

2. Plugging methods and types of plugs;

3. Number, size, material, location and method of installation of suction piping;

4. Number, size, material, method of installation and location of installation of discharge piping;

5. Bypass pump sizes, capacity, number of each size to be on site and power/fuel requirements;

6. Pump curves showing pump operating range are to be submitted;

7. Thrust and restraint block sizes and locations as necessary in accordance with manufacturer/supplier of LineStops, Insert Valves, and other equipment to be installed within piping, if any;

8. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill, and any equipment necessary to maintain clearance for construction activities;

9. Method of noise control for each pump. Facilities are located within residential areas.

10. Any temporary pipe supports and anchoring required;

11. Design for access to bypass pumping locations indicated on the Drawings;

12. Selection of bypass pumping pipe size;

13. Schedule for installation of and maintenance of bypass pumping lines.

14. Emergency plan for adverse weather and flooding for various phases of the Work.

15. Contractors plan for providing continuous monitoring of the bypass pumping operations including qualifications of any onsite monitoring persons and specifications of any electronic monitoring operations. Automatic dialer shall be installed to notify emergency contacts.

B. Sequence of Construction Plan

1. Contractor shall submit the proposed Sequence of Construction to the Engineer for review and approval. The Sequence of Construction shall define work to be performed, including the following items:

   a. Definition of the start date, duration and end date for each of the segments of the work.

   b. For each segment of work, define activities to be performed by or witnessed by the

Owner and date on which these activities are to be performed.

c. Scheduling/timing of manufacturer's field services, as specified.

2. Provide complete list of equipment and material that is required to perform each segment of work.

1.4 SPECIAL PRECAUTION

A. The Contractor is notified that the bypass pumping operations are critical and must be maintained at all times. If any spills of raw wastewater occur due to the failure of the Contractor to maintain the temporary bypass pumping when needed, the Contractor shall be responsible for any fines levied on the Owner by the FDEP or any other applicable agency.

PART 2 – PRODUCTS

2.1 PUMPING EQUIPMENT

A. General:

1. The noted project areas are critical parts of the Owner's sewer system and the flow conveyance must be kept in service at all times. It is essential to the operation of the existing wastewater system that there be no interruption in the conveyance of wastewater to and from any project work area throughout the duration of the project. To this end, the Contractor shall provide, maintain, operate, and monitor all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power/fuel, and all other labor and equipment necessary to intercept the wastewater flow before it reaches the point where it would interfere with the construction work, carry it past the work and return it to the existing system downstream of the work.

2. It is the Contractor's responsibility to provide equipment that is adequate for the performance of the temporary bypassing operations under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required operations, and shall be subject to review by the Owner's representative at any time within the duration of the Contract. All operations hereunder shall conform to the applicable requirements of the OSHA Standards for construction.

3. Should the Contractor fail to maintain the continuous operation of the bypass pumping system and operations, the Owner shall repair/operate the bypass pumping system to maintain station operation. Owner shall look to recover the costs for labor, materials, sewage hauling and any other activities required, and costs incurred during operation/repair of the temporary bypass system from monies owed the Contractor for other portions of the project work.

4. Pump station operational requirements take precedence over Contractor activities. Therefore, interruption of pump station operations shall be coordinated and are subject to the operational requirements of the Owner. Contractor shall assume that any interruption of pumping system operations may be deferred by up to one week from the requested time due to operational constraints.

5. The Contractor shall provide for utilities and services for its own operations. The Contractor shall furnish, install, and maintain all temporary utilities during the contract period including removal upon completion of the project work.

6. Pumps used shall be fully automatic self-priming units that do not require the use of foot-valves

in the priming system.

7. The pumps shall be engine driven on skid bases or highway trailer with centralized lifting bracket and integral fuel tank. The pump shall be direct coupled to an electric start diesel engine.

8. All pumps used shall be constructed to allow dry running for long periods of time to accommodate the cyclical nature of the flows.

9. All pumps shall be High Pressure Solids Handling Self-Priming Pumps as manufactured by Thompson Pump & Manufacturing Co., Inc. in state of Florida, Godwin Pumps of America, Inc., or Engineer approved equal.

10. Furnish each pump with the necessary stop/start controls.

11. Contractor shall not be permitted to stop or impede the main flows under any circumstances except as otherwise defined and approved by Owner and Engineer under the sequence of construction. The Contractor shall 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.

12. The Contractor shall protect water resources, wetlands and other natural resources.

B. Temporary Bypass Pumping Requirements: The Contractor shall be responsible for the construction of the temporary bypass facilities as described herein and indicated on the Drawings. Requirements for the bypass pumping system are as follows:

1. Bypass pumping system shall be operated 24 hours per day once put into operation until such time as new/rehabilitated sewer facilities are approved for operation by Owner and Engineer.

2. Provide two pumps at each bypass pumping location, consisting of one duty pump and one standby pump. The standby pump shall be piped into the suction and discharge headers and shall be on-line and ready for use in the event it is needed. The two pumps combination shall consist of two sound attenuated, diesel driven pump sets (lead, backup).

3. Bypass pump shall each have a performance curve that meets or exceeds the performance curve for the required bypass operations at each bypass pumping location.

   a. For sewer rehabilitation, all existing project gravity sewers are 8-inch. Additional information can be provided by City and Engineer during construction.

4. Contractor shall provide continuous monitoring of the bypass pumping operations whether by electronic monitoring operations or by personnel monitoring operations during entire period of active bypass operations to ensure continuous operation of the system. Automatic dialer shall be installed to notify emergency contacts.

5. The bypass pumps shall be quiet models producing no more than 70 dBA at a distance of 23 feet.

6. Provide all necessary pipeline plugs, LineStops, Insert Valves, pumps of adequate size to handle peak flows, and temporary suction and discharge piping and fittings to ensure that the total current flow capacity of pump station or sewer main can be safely diverted around the project work area while the facility is modified and/or not in operation.

7. If removal or modification of any portion of the upstream manhole(s) is necessary to utilize as a suction location(s), contractor is responsible for securing the area and prohibiting public

access to the manhole(s). Contractor shall restore the manhole(s) to pre-construction condition or as noted in the construction documents.

8. The Contractor shall make all arrangements for temporary bypass pumping operations during the time when the pump station or sewer main is shut down for any reason. The bypass system must overcome any existing force main pressure on the discharge.

9. Discharge Piping shall be constructed of steel, ductile iron, or polyethylene pipe with positive, restrained joints. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the Engineer.

10. Operation: The bypass pumps shall have variable capacity by controlling the speed of the diesel engine. Each pump shall have a separate control panel.

11. Provide vacuum and pressure gauges on the suction and discharge headers.

12. Provide controls to automatically start, stop, and vary the pump operations in accordance with the approved control sequence.

13. Control Sequence – Contractor shall coordinate with the Owner operations staff to determine appropriate set points and controls for temporary bypass pumping operations.

2.2 EMERGENCY RESPONSE

A. Contractor shall provide technician(s) capable of maintaining and trouble- shooting the bypass system on-call in case of an emergency on a 24-hour basis to maintain or re-establish pump sets. Technician shall submit incident reports and turn them into the Owner within 24 hours of any incident.

B. The Contractor and the Owner's Representative shall be linked by cell phone 24 hours a day during the course of the bypass operations. Any alarms shall initiate a call to the Contractor and the Owner. Contractor and Owner shall each have a minimum of three (3) individuals listed within the "calling tree". Starting with Contractor contacts, if the first contact does not confirm receipt of the alarm call, then the next contact shall be called until the alarm is either confirmed and/or all contacts are called. Owner's link into the alarm status is only for informational purposes. The Contractor shall be responsible for all bypass alarm conditions and shall be required to resolve the condition that is causing the alarm to occur.

PART 3 – EXECUTION

3.1 PREPARATION

A. The Contractor shall be responsible for locating any existing utilities in the area where the Contractor selects to locate the bypass pumps and pipelines. The Contractor shall locate the bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from Owner and the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor. Construction activities shall not be impeded by bypass piping.

B. During bypass pumping operations, the Contractor shall protect the pump station, sewer mains, and force main from damage inflicted by the Contractor's equipment and operations. The Contractor shall be responsible for all physical damage to the sewer facilities caused by human or mechanical failure.

C. During bypass pumping, do not allow sewage to be leaked, dumped, or spilled in or onto any area outside of the existing sanitary sewer system.

D. In the event of an accidental spill or overflow, immediately stop the discharge and take action to clean up and disinfect the spill. Promptly notify the Owner and Engineer so that required reporting can be made.

E. In the event of an accidental spill or overflow, the Contractor is responsible for any damages that may have occurred to public or private property including cleaning, disinfection, and other corrections to the satisfaction of the Engineer at no cost to the Owner.

3.2 INSTALLATION AND REMOVAL

A. The Contractor shall pipe sections or make connections to the existing sewer and discharge forcemain and construct temporary bypass pumping structures only at the locations indicated on the Drawings or in the approved Bypass Pumping Plan, and as may be required to provide an adequate suction and discharge conduit, unless otherwise approved by the Owner and Engineer.

B. As necessary, plugging or blocking of wastewater flows shall be performed with the use of approved plugs for gravity pipes and with the use of LineStops and/or Insert Valves on force mains which shall be installed by contractors approved by the Owner. When plugging or blocking is no longer needed for performance of the work, the plugs shall be removed in a manner that permits the wastewater flow to slowly return to normal without surge, surcharging, or causing other major disturbances downstream.

C. The installation of the bypass pipelines is prohibited in all wetland or ditch areas.

D. At the conclusion of the bypass pumping operations, when all of the modifications to the sewer facilities are complete, tested, and ready for operation, the Contractor shall demonstrate the new system in automatic mode for 72 hours. At the completion of the demonstration period, and upon receipt of Engineer's written approval, the Contractor shall remove all the piping and bypass pumping equipment, restore all property to pre-construction condition and restore all pavement.

3.3 QUALITY CONTROL AND MAINTENANCE

A. Testing: Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Engineer and Owner shall be given 24 hours' notice prior to testing.

B. Inspection: Contractor shall inspect the bypass pumping system at a minimum of twice daily, typically at the beginning and end of the workday, to ensure that the system is working correctly.

C. Maintenance Service: Contractor shall insure that the temporary bypass pumping system is properly maintained, and a responsible operator shall inspect the bypass pumping equipment a minimum of once daily during all times when pumps are operating.

D. Monitoring: The Contractor shall be responsible for monitoring the bypass operations 24 hours per day, 7 days per week. All electronic monitoring must be detailed in the comprehensive written Bypass Pumping Plan and approved by the Owner and Engineer.

E. Extra Materials: Spare parts for pumps and piping shall be kept on site as required. Adequate hoisting equipment for each pump and accessories shall be maintained on the site. Adequate diesel fuel storage for pumps shall be provided to maintain constant operations of the pumps.

3.4 SEQUENCE OF CONSTRUCTION

A. Contractor shall thoroughly familiarize itself with all constraints of maintaining operations of the sewer facilities. Contractor shall propose a Sequence of Construction incorporating these constraints and secure concurrence of the Owner and Engineer prior to starting work.

B. The Contractor shall submit a construction plan and schedule, which details the interruptions to be made which the Contractor shall be fully responsible for. One week prior to connections being made to existing structures or pipes, a coordination meeting shall be held between the Contractor, Engineer, and Owner to discuss the approved construction plan.

C. Schedule of construction, interconnecting details, and other revisions necessary for proper interfacing of the Work shall be subsequently modified by Contractor accounting for results of said coordination meeting. The Engineer and Owner shall be notified 24 hours prior to any actual interruptions or connections being made. No bypassing operations shall begin prior to securing the Owner's approval of respective connection plan and work schedule.

D. Temporary Bypass Pumping System Requirements:

1. Contractor shall provide air and vacuum release valve on suction piping to bleed off trapped air.

2. Temporary bypass pump operations and equipment shall include installation of isolation and check valves.

3. Install pressure gauge on pump discharge header and pressure and/or vacuum gauge on suction header. Gauges shall have isolation valves and diaphragm seals.

4. For pump station improvements, demonstrate the bypass pumping system by running it in automatic mode for 72 hours for bypassing operations at pump stations. If the system operates successfully during this period, the existing pumps can be removed from service. If the system does not operate successfully, make repairs/modifications and restart the demonstration period.

5. Provide temporary lighting in the yard for pump maintenance, service, and operation at night, as necessary.

END OF SECTION 01580

SECTION 01710
CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work:

1. Execute cleaning, during progress of the Work and at completion of the Work as required by Section 00700: General Conditions.

B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.

2. Each Specification Section: Cleaning for specific Products or Work.

C. Reference Standards

FDOT Standard Specifications for Road and Bridge Construction FY 2025-26: Section 4-6 Final Cleaning Up of Right-Of-Way.

1.2 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with all local, state, and federal codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property, and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

A. Execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations or personnel activities.

B. Provide on-site containers for the collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris and rubbish from the site as needed and dispose of at legal disposal areas away from the site.

D. Provide traps or fabric to catch screws, nails, and other fastening hardware that may fall to prevent harm to the public.

3.2 DUST CONTROL

A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until the paint is finished.

B. Schedule operations so that dust and other contaminants resulting from the cleaning process will not fall on wet or newly coated surfaces.

3.3 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Prior to final completion, or City occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

END OF SECTION

SECTION 01720
PROJECT RECORD DRAWINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: Maintain at the site for the City one (1) record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications of 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.

B. Related Requirements Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 01340.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

B. Provide files and racks for storage of documents.

C. Provide locked cabinet or secure storage space for storage of samples.

D. File documents and samples in accordance with CSI format with section numbers as provided herein.

E. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

F. Make documents and samples available at all times for inspection by the Engineer or City's Representative.

G. As a prerequisite for progress payments, the Contractor is to exhibit the currently updated "Record Documents" for review by the Engineer and City.

1.3 MARKING DEVICES

Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.4 RECORDING

A. Label each document "PROJECT RECORD" in neat large, printed letters.

B. Record information concurrently with construction progress. Do not conceal any work until the required information is recorded.

C. Drawings: Legibly mark to record actual construction.

D. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical Locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.

E. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

F. Field changes of dimension and detail.

G. Changes made by Change Order.

H. Details not on original Contract Drawings.

I. Specifications and Addenda: Legibly mark each section to record.

J. Manufacturer, trade name, catalog number of Supplier of each product and item of equipment actually installed.

K. Changes made by Change Order.

L. Shop Drawings (after final review and approval): Provide five (5) sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.5 SUBMITTAL

A. At Contract closeout, after review by the Engineer and the City staff, the Contractor shall deliver Record Documents to the Engineer for the City, including the following:

1. The record as-built drawings shall be submitted to the Engineer in AutoCAD, Release 2016 or latest version used by the City, two (2) CDs/DVDs with signed and sealed digital PDF copies, and two (2) signed and sealed original full size (24”x36”) paper copies.

2. Record Drawings shall be signed and sealed by a Florida Licensed Professional surveyor with Surveyor’s statement (embossed seal) and original signature on each sheet.

3. Contractor’s statement and original signature on each sheet.

   a. Statements shall verify that record drawings reflect the true conditions.

   b. Record drawings shall be labeled on each sheet in 1-inch-high letters.

   c. Street names shall be on all streets.

   d. Location and elevation of the benchmark shall be shown on drawings.

4. Accompany submittal with transmittal letter in duplicate, containing:

   a. Date.

   b. Project title and number.

   c. Contractor’s name and address.

   d. Title and number of each Record Document.

   e. Signature of Contractor or his authorized representative.

5. Surveyor’s Statement (embossed seal) and original signature on each sheet.

SECTION 01720
PROJECT RECORD DRAWINGS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01720
PROJECT RECORD DRAWINGS

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SECTION 01740
WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work:

1. Compile specified warranties and bonds, as in Article 5 and 13 of Section 00700: General Conditions and as specified in these Specifications.

2. Co-execute submittals when so specified.

3. Review submittals to verify compliance with Contract Documents.

4. Submit to the Engineer for review and transmittal to City.

B. Related Work Described Elsewhere:

1. Instruction to Bidders: Bid Bonds.

2. Conditions of the Contract: Performance Bond and Payment Bond.

3. General Conditions: Section 00700.

4. Special Conditions: Section 00800.

5. Special Project Procedures: Section 01100.

1.2 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds, and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two (2) each.

C. Table of Contents: Neatly typed in orderly sequence. Provide complete information for each item.

1. Product of work item.

2. Firm, with name of principal, address, and telephone number.

3. Scope.

4. Date of beginning of warranty, bond, or service and maintenance contract.

5. Duration of warranty, bond, or service maintenance contract.

6. Provide information for City's personnel:

a. Proper procedure in case of failure.
b. Instances which might affect the validity of warranty or bond.

7. Contractor information including name of responsible principal, address, and telephone number.

1.3 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inches by 11 inches, punch sheets for standard three-post binder. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

a. Title of Project.
b. Name of Contractor.

C. Binders: Commercial quality, three-post binder with durable and cleanable plastic covers and maximum post width of two (2) inches.

1.4 WARRANTY SUBMITTALS REQUIREMENTS

A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by the City.

B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Divisions 11: Equipment; and 15: Mechanical; and which has at least a 1 Hp motor or which lists for more than $1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.

C. The City shall incur no labor or equipment costs during the guarantee period.

D. Guarantee shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by the manufacturer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 2105
RIGHT-OF-WAY CLEARING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope of Work:

This section describes the work included in clearing the pipeline rights-of-way for construction operations.

B. Related Work Specified Elsewhere:

1. General Conditions: Section 00700.

2. Excavating, Backfilling, and Compacting: Section 02200.

C. Clearing Within Existing Rights-Of-Way:

Adhere to requirements of agency issuing permits for construction within its right-of-way.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

A. Clearing: Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth within the easement areas as required for trenching and installation of pipe. Remove all evidence of their presence from the surface (to a depth of twelve (12) inches below the surface) including sticks and branches. Remove and dispose of trash piles and rubbish. Protect trees, shrubs, and vegetative growth and fencing which are not required to be removed. The Contractor will be responsible for obtaining any clearing permits required by all local laws, codes, and ordinances and comply with any tree mitigation requirements pertaining to the clearing permit.

B. Trees and Shrubbery: Inspect the rights-of-way as to the nature, location, size, and extent of vegetative material to be removed or preserved, as specified herein. Preserve in place trees that are specifically shown on the Drawings and specified herein to be preserved.

C. Preservation of Trees, Shrubs, and Other Plant Material:

1. All plant materials (trees, shrubbery, and plants) beyond the easement and right-of-way limits shall be saved and protected from damage resulting from the work. No filling, excavating, trenching, or stockpiling of materials will be permitted within the drip lines of these plant materials. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of a plant or group of plants. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.

2. Cut and remove tree branches where such cutting is necessary to affect construction operation. Remove branches other than those required to affect the work to provide a balanced appearance of any tree. Scars resulting from the removal of branches shall be treated with a tree sealant.

D. Disposal of Clearing Debris: Do not burn combustible materials. Remove all cleared material from the worksite and dispose of it in accordance with all local laws, codes, and ordinances.

END OF SECTION

SECTION 02110
CLEARING, GRUBBING, AND STRIPPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: This section describes the work included in clearing, grubbing, stripping, and otherwise preparing the project site for construction operations.

B. Clearing: Remove and dispose of shrubs, brush, limbs, and other vegetative growth. Remove all evidence of their presence from the surface including sticks and branches. Remove and dispose of trash piles and rubbish that collects during construction. Protect trees, shrubs, vegetative growth, and fencing, which are not designed for removal. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others.

C. Grubbing: Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs, and any other organic or metallic debris remaining after clearing not suitable for construction purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

D. Stripping: Remove and dispose of all organics and sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped. Grass and grass roots in areas to be excavated or filled upon shall be stripped off to a depth of 4 inches. In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. Any topsoil remaining after all work is in place shall be disposed of by the Contractor unless directed otherwise by the Engineer.

PART 2 - MATERIALS

2.1 GENERAL

A. Trees and Shrubbery: Existing trees, shrubbery, and other vegetative material may not be shown on the Drawings. Inspect the site as to the nature, location, size, and extent of vegetative material to be removed or preserved, as specified herein. Preserve in place trees that are specifically shown on the drawings and are not designated to be removed.

B. Preservation of Trees, Shrubs, and Other Plant Material:

1. All plant materials (trees, shrubbery, and plants) beyond the limits of clearing and grubbing shall be saved and protected from damage resulting from the work. No filling, excavating, trenching, or stockpiling of materials will be permitted within the dripline of these plant materials. The dripline is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of a plant or group of plants. To prevent soil compaction within the dripline area, no equipment will be permitted within this area.

2. When trees are close together, restrict entry to area within dripline by fencing. In areas where no fence is erected, the trunks of all trees 2 inches or greater in diameter shall be protected by encircling the trunk entirely with boards held securely by 12-gauge wire and staples. This protection shall extend from ground level to a height of 6 feet. Cut and remove tree branches where such cutting is necessary to affect construction operation. Remove branches other than those required to affect the work to provide a balanced appearance of any tree. Scars resulting from the removal of branches shall be treated with a tree sealant.

PART 3 - EXECUTION

3.1 GENERAL

A. Clearing and Grubbing Limits: All excavation and embankment areas associated with the new stormwater system shall be cleared and grubbed to 2 feet below excavated surface.

B. Disposal of Clearing and Grubbing Debris: Do not burn combustible materials. Remove all cleared and grubbed material from the work site and dispose of in accordance with all local laws, codes, and ordinances.

C. Areas to be Stripped: All excavation and embankment areas associated with new structures shall be stripped. Stockpile areas shall be stripped.

D. Disposal of Strippings: Remove all stripped material and dispose off-site, unless otherwise directed to stockpile material.

END OF SECTION

SECTION 02140
DEWATERING

PART 1 -GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work to be performed under this section shall include the design and installation of a temporary dewatering system until completion of construction to remove storm and subsurface waters from structure or utility trench excavations as required.

1.2 QUALITY ASSURANCE

A. Qualifications: The temporary dewatering system shall be designed by a firm who regularly engages in the design of dewatering systems and who is fully experienced, reputable, and qualified in the design of such dewatering systems. The firm shall have a successful record of operation for a minimum of five (5) years prior to bid date. The design firm shall supply the Engineer with previous installation details of at least three (3) successful dewatering operations of a similar nature in the State of Florida.

B. In lieu of experience, the Contractor shall provide a performance and warranty bond for 1.0 times the total installed cost of the temporary dewatering system. This bond shall be executed prior to award and/or contract execution.

C. Standards: The dewatering of any excavation areas and the disposal of water during construction shall be in strict accordance with all local and state government rules and regulations. If a consumptive use permit is required by SJRWMD, the Contractor shall be responsible for preparing, submitting, and paying any applicable fees for said permit. The cost for obtaining this permit shall be included in the unit price items in the bid and no separate or additional payment will be made.

D. As determined necessary by the Contractor, obtain FDEP "Notice of Intent to Use the Generic Permit for Discharge Ground Water from Dewatering Operations" permit. Contractor shall prepare and submit the permit application and supporting documents including groundwater sampling and dewatering plan to receive permit approval.

E. If a NPDES permit is required, the Contractor shall prepare, submit, obtain, and pay for the permit application fees associated with obtaining this permit. The cost for obtaining this permit shall be included in the unit price items in the bid form and no separate or additional payment will be made.

1.3 SUBMITTALS

A. Submit to the Engineer for review, the proposed methods of construction, including dewatering, excavation, bedding, filling, compaction, and backfilling for the various portions of the Work. Review shall be for method only. The Contractor shall remain responsible for the adequacy and safety of the methods.

B. Submittals shall be in accordance with Section 01340, and shall include the following:

1. Design Notes and Drawings.
2. Descriptive literature of the temporary dewatering system.
3. Layout of all piping involved.
4. Observation well locations.

PART 2 - PRODUCTS

2.1 GENERAL

A. The equipment specified herein shall be standard dewatering equipment of proven ability as designed and manufactured by firms having experience in the design and production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods.

B. Only “Silent Pac” type of dewatering pumps will be used.

PART 3 – EXECUTION

3.1 GENERAL

A. The Contractor shall be required to monitor the performance of the dewatering system during the progress of the Work and require such modifications as may be required to assure that the systems will perform satisfactorily. The dewatering system shall be designed in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the bottom of the trench or excavation for the structures and pipeline, and the dewatering system shall be designed to meet the requirements as specified herein.

B. Dispose of water in a manner to avoid damage to property. Maintain excavation "in-the-dry" condition until backfill has been placed and compacted. Whatever the nature of unstable material encountered, or the groundwater conditions, drainage shall be complete and effective.

3.2 DEWATERING, DRAINAGE, AND FLOTATION

A. Water levels will normally vary from season to season. No claims for extras based on groundwater table conditions will be allowed.

B. The Contractor shall construct and place all pipelines, structures, concrete work, fill, backfill, and bedding material in-the-dry. In addition, the Contractor shall make the final 24 inches of excavation for this work in-the-dry and not until the water level as indicated by groundwater observation wells is a minimum of 24 inches below proposed bottom of excavation. For purposes of this Contract, in-the-dry is defined as ±2% of the optimum moisture content of the soil.

C. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

D. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

E. It is expected that wellpoints will be required for pre-drainage of the soils prior to final excavation for most of the in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline, or fill will not be floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.

F. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems he proposed for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.

G. The Contractor's proposed method of dewatering shall include operating groundwater observation wells to be used to determine the water level during construction. Observation wells shall be installed at structures and along pipelines at locations as approved by the Engineer prior to their installation.

H. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the Engineer for approval. However, such approval shall not relieve the Contractor of responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils or damage to structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.

I. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clean, with no visible soil particles in a one-quart sample.

J. Continuous pumping will be required as long as water levels are required to be below natural levels.

3.3 OBSERVATION WELLS

A. Prior to excavation, the Contractor shall install groundwater observation wells at locations to be approved by the Engineer adjacent to structures under construction for the purpose of measuring water levels during excavation. The observation well shall consist of a screen, casing, and cap of approved size and material of construction. The observation well shall be placed in a 2-1/2 inch bore hole which shall be carried to an elevation at least 24 inches below final subgrade. The annular space surrounding the intake point and the rise pipe shall be sealed in such a way as to prevent infiltration from surface water. The observation well shall be developed in such a manner as to ensure proper indication of subsurface water levels adjacent to the structure.

B. The Contractor shall be responsible for maintaining the observation wells and for observing and recording the elevation of groundwater in them until adjacent structure is completed and backfilled. Each observation well shall be observed and recorded daily. Measurements shall be supplied daily to the Engineer. The Engineer may require that the observation wells reflect true groundwater levels by adding water to the well, recording the drop in the level from the time the water was added. A plugged observation well shall be redeveloped as necessary to indicate true groundwater levels.

3.4 PROTECTION AND SITE CLEAN-UP

A. At all times during the progress of the Work the Contractor shall use all reasonable precautions to prevent either tampering with the system or the entrance of foreign material.

B. Immediately upon completion of the dewatering system, the Contractor shall remove all of his equipment, materials, and supplies from the site of the work, remove all surplus materials and debris, fill in all holes or excavations, and grade the site to elevations of the surface levels which existed before work started. The site shall be thoroughly cleaned and approved by the Engineer.

3.5 PERMITS

A. Contractor shall be responsible for obtaining all permits/approvals for the dewatering operations from all applicable federal, state, and local agencies, including but not limited to the withdrawal and disposal/discharge of water from the dewatering operations.

END OF SECTION

SECTION 02200
EXCAVATING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work included under this Section consists of clearing, excavating, removal and replacement of unsuitable materials with suitable fill materials, grading, and backfilling as required for the construction of the structures, piping, and appurtenances as shown on the Drawings and specified herein.

B. Related Work Described Elsewhere:

1. Dewatering: Section 02140

2. Pavement Removal and Replacement: Section 02574

3. Solid Sodding: Section 02934

C. Plan For Earthwork: The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract. Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations to the Engineer for review. The Contractor shall consider, and his plan for excavation shall reflect, the equipment and methods to be employed in the excavation. No claims for extras based on substrata or groundwater table conditions will be allowed.

1.2 QUALITY ASSURANCE

A Testing Laboratory employed by the Contractor will make such tests as are specified. The Contractor shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. Costs for all testing shall be paid by the Contractor, including any and all tests which have to be repeated because of the failure of the tested material to meet specifications. Testing Laboratory or Contractor shall provide a map of all test locations. All testing shall be done in the presence of the Engineer or the City Representative. The contractor shall also employ the services of a Geotechnical Engineer. In the event unsuitable materials should be encountered during excavation; the Geotechnical Engineer shall perform all required testing necessary to determine the extent of the unsuitable materials and recommend what remedies shall be necessary including the removal and replacement of unsuitable materials with suitable fill materials. The removal and replacement of unsuitable materials with suitable fill materials shall be paid for at the unit prices established in the Bid Form.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. All fill and backfill material shall be subject to the approval of the Engineer.

2. All fill and backfill material shall be free of organic material, trash, or other objectionable material. The Contractor, at no additional cost to the City of Jacksonville Beach, shall remove excess or unsuitable material from the job site.

B. Common Fill Material: Common fill shall be sand and shall not contain stones, rock, concrete or other rubble larger than 2 inches in diameter. It shall have physical properties, which allow it to be easily spread and compacted.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: To the maximum extent possible, preserve existing trees and structures within the limits of construction. Any structure that must be disturbed due to contractor operations shall be returned to its original condition.

3.2 EXCAVATION

A. Excavating for Utilities:

1. Immediately document the location, elevation, size, material type, and function of all new subsurface installations, and utilities encountered during the course of construction.

2. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and located in the field and should anticipate the encounter of unknown obstructions during the course of work.

3. Encounters with subsurface obstructions shall be hand excavated.

4. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of the suborder soils. Suborder soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate dewatering or other construction methods, shall be removed and replaced by crushed stone as required by the Engineer at the Contractor's expense.

5. All pavements shall be cut for removal with saws and approved power tools.

6. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.

7. All locations and elevations as required herein must be permanently documented by the Contractor on the Record Drawings prior to the Engineer's approval of the Application for Payment for that work.

3.3 DRAINAGE

A. The Contractor shall at all times during construction provide ample means and devices with which to remove promptly and dispose promptly of all water entering trench and structure excavations and shall keep said excavations acceptably dry, until the structures to be built therein are completed. All water pumped or drained from the Work shall be disposed of in a suitable manner without damage to storm sewer, pavement, pipes, electrical conduits, or any other work and without damage to surrounding property and in accordance with pertinent rules and regulations.

B. Drainage Shall Be Adequate: No pipe shall be laid in water and no water shall be allowed to rise above the bottom of any pipe while it is being jointed, except as otherwise permitted in writing. No masonry shall be placed in water and no water shall be allowed to rise over masonry until the concrete or mortar has attained its initial set. Nor shall water be allowed to run over the completed masonry for four days. In no event shall water be allowed to rise so as to set up unequal pressures in the structures until the concrete or mortar has set at least 24 hours and also until any danger of flotation has been removed.

C. Dewatering, if required, shall be continued during construction to keep the ground water below the level of the backfill at all times until the backfill is completed.

3.4 FILL AND COMPACTION

A. All pipe trenches shall be backfilled with suitable material compacted to 95% (98% under all pavement) of ASTM D1557 in 6-inch lifts. The material should exhibit moisture content within ± 2 percent of the Modified Proctor optimum moisture content (AASHTO T-180) during the compaction operations. Special care shall be taken on each side of the pipes and to 12 inches above pipe. All trench work shall be in compliance with Florida Chapter 90-96 "Trench Safety Act".

B. Field density tests shall be determined in each layer of backfill at the following locations:

1. Every 200 feet.
2. Every street crossing.
3. Every structure location
4. Other locations as determined by the Resident Project Representative.

C. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. Backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

3.5 SHEETING, SHORING, AND BRACING

A. The Contractor shall provide and install such sheeting and shoring as may be required to support the sides of any excavation to prevent earth movement that could endanger the work or workmen, or any existing structures, or to confine the construction within a specified area such as an easement or street right-of-way. It shall be the Contractor's responsibility to place this sheeting and shoring for such protective purposes without the Engineer's instructions. Pipeline sheeting shall extend to a minimum of three feet below pipe or structure. In the process of extraction of sheeting, the use of vibratory type pile drivers (as opposed to impact type) shall be limited to that sheeting driven no greater than five (5) feet below the pipe invert.

B. For excavations less than ten (10) feet in depth, the Contractor shall provide and install such sheeting and shoring as he may deem necessary. Such sheeting and shoring will be considered as being for the Contractor's convenience and benefit and all costs of furnishing, driving, and removing same shall be borne by him. Sheeting for excavations less than ten (10) feet in depth may be timber or steel at the Contractor's option, unless specified on the Contract Drawings and Documents, or specified by the Engineer.

C. Unless otherwise directed by the Engineer, all timber sheeting shall be cut off a minimum of 30 inches below grade and left in place, with proper bracing to provide lateral support. Timber sheeting, bracing and shoring above the cut-off elevation shall be removed by careful extraction so as not to endanger other structures or property. All voids left shall be immediately backfilled with approved materials and compacted.

D. Steel sheeting shall be required for all excavations ten (10) feet or more in depth and at such other locations as may be indicated on the drawings. Steel sheeting may be completely removed when sufficient backfill has been placed to prevent damage to the work and/or existing structures. Care shall be exercised to prevent the opening of voids during the extraction process.

E. Steel sheeting shall be left in place when so authorized by the Engineer. The top of steel sheeting left in place shall be no less than 30 inches below grade unless otherwise shown on the Drawings or directed by the Engineer.

F. Steel drag shields or trench boxes may be used, location, fabrication and operation subject to written approval of the Engineer and shall be Steel Safety Shield manufactured by Safety Shoring Shields, Inc., 155 North Dean Street, Englewood, New Jersey, 07861; Efficiency Trench Box manufactured by Efficiency Production, Inc. 2360 East Jolly Road, Okemos, Michigan 48864; or approved equal. Voids left by the advancement of the shield shall be carefully backfilled and compacted in accordance with trench backfill requirements.

END OF SECTION

SECTION 02320
CURE IN PLACE PIPE (CIPP)

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The scope of this sewer pipe rehabilitation includes but is not limited to providing Cured in Place Pipe (CIPP) technology for rehabilitation of sewer pipe in Jacksonville Beach, Florida and provide the necessary measurements to bypass the sewer pipe to be rehabbed.

B. All bypass pumping operations required to complete the gravity sewer main/service installations shall be included as part of the unit price for installing the gravity system piping. Bypassing pumps shall comply with Section 01580, Bypass Pumping.

1.2 GENERAL DESCRIPTION

A. Description

1. The work specified in this section provides for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube that is formed to the original conduit by use of a hydrostatic head. The resin is cured by circulating hot water within the tube. The Cured-In-Place Pipe (CIPP) shall be continuous and tight fitting.

2. Referenced Documents

a. This specification references ASTM F1216 (Rehabilitation of pipelines by inversion and curing a resin impregnated tube), ASTM Fl 743 (rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), ASTM D5813 (Cured-in-Place, Thermosetting Resin Sewer Pipe), ASTM D790.

1.3 QUALITY ASSURANCE

A. The process (materials, methods, and workmanship) must be proven through previous successful installations, commensurate with the prequalification levels. (Submitted with prequalification submittal)

B. Sewer rehabilitation products that will be utilized must have had successful independent third-party test results prepared in accordance with ASTM F1216 substantiating the performance and design of the proposed product. No product shall be approved without independent third-party testing verification. (Submitted with pre-qualification submittal)

C. The contractor is to provide a narrative of the Contractor Quality Control program employed during the manufacture of the reconstruction system components, the installation of the proposed reconstruction system, and certification of qualification of the personnel proposed to provide design, engineering, technical support, project management, installation, and supervisory duties. (Submitted with pre-qualification submittal)

1.4 SUBMITTALS

A. Work Plan

1. Prior to beginning work, the contractor should describe the installation procedures including equipment staging area requirements, means of sewer access, methods of maintaining sewage flow, methods used to reactivate service laterals, method used to rehabilitate service connections and whether or not access to private property, pits or other excavations are required.

B. For each section being lined, the calculation data is used to determine the minimum design thickness.

C. An As-Built Data Sheet (attached to this section) for each length of pipe installed, including resultant manhole inverts and service connection locations at the main pipe and right of way, and except for the sketch, shall be prepared in Microsoft Excel.

D. Third party tests results as required under ASTM F 1216.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The liner material shall be a polyester fiber felt resin-impregnated tubing.

1. Inspection of equipment may be made.

2. Seams in the tube shall meet or exceed the design properties required for the entire tube in accordance with ASTM D 1216.

3. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

4. Resin - The resin system shall be a corrosion resistant polyester, vinyl ester or epoxy, and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM Fl 743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project. The resin shall produce CIPP which shall comply with the structural and chemical resistance requirements of this specification.

5. Backfill material will be a DOT approved flowable fill mixture for all pavement excavations; non-pavement excavations shall meet the City of Jacksonville Beach specifications. (Reference Florida Department of Transportation Index No. 307 for Flowable Fill)

6. Connections to the existing sewer service connection pipe shall be made by using flexible connections. All flexible connections shall conform to ASTM C-425 and shall be manufactured by Fernco #1056 Series Joint Sealer, or an approved the City of Jacksonville Beach equivalent. For connections made under pavement, an S/S Shear Ring shall be installed also.

B. Structural Requirements

1. The CIPP shall be designed as per ASTM F1216. The CIPP design shall assume no bonding to the original pipe wall.

2. The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the Long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) shall be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, shall be verified by this testing. Values in excess of 50% shall not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in Design.

3. The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7. Application of Enhancement **(K)** Factors in excess of 7 shall be substantiated through independent test data.

4. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any

two layers with a probe or point of a knife blade so that the layers separate cleanly, or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples shall be cut from the work. Any reoccurrence may cause rejection of the work.

5. The cured pipe material (CIPP) shall conform to the structural properties, as listed below:

		Minimum Physical Properties	
Test Method		Minimum Resin per ASTMF1216	Resin 400,000 psi Properties
Modulus of Elasticity	ASTMD-790 (short term)	250,000 psi	400,000 psi
Flexural Stress	ASTMD-790	4,500 psi	4,500 psi

6. The required structural CIPP wall thickness shall be based as a minimum, on the physical properties and the following design parameters:

Design Safety Factor	=	2.0
Creep Retention Factor	=	50%
Ovality*	=	2%
Enhancement Factor, k (Section 2.4.3)	=	See Section 2.4
Groundwater Depth (above invert)*	=	At grade
Soil Depth (above crown)*	=	Per plans
Live Load	=	Highway/Roadway
Soil Density	=	120 pcf
Live Load*	=	AASHTO
		H-20 where the CIPP is in roadway
Design Condition**	=	fully deteriorated

* Denotes information which can be provided here or in inspection video tapes or project instruction plans. Multiple line segments may require a table of values.

** Product installed should be installed as "fully structural" without relying on the structure of the existing pipe.

Engineer/the City of Jacksonville Beach will be sole judge as to pipe conditions and parameters utilized in Design.

7. Refer to the attached Dimensional Ratio table for specific pipe section requirements, based on the pipe condition, depth, ovality, etc. as computed for the conditions shown, using ASTM F 1216 Design Equations.

8. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

9. The owner authorizes the use of proven materials that serve to enhance the pipe performance specified herein. Proven materials have passed independent laboratory testing, not excluding long-term (10,000 hour) structural behavior testing, and have been successfully installed to repair failing host pipes in the U. S. for at least 4 years.

   In addition to the aforementioned, the owner may require that the contractor demonstrate that the enhancements proposed exceed the specifications herein, prior to the installation of the enhanced material systems. This section in no way shall be interpreted as authorization to deviate from the minimum standard practices set forth herein.

PART 3 - EXECUTION

3.1 TESTING REQUIREMENTS

A. Chemical Resistance – The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples without plastic coating meet these chemical testing requirements.

B. Hydraulic Capacity – Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.

C. CIPP Field Samples – When requested by the City of Jacksonville Beach, the Contractor shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Paragraph 2.1.B.5 have been achieved in previous field applications. Samples for this project shall be made and tested as described in Paragraph 2.1.B.9.

3.2 PRE-INSTALLATION

A. The Contractor shall clean and remove all internal debris out of the sewer line to permit proper installation.

B. The Contractor shall make a point repair excavation to uncover and remove or repair the obstruction if during the pre-installation inspection reveals an obstruction previously not identified such as a protruding sewer connection, dropped joint, or a collapse, that shall prevent the inversion process. Such excavation work shall be approved by the City of Jacksonville Beach Representative as an extra item and shall be reimbursed as an SWA (Supplemental Work Order).

3.3 INSTALLATION

A. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM Fl 743, Section 6, with the following modifications:

1. Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process or equivalent shall be used to ensure thorough resin saturation throughout the length of the felt tube.

2. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

3. Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule or with any alternative method deemed acceptable by the City of Jacksonville Beach.

3.4 REINSTATEMENT OF BRANCH CONNECTIONS

A. All sewer service connections shall be identified and located prior to CIPP insertion. Contractor shall excavate and make the reconnection, replace the service pipe, and tie-in to the existing service pipe at the right of way. Excavation may be by mechanical means if damage to customer property is minimal, otherwise, hand excavation is required. Excavated material shall be placed on plywood or plastic to facilitate restoration. Upon completion of insertion and curing of CIPP. Contractor shall expedite the reconnection of services so as to minimize any inconvenience to customers. When directed by the City of Jacksonville Beach, if a connection cannot be excavated and reinstatement of the service is required, the service connection may be reinstated by means of an internal robotic

cutter.

B. Sewer service connections shall be connected to the new pipe by two methods. Any substitutions in the sewer service saddle due to any reason must be approved by the City of Jacksonville Beach.

1. Conventional PVC gasketed saddles, held into place by stainless steel bands.

2. ROMAC style CB Saddle with neoprene fitting, ductile iron gland and wide s/s saddle.

3. The service connections will be a minimum of 6.0" diameter unless otherwise approved by the City of Jacksonville Beach.

3.5 INSPECTION

A. CIPP samples shall be prepared, and physical properties tested in accordance with ASTM F1216, Section 8.1 using either method proposed. The flexural modulus must meet or exceed the value used in design in Section 2.4 (Structural requirements for the pipe size and thickness furnished in design).

B. Leakage testing of the CIPP shall be accomplished during cure while under a positive head. CIPP products in which the pipe wall is cured while not in direct contact with the pressurizing fluid (e.g., a removable bladder) must be tested by an alternative method approved by the City of Jacksonville Beach.

C. Visual inspection of the CIPP shall be in accordance with ASTM Fl 743, Section 8.6.

3.6 TELEVISION INSPECTION

A. A preliminary CCTV CD will normally be prepared by the City of Jacksonville Beach's preferred CCTV provider. The tape will clearly identify the condition of the pipe, elevations, material types, and location of all lateral connections, and will be furnished to the Contractor. All other CCTV work and cleaning performed by the Contractor is incidental to the task.

B. After the existing sewer is completely replaced, the new line will be internally inspected using CCTV and video recorded. The finished CD shall be continuous over the entire length of the sewer between two manholes and prove to be free from visual defects. The City of Jacksonville Beach will perform this post installation CCTV inspection for project acceptance and follow up inspections during the warranty period. The Contractor shall notify the City of Jacksonville Beach in writing indicating 48 hours in advance that the sections will be available for post CCTV Inspections.

C. Defects including damage, unacceptable sags, faulty service connections, leaks, etc. which may affect the integrity or strength of the pipe in the opinion of the City of Jacksonville Beach and/or their representative shall be corrected at the Contractor's expense.

3.7 ADDITIONAL ITEMS

A. The Contractor will be responsible for the costs incurred by any delays, including but not limited to: emergency work due to line failure, additional costs incurred by the City of Jacksonville Beach to repair/replace the line beyond the estimate provided by the Contractor to perform the work.

B. The Contractor is responsible for repairing any site damage and providing site restoration, which shall be remediated as follows: Sod- 7 calendar days, Concrete - 8 calendar days, Asphalt- 7 calendar days (<200 sq ft) or 21 days (>200 sq ft). The remediation time is additive. For example, if Sod and Concrete require restoration, both must be complete within 15 calendar days.

C. The Contractor will place the City of Jacksonville Beach-approved door hangars in the neighborhoods where the work will be performed, as well as being responsive to the City of Jacksonville Beach.

D. The Contractor will complete all warranty work within 30 calendar days of notification, unless a mutually agreed alternate time frame is defined. The exception is in the case of a customer outage, where correction should be completed immediately, but no later than 48 hours after notification.

END OF SECTION

SECTION 02407
DEMOLITION AND ABANDONMENT

PART 1 – GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish all materials, labor, supervision, and equipment required for the orderly demolition, abandonment, removal, and/or salvaging of existing structures, piping, valves, fittings, appurtenances, and other equipment, as shown on the drawings and described herein. All references to industry standards (AWWA, ASTM, etc.) shall be to the latest version unless otherwise noted.

1.2 GENERAL REQUIREMENTS

Structures, equipment, piping and other improvements to be demolished or removed shall be as detailed on the drawings. Demolition shall be accomplished in a neat and careful manner so as not to damage adjacent structures or unnecessarily interfere with existing operations. Fill shall be provided to match existing grades and the area spot sodded and grassed, or replacement pavement provided as specified in these specifications.

1.3 ABANDONMENT

A. Pipelines

1. Abandonment by Plugging

When called for on the Contract Drawings, abandoned mains shall be plugged with a plugged fitting at points specified. All plugs shall be appropriately sized and shall conform to the piping being plugged.

2. Abandonment by Grout Filling

When called for on the Contract Drawings, the abandoned main shall be grout filled by pumping a grout mixture into the main with an approved grout. The main shall be completely filled, leaving no voids or air spaces. Grout mix shall be as specified in this specification section.

3. Abandonment by Sealing

All below grade pipe to be abandoned by sealing, either as noted on the Contract Drawings or as a result of demolition of a structure, shall be sealed with grout, Class "C" concrete or brick and mortar. The grout, concrete or brick and mortar shall extend into the pipe for at least 12 inches, forming a solid waterproof plug completely bonded to the pipe.

4. Abandonment of Asbestos Pipe

Abandonment of asbestos piping shall be by either grout filling or sealing. While cutting asbestos pipes, the operator must wear a HEPA type particle mask and adhere to all applicable safety standards for handling asbestos containing material.

B. Structures

The structure shall be removed to a point 36 inches below grade or as noted on the drawings. The remaining structure shall be filled with AASTHO Class A-3 soil, free of organic matter or other deleterious material, compacted to 100% of maximum density as determined by the Laboratory Standard Procter Test, ASTM D698. A tolerance of minus 2% will be allowed in the compactive effort. All pipes leading in and out of the structure to be abandoned shall be sealed or grout filled in accordance with this specification section and as indicated on the Contract Drawings. The portion of the structure to be removed shall be removed from the site and disposed of at an approved disposal facility.

1.4 REMOVAL

A. Pipelines

1. Below Grade

When called for on the Contract Drawings, removal of existing pipelines shall mean complete removal of the existing pipeline and disposal of the pipe and appurtenances (valves, fittings, thrust blocks, etc.) not indicated to be salvaged. Backfill and compaction shall conform to Section 2200, Excavating, Backfilling, and Compacting of this specification.

2. Above Grade

All existing piping and appurtenances (valves, fittings, etc.) located above ground shall be removed to a minimum of 36 inches below the finish grade. The abandoned pipe ends, below grade, shall be sealed with Class "C" concrete or completely grout filled as specified in this section and as indicated on the Contract Drawings.

3. Asbestos Pipe

Removal of asbestos pipes shall be in accordance with Sections 4.1.1 and 4.1.2 above. While cutting asbestos pipes, the operator must wear a HEPA type particle mask and adhere to all applicable safety standards for handling asbestos containing material. Asbestos pipes may be disposed of in an approved landfill site.

B. Structures

Removal of existing structures, where designated on the drawings, shall be the complete removal of the existing structures. The existing structures shall be removed from the site. Any or all existing pipes in and out of the structure to be removed shall be plugged, grout filled, sealed, or connected to the new structure as specified and as indicated on the Contract Drawings. The void left by the removal of the structure shall be filled and compacted in accordance with Section 02200, Excavating, Backfilling, and Compacting of this specification.

1.5 DISPOSAL OF DEBRIS

All material not salvageable shall be considered debris and disposed of by hauling to an approved disposal site. The Contractor shall be responsible for the disposition of all debris.

1.6 SALVABLE MATERIAL

All equipment, piping, fittings, valves, and appurtenances to be removed or abandoned shall be inspected by the City of Jacksonville Beach or its representative immediately prior to removal or abandonment. The City of Jacksonville Beach's decision as to the salvageability shall be final. Such material which is, in the opinion of the City of Jacksonville Beach or its representative, salvageable shall be removed and transported to a location within the limit of the City of Jacksonville Beach as designated by the representative for the City of Jacksonville Beach. If the equipment is not wanted by the City of Jacksonville Beach, the Contractor shall become the owner of the equipment and shall dispose of same. Under no circumstances may existing structures, piping or equipment be removed or demolished without obtaining approval from the City of Jacksonville Beach or its representative. The Contractor shall be responsible for transporting the salvageable material to the desired location.

1.7 GROUT MIX

Grout for filling abandoned mains shall consist of at least 15 percent Portland Cement by volume and shall be mixed to a consistency suitable for pumping. Sand used in the mixture shall be composed only of hard, strong, durable, uncoated grains of quartz and shall be free from extraneous substances.

END OF SECTION

SECTION 02427
SEWAGE MANHOLES

PART 1 – GENERAL

1.1 SCOPE OF WORK

The Work under this section shall include all labor, material, and equipment necessary for the construction and installation of all new sewage manholes and the removal of existing sewage manholes as called for on the drawings. All bypass pumping operations required to complete the gravity sewer main/service installations shall be included as part of the unit price for installing the gravity system piping and related structures. Bypassing pumps shall be the silent-pack type units to minimize the sound associated with the work. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. All materials shall be new unless specifically called for otherwise.

1.2 SHOP DRAWING SUBMITTALS

The Contractor shall submit shop drawings consisting of individual manholes showing invert elevations, pipe sizes, and similar details for approval before placing order for sewage manholes.

PART 2 – MATERIALS

2.1 PRECAST CONCRETE SEWAGE MANHOLES

Sewage manhole bases, sections, and cones shall conform to the requirements of ASTM C478, “Specification for Precast Reinforced Concrete Manhole Sections” with the exception of Section 10(a), except as modified herein. Cement shall meet the requirements of ASTM C150, “Specification for Portland Cement Type H”. Concrete shall meet the minimum requirements for Class "A". Concrete Work (21/2 plus or minus slump). Minimum wall thickness shall be 1/12 the inside diameter of the manhole in inches plus 1 inch. The required minimum strength of concrete shall be confirmed by making and testing 4 standard cylinders at twenty-eight days (4,000 psi). Rings shall be custom-made with openings to meet indicated pipe alignment conditions and invert elevations.

A. BASES

Bases for concrete manholes shall be cast integrally with the bottom manhole section.

B. JOINTS

Joints shall be tongue and groove configuration formed with machined castings. The joint shall be sealed using an approved pre-molded plastic joint sealer. Prior to placement of the joint sealer the joint surfaces shall be primed in accordance with the recommendations of the sealer manufacturer.

C. COATING

With the exception of joint contact surfaces and the interior surfaces of all openings to receive the sewer pipe and a 1-inch annular ring around the interior and exterior of said openings, the exterior surfaces of each concrete manhole, including adjusting rings, shall be given 2 coats of bitumastic coating. Total minimum dry film thickness shall be 12 mils. Each coat shall be applied at a rate not to exceed one gallon per 100 square feet. The waterproofing materials shall be applied by brush or spray and in accordance with the instructions of the manufacturer. Time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat. Special precautions shall be taken not to coat joint contact surfaces. All concrete manholes shall be coated internally with “Spectrashield”. The exterior shall receive a bitumastic coating.

D. WATER STOPS

For PVC pipe installation into the manhole, the Contractor shall install a water stop as manufactured by the pipe supplier. The water stop shall be installed on the pipe according to the manufacturer's recommendations; upon completion of this, the Contractor shall then mortar or grout same into the precast annular opening as specified in this section of the specifications.

E. FLEXIBLE MANHOLE CONNECTOR

As an alternate method of connecting the sewer pipe to the precast concrete manhole, a flexible pipe to manhole connector may be used. The connector shall be the sole element to assure a flexible watertight seal of the pipe to the manhole.

1. MATERIAL

The Neoprene-EPDM material the connector is manufactured from shall conform to ASTM C443 and shall be a minimum of 3/8 inches (9.4mm) thick or greater. The material shall be resistant to ozone, weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils, and petroleum products.

2. BANDS

The stainless-steel band and screw assembly shall be a totally non-magnetic series 304 stainless steel.

3. CONNECTOR

The connector shall be of a size specifically designed for the specified pipe material and size. The connector shall be installed in the manhole wall by the precast manufacturer in strict accordance with the recommendations of the connector manufacturer. During the invert construction stage, the interior annular space between the exterior of the pipe and the interior of the connector shall be filled with a Type II lean cement grout by the Contractor.

2.2 FIBERGLASS SEWAGE MANHOLES

A. GENERAL

Fiberglass reinforced polyester manhole shall be manufactured from commercial grade unsaturated polyester resin with fiberglass reinforcements. Manhole shall be a one-piece unit manufactured to meet or exceed all specifications of ASTM D3753.

B. MANUFACTURE

1. RESIN

The resins used shall be a commercial grade unsaturated polyester resin.

2. REINFORCING MATERIALS

The reinforcing materials shall be commercial Grade “E” type glass in the form of mat, continuous roving, and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

3. INTERIOR SURFACING MATERIAL

The inner surface exposed to the chemical environment shall be a resin-rich layer of 0.010 to 0.020 inches thick. The inner surface layer exposed to the corrosive environment shall be

followed with a minimum of two passes of chopped roving of minimum length 0.5 inches (13 mm) to maximum length of 2.0 inches (50.8 mm) and shall be applied uniformly to an equivalent weight of 3 oz/ft^2. Each pass of chopped roving shall be well-rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10 inches (2.5 mm).

4. WALL CONSTRUCTION PROCEDURE

After the inner layer has been applied, the manhole wall shall be constructed with a chop and continuous strand filament wound manufacturing process which insures continuous reinforcement and uniform strength and composition. The cone section, if produced separately, shall be affixed to the barrel section at the factory with a resin-glass reinforced joint resulting in a one-piece unit. Seams shall be fiberglassed on the inside and the outside using the same glass-resin jointing procedure. Field joints shall not be acceptable.

5. EXTERIOR SURFACE

For a UV inhibitor, the resin on the exterior surface of the manhole shall have gray pigment added for a minimum thickness 0.125 inches. The exterior surface shall be relatively smooth with no sharp projections. Hand-work finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 0.5 inches in diameter, delamination, or fiber show.

6. INTERIOR SURFACE

The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, delamination, blisters larger than 0.5 inches in diameter, and wrinkles of 0.125 inches or greater in depth. Surface pits shall be permitted if they are less than 0.75 inches in diameter and less than 0.0625 inches deep. Voids that cannot be broken with finger pressure and that are entirely below the resin surface shall be permitted if they are less than 0.5 inches in diameter and less than 0.0625 inches thick.

7. STUB-OUTS AND CONNECTIONS

Stub-outs must be installed according to the manufacturer's instruction. Installation of smooth exterior PVC sewer pipe must be performed by sanding, priming, and using resin fiber-reinforced hand lay-up. The resin and fiberglass shall be the same type and grade as used in the fabrication of the fiberglass manhole. Special fittings or boots may be installed by manhole manufacturer.

8. MANHOLE BOTTOM

When indicated on the drawings, manholes shall have resin fiber-reinforced bottoms. Bottom shall have a minimum of three 1½ inch deep x 3½ inch wide stiffening ribs completely enclosed with resin fiber-reinforcement and have a minimum of 3-inch anti-flotation ring. Manhole bottom shall be a minimum of 5/16 inches thick.

9. FILLERS AND ADDITIVES

Fillers, when used, shall be inert to the environment and manhole construction. Sand shall not be accepted as an approved filler. Additives, such as thixotropic agents, catalysts, promoters, etc. may be added as required by the specific manufacturing process to be used to meet the requirements of this standard. The resulting reinforced-plastic material must meet the requirements of this specification.

C. DESIGN PROPERTIES

1. INTERIOR ACCESS

All manholes shall be designed so that a ladder or step system can be supported by the installed manhole.

2. MANWAY REDUCER

Manway reducers will be concentric with respect to the larger portion of the manhole diameters through 60 inches. Larger manholes may have concentric or eccentric manway reducer openings.

3. COVER AND RING SUPPORT

The manhole shall provide an area from which a typical ring and cover plate can be supported without damage to the manhole.

4. MANHOLE LENGTHS

Manhole lengths shall be in 6-inch increments +/- 2 inches.

5. DIAMETER TOLERANCE

Tolerance of inside diameter shall be +/- 1% of required manhole diameter.

D. PHYSICAL REQUIREMENTS

1. PHYSICAL PROPERTIES

	Hoop Direction	Axial Direction
a. Tensile Strength (psi)	18,000	5,000
b. Tensile Modules (psi)	0.6×10^6	0.7×10^6
c. Flexural Strength (psi)	26,000	4,500
d. Flexural Modules (psi)	1.4×10^6	0.7×10^6
e. Compressive (psi)	18,000	12,000

2. LOAD RATING

The complete manhole shall have a minimum dynamic-load rating of 16,000 lbf. when tested in accordance with ASTM D3753 8.4 (note 1). To establish this rating, the complete manhole shall not leak, crack, or suffer other damage when load tested to 40,000 lbf and shall not deflect vertically downward more than 0.25 inch at the point of load application when loaded to 24,000 lb.

3. STIFFNESS

The manhole cylinder shall have the minimum pipe-stiffness values shown in the table below when tested in accordance with ASTM D3753 8.5 (note 1).

MANHOLE LENGTH IN FEET	PSI
3 - 6.5	0.75
7 - 12.5	1.26
13 - 20.5	2.01
21 - 25.5	3.02
26 - 35	5.24

4. SOUNDNESS

In order to determine soundness, apply an air or water pressure test to the manhole test sample. Test pressure shall not be less than 3 psig or greater than 5 psig. While holding at the established pressure, inspect the entire manhole for leaks. Any leakage through the laminate is cause for failure of the test. Refer to ASTM D3753 8.6.

5. CHEMICAL RESISTANCE

When tested in accordance with ASTM D3753 8.7, the log of percent retention of each property after immersion testing when plotted against the log of immersion time, and extrapolated to 100,000 hours, shall ensure retention of at least 50% of initial properties.

6. REQUIRED THICKNESS FOR BURIED MANHOLES

Assumptions: Hoop Modulus = 4,000,000 psi

Soil Modulus = 1000 psi (minimum)

Diameter (Inches)	Wet Soil Depth (max) (Feet)	Minimum Thickness (Inches)
48	10	.25
	20	.3125
	30	.375
60	10	.375
	20	.4375
	30	.5
72	10	.4375
	20	.5
	30	.5625

96	10	.5625
	20	.625
	30	.75

7. TEST METHODS

All tests shall be performed as specified in ASTM D3753 Section 8. Test method D-790 (see note 5) and test method D-695.

8. CERTIFICATION

As a basis of acceptance, the manufacturer shall provide an independent certification which consists of a copy of the manufacturer's test report and a copy of the test results that the manhole has been sampled, tested and inspected in accordance with the provision of this specification and meets all requirements.

9. MARKING AND IDENTIFICATION

Each manhole shall be marked on the inside and outside with the following information:

4.9.1. Manufacturer's name or trademark

4.9.2. Manufacturer's factory location

4.9.3. Manufacturer's serial number

4.9.4. Total length

2.3 CAST IRON SEWAGE MANHOLE FRAMES AND COVERS

Cast iron sewage manhole frames and covers shall be of the type as shown in the Engineering Plans. The cover shall bear the name, "City of Jacksonville Beach, Florida". Manhole cover shall be 30 inches in diameter. Castings shall be made of good quality, strong, tough, even grained cast iron and shall be smooth, free from scale, lumps, blisters, sand holes and defects of any nature which would render them unfit for the service for which they are intended. They shall be thoroughly cleaned. Castings shall meet the requirements of ASTM A48, "Specifications for Gray Iron Castings, Class No. 30, or Grade 65-45-12" and Ductile Iron meeting the requirements of ASTM A536, "Standard Specification for Ductile Iron Castings". In either case, manhole frame and cover shall be designed to withstand an HS20-44 loading defined in the AASHTO Specifications. Frames and covers shall be machined or ground at touching surfaces so as to seat firmly and prevent rocking. Any set not matching perfectly shall be removed and replaced at no additional cost. The cover shall be flush with rim of frame and shall have no larger than an 1/8-inch gap between frame and cover.

2.4 CONCRETE ADJUSTMENT RINGS (MANHOLE COLLARS)

Concrete adjustment rings shall be 4000 psi concrete, Type II cement. Minimum height of rings shall be 3 inches. Maximum height shall be 18 inches. Rings shall be grouted in place.

2.5 MATERIAL WARRANTY

The manufacturer of materials furnished on the project shall supply to the City of Jacksonville Beach, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new

materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

PART 3 – INSTALLATION

3.1 PRECAST CONCRETE SEWAGE MANHOLES

A. SETTING SEWAGE MANHOLE BASES

Sewage manhole bases shall be set level on a bedding consisting of 4 inches of rock (57 stone) mixed with bags of dry cement in quantities.

B. INSTALLING SECTIONS

Precast concrete sections shall be set so the manhole will be vertical and with sections in true alignment. Joint surfaces of the base or previously set section shall be sealed with pre-molded plastic joint sealer. Joints shall be pre-primed.

C. METALLIC NON-SHRINK MORTAR

All holes in sections used for handling and the annular space between the wall and entering pipes shall be thoroughly plugged with non-shrinking mortar or grout applied and cured in strict conformance with the manufacturer's recommendations so that there will be zero leakage through openings and around pipes. The mortar shall be finished smooth and flush with the adjoining interior and exterior manhole wall surfaces.

D. GRADE ADJUSTMENT

For grade adjustment in setting the manhole frame concrete adjustment rings shall be used on top of manhole slabs and precast concrete manhole cones in accordance with the drawings.

E. SETTING SEWAGE MANHOLE FRAMES

Sewage manhole frames and covers shall be set to conform accurately to the finished ground or pavement surface as established by the Contract Drawings, unless otherwise directed by the Engineer. Frames on manhole cones shall be set concentric with the masonry and in a full bed of mortar so that the space between the top of the manhole and the bottom flanges of the frame shall be completely filled and made watertight. A ring of mortar at least 1 inch thick and pitched to shed water away from the frame shall be placed around the outside of the bottom flange. Mortar shall extend to the outer edge of the concrete adjustment rings and shall be finished smooth and flush with the top of the flange.

3.2 FLOW CHANNELS

Flow channels in the manhole base shall be formed of Class "C" concrete, while the manhole is under construction. Flow channels shall be solid concrete or concrete with solid filler blocks. No rubble shall be allowed. Cut off pipes at inside face of the manhole and construct the invert to the shape and size of pipe indicated. All inverts shall follow the grade of the pipe entering the manhole. A change in direction of the sewer and entering branch or branches shall be laid out in smooth curves of the longest possible radius which is tangent to the center lines of adjoining pipelines.

3.3 DROP INLETS

Where shown on the drawings, drop inlets to the manhole shall be constructed as shown on the City of Jacksonville Beach Standard Details and specified herein.

3.4 CONNECTIONS TO EXISTING STRUCTURES

A. OPENING

The Contractor shall core suitable openings using a coring machine, jigsaw, or hole saw into the existing structure or remove the existing pipe to accommodate the pipelines as indicated on the Contract Drawings and as specified. The portion of each existing structure removed for the new installation shall be confined to the smallest opening possible, consistent with the work to be done. Fiberglass manholes shall have the cut out in the wall equal to the outside diameter of pipe, plus ½ inch maximum.

B. REPAIR – CONCRETE STRUCTURES

After the pipe is installed, the Contractor shall carefully close up the openings around the pipe, using non-shrink mortar and repair the existing structure invert, if necessary, in a manner satisfactory to the Engineer. If the existing structure has a specialty coating, repair that coating using coating manufacturer's product and installation requirements.

PART 4 – SEWAGE MANHOLE ABANDONMENT AND REMOVAL

4.1 SEWAGE MANHOLE ABANDONMENT

Sewage manhole abandonment shall be in accordance with Section 02407, 'Demolition and Abandonment' of this specification.

4.2 SEWAGE MANHOLE REMOVAL

Removal of existing manholes shall include the complete removal of said manholes where so noted on the contract drawings.

4.2.1 REMOVAL ONLY

Where no new structure is designated to replace the removed manhole, the void, left by the manhole removal shall be filled and compacted in accordance with Section 02200 – Excavating, Backfilling, and Compacting of this specification.

4.2.2 REMOVE AND CONSTRUCT

Where a new structure is designated to replace an existing manhole, complete removal of the existing manhole shall be achieved so as to permit the construction of a new manhole at approximately the same location.

4.2.3 DISPOSAL OF STRUCTURE

The existing manhole to be removed shall be removed from the site. The rubble shall be disposed of without damage to any of the new or existing facilities at the site. The debris shall be hauled to a disposal site to be designated or approved by the Engineer.

PART 5 – CONTRACTOR WARRANTY

The Contractor shall supply to City of Jacksonville Beach a one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

END OF SECTION

SECTION 02446
HORIZONTAL DIRECTIONAL DRILLING

PART 1. GENERAL

1.1 SCOPE OF WORK:

The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation for pipe larger than 12 inches inside diameter (ID), also commonly referred to as directional boring or guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities, and environmental protection and restoration.

1.2 QUALITY ASSURANCE:

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification or within any associated permit (i.e.: US ACOE, EPD, DOT, Etc.). Adherence to the specifications contained herein, or the City Representative's approval on any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract. The HDD contractor shall be responsible for the repair of all damage to private and/or public property (at no expense to the City). Repair work shall meet all local and state rules and requirements.

1.3 QUALIFICATIONS:

A. The work specified in this Section requires significant previous experience and expertise in similar work to avoid negative impacts to public safety and the environment. Therefore, the Contractor performing the work shall be qualified, in City's judgment, to complete the horizontal directional drilling work specified herein. **The Contractor shall submit substantiating evidence of qualifications, in accordance with the provisions of this Section and the Instructions to Bidders, for pre-qualification approval.** Failure to submit the required documentation may cause the Contractor to be declared unqualified to perform the scope of work and submit a bid for the project. **All horizontal directional drilling operations including pipe joining/fusing shall be performed by the Contractor.** Subcontracting of the horizontal directional drilling operations will not be approved by City for this project. In order to qualify to perform work specified in this Section, the Contractor must provide evidence satisfactory to City, including the following:

1. Contractor to have self-performed work comparable in nature to the scope of work required by this project for a minimum of five (5) years.

2. Contractor to have successfully self-performed at least three (3) horizontal directional drilling projects to install product pipes of a similar nominal diameter and length to the proposed project within the past five (5) years. City shall have sole authority to determine the adequacy of representative projects.

3. In order to qualify to perform the work specified in this Section the Contractor must provide evidence satisfactory to the City of the following personnel qualifications:

    a. The Contractor's proposed project manager, superintendent, drill operator, and guidance system operator assigned to horizontal directional drilling of this project shall be experienced in work of this nature and shall have successfully completed similar projects using horizontal directional drilling.

b. All drilling, drill guidance, and pipe joining equipment operators shall be experienced in comparable horizontal directional drilling work and shall have been fully trained in the use of the proposed equipment by an authorized representative of the equipment manufacturer(s) or their authorized training agents.

c. All HDPE fusion equipment operators shall be qualified to perform pipe joining using the means, methods and equipment employed by the Contractor. Fusion equipment operators shall have current, formal training on all fusion equipment utilized for the project. Training received more than two (2) years prior to operation of the fusion equipment for this project shall not be considered current. The Contractor shall submit written certification of training provided by the fusion equipment manufacturer.

B. Contractor Qualification Documentation:

1. The Contractor shall submit information demonstrating compliance with the Contractor self-performance and personnel qualification requirements of this Section to become pre-qualified to perform the horizontal directional drilling operations, in accordance with the Instructions to Bidders. The Contractor shall provide the documentation noted below as proof of experience and personnel qualifications. Other Contractor qualification information shall be provided as noted in the Instructions to Bidders.

a. The Contractor shall submit the following information for each of the three (3) referenced projects:

1) Name and general description of project.
2) Name, title, address, and telephone number of project owner.
3) Contract start and completion date.
4) Construction cost.
5) Length, depth (typical and greatest), and diameter of each completed bore(s).
6) Description of pipe(s).
7) Type and manufacturer of drilling and installation equipment used.
8) Ground conditions encountered.
9) HDPE/FPVC pressure testing procedure required.
10) Project MOT and pedestrian coordination required.
11) Special conditions of project, e.g. night work required.

b. The Contractor shall submit the following personnel information:

1) Names and resumes, including specific project experience, for the proposed project manager, superintendent, guidance operator, and drill operator, for this project, demonstrating that each meets the requirements of this Section.
2) Names and qualifications, including specific project experience, for all proposed drilling, drill guidance, and pipe joining equipment operators, for this project, including evidence of training in the use of the proposed equipment by an authorized representative of the equipment manufacturer or their qualified agent, demonstrating that each meets the requirements of this Section.

1.4 PROJECT SCHEDULE AND COOPERATION:

The project schedule shall be established on the basis of working a normal work schedule as defined in the Special Conditions or otherwise indicated in the Construction Drawings. Unless approved or requested

otherwise by the City, normal or general items of work, such as bacteriological testing, leakage and pressure testing, locate wire testing, density testing, and final inspections, shall be scheduled during the normal work schedule. Due to operational and manpower limitations on the City systems, the City may require the contractor to perform work outside of the normal work schedule. These operational and manpower limitations may include line filling and flushing operation, tie-in work, (cut-in work or other work) and other phases of the work which may impact the continued (non-interruptible) service to existing City customers. The contractor shall plan and anticipate the cost impact of these systems' limitations and provide such work or services at no additional cost to the City.

1.5 WARRANTY:

The Contractor shall supply to the City a one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

The pipe manufacturer shall provide a warranty to the Contractor that the pipe conforms to these specifications and that the pipe shall be free from defects in materials and workmanship for a period of one (1) year from the date of final completion of the installation. The manufacturer's warranty shall be in a form acceptable to and for the benefit of the City and shall be submitted by the contractor as a condition of final payment. The manufacturer's warranty to the contractor shall in no way relieve the contractor from its unconditional warranty to the City.

The contractor shall warrant to the City that the methods used on the contract, where covered by patents or license agreements, are furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements. The contractor shall defend, indemnify, and hold the City harmless from and against any and all costs, loss, damage, or expense arising out of, or in any way connected with, any claim of infringement of patent, trademark, or violation of license agreement.

1.6 REFERENCED STANDARDS:

A. The work shall conform to applicable provisions of the City of Jacksonville Beach Standards for Water and Sewer Design and Construction, and the following standards, latest editions, except as modified herein.

B. American Water Works Association (AWWA) Standards:

AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.

ASTM D638 Standard Test Method for Tensile Properties of Plastics.

ASTM D2122 Standard Method of Determining Dimensions of Thermoplastics Pipe and Fittings.

ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.

ASTM D2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

ASTM E3261 Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

ASTM D3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.

ASTM F412 Standard Terminology Relating to Plastic Piping Systems.
ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

1.7 PERMITS:

The Contractor shall verify the existence of all necessary permits before commencing any work on the project.

1.8 SUBMITTALS (For HDD Portions of Project Only):

A. Work Plan: Prior to beginning work, the Contractor must submit to the City Representative a work plan detailing the procedure and schedule to be used to execute the project. Horizontal directional drilling shall not commence until the contractor has received written approval of all work plan submittals from City.

1. Methods: The Contractor shall provide complete descriptions of proposed plans, procedures, and personnel, as well as supporting calculations, for the following:

   a. Drilling operations, addressing: Procedures for pilot hole drilling and reaming. Procedures for tracking and controlling the drilling head location. Procedures for preparing as-builts.
   b. Drilling fluid management plan.
   c. Spoils handling and disposal plan.
   d. Pipe storage and handling, addressing: Means and methods for protecting pipe and ensuring temperature control in accordance with the Contractor's installation calculations.
   e. Pipeline assembly and installation, addressing: Procedures for pipe joining, pipeline pullback, and pullback monitoring.
   f. Prevention of inadvertent fluid losses and spills, and contingencies for rapid containment and cleanup, addressing: Measures to mitigate risk of inadvertent fluid returns to surface. Procedures for monitoring and controlling drilling fluid flows and pressures. Equipment, resources, and procedures for identifying, containing, and cleaning up fluid losses and spills.
   g. Quality control and testing procedures.
   h. Safety plan.

2. Schedule: The Contractor shall provide a schedule for all horizontal directional drilling activities commencing with the site preparation and terminating on completion of testing and final acceptance of the installed pipe. The schedule shall address anticipated subsurface conditions and overall project requirements.

3. Equipment

   a. The contractor shall provide the make, model, and technical specifications for each of the following:
      1. Horizontal directional drill rig.
      2. Drilling system components.
      3. Downhole drilling assembly and reaming equipment.

4. Downhole pressure sub.
5 Guidance and control system.
6. Pulling head.
7. Swivel.
8. Rollers.
9. Solids separation and drill fluid recirculation systems.
10. Pipe fusion equipment.
11. Pipe fusion data logger.
12. Pipe handling equipment.
13. Pigs and pigging equipment.

b. The Contractor shall provide the following specific equipment information:
   1. Calibration certification for the pilot bore guidance and control system.
   2. Calibration certification for the heat fusion datalogger.

4. Supplemental Work Plan Requirements: The Contractor shall provide the following additional work plan submittals. The submission requirements for additional work plan submittals including the number of copies and delivery of submittals shall follow the requirements outlined in the Submittals Section of the Special Conditions. Horizontal directional drilling shall not commence until the Contractor has received written approval of all supplemental work plan submittals.

   a. The Contractor shall submit acknowledgement of use of the Maintenance of Traffic plans in the Construction Drawings or shall submit alternate detailed Maintenance of Traffic plans for entry and exit pit sites and all areas of construction which will impact typical roadway or pathway use. Approval of the City will be required for ALL Maintenance of Traffic plans with the ROW Permit.
   b. Frac-Out and Surface Spill Contingency Plan: Plans for mitigating the potential for inadvertent drilling fluid losses to surface, and for rapidly identifying and cleaning up spills near the investigation borings located along the project alignment. Investigation boreholes along the alignment have been backfilled as reported in the Geotechnical Report. The Contractor's work plans shall address the risk that investigation boreholes may contribute to the risk of drill fluid loss.
   c. Contingency plan for rapidly identifying, locating, and containing any drilling fluid returns.
   d. The Contractor shall submit a contingency plan to address procedures to be employed in the event any of the listed items occur.
      1. Utility strike, obstruction, or inability to advance drill pipe.
      2. Excessive deviation from proposed line and grade, as described within this Section.
      3. Inability to move pipe through borehole during pullback.
      4. Settlement or heave of roadways and structures within 50 feet of the alignment.

B. Calculations:

The Contractor shall submit final design calculations for the City's review and approval as soon as possible following Notice to Proceed, and in accordance with the Project Schedule section of the Special Conditions. Final design calculations shall support the Contractor's specific proposed means, methods, and products. The Contractor's final design calculations shall be prepared and

sealed by a Licensed Professional Engineer registered to practice in the State of Florida and retained by the Contractor. Horizontal directional drilling shall not commence until the Contractor has received written approval of all design calculation submittals from the City.

At a minimum, design calculations shall demonstrate that the proposed pipe, equipment, and means and methods comply with the requirements of this Section and have been designed based on the design bore path and installation means and methods for anticipated installation and handling, hydrostatic, earth and live loads, installation temperature, and site conditions. Design calculations shall address the considerations and guidelines presented in ASTM F1962: Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings

The Contractor shall supply copies of all other calculations required to support the required submittals for horizontal directional drilling. At a minimum, the following calculations should be included:

1. Maximum allowable pipe loading limits.
2. Pullback load calculation based upon proposed drill path plan and profile.
3. Buoyancy effect calculations.
4. Effects of ballasting plan on pipe pullback forces.
5. Hydrofracture analysis. This should include a maximum annular pressure curve and the respective formation pressure versus depth based on the proposed drill plan and profile.
6. Confirmation that design parameters do not exceed predicted installation stresses including factors such as tensile load, buckling and deformation.

C. Shop Drawing Submittals:

For all materials provided, Contractor shall provide copies of documentation (actual catalog data, brochures, drawings, and descriptive literature) necessary to establish compliance with the Specifications in accordance with Submittals Section of the Special Conditions.

D. Construction Records:

1. Daily Reports: The Contractor shall maintain daily activity reports throughout all horizontal directional drilling operations, including pipe installation. A sample daily report shall be submitted to City for approval prior to the commencement of drilling operations. Daily reports shall be submitted within 24 hours of completion, and shall include, for each drill rod added or withdrawn, or every 30 feet during drilling, pre-reaming, and pullback:

    a. Downhole tools and equipment in use.
    b. Description of ground conditions encountered.
    c. Description of drilling fluid.
    d. Drilling fluid pumping rate.
    e. Maximum and minimum downhole fluid pressures.
    f. Drilling head location - at least every 10 feet along the bore path.
    g. Drill stem torque.
    h. Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.
    i. Details of any unusual conditions or events.

2. Production and Record Drawings: The Contractor shall maintain at the construction site a complete set of field drawings for recording the as-built conditions. The Contractor shall plot as-built conditions on the field drawings, including the location in plan and elevation of the drill string, reaming head, and installed pipe, at the completion of each production shift. The Contractor shall compile and submit as-built data in accordance with the Project Record Documents requirements in the Special Conditions.

   a. As-Built data provided to the Engineer of Record for incorporation into the Record Drawings shall include Horizontal Directional Drill pipe installation information in plan and profile views in AutoCAD format with X, Y, and Z coordinates in Florida State Plane East Zone Coordinates (Horizontal Datum NAD 83 and Vertical Datum NAVD 88) conducted by a surveyor licensed in the State of Florida. Directional Drill Bore Log shall be provided as part of the As-Built documentation and shall be in Florida State Plane East Zone Coordinates (Horizontal Datum NAD 83 and Vertical Datum NAVD 88) and be relative to the established surface survey benchmark and baseline stationing that is tied to existing, fixed and visible sight features. Directional Drill Bore Log shall show recorded X, Y, and Z locations of the drill head at minimum every 20 feet in the AutoCAD format documentation.

3. Testing and Quality Control and Assurance Documentation: The Contractor shall maintain records for all testing and quality control and assurance procedures. The following records shall be provided to City or City's Representative on the day that information is acquired by the Contractor:
   a Manufacturer's Field Reports.
   b. Test reports.
   c. Fusion reports. For each weld, provide an electronic and printed report of the downloaded information for each weld.

1.9 NOTIFICATION:

The City Representative must be notified 48 hours (minimum) in advance of starting the drilling work. The Directional Bore shall not begin until the proper preparations (see Work Plan) for the operation have been completed.

1.10 SITE PREPARATION:

A. Prior to any alterations to work-site, Contractor shall video record and photograph entire work area in accordance with Section 01380: Construction Photographs and Video. Two (2) copies of such documentation shall be given to the City Representative and Engineer, and one (1) copy shall remain with Contractor for a period of two (2) years following the completion of the project. Pre-construction videos and photographs shall be reviewed and approved by City and Engineer prior to disturbing the project site.

B. The Contractor shall coordinate utilities locates with Sunshine811 (web site www.Sunshine811.com). Once the locate service has field marked all utilities, the Contractor shall verify each utility (including any service laterals, i.e. water, wastewater, cable, gas, electric, telecommunications, etc.) and those within each paved area. Verification may be performed utilizing Ground Penetrating Radar, hand dig, or vacuum excavation. Prior to initiating drilling, the Contractor shall record on the drawings both the horizontal and vertical location of the utilities off of a predetermined baseline. The Contractor shall utilize the Ground Penetrating Radar over the projected bore path whether utilities are located in the horizontal drill pathway or not, in order to reduce the opportunity of conflicting with any unforeseen obstructions.

C. Work site shall be graded and filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

D. Following drilling operations, Contractor will de-mobilize equipment and restore the worksite to original condition. All excavations will be backfilled and compacted in accordance with Section 02200 Excavating, Backfilling, and Compacting and the Construction Details.

1.11 ENVIRONMENTAL PROTECTION:

Contractor shall place erosion and sediment control measures between all drilling operations and any drainage, wetland, waterway, or other area designated for such protection by contract documents, permits, and state, federal, and local regulations. Contractor shall place approved protection methods to limit intrusion upon project area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains, and other measures. Contractor shall adhere to all applicable environmental regulations including environmental conditions stated in local, state, and federal permits. Fuel may not be stored in bulk containers (greater than 25 gallons) within 200' of any waterbody or wetlands.

1.12 SAFETY:

Contractor shall adhere to all applicable state, federal, and local safety regulations and all operations shall be conducted in a safe manner.

1.13 DOMESTIC WATER:

For the supply of domestic water during construction, the Contractor shall utilize a City meter assembly (meter & backflow device) and pay for all water consumed.

PART 2. MATERIALS

2.1 HIGH DENSITY POLYETHYLENE (HDPE, PE) PIPE AND FITTINGS:

A. Materials:

Materials used for the manufacture of polyethylene pipe and fittings shall be PE3608 or PE4710 high density polyethylene meeting cell classification 345464C per ASTM D3350; and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D1248; and shall be listed in the name of the pipe and fitting Manufacturer in PPI TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73°F per ASTM D-2837. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

B. Polyethylene Pipe

HDPE Pipe shall conform to AWWA C906, DR-11, Ductile Iron Pipe (DIP) size and NSF 61 Standard. For pipe sizes 24-inch and larger, the HDPE may be IPS size, DR 11. Polyethylene pipe shall be manufactured in accordance with ASTM F714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe

shall be tested for (from material or pipe) melt index, density, % carbon, dimensions and either quick burst or ring tensile strength (equipment permitting).

C. Nominal Pipe Sizes

Nominal pipe sizes only are indicated on the drawings and bid form. Outside diameter of pipe is generally 1 to 2-inches greater than the nominal pipe diameter.

D. Service Identification:

Permanent identification of piping service shall be provided by co-extruding multiple equally spaced color stripes into the pipe outside surface or by solid colored pipe shell. The striping material shall be the same material as the pipe material except for color. Colors for identifying piping service shall be in accordance with the City of Jacksonville Beach Standards for Water and Sewer Design and Construction.

E. Back-up Rings and Flange Bolts:

Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. Convoluted style backup rings are preferred over flat stock rings. The lap joint flange bore shall be chamfered to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.

F. Manufacturer's Quality Control:

The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rated, and contamination. The cell classification properties of the material shall be certified by the supplier and verified by Manufacturer's Quality Control.

G. Polyethylene Mechanical Joint (MJ) Adapters:

Mechanical connections of HDPE pipe to Ductile Iron or PVC piping, mechanical joint fittings, or valves shall be through a fusible polyethylene mechanical joint adapter with or without an integral, internal stainless-steel insert. Mechanical joint adapter shall be of the same DR rating as the pipe. Adaptors shall include longer T-bolts or all thread rods with nuts at the mechanical joint bell.

2.2 DRILLING FLUIDS SHALL BE A BENTONITE SLURRY.

2.3 DELIVERY, STORAGE, AND HANDLING OF MATERIALS:

A. Inspect materials delivered to the site for damage. All materials found during inspection or during the progress of work to have cracks, flaws, cracked linings, or other defects shall be rejected and removed from the job site without delay.

B. Unload and store opposite or near the place where the work will proceed with minimum handling. Store material under cover out of direct sunlight. Do not store directly on the ground. Keep all materials free of dirt and debris.

C. Contractor is responsible for obtaining, transporting and sorting any fluids, including water, to the work site.

D. Disposal of fluids is the responsibility of the Contractor. Disposal of fluids shall be done in a

manner that is in compliance with all permits and applicable federal, state, or local environmental regulations. The bentonite drilling slurry, as appropriate, shall be recycled for reuse in the hole opening operation, or shall be hauled by the Contractor to an approved location or landfill for proper disposal. Contractor shall thoroughly clean the entire area of any fluid residue upon completion of installation, and replace any and all plants, vegetation, and sod damaged, discolored, or stained by drilling fluids.

2.4 EQUIPMENT REQUIREMENTS

A. GENERAL:

The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing, delivery, and recovery system of sufficient capacity to successfully complete the drill, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be re-used, a guidance system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle the drilling fluid volume, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of this project.

B. DRILLING SYSTEM

1. Drilling Rig:

The directional drilling machine shall consist of a power system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pullback operations. There shall be a system to detect electrical current from the drilling string and an audible alarm which automatically sounds when an electrical current is detected.

2. Drill Head:

The drill head shall be steerable and shall provide the necessary cutting surfaces and drilling fluid jets.

3. Mud Motors (if required):

Mud motors shall be of adequate power to turn the required drilling tools.

4. Drill Pipe:

Shall be constructed of high quality 4130 seamless tubing, grade D or better.

C. GUIDANCE SYSTEM:

Magnetic Guidance System (MGS) wireline, wireless, or gyroscopic shall provide real time electronic data to the inspector on request. All daily data and project data shall be displayed on the "As Built". If deemed necessary, the City shall, at the contractor's expense, require a third party to verify the drill path profile and location of the installed line to the City's satisfaction. The guidance system shall be capable of tracking at all depths up to forty feet (40') below the maximum

proposed depth and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to +/-2% of the vertical depth of the borehole at sensing position at depths up to one hundred feet and accurate within 1.5 meters horizontally.

The Guidance System shall be of a proven type and shall be operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies on the surface of the drill path and shall consider such influences in the operation of the guidance system if using a magnetic system.

1. Bore Tracking and Monitoring:

   At all times during the pilot bore the Contractor shall provide and maintain a bore tracking system that is capable of accurately locating the position of the drill head in the x, y, and z axes. The Contractor shall record these data at least once per drill pipe length.

   a. Downhole and Surface Grid Tracking System:

      Contractor shall monitor and record x, y, and z coordinates relative to an established surface survey benchmark. The data shall be continuously monitored and recorded at least once per drill pipe-length.

   b. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed plus or minus 5 feet (horizontal or vertical deviation) from the design path, such occurrences shall be reported immediately to the City. The Contractor shall undertake all necessary measures to correct deviations and return to design line and grade.

   c. Drilling Fluid Pressures and Flow Rates:

      Drilling fluid pressures including drilling fluid pressure in the borehole annular space and flow rates shall be continuously monitored and recorded by the Contractor. These measurements shall be made during pilot bore drilling, reaming, and pullback operations.

D. DRILLING FLUID (MUD) SYSTEM:

1. Mixing System:

   A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid. Mixing system shall continually agitate the drilling fluid during operations.

2. Drilling Fluids:

   Drilling fluid shall be composed of clean water, appropriate additives, and clay. Water shall be from an authorized source with a minimum pH of 6.0. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid.

3. Delivery System:

The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system or disposed of properly. A berm, minimum of 12" high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits, and drilling fluid cycling system to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage, recycling, and disposal facilities.

4. Drilling Fluid Viscosity

In the event that inadvertent returns or returns loss of drilling fluid occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel, and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor shall cease operations and notify CIty Representative. City Representative and Contractor shall discuss additional options, and work will then proceed accordingly.

5. Drilling Fluid Recycling System:

The drilling fluid recycling system shall separate sand, dirt, and other solids from the drilling fluid to render the drilling fluid re-usable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.

6. Control of Drilling Fluids:

The Contractor shall follow all requirements of the Frac-Out and Surface Spill Contingency Plan as submitted and approved and shall control operational pressures, drilling mud weights, drilling speeds, and any other operational factors required to avoid hydro-fracture fluid losses to formations and control drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. The Contractor shall maintain on-site mobile spoil removal equipment during all drilling, pre-reaming, reaming, and pullback operations and shall be capable of quickly removing spoils. The Contractor shall immediately notify the City of any inadvertent returns or spills and immediately contain and clean up the return or spill.

E. OTHER EQUIPMENT:

1. Pipe Rollers:

Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe and to protect trees during pipe pullback operations.

2. Pipe Rammers:

Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of City Representative.

3. Restrictions:

Other devices or utility placement systems for providing horizontal thrust other than those defined above in the preceding sections shall not be used unless approved by the City

Representative prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

F. DATA LOGGER.

1. General:

A data logger shall be used to record and document all butt weld fusion processes. A record shall be made of every fusion weld made. The data logger shall be of a rugged, handheld computer as the recording device connected to a data collection device. The data collection device shall record the heater temperature and fusion pressure profile over time. All data shall be recorded and transmitted to the handheld computer where the joint report will be stored, viewed, printed, or transferred to a desk top computer for archiving. The operator associated with the fusion process shall utilize the data logger report as one means to confirm a complete and proper weld. This data shall be made immediately available to the City Representative, upon request. Unless approved otherwise by the City, a written or downloaded report for each fusion weld process shall be required and submitted to the City Representative within ten (10) working days after the fusion weld process for review and approval. If a potential defect fusion weld is suspected by the City or the Contractor, the work shall stop and a mutually acceptable (between the Contractor and City) corrective action plan shall be executed.

2. Data logger:

Equipment shall be Mc Elroy Datalogger Model no. DL6303 DL 6304 or City approved equal.

PART 3. EXECUTION

3.1 DRILLING PROCEDURES

A. DRILL PATH:

Prior to drilling, Contractor shall utilize all verified locate information to determine drill pathway. Marked up drawings (see Site Preparation paragraph) shall be on site at all times and referred to during the drill operation.

B. GUIDANCE SYSTEM:

Contractor shall provide and maintain instrumentation necessary to accurately locate the pilot hole (both horizontal and vertical displacements), measure pilot string torsional and axial forces and measure drilling fluid discharge rate and pressure. The City Representative shall have access to instrumentation and readings at all times during operation.

C. PILOT HOLE:

The pilot hole shall be drilled along the path shown on the plans and profile drawings. Unless approved otherwise by City, the pilot-hole tolerances shall be as follows:

1. Elevation:

As shown on the plans.

2. Alignment:

   As indicated; at a minimum three (3) feet within the right-of-way, easement, CMPA boundary, or other restrictive designations.

3. Curve Radius:

   The pilot hole radius shall be no less than 80% of the maximum bending radius as recommended by the pipe manufacturer of the pipe being installed. In no case shall the bending radius be less than 30 pipe diameters, unless approved otherwise by City.

4. Entry Point Location:

   The exact pilot hole entry point shall be within ±5 feet of the location shown on the drawings without prior City written permission for deviation.

5. Exit Point Location:

   The exit point location shall be within ± 5 feet of the location shown on the drawings without prior City written permission for deviation.

6. Limitations on Depth:

   HDPE/FPVC pipe larger than bore hole path shall be specifically designed by the engineer and approved by City. Where utilities cross under roads, the depth of cover shall comply with applicable authorizing agency and permit.

7. Water Main and Non-Water Main Separation Requirements:

   The minimum separation requirements between water main and a non-water main shall be as required by FDEP and in accordance with relevant permits. The current requirements are specified below:

   a. Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sanitary sewer, storm sewer or sewer manhole. The distance shall be measured edge-to-edge.
   b. When local conditions prevent a horizontal separation of 10 feet, the water main may be laid closer to a sewer (on a case-by-case basis) provided the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer. It is advised that the sewer be constructed of materials and with joints that are equivalent to water main standards of construction and be pressure tested to assure watertightness prior to backfilling.

D. PULL BACK:

After successfully reaming the bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel and appropriate tools per the contractor's approved Work Plan. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor will not apply more than the maximum safe pipe pull force at any time. Maximum allowable tensile force imposed on the pull section shall be equal to 80% of the pipe manufacturer's

safety pull (or tensile) strength.

1. Torsional stress shall be minimized by using a swivel to connect a pull section to the reaming assembly.

2. The pullback section of the pipeline shall be supported during pullback operations so that it moves freely and the pipe is not damaged.

3. External pressure shall be minimized during installation of the pullback section in the reamed hole. Damaged pipe resulting from external pressure shall be replaced at no cost to the City.

4. Buoyancy modification shall be at the discretion of the Contractor and shall be approved by the City Representative. The Contractor shall be responsible for any damage to the pull section resulting from such modifications.

5. In the event that pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will notify City Representative. City Representative and Contractor will discuss options and then work will proceed accordingly.

3.2 PIPE ASSEMBLY

A. GENERAL:

Pipe shall be welded/fused together in one length, if space permits. Pipe may be placed on pipe rollers before pulling into bore hole to minimize damage to the pipe. It is critical that all original oxidized pipe surface be removed in order for fusion to take place. The scraping process requires that approximately 0.10" of the outer "skin" be removed in order to penetrate the oxidation and contamination barrier. Oxidized pipe surface simply will not bond.

B. ACCEPTABILITY OF DAMAGED PIPE:

Cuts or gouges that reduce the wall thickness by more than 10% is not acceptable and must be cut out and discarded.

C. BUTT FUSION LOG:

Each butt fusion shall be recorded and logged by an approved electronic monitoring device (Reference paragraph 2.04 F.2.) affixed to the fusion machine. Joint data shall be submitted as part of the As-Recorded information, in accordance with this specification.

D. BUTT FUSION TESTING:

When requested by a City inspector, butt fusion testing will be performed. The test fusion shall be allowed to cool completely, and then fusion test coupons shall be cut out. The test shall involve McElroy' "In Field Tensile Tester" which utilizes test coupons (conducted in accordance with manufacturer's recommendations) or City pre-approved test methods and/or manufacturer.

E. MECHANICAL JOINING:

Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material. Mechanical couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will

cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall not be used in lieu of fully restrained mechanical couplings.

F. GENERAL REQUIREMENTS FOR OPEN-CUT CONSTRUCTION:

Mains shall be constructed of the materials specified and as shown on the drawings. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks. Defective, damaged, or unsound pipe or fittings shall be rejected. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel. Any pipe which has its grade or joint disturbed after laying shall be taken up and re-laid. Only suitable soils shall be utilized in the backfill operation. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the City. Plugs shall remain in pipe ends until all water is removed from the trench. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the City. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe. Lines shall be located as shown on the drawings. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the City Representative of the results of these investigations so that the necessary modifications may be determined. Refer to City Standards for Water and Sewer Design and Construction and other sections of the Technical Specifications for additional requirements.

3.3 SWABBING

A. The purpose of swabbing a new pipeline is to conserve water while thoroughly cleaning the pipeline of all foreign material, sand, gravel, construction debris, and other items not found in a properly cleaned system. Prior to pressure testing of a new pipeline, swabbing shall be utilized as indicated below.

B. All new water and sewer force mains greater than 12” I.D. shall be hydraulically cleaned with a polypropylene swabbing device to remove dirt, sand, and debris from the main.

C. If swabbing access and egress points are not provided in the design drawings, it will be the responsibility of the Contractor to provide temporary access and egress points for the cleaning, as required.

D. Passage of cleaning poly swabs through the system shall be constantly monitored, controlled and all poly swabs entered into the system shall be individually marked and identified so that the exiting of the poly swabs from the system can be confirmed.

E. Cleaning of the system shall be done in conjunction with, and prior to, the initial filling of the system for its hydrostatic test.

F. The Contractor shall insert flexible polyurethane foam swabs (two pounds per cubic foot density) complete with rear polyurethane drive seal, into the first section of pipe. The swabs shall remain there until the pipeline construction is completed. A City representative shall be present for the swabbing process including swab insertion and retrieval.

G. The line to be cleaned shall only be connected to the existing distribution system at a single connection point.

H. Locate and open all new in-line valves beyond the point of connection on the pipeline to be cleaned during the swabbing operation.

I. At the receiver or exit point for the poly swab, the Contractor is responsible for creating a safe environment for collection of debris, water, and the swab. Considerations shall be made for protecting surrounding personnel and property and safe retrieval of the swab.

J. Only with City personnel on-site shall the supply valve from the existing distribution system be operated. Cleaning and flushing shall be accomplished by propelling the swab down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear and swab(s) is/are retrieved.

1. Re-apply a series of individual swabs in varying diameters and/or densities as required, to attain proper cleanliness of pipeline.

2. Swabbing speed shall range between two and five feet per second.

K. After the swabbing process, pressure testing and disinfection, as appropriate, of the pipe shall be completed in accordance with the City of Jacksonville Beach Standards for Water and Sewer Design and Construction and this specification.

3.4 TESTING

A. DISINFECTION TESTS:

1. Upon satisfactory completion of the hydrostatic testing, all new water lines and other pipe-related installations which may have been contaminated by the work shall be disinfected prior to being placed in service. Disinfection shall follow the applicable provisions of AWWA Standard C651 – AWWA Standard for Disinfecting Water Mains, drinking water standards as published by the Florida Department of Environmental Protection, and as outlined in the City of Jacksonville Beach Standards for Water and Sewer Design and Construction.

B. HYDROSTATIC (PRESSURE AND LEAKAGE) TESTS:

1. Contractor shall test HDPE/FPVC pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by the City. All field tests shall be made in the presence of the City Representative. Except as otherwise directed, all pipelines shall be tested. Unless approved otherwise by the City, all fusible or butt weld joints shall be tested, including MJ adapter fittings associated with the new construction. All piping to operate under liquid pressure shall be tested in sections of approved length. The pressure testing of an HDPE/FPVC line section shall be tested separately from the PVC and DIP line sections. Where impractical, the HDPE/FPVC test section shall include only a minimum amount of PVC and DIP within the test section. If at all possible, the PVC and DIP test sections shall be left exposed during the pressure test for visual leakage observation. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment and all labor required. City may elect to furnish suitable pressure gauges for these tests. If not, the Contractor will furnish suitable pressure gauges, calibrated by an approved testing laboratory, with increments no greater than 2 psi. Gauges used shall be of such size that pressures tested will not register less than 10% or more than 90% of the gauge capacity. All valved sections shall be hydrostatic tested to ensure sealing (leak allowance) of all line valves. All HDD over 100 linear feet shall be air pressure tested (above ground) @ 5 PSI for a period of 15 minutes, prior to insertion. There shall be no

pressure loss allowed.

2. Unless it has already been done, the section of pipe to be tested shall be filled with potable water and air shall be expelled from the pipe. If blow-offs or other outlets are not available at high points for releasing air, the Contractor shall provide 1 inch (minimum taps and blow-off valves (at the 12:00 position), as necessary. The cost of constructing blow-off valves and plugging them, after a successful pressure test, shall be included in the unit price bid amount for the HDD installation.

3. Hydrostatic testing shall consist of 150 psig test pressures, based on the elevation of the highest point of the line or section under test. Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the City Representative. The pump, pipe connection, and all necessary apparatus shall be furnished by the Contractor and shall be subject to the approval of the City Representative.

4. 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.

5. Initial Phase of Pressure Testing: First, all air must be removed from the test section. The pressure test shall be completed after the line is backfilled. If possible, all flanged or mechanical joint valves and fittings shall be left exposed for visual leak inspection. If possible, all PVC and DIP test sections shall be left exposed for visual leak inspection. Initially, the pressure within the test section should be raised to approximately 160 psi and then allowed to be idle (no additional make-up water/pressure 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/pressure shall be applied to the test section during this 3-hour stabilization period unless the line pressure drops below 140 psi. In this case, make-up water/pressure shall only be applied to the test section to maintain a minimum of 140 psi (during the 3-hour stabilization period).

6. Final Phase of Pressure Testing: The final phase of the pressure test shall involve applying make-up water/pressure to achieve an "initial test pressure" of 150 psi (minimum)/155 psi (maximum). The test section is then allowed to be idle (no make-up water/pressure is added) for a period of 2 hours. After this 2-hour period, make-up water/pressure is applied and measured to re-establish the "initial test pressure". The quantity of water utilized to re-pump the line shall be measured and compared to the allowable quantities as determined by the table below. If the actual make-up water quantity is equal 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.

Table 1: Allowable Make Up Amount

Nominal Pipe Size (inches)	Make-up Water Allowance (Gallons/Linear feet of Pipe) 2-hour test
6	0.0030
8	0.0050
10	0.0065
12	0.0115
14	0.0140
16	0.0165
18	0.0215
20	0.0275
22	0.0350
24	0.0440
26	0.0500
28	0.0555
30	0.0635
32	0.0715
34	0.0810
36	0.0900
42	0.1155
48	0.1350
54	0.1570

7. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting, or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

8. If, in the judgment of the City, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement. Re-disinfection of water mains shall be required if the line is de-pressurized for repairs prior to tying.

C. LOCATE WIRE:

Two locate wires shall be provided on all HDPE/FPVC installations. For HDD projects, locate wire shall be 12 AWG high strength copper-clad carbon steel with 45 mils (min) insulation. For open-cut portions of the project, the locate wire construction and testing shall meet the requirements as listed in the General Notes and Construction Details in the Construction Drawings. The external color shall be blue for water and green for wastewater. Locate wire shall be brought to grade within a valve box or locate station box at all "entry point locations" and all "exit point locations". For HDD projects, there is no maximum length or interval between locate wire stations. The testing and report requirements within the General Notes of the Construction Drawings shall be required except as modified herein. If both locate wires break or are not continuous (from end to end), the Contractor shall, at the Contractor's expense, provide soft-digs for the portions of the main with 12 feet or less cover (every 25 LF along main) to confirm as-built data. This soft-dig data shall be recorded on the as-built record drawings.

END OF SECTION

SECTION 02574

PAVING, SURFACING, PAVEMENT REMOVAL, AND REPLACEMENT

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, equipment, tools, and transportation and perform all work necessary for the construction of asphalt concrete surface courses composed of a mixture of aggregates, mineral fillers, and asphalt cement properly applied upon a prepared base, in accordance with these Specifications and in conformity with the lines, grades, thickness, and typical cross sections shown on the Drawings. Type SP9.5 with a maximum of 15% RAP asphaltic concrete for all surface courses shall be used. Place asphaltic concrete pavement around drain inlets and catch basins manhole covers and valve boxes by hand methods.

1.2 QUALITY ASSURANCE

A. Standards: Comply with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, 2000, and Supplemental Specifications thereto, hereinafter referred to as FDOT Specifications and hereby made a part of this Contract to the extent they are applicable thereto and shall be as binding upon the Contractor as though reproduced herein in their entirety.

B. Complete and submit laboratory analysis by a Certified Testing Laboratory on all materials in accordance with Section 01340 and obtain materials acceptance by the Engineer, prior to placement.

C. Submit manufacturer's/supplier's certificates of compliance with Specifications for all materials proposed.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Bituminous Material: Asphaltic cement, Viscosity Grade AC-20, conforming with FDOT Specifications, Section 916-1.

B. Coarse Aggregate: Stone or slag conforming with FDOT Specifications, Section 901.

C. Fine Aggregate: As specified in FDOT Specifications, Section 902-2.

D. Mineral Filler: As specified in FDOT Specifications, Section 917-1 and 917-2.

2.2 GENERAL COMPOSITION OF MIXTURE

A. Provide a combination of aggregate (coarse, fine, or mixtures thereof), mineral filler, if required, and bituminous material, sized, graded, and combined in such proportions that the resulting mixture will meet the grading and physical properties of the approved job mix formula. Use a mixture containing screenings, meeting with the requirements of FDOT Specification Section 902, equal to a minimum of 15 percent, by weight, of the total aggregate.

B. Use only Virgin Asphalt, no RAP is allowed.

PART 3 – EXECUTION

3.1 TRANSPORTATION OF MIXTURE

A. Transport the mixture in tight vehicles previously cleaned of all foreign material and, if necessary,

cover each load with a waterproof canvas cover of sufficient dimensions to protect it from weather conditions. Thinly coat the inside surface of the truck bodies with soapy water, or a mixture of water with not more than five percent of lubricating oil, but no excess of either. After the truck bodies are coated and before any mixture is placed therein, raise them so that all excess water will drain out. Do not use kerosene, gasoline, or similar products to prevent adhesion.

3.2 LIMITATIONS FOR SPREADING

A. Spread the mixture only when the surface is properly prepared and is intact, firm, cured, and dry. Do not spread the mixture when the air temperature is less than 40°F, or when the spreading cannot be finished and compacted in daylight hours. Ensure that the temperature of the mix at the time of spreading is not less than that recommended by FDOT Specifications for the particular work.

3.3 PLACING MIXTURE

A. Place the mixture in accordance with FDOT Specifications, Section 330-9.

3.4 COMPACTING MIXTURE

A. Compact the mixture in accordance with FDOT Specifications, Section 330-10.

3.5 JOINTS

A. Form joints in accordance with FDOT Specifications, Section 330-11.

3.6 FIELD QUALITY CONTROL

A. Surface Requirements:

1. For the purpose of testing the finished surface, provide a 10-foot straightedge and a standard template cut to the true cross section of the road and designate an employee whose duty it is to handle the straightedge and template in checking all rolled surfaces, under the direction of the Engineer.

2. Construct the finished surface such that it will not vary more than ¼-inch from the template cut to the cross section of the road, nor more than 3/16-inch from the 10-foot straightedge applied parallel to the center line of the pavement. Correct any irregularity of the surface exceeding the above limits. Repair depressions which may develop after the initial rolling by loosening or removing the mixture and adding new material to bring the areas to a true surface. Skin patching will not be accepted. Remove such portions of the completed pavement as are defective in surface compaction or in composition, or that do not comply with all other requirements of these Specifications, and replace with suitable mixture, properly laid in accordance with these Specifications and at no cost to the Owner.

B. Thickness Requirements: Verify by core boring that the thickness of the compacted asphaltic concrete surface course is not less than that shown on the Drawings. Remove and replace to the required thickness any surface course found to be deficient.

C. Testing: Give timely notice to the testing laboratory, engaged by the contractor as described in Section 01410, of readiness for the required density and other tests. Pay for all retesting required due to non-compliance until satisfactory results are obtained.

D. Protection of Pavement: After the completion of the pavement, allow no vehicular traffic of any kind on the pavement until it has set sufficiently to prevent rutting or other distortion.

3.7 PAVEMENT REMOVAL AND REPLACEMENT PERFORMANCE

A. Removals:

1. Pavement Removal:

a. Where existing pavement is to be removed, the surface shall be mechanical saw cut prior to each trench excavation, leaving a uniform and straight edge, with minimum disturbance to the remaining adjacent surfacing. The width of cut for this phase of existing pavement removal shall be minimal.

b. Immediately following the specified backfilling and compaction, a temporary sand seal coat surface shall be applied to the cut areas. This temporary surfacing shall provide a smooth traffic surface with the existing roadway and shall be maintained until final restoration. Said surfacing will remain for 10 days in order to assure the stability of the backfill under normal traffic conditions. Following this period and prior to 15 days after application, the temporary surfacing shall be removed, and final roadway surface restoration accomplished.

c. In advance of final restoration, the temporary surfacing shall be removed, and the existing pavement mechanically sawed straight and clean to the stipulated dimensions. Following the above operation, the Contractor shall proceed immediately with final pavement restoration in accordance with these requirements.

2. Sidewalk, Drive and Curb Removal: Concrete sidewalks, curbs, combination curb and gutter, walks, drive ribbons, or driveways shall be removed by initially sawing the structure, with a suitable power saw, as specified above for pavement. When a formed joint in the concrete exists within 3 feet of the proposed saw cut and parallels the proposed saw cut, the removal line shall be extended to the formed joint. After sawing, the material shall be removed.

B. Restorations:

1. General: Street or roadway pavement cut and removed in connection with trench excavation shall be replaced or restored in equal or better condition than the original and as shown on the Drawings. The Drawings indicate minimum requirements.

2. Pavement Restoration – Asphalt: Asphaltic concrete shall be Type SP9.5 with a maximum of 15% RAP, a minimum of 1-1/2 inches thick over a minimum of 8-inches limerock base, LBR 100, 100% maximum density, AASHTO T-180.

3. Driveway Restoration – Asphalt: Driveway pavement with base cut and removed in connection with trench excavation shall be replaced or restored as specified above for street or roadway pavement, except that in no case shall new driveway base course be less than 6 inches in thickness and the asphaltic concrete shall be SP9.5 with a maximum of 15% RAP, 1 ½-inches thick. Muck or unsuitable material found under existing driveway construction will not be removed or replaced.

4. Concrete, Sidewalk, Walkway, Driveway, Driveway Ribbon, and Curb Restoration:

a. Concrete sidewalks, walkways, driveways, driveway ribbons, and curbs required to be removed for the installation of facilities under this Contract shall be restored. Concrete shall be monolithic construction and shall be 3000 PSI for sidewalks and walkways and 4000 PSI for driveways, driveway ribbon, curb, and curb and gutter combination restoration, ready-mixed concrete with commercial grade fiber-mesh.

b. Replaced portions of these items shall conform to the lines, grades, and cross sections of the removed portions. Concrete sidewalks and walkways shall be of 6-inch thickness; concrete driveways and driveway ribbons shall be 6-inch thickness. Replaced concrete curb and/or gutter shall joint neatly to the remaining section.

5. Unsurfaced streets, alleys, and driveways shall be restored with 8 inches of compacted base material placed in the top of trench.

END OF SECTION

SECTION 02576
COLD MILLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Process of removing all or portions of existing asphalt pavement to remove distressed pavement, restore cross-section, improve profile, restore clearances, or improve drainage.

B. Related Sections: Refer to the following section for related work:

1. Section 02574 “Pavement Removal & Replacement”

1.2 DEFINITIONS

Excessive Grooving: Variation in milled surface in excess of 1 inch (25 mm) from high point to low point across width of surface milled by each pass of milling machine.

PART 2 - PRODUCTS

2.1 EQUIPMENT

Milling Machine: Specially designed and built for milling of bituminous pavements without additional heat and ability to plane Portland cement concrete patches in bituminous pavements.

A. Cutting Drum: Minimum 60 inches (1.5 m) wide and equipped with carbide-tipped butting teeth placed in variable lacing pattern to produce desired finish.

B. Capable of being operated at speeds from 0 to 40 feet (0 to 12m) per minute, self-propelled and capable of spraying water at cutting drum to minimize dust while maintaining enclosed cutting area.

C. Capable of removing material next to the gutter of pavement being reconditioned and designed to enable operator at all times to observe milling operation without leaving controls.

D. Adjustable for slope and depth, capable of accurately controlling profile grades and cross slopes within tolerance of plus or minus one inch (25 mm). Equipment shall control profile grades by using either independent grade control or minimum 40 foot (12 m) external reference and shall also have cross slope elevation controls.

E. Provide smaller machine if required to trim areas inaccessible to larger machine at manholes, gate valve covers, curb returns and intersections.

F. Milling equipment shall be equipped with means to effectively limit the amount of dust escaping from milling operation.

PART 3 – EXECUTION

3.1 PREPARATION

Traffic Signal Loop Detectors: Before cold milling pavement within 300 feet (90 m) of traffic signal, notify City of Jacksonville Beach Public Works Department (COJBPWD) at least 3 working days prior to commencing work within area.

A. Upon notification, COJBPWD will coordinate marking location of existing loop detectors.

B. Do not cold mill within 12 inches (305 mm) of loop detector conductors.

C. Damage to existing loop caused by milling operation will require replacement of loops in their entirety at the Contractor's expense.

3.2 PROCEDURE

A. General: Cold mill existing pavement surface to depth, width, and grade as indicated in Contract documents or as directed by COJBPWD. Surface of pavement after milling shall be uniformly rough grooved or ridged as directed by COJBPWD.

B. Cold Milling of Pavement surfaces. Thickness of pavement removal shall be described as nominal thickness, with ranges as follows:

1. Nominal ¾-inch (19.1 mm) Cut: ¾-inch (19.1 mm) average of cuts ranging from 0 to 1-1/2 inches (0 to 38.1 mm).

2. Nominal 1-inch (25 mm) Cut: 1-inch (25 mm) average of cuts ranging from 0 to 2 inches (0 to 51 mm).

3. Nominal 1 ½-inch (38.1 mm) Cut: 1 ½-inch (38.1 mm) average of cuts ranging from 0 to 3 inches (0 to 76 mm).

4. Nominal 2-inch (51 mm) Cut: 2-inch (51 mm) average of cuts ranging from 0 to 4 inches (0 to 102 mm).

C. Loosened Material: During milling operation, sweep street with mechanical equipment and remove loosened material from site until completion of removal work. Follow no closer than 50 feet (15 m) behind the milling machine to remove millings or sweep loosened material.

D. Pavement Transitions: In areas where cold milling is done, but will not be paved within 1 week, overlay with 2-foot (610 mm) minimum width of asphalt concrete pavement transition adjacent to gutters, cross gutters, and structures and at existing transverse joint lines. Pavement transition may be omitted when vertical offset between milled surface and adjacent riding asphalt surface is less than 3/8 inch (9.5 mm).

E. Tolerances: When 10 foot (3 m) straight edge is laid on finished surface parallel to centerline of roadway surface shall not vary from edge of straightedge more than 3/8 inch (9.5 mm), except at intersections or any changes of grade.

1. Adjust to establish depth in increments of 1 inch (25mm) or less.

2. Excessive grooving by cold milling will not be permitted.

3.3 CLEANING

Keep premises free from accumulations of waste materials, rubbish and other debris resulting from work. Remove cold milled material from pavement surface and transport to approved salvage or disposal areas.

A. Remove tools, construction equipment and machinery and surplus materials.

B. Restore to their original condition portions of site not designated for alteration by Contract Documents, unless completion

END OF SECTION

SECTION 02660
WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 GENERAL

A. Scope of Work

The Contractor shall furnish and install a potable water piping system, complete, tested, and ready for operation. The work shall also include such connections, reconnections, temporary service, and all other provisions in regard to the existing operation and modification as is required to perform the new work. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the City of Jacksonville Beach Standard Water and Sewer Specifications, Details, and Testing shall be installed. All materials shall be new unless specifically stated otherwise.

B. Shop Drawing Submittals

Complete shop drawings, actual catalog data, brochures, and descriptive literature will be required and shall meet the requirements of the City of Jacksonville Beach Water and Sewer Standards. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which may, in the Engineer's opinion, not be in compliance with the City of Jacksonville Beach Water and Sewer Standards.

1. The Contractor shall submit for the approval of the Engineer four (4) copies, plus as many additional copies as he may need for his files of all shop and setting drawings and schedules required for the work.

2. The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking; no claim by the Contractor for delays arising from his failure in this respect shall be allowed.

3. All shop drawings submitted must bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings without this stamp of approval shall not be considered and will be returned to the Contractor for resubmission. If documents vary from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make mention in such letter of variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor shall not be relieved of the responsibility of executing the work in accordance with the Contract Documents even though such shop drawings have been approved.

4. Where a shop drawing is submitted by the Contractor indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the City and which does not involve a change in Contract Price or extension of time, the Engineer will approve the drawings.

5. The approval by the Engineer of shop drawings will be general and shall not relieve the Contractor from the responsibility for inherent error which may exist.

PART 2 - PRODUCTS

2.1 MATERIALS

All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, and shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

A. Pipe

Pipe for potable water lines in sizes up to and including 48 inches shall be ductile iron or polyvinyl chloride (PVC) as shown on the drawings and as herein specified. Pipe for potable water lines larger than 48 inches shall be ductile iron. Pipe to be used as a casing in sizes 4 inches and larger shall be welded steel pipe as shown on the drawings and as herein specified. Pipe to be installed underground shall be push-on joint type. Pipe installed on bridges, piles or other above ground installations shall be restrained joint ductile iron pipe or flanged ductile iron pipe as described in these specifications. PVC pipe shall not be used in above ground applications. Underground pipe shall be furnished in nominal 18- or 20-foot laying lengths unless indicated otherwise on the drawings. Pipe shall be cut to length as required to fit installation conditions. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	APPLICATION
Ductile Iron	3 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	water mains and services-3 inches & 4 inches for services only
DR18	4 inches thru 48 inches	Push-on joint	water mains and services-4 inches for services only
SDR 21 PVC	2 inches only	Push-on joint	water mains only
Polyethylene	2 inches and smaller	No joints in pipe	services only
Galvanized	smaller than 3 inches	I.P.T.	flushing valves and contaminated soil sites
Steel	4 inches and larger	Welded	casing only

1. Ductile Iron Pipe (N/A This Project)

   Ductile iron pipe wall thickness and pressure class shall conform to ANSI Specification ANSI A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151) with pressure class 150 as a minimum. Pipe shall also be certified by ISO 9000 by an accredited registrar. Each length shall be clearly marked with the name of the manufacturer, location of the foundry, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining and length. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. All ductile iron pipes shall be externally coated and internally lined as specified in this section. All ductile iron pipe shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

2. Polyvinyl Chloride Pressure Pipe

   a. Water mains 4" and larger shall be constructed of Polyvinyl Chloride (PVC) pipe with a dimension ratio (DR) of 18 suitable for a working pressure of 150 PSI at 73.4 F. Pipe shall conform to AWWA Standard C900 for Polyvinyl Chloride Pressure Pipe, 4" through 12" for water distribution, latest edition or revision. Pipe shall be manufactured to cast iron equivalent diameters.

   b. Water mains and fittings smaller than 4" shall be Polyvinyl Chloride (PVC) pipe SDR 21 PR 200 and shall conform to ASTM D2241, latest revision. The pipe shall have a gasketed bell with rubber ring conforming to ASTM F477. Fittings for 2" water mains shall be compatible with the type of pipe specified except for flushing connections which shall use solvent weld fittings. Pipe for flushing connections shall be Polyvinyl Chloride (PVC) pipe, Schedule 40 and shall conform to ASTMD1785.

   c. Fittings for four inch (4") and larger pipe shall be ductile iron and shall conform to the type of pipe being installed. The fittings shall have a minimum working pressure of 150 psi. Fittings shall be cement lined in accordance with AWWA C104/ANSI A21.4 American National

standard for Cement- Mortar Lining for Ductile-Iron pipe and Fittings for Water and shall be furnished with an external asphaltic coating.

d. Buried Warning and Identification Tape: Polyethylene plastic and metallic core or metallic-faced, acid and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, three inch (3") minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar working. Color and printing shall be permanent, unaffected by moisture or soil.

e. Warning Tape Color Codes: Blue (Water Systems): Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to three feet (3') deep. All water mains shall be provided with 12-gauge continuous wire on top of water main. All 12-gauge wiring shall be terminated inside valve boxes or at a maximum of 475' intervals with a minimum of 36 inches excess wiring rolled up inside the valve box.

3. Steel Casing Pipe (N/A This Project)

Pipe to be used as a casing shall conform to either ASTM Standard A139 for "Electric Fusion (arc) Welded Steel Pipe" with a minimum yield strength of 35,000 psi or "API Specification API-5LX, Grade X-42 Welded Steel Pipe". Wall thickness shall meet the requirements of the latest Revision of the American Railway Engineering Association Manual of Recommended Practice or the Florida Department of Transportation Standard Specification for Road and Bridge Construction. For street uses which are not DOT or railroad, use DOT casing thickness unless otherwise indicated by Engineer. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.

B. Service Lines

1. Polyethylene Tubing

All services 2 inches and smaller shall be polyethylene tubing. Tubing shall be manufactured of PE 3408, High Density Polyethylene (HDPE), in accordance with AWWA C901, ASTM D1248, ASTM D2239, ASTM D2737 and ASTM D302660. The tubing shall have a minimum working pressure of 200 psi. Polyethylene tubing shall be copper tube size SDR9 and shall be colored blue. HDPE pipe shall have ultraviolet (UV) inhibitors for protection against direct sunlight for 4 years. Inserts for polyethylene tubing shall be 316 stainless steel. Tubing shall be approved for use with potable water by the National Sanitation Foundation (NSF-14) and shall be continuously marked at intervals of not more than two feet with the following:

a. Nominal size
b. Pressure rating
c. NSF seal
d. Manufacturer's name or trademark
e. Standard dimension ratio
f. ASTM specification

C. Fittings

Fittings shall have joints that match the type of pipe furnished except as follows or as otherwise specified. Fittings on 2-inch PVC pipe may be PVC with push-on bell type joint or solvent weld. Fittings 3 inches and larger on push-on joint pipe installed underground shall be ductile iron with mechanical joint ends or PVC with restrained push-on bell type joint. Fittings 3 inches and larger installed above ground shall be ductile iron with flanged ends or restrained joints unless shown otherwise on the drawings. Fittings for fire hydrant laterals shall be ductile iron, including tee to lateral.

FITTING MATERIAL	FITTING SIZE	JOINT TYPE
Ductile Iron	3 inches and larger	mechanical joint, flanged joint, ball joint
PVC DR18	4 inch through 8 inch	push on joint
SCH 40	2 inches only	solvent weld
SCH 80	2 inches only	solvent weld, threaded
SDR 21	2 inches only	push on joint
Polyethylene	2 inches only	butt fused, compression joint
Galvanized	2 inches only	I.P.T.

1. Ductile Iron Fittings

   Ductile iron fittings shall have a minimum working pressure of 150 psi. Fittings shall conform to ANSI Specification A21.10 (AWWA C110), A21.11 (AWWA C111), A21.15 (AWWA C115) and/or A21.53 (AWWA C153). Fittings shall also be certified by ISO 9000 by an accredited registrar. Compact fittings shall normally be installed. Long body fittings shall be used where the drawings specifically call for long body fittings, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable. All fittings furnished by the approved manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, foundry location, plant code, and degrees or fraction of the circle. Cast letters and figures shall be on the outside body of the fitting. They may require random ductile testing of manufacturer's fittings. All ductile iron fittings shall be externally coated and internally lined as specified in this section.

   a. Ductile Iron Integral Restraint Joint (IRJ) fittings in sizes 4" through 12" shall meet or exceed the applicable standards cited in this specification. Fittings shall be manufactured of ductile iron (65.45.12) and shall conform to the material and performance requirements of ANSI/AWWA C153/A21.53. Fittings shall be designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 and PVC pipe conforming to AWWA C900. All fittings shall be provided with integral restraint joints and have seals conforming to ASTM F 477 and the physical testing requirements of AWWA C111. All fittings shall be internally and externally coated with fusion bonded epoxy coatings to the requirements of ANSI/AWWA C116/A21.16. Assembly of fitting joints shall not require beveling of the plain end of a cut pipe and shall not require the use of jacks or power equipment to force the pipe end past the gasket. Fittings shall be manufactured by Ebba Iron Restrainers, Uni-flange, or Mega-lugs., or engineer approved equal

2. Polyvinyl Chloride Fittings

   Fittings that are 2 inches may be PVC with push-on bell type joint or PVC with solvent weld joints as outlined in the chart of Section 2.3. Fittings that are 4 inches and larger shall be restrained push on bell joint. Restraints shall be in accordance with this specification regarding installation and material. The fittings shall conform to the appropriate sections of these specifications for PVC pipe and PVC pipejoints.

   a. PVC 1120, Class 150, DR18 Fittings

      PVC fittings 4 inches through 8 inches may be used with PVC C900 pipe. Fittings shall be PVC injection molded, made from materials meeting or exceeding the requirements of cell class 12454-B material as defined in ASTM D1784. All PVC fittings must comply with, or exceed, AWWA C907. All fittings must be designed to the pressure class of DR18, with a pressure rating of 150 psi and a 2.5 to 1 factor of safety. Virgin materials only shall be used in the manufacture of PVC pressure fittings. These fittings must have UL-FM approval and shall comply with or

exceed all ASTM Standards for PVC fittings. All fittings must have NSF-61 approval. The elastomeric gasket shall comply with the requirements specified in ASTM F477.

b. PVC 1120, SDR 21, Fittings

SDR 21 fittings shall be injection molded, push on bell type with electrometric rubber seals in accordance with ASTM D3139. Seals shall conform to ASTM F477.

c. PVC 1120, Schedule 40 And Schedule 80 Fittings

Schedule 40 and schedule 80 fittings shall have solvent weld joints and shall be in accordance with ASTM D2672.

d. Polyethylene Fittings

All polyethylene fittings shall comply with NSF-14 requirements. All fittings and couplings shall be thermoplastic nylon 6/6 material suitable for working pressure of 200 psi. Joints on all thermoplastic fittings shall be compression type with 360-degree restraint or threaded as required for a complete installation.

3. Nonstandard Fittings and Wall Castings (N/A This Project)

Fittings having nonstandard dimensions and cast specifically for this project shall be of an approved design. They shall be manufactured to meet the requirements of the same specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect. Wall castings shall be of the size and types indicated on the drawings. Flanges, facing, and drilling shall conform to the 125- pound American National Standard. Flanges shall be drilled and tapped for studs. Other dimensions shall be substantially equal to corresponding parts of standard bell and spigot fittings.

4. Tapping Sleeves

a. Stainless Steel

Stainless steel tapping sleeves may be used on 4-inch pipes and larger. Stainless steel tapping sleeves shall be all 304 stainless steels, including flanges, bolts and nuts and shall be rated for 150 psi minimum operating pressure and 200 psi minimum test pressure. The tapping sleeve shall have a pilot flange recessed for tapping per MSS SP-60. The pilot flange shall be pressure rated Class D according to AWWA C207 with 125-pound drilling conforming to ANSI B16. Each sleeve shall be supplied with a flange gasket bonded to the flange. The body gasket shall be a full circle, grid pattern, covering the entire length of the sleeve, cloth reinforced, with attached stainless-steel bridge to support the gasket at the lugs. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases, and sewage. The sleeve shall have a 3/4-inch NPT bronze or stainless-steel test plug. All welds shall conform to ASTM A380 and shall be fully passivated.

D. Joints

Type of joint used shall be approved by the Engineer prior to installation. Joints shall be made in accordance with approved printed instructions of the manufacturer and shall be absolutely watertight.

1. Mechanical Joints

All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111). All glands shall be made of ductile iron only.

2. Push-On Joints

a. Ductile Iron

Push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111). All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.

b. Polyvinyl Chloride (PVC)

PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM D3139. Electrometric gaskets shall conform to ASTM F477.

3. Ball and Socket Joints (N/A This Project)

Where sub-aqueous joints are indicated, joints shall be bolted or boltless flexible ball and socket joints conforming to the pressure and thickness requirements of ANSI A21.10 (AWWA C110) and ANSI A21.51 (AWWA C151) and shall be capable of providing a maximum deflection of fifteen degrees at each joint. Joints and gasket material shall be manufacturer's standard. The specific type of joint shall be as shown on the drawings and/or as approved by the Engineer. Installation shall be in accordance with the manufacturer's recommended practice.

4. Flanged Joints

Ductile iron flanged joints shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.15 (AWWA C115). Flanges shall be in accordance with ANSI Specification B16.1, Class 125 with any special drilling and tapping as required to ensure correct alignment and bolting. Screwed flanges shall be screwed in tight at the foundry by machine before they are faced and drilled. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true. Gaskets shall be rubber ring type, cloth inserted, minimum thickness of 1/8 inch and shall be used on all flanges. The entire gasket, including the retainer and sealing ring, shall be one continuous piece. Retainers glued together will not be accepted. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same ANSI standard as the flanges. All flange bolts and nuts shall be 316 stainless steel. Bolt studs shall be of the same quality as machine bolts. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment. The Contractor shall provide suitable filling rings where the layout of the flange piping is such as to necessitate their use. In materials, workmanship, facing and drilling, such rings shall conform to ANSI B16.1 Class 125.

5. Machined Surfaces

Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.

6. Steel Casing Pipe Joints

Steel casing pipe joints shall be electric fusion (arc) welded by operators whose qualifications meet the requirements of the American Welding Society Standard procedures and in conformance with AWWA C206.

7. Polyvinyl Chloride Solvent Weld Joints

Pipe joints for schedule 40 or schedule 80 pipe shall be solvent weld joints. The solvent cement shall comply with ASTM D2564. The joint shall be made in accordance with ASTM D2855. The joint shall conform to ASTM D2672.

8. Polyethylene Joints

Polyethylene joints shall be butt-fused, done with polyethylene fittings or brass compression fittings.

9. Restrained Joints

   a. Restrainers

      The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI A21.11 (AWWA C111) and ASTM A536. The restrainer system shall provide anchoring of PVC pipe to mechanical joint fittings or bell to spigot PVC pipe joints. Restraints shall provide a full 360-degree contact with sufficient gripping action to secure the clamp to the pipe and be designed so that restraint action is increased as a result of increases in line pressure. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance.

   b. Retainer Glands

      Retainer glands shall be manufactured of ductile iron grade 64-42-10, ASTM A536 or the pre-approved equal and shall be designed to fit standard mechanical joint bells conforming to applicable sections of ANSI A21.10 (AWWA C110), ANSI A21.11 (AWWA C111) and ANSI A21.53 (AWWA C153). The restraining device shall be rated for the full working pressure of the pipe type used including surge allowance and a 2:1 safety factor. Mechanical restraints shall include a restraining mechanism which, when actuated, imparts a wedging action against the pipe, increasing its resistance as the pressure increases. The restraint shall be compatible with the type of joint being installed. The joint deflection shall not exceed 80% of the pipe manufacturer's recommended maximum deflection. Deflection, if necessary, shall be made before tightening the set screws. Bolts and set screws shall be tightened alternately, 180 degrees apart, to the torque recommended by the manufacturer. Retainer glands having set screws that make point contact with the pipe without using a pad to disperse point loading shall not be used on PVC pipe. The restraining device shall not damage or lower the working pressure of the pipe installed. Retainer glands shall be either Ebba Iron or Mueller.

10. Flange Adapters

    Flange adapters shall be ductile iron manufactured to ASTM A536 standards. Bolt circles and bolt holes shall meet ANSI B16.1 for 125 pounds. Adapter flanges shall meet or exceed all test requirements of AWWA C900, ASTM D2241, and ASTM D1599.

11. Pipe Couplings

    The Contractor shall furnish and install pipe couplings as required to complete the work. Pipe couplings used to join two pieces of ductile iron pipe or PVC pipe shall be sized to match the outside diameter of the pipeline. Transition couplings shall be used to join pipes of different outside diameters. The coupling sleeve shall be manufactured of ductile iron conforming to ASTM A536 and be coated with 14 mils of epoxy. The bolts shall be manufactured of a metal of high corrosion resistance and shall conform to ANSI 21.11 (AWWA C111). Gaskets shall be wedge-type and manufactured of virgin SBR for water and sewer service. The installation of all couplings shall be in accordance with the manufacturer's recommendations. After installation, all coupling surfaces including bolts and nuts shall be coated with an approved coating as specified in this section of these specifications. Couplers and adapters for polyethylene pipe shall be brass conforming to AWWA C800 and shall be female IPT, pack joint, or compression nut.

12. Full Circle Repair Clamps

    Full circle repair clamps shall have type 304 stainless steel shells, lugs, bolts, nuts and washers as per ASTM A193, A194, A240, or shall have type 304 stainless steel shells per ASTM A240, ductile iron lugs as per ASTM A536, and 304 stainless steel bolts, washers, and nuts. Gaskets for both types shall be virgin SBR as per ASTM D2000 for water and sewer service.

E. Corrosion Protection for Ductile Iron Pipe

1. Interior Lining

   The interior of all ductile iron pipes, fittings, and specials shall be thin cement lined. The lining shall comply with ANSI Standard A21.4 (AWWA C104).

2. Exterior Coating

   All ductile iron pipe and fittings except on bridges or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun and be strongly adherent to the fitting. All bolts, nuts, studs, and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling. Pipes crossing under ditches, culverts, rivers, creeks, etc., shall be considered as buried pipe. All ductile iron pipes shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

3. Polyethylene Wrap (N/A This Project)

   In areas where soils are corrosive in nature, ductile iron pipes, fittings, valves and other appurtenances shall be protected with polyethylene wrap or tubing. The Contractor shall furnish and install polyethylene tube or wrap for ductile iron pipe at the locations shown on the construction drawings.

   a. Material

      The polyethylene material shall meet or exceed the requirements of AWWA C105 in all respects. The wrap shall be virgin, high density polyethylene, 4 mils thick minimum. The polyethylene wrap shall be white with 2 each, 6-inch wide, continuous blue tapes located at the 2:00 and 10:00 o'clock position on the pipe.

   b. Installation

      Although not intended to be a water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill. Installation shall be done according to one of the methods described in AWWA C105, subject to approval by the Engineer and the manufacturer.

F. Piping Supports

1. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as specified.

2. Piping within pumping stations shall be adequately supported from floors, walls, ceilings, or beams. Supports from the floor shall be by approved saddle stands or suitable concrete piers as indicated or approved. Pipe saddles shall be shaped to fit the pipe with which they will be used and shall be capable of screw adjustment. Concrete piers shall conform accurately to the bottom one-third to one-half of the pipe. Piping along walls shall be supported by approved wall brackets with attached pipe rolls or saddles or by wall brackets with adjustable hanger rods. For piping supported from the ceiling, approved rod hangers of a type capable of screw adjustment after erection of the piping and with suitable adjustable concrete inserts or beam clamps shall be used. If required, piping supports shall be placed so as to provide a uniform slope in the pipe without sagging. Supports shall be located wherever necessary, and in no case shall they exceed 8 feet on centers for ductile iron pipe and 4 feet on centers for PVC pipe.

3. Casing Spacers

   Casing spacers shall be a two-piece prefabricated unit by a single manufacturer. All casing spacers in a single casing pipe crossing shall be by the same manufacturer. Casing spacers shall have a shell made from either 304 stainless steel, 14-gauge mild steel which has been heat fusion coated with PVC plastic, (PVC coating shall be .01 inch thick over the entire band including the runner studs) or high-density polyethylene. Casing spacers on 16 inches and smaller carrier pipes shall have 8-inch-wide steel bands

and casing spacers on 18 inches and larger carrier pipe shall have 12-inch-wide steel bands, except high density polyethylene spacers shall have high density polyethylene bands. All casing spacers for 14 inches and smaller pipe size shall have four 10-gauge or 14-gauge steel risers with runners and casing spacers for 16-inch and larger pipe shall have six 10-gauge or 14-gauge steel risers with runners (two top and four bottom), except high density polyethylene spacers shall have one riser for every diameter inch of carrier pipe. The runners (risers) shall be either glass reinforced plastic, UHMW polymer, or high-density polyethylene. All nuts, bolts, and washers shall be 304 stainless steel. All risers over 2 inches in height shall be reinforced. Wooden skids are not an acceptable alternate.

G. Material Warranty

The manufacturer of materials furnished on the project shall supply to the City of Jacksonville Beach, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

H. Material Testing

The City of Jacksonville Beach requires all materials furnished to conform to the following standards. The entire product of any manufacturer or of any one part may be rejected when, in the opinion of the City of Jacksonville Beach, the methods of manufacture fail to secure uniform results acceptable to the requirements of these specifications. Pipe and materials shall be tested in, and for conformity with, the latest editions of the following:

Item	Specifications
Ductile Iron Pipe	ANSI A21.50 (AWWA C150)
and Fittings	ANSI A21.51 (AWWA C151)
	ANSI A21.53 (AWWA C153)
Polyvinyl Chloride	ASTM D1598
Pipe and Fittings	ASTM D1599
	ASTM D1784
	ASTM D1785
	ASTM D2122
	ASTM D2241
	ASTM D2564
	ASTM D2672
	ASTM D2837
	ASTM D2855
	ASTM D3139
	ASTM F477
	AWWA C900
	AWWA C905
	AWWA C907
Polyethylene Tubing	ASTM D1248
	ASTM D2239
	ASTM D2737
	ASTM D302660
	AWWA C901

PART 3 – EXECUTION

3.1 INSTALLATION

A. Reference Points and Layout

The Contractor shall be responsible for setting all grade, lines, and levels. The Contractor or Contractor's Surveyor will provide centerline of construction; the engineer will provide a reference benchmark. Any reference points, points of intersection, property corners, or benchmarks, which are disturbed during construction, shall be restored by a Land Surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

B. Handling and Cutting Pipe

Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by the City of Jacksonville Beach, may be cut off before the pipe is laid so that the pipe used shall be perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack. Except as otherwise approved, all cutting shall be done with a power driven cut off saw. All cut ends shall be examined for possible cracks caused by cutting.

C. Pipe Installation

1. General Requirements

Water mains shall be constructed of the materials specified and as shown on the drawings. All PVC C900/C905 pipes shall be laid in accordance with AWWA C605. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks. Defective, damaged, or unsound pipe or fittings shall be rejected. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. Any pipe which has its grade or joint disturbed after laying shall be taken up and re-laid. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer. Plugs shall remain in pipe ends until all water is removed from the trench. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the Engineer. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe.

2. Pipe Cover

The cover over all piping shall be a minimum of 30 inches in unpaved areas and 36 inches in paved areas with a maximum of 60 inches unless specifically approved otherwise. Cover for pipe under pavement shall be measured from the finished grade. Any reduction in pipe cover will require approval from the City of Jacksonville Beach and the Engineer. Greater depths will be permitted where required to miss obstructions only. Lines shall be located as shown on the drawings. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the Engineer of the results of these investigations so that the Engineer may give instructions as to the modifications required. Refer to Section 02200 for backfill and compaction requirements.

3. Installation of Iron Piping

All iron pipe and fittings shall be laid in accordance with the pipe manufacturer's recommendations

and the American Water Works Association Specification AWWA C600.

4. Thrust Restraint

All non-flanged fittings and valves shall be restrained using one of the following methods:

a. Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified in the following table.

All M.J. Fittings must be restrained using either Ebba Iron Restrainers, Uni-flange, or Mega-lugs. Rod restraints will be approved on an individual basis only.

No thrust blocks will be used without prior approval of City of Jacksonville Beach Public Works Department.

CHART "F"

MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)									
NOMINAL PIPE SIZE (INCHES)	11 1/4° Horizontal Elbow	22 1/2° Horizontal Elbow	45° Horizontal Elbow	90° Horizontal Elbow	Horizontal Tees	Horizontal Plugs and Valves	45° Vertical Offset Upper length/lower length	22½° Vertical Offset Upper length/lower length	Reducer (to 1 size smaller) Length on Larger Size Side
4	2	4	8	20	20 - run 1 – branch	50	20/3	8 / 1	n/a
6	2	5	10	28	20 - run 1 – branch	70	28/4	11 / 2	28
8	3	6	14	36	20 - run 1 - branch	90	36/5	14 / 3	30
10	4	8	18	40	20 - run 1 - branch	110	45/6	17 / 3	29
12	4	9	20	50	20 - run 1 - branch	120	52/8	20 / 4	50
14	5	10	23	56	20 - run 10 - branch	140	60/9	23 / 4	30
16	6	11	26	60	20 - run 26 - branch	160	67/10	26 / 5	30
18	6	12	29	69	20 - run 41 - branch	180	74/12	29 / 5	29
20	7	13	32	75	20 - run 55 - branch	195	80/13	36 / 6	29
24	7	15	33	76	20 - run 58 - branch	200	81/14	37 / 7	55
30	9	18	36	88	20 - run 77 - branch	235	97/16	44 / 8	77
36	10	20	40	100	20 - run 115 - branch	270	110/20	51 / 10	77

NOTE: Table assumptions: PVC pipe, Safety Factor = 1.5, Soil = GM or SM, 3 ft. bury depth to top of pipe, trench type 3, branch on tee is one size smaller than run of tee size and 20 feet of pipe is installed past the tee on the run side (smaller branch sizes must be calculated by the engineer). Vertical offsets are 3 feet deep on top and 8 feet deep on bottom. Reducers are calculated for one size reduction. Test pressure of 150 psi.

The use of thrust blocks shall be limited to situations such as point repair where exposing several joints of pipe is not feasible due to existing ground conditions and also must be used with mechanical joint restraining devices when, in the judgment of the Engineer, the nature and criticality of an installation is such as to require positive assurance of stability. Concrete collars with tie rods may be used on dead end lines at the Contractor's discretion.

Concrete used for this purpose shall be 2,500 psi minimum. When applicable, schedule and details for the required thrust blocks are included on the drawings. The use of thrust blocks will only be approved by the City of Jacksonville Beach for special conditions.

5. Joint Restraints within Carrier Pipe (N/A This Project)

All joints within steel casing pipe shall be restrained with mechanical restraining devices. End joints shall be tie rodded, with the ends of the rods welded to the end of the casing.

6. Casing Spacer Installation (N/A This Project)

All carrier pipes in casings shall utilize casing spacers installed on the carrier pipe inside the casing pipe. Casing spacers shall be installed one foot on both sides of each carrier pipe joint and at ten feet intervals along the carrier pipe for pipe up to 48 inches. For carrier pipes larger than 48 inches, casing placement shall be as recommended by the casing spacer manufacturer. A casing spacer shall also be installed within two feet of each of the ends of the casing pipe.

D. Water Main and Non-Water Main Separation Requirements

1. Horizontal Separation between Underground Water Mains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, Reclaimed Water Pipelines, and On-Site Sewage Treatment and Disposal Systems.

a. New or relocated underground water mains shall be laid to provide a horizontal distance of at least three feet between the outside of the water main and the outside of any existing or proposed storm sewer, stormwater force main, or pipeline conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C.

b. New or relocated underground water mains shall be laid to provide a horizontal distance of at least three feet, and preferably ten feet, between the outside of the water main and the outside of any existing or proposed vacuum-type sanitary sewer.

c. New or relocated underground water mains shall be laid to provide a horizontal distance of at least six feet, and preferably ten feet, between the outside of the water main and the outside of any existing or proposed gravity-or pressure-type sanitary sewer, wastewater force main, or pipeline conveying reclaimed water not regulated under Part III of Chapter 62-610, F.A.C. The minimum horizontal separation distance between water mains and gravity-type sanitary sewers shall be reduced to three feet where the bottom of the water main is laid at least six inches above the top of the sewer.

d. New or relocated underground water mains shall be laid to provide a horizontal distance of a least ten feet between the outside of the water main and all parts of any existing or proposed "on-site sewage treatment and disposal system" as defined in Section 381.0065 (2), F.S., and Rule 64E-6.002,F.A.C.

2. Vertical Separation between Underground Water Mains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, and Reclaimed Water Pipelines

a. New or relocated underground water mains crossing any existing or proposed gravity-or vacuum – type sanitary sewer or storm sewer shall be laid so the outside of the water main is at least six inches, and preferably twelve inches, above or at least twelve inches below the

outside of the other pipeline. However, it is preferable to lay the water main above the other pipeline.

b. New or relocated underground water mains crossing any existing or proposed pressure-type sanitary sewer, wastewater or storm water force main, or pipeline shall be laid so the outside of the water main is at least six inches, and preferably twelve inches, above or at least twelve inches below the outside of the other pipeline. However, it is preferable to lay the water main above the other pipeline. However, it is preferable to lay the water main above the other pipeline.

c. At the utility crossings described in paragraphs (a) and (b) above, on full length of water main pipes shall be centered above or below the other pipeline so the water main joints will be as far as possible from the other pipeline. Alternatively, at such crossings, the pipes shall be arranged so that all water main joints are a least three feet from all joints in vacuum-type sanitary sewers, storm sewers, stormwater force mains, or pipelines conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C., and at least six feet from all joints in gravity or pressure type sanitary sewers, wastewater force mains, or pipelines

3. Separation between Water Mains and Sanitary or Storm Sewer Manholes.

a. No water main shall pass through, or come into contact with, any part of a sanitary sewer manhole.

b. Effective August 28, 2003, water mains shall not be constructed or altered to pass through, or come into contact with, any part of a storm sewer manhole or inlet structure. Where it is not technically feasible or economically sensible to comply with this requirement (i.e., where there is a conflict in the routing of a water main and a storm sewer and where alternative routing of the water main or the storm sewer is not technically feasible or is no economically sensible), the Department shall allow exceptions to this requirement (i.e., the Department shall allow construction of conflict manholes), but suppliers of water or persons proposing to construct conflict manholes must first obtain a specific permit from the Department in accordance with Part V of this chapter and must provide a preliminary design report or drawings, specifications, and design data accompanying their permit application the following information:

i. Technical or economic justification for each conflict manhole.

ii. A statement identifying the party responsible for maintaining each conflict manhole.

iii. Assurance of compliance with the design and construction requirements in sub-subparagraphs a. through d. below.

(a) Each water main passing through a conflict manhole shall have a flexible, watertight joint on each side of the manhole to accommodate differential settling between the main and themanhole.

(b) Within each conflict manhole, the water main passing through the manhole shall be installed in a watertight casing pipe having high impact strength (i.e., having an impact strength at least equal to that of 0.2-inch-thick ductile iron pipe).

(c) Each conflict manhole shall have an access opening, and shall be sized, to allow for easy cleaning of the manhole.

(d) Gratings shall be installed at all storm sewer inlets upstream of each conflict manhole to prevent large objects from entering the manhole.

4. Separation between Fire Hydrant Drains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, Reclaimed Water Pipelines, and On-Site Sewage Treatment and Disposal Systems.

New or relocated fire hydrants with underground drains shall be located so that the drains are at least three feet from any existing or proposed storm sewer, stormwater force main, or pipeline conveying reclaimed water regulated under Part III of Chapter 62-610, F.A.C.; at least three feet, and preferably ten feet, from any existing or proposed vacuum-type sanitary sewer; at least six feet, and preferably ten feet, form any existing or proposed gravity or pressure type sanitary sewer, wastewater force main, or pipeline conveying reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.; and at least ten feet from any existing or proposed "on-site sewage treatment and disposal system" as defined in Section 381.00665(2), F.S., and Rule 64E-6.002, F.A.C.

E. System Connections

All connections and ties to the City of Jacksonville Beach Water System and transfer of services will be performed by the Contractor under supervision of the City of Jacksonville Beach's representative.

1. Water Main Connections

Tapped connections in the barrel of a pipe shall be less than the diameter of pipe being tapped except for a 4-inch pipe which may be tapped with a 4-inch tapping sleeve and valve. No taps shall be made within 5 feet of a joint. When making 2-inch PVC water main connections to water mains, a flexible connection shall be made using 2-inch polyethylene pipe one foot long (minimum). The polyethylene pipe shall tie to the existing water main and then tie to the new 2-inch PVC water main. There shall be a stainless-steel nipple between saddle and valve on 2-inch water main connections.

2. Water Service Connections

Water services to be Polyethylene – Orangeburg #4-05110, 3406 or Drisco pipe 3408, 5100 ultra-line. All long and short side water services are to be one inch (1").

F. Field Testing

1. Disinfection Tests

a. All water pipe and fittings of whatever size and wherever installed on potable water lines shall be thoroughly disinfected prior to being placed in service. Disinfection shall follow the applicable provisions of the procedure established for the disinfection of water mains as set forth in AWWA Standard C651 entitled "AWWA Standard for Disinfecting Water Mains". See Appendix

Temporary blow-offs shall be installed for the purpose of clearing the water main. Blow-offs installed on water mains up to and including 12 inches shall be the same diameter as the water main. Blow-offs installed on 16-inch water mains and larger shall be the next smaller size, in diameter, than the water main being tested. Temporary blow-offs shall be removed and plugged after the main is cleared. The City of Jacksonville Beach Representative shall be present prior to and during the operation of blow-offs. The main shall be flushed prior to disinfection.

The new water main shall be connected to the existing water main at one point only for flushing purposes (no looping). The new main MUST have a blow off at the end as required previously. After the new main is thoroughly flushed, the open end shall be sealed and restrained and the main shall be thoroughly disinfected as specified.

The contractor may use a separate source of water for flushing purposes. Upon completion of the flushing, the contractor shall proceed with disinfection as specified.

Anytime the new line is reopened (to repair defective joints or pipe, defective fitting or valve) the complete disinfection process shall be repeated.

Once bacteriological clearance (on 2 days of samples) has been approved, the main may be pressure tested against an existing system valve.

The Permittee's Engineer shall submit two (2) copies each of the following: FDEP certification form; pressure test results (witnessed by City of Jacksonville Beach Public Works, Distribution and Collection System personnel); two (2) consecutive days of satisfactory bacteriological test samples; and As-Built drawings to the City Engineer or Public Works Director for signatures prior to submittal to the FDEP. **No new water mains shall be placed into service until a Certification of Completion has been approved by the Florida Department of Environmental Protection (FDEP).** The Contractor shall allow time for this process to be completed.

2. Leakage and Pressure Tests

The Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by the City of Jacksonville Beach or connecting pipeline to any existing pipeline or facility. All field tests shall be done in the presence of the Engineer. Except as otherwise directed, all pipelines shall be tested. Pipelines laid in excavation (other than trench excavation) shall be tested prior to the backfilling of the excavation. All piping to operate under liquid pressure shall be tested in sections of approved length. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment and all labor required. If the Contractor chooses to pressure test against an existing City of Jacksonville Beach water main/valve, the new water main must be disinfected prior to connection to the City of Jacksonville Beach line. The City of Jacksonville Beach will not be responsible for failure of the pressure test due to the existing valve leaking. If positive test results cannot be obtained because the City of Jacksonville Beach valves will not hold the test pressures, the Contractor shall be required to disconnect from the City of Jacksonville Beach System and re-test independent of the City of Jacksonville Beach System and at the Contractor's expense. The Contractor will use suitable pressure gauges, calibrated by an approved testing laboratory, with increments no greater than 2 psi. Gauges used shall be of such size that pressures tested will not register less than 10% nor more than 90% of the gauge capacity. Leakage and pressure testing shall be in accordance with AWWA C600 and as outlined below.

a. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If blow-offs or other outlets are not available at high points for releasing air, the Contractor shall make the necessary taps at such points and shall plug said holes after completion of the test.

b. Hydrostatic testing shall consist of a combined pressure test and leakage test. Specified test pressures, based on the elevation of the highest point of the line or section under test, and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection, and all necessary apparatus shall be furnished by the Contractor and shall be subject to the approval of the Engineer. All valved sections shall be hydrostatic tested to ensure sealing (leak allowance) of all line valves. See Section 351.

c. All piping shall be pressure and leakage tested for a minimum of two hours duration at 150 psi. Pressure tests shall be conducted with a pressure loss of not more than 5 psi regardless of length being tested. No pipe will be accepted if pressure loss is greater than 5 psi, regardless of leakage test results. All exposed pipes, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory. Repairing, replacing, and retesting shall be done at the Contractor's expense.

d. Leakage tests shall be conducted simultaneously with the pressure tests. At the end of the pressure test, the line will be pumped back to initial test pressure. The quantity of water used

to repump the line shall be measured and compared to the limitations calculated using the leakage equation below. No pipe installation will be accepted if the leakage is greater than determined by the following formula:

$$L = \frac{SD\,P^{1/2}}{133200}$$

In which L is the allowable leakage in gallons per hour, S is the length of pipeline tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test in pounds per square inch. If any test discloses leakage greater than that specified above, the Contractor shall, at its own expense, locate and repair the defective material and retest until the leakage is within the specified allowance.

e. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting, or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

f. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval, but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement. Re-disinfection shall be required if the line is depressurized for repairs prior to tying into the City of Jacksonville Beach system.

3. Locate Wiring Testing

Installed locate wiring shall be tested by the contractor with an approved testing company using approved equipment. Locate wire testing company must be provided with a copy of the As-Builts.

G. Inspection

All pipes and fittings shall be subject to inspection at the time of delivery and in the field just prior to installation. All pipes and fittings, which in the opinion of the Engineer do not conform to these specifications, will be rejected and shall be removed by the Contractor at the Contractor's expense. An authorized City of Jacksonville Beach representative must be present for all pressure and leakage testing, connections to the existing lines, and the collection of water samples. The City of Jacksonville Beach representative will pull the water samples and deliver them to the lab.

H. State Highway Crossings

Permits for all work within the right-of-way of a State Highway will be obtained by the Engineer. The Contractor shall, however, verify the existence of the permit before commencing work in this area. All work related to the State Highway crossing shall be in full compliance with the requirements of the Florida Department of Transportation permit and in accordance with the Florida Department of Transportation Utility Accommodation Guide and standard specifications. Unless otherwise shown on the drawings or specified herein, State Highway crossings shall be made by jacking a steel pipe casing, of the size shown on the drawings and shown in the City of Jacksonville Beach Standard Details, under the highway at the elevations and locations shown. The water main shall then be placed in the casing with approved casing spacers as specified in this section. All joints within carrier pipe shall be mechanically restrained joints. After inspection, the ends of the casing shall be filled with 2500 psi concrete not less than 8 inches thick.

I. Railroad Crossings (N/A This Project)

Permits for all work within the railroad right-of-way will be obtained by the Engineer. The Contractor shall, however, verify existence of the permit before commencing work in this area. All work related to

the railroad crossings shall be in full compliance with the terms of the permit and AREA Specifications for Pipeline Crossings Under Railway Tracks for Non-Flammable Substances. The water main shall be placed in steel casing pipe under all railroad crossings whether installed by open cutting or jacking and boring. The water main shall then be placed in the casing with approved casing spacers as specified in this section. All joints within carrier pipe shall be mechanically restrained joints. After inspection by the Engineer, the ends of the casing shall be sealed with 2,500 psi. concrete not less than 12 inches thick. Upon completion and prior to final acceptance, the Contractor shall place crossing markers of a type acceptable to the Railroad Company at each end of the crossing at the railroad right-of-way.

K. Locate Wiring

Contractor shall furnish and install #12 copper locate wiring and warning tape on all PVC water mains and polyethylene and PVC water services installed. Locate wire on services shall be limited to a continuous loop of wire extending 3 feet along the service from the main. Locate wire must be attached to water mains and services with plastic zipper type ties at each side of bell joint or fitting and at 10-foot intervals along pipeline. Locate wire shall be brought to within 8 inches of grade within a valve box or water meter box flush with finished surface with 36 inches of locate wire rolled up inside box at 475-foot intervals. Locate wire shall be installed in box and along pipeline as detailed in the City of Jacksonville Beach Standard Details. Locate wire shall be installed in either the 1:00 or 11:00 position on the pipe. Locate wires shall be attached to intersecting ductile iron or galvanized pipeline using a three-way splice and brass split ground clamp with wire installed around brass nipple. Locate wiring must have the ability to conduct electrical current; therefore, the wiring must be continuous with any breaks in the line spliced as per the City of Jacksonville Beach Standard Details. Locate wire shall be spliced with the City of Jacksonville Beach approved wire connectors.

L. New Water Services

New water services shall be furnished and installed in the sizes and locations indicated on the Contract documents. Short services shall be services installed on the same side of the road as the water main. Long services shall be services installed on the opposite side of the road as the water main. All water services on this project will be installed by the jack & boring or underground piercing tool method. No open cutting of roadway will be allowed for water services.

M. Renewal and Transfer of Water Service

1. General

Where a new water main is installed or where an existing water main is relocated or replaced, as shown on the drawings or where necessary due to a direct conflict with proposed construction and when approved by the Engineer, the Contractor shall install new piping from the water main to each existing water meter.

2. Service Line Size

Service lines and component parts thereof shall be sized based on the existing meter size as follows:

SINGLE METER SERVICES		
Meter Size	Service & Tap Size	Curb Stop Size
3/4”	1”	1”
1”	1”	1”
1-1/2”	1-1/2”	1-1/2”
2”	2”	2”

N. Contractor Warranty

The Contractor shall supply to the City of Jacksonville Beach a one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

END OF SECTION

SECTION 2660-B
WATER VALVES & APPURTENANCES

PART 1 - GENERAL

1.1 GENERAL

A. Scope of Work

The Contractor shall furnish, install, joint, and test all gate valves, butterfly valves, check valves, and other special valves and appurtenances as shown on the drawings and herein specified. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials Manual shall be installed. All materials shall be new unless specifically stated otherwise.

B. Rotation of Opening

All valves larger than two inches installed within a water system to be the City of Jacksonville Beach owned shall open by turning to the left or counterclockwise, when viewed from the stem.

C. Extension Stems

Where extension stems are required, substantial, adjustable wall brackets and extension stems shall be furnished and located as directed. Extension stems shall be provided on all buried valves when the operating nut is deeper than 30 inches below the final grade. Sufficient stem extension shall be provided so that the nut will be no more than 30 inches below finished grade.

D. Painting of Valves and Valve Box Lids

The top side of all water valve box covers shall be painted blue except for gate valves at fire hydrants. The top of valve box covers at fire hydrants shall be painted yellow. Oil-based, traffic-rated paint shall be used.

E. Hydrostatic and Leakage Test

The Contractor shall be required to perform a separate hydrostatic/leakage field test on each valve installed to insure it is bubble tight. The duration of this test shall be 15 minutes at 150 psi and conform to AWWA C504. The method of performing this test shall be left up to Contractor with the Engineer's approval. The failure of the valve to perform will result in its removal from the job site and replacement by the Contractor at the contractor’s expense.

F. Locating Markers for Valves

A ‘V’ cut shall be carved in the curb closest/adjacent to a below grade valve. This ‘V’ cut shall be painted blue.

PART 2 - PRODUCTS

2.1 GATE VALVES

A. Gate valves two inches (2") and smaller shall be bronze body, inside screw, with non-rising stem, solid wedge, 200 PSI cold water non-shock rating, and open by turning to the left. Valve shall be Walworth No: 4, Powell No: 507, or approved equal.

B. Gate valves three inches (3") to twelve inches (12") in diameter shall be designed for 175 PSI minimum working pressure. Valves over twelve inches (12") in diameter shall be 150 PSI minimum working pressure. Gate valves, when fully open, shall have a clean waterway equal to the nominal diameter of the pipe. The valve shall open by turning to the left or counterclockwise when viewed from the stem. The operating nut or wheel shall have an arrow cast in the metal indicating the direction of opening. Each

valve shall have the manufacturer's distinctive marking, pressure rating and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydraulic pressure equal to twice the specified working pressure. Gate valves shall be iron body, fully bronze mounted, single disc, double seat, tapered wedge type, except as noted otherwise herein and unless otherwise called for on the plans. The valves shall conform to AWWA C500 (latest), Specifications for Gate Valves for Ordinary Water Works Service with an "O" ring seal of standard manufacture.

1. All Buried gate valves shall be iron body bronze mounted, rubber encapsulated, resilient seat, solid wedge, non-rising stem type with operating nuts and adjustable valve boxes and covers. Operating nuts shall be two inches square. All gate valves 20 inches or larger must be bevel geared for both horizontal and vertical installations. All valves shall be installed vertically unless additional depth of bury is impossible due to physical obstructions. Where depth of cover does not permit, the valves shall be mounted horizontally and fitted with rollers, scrapers, and tracks. Tracks shall be stainless steel. Provide cleanout on each side of the bonnet. Gate valves shall open counterclockwise.

2. All above ground gate valves shall be of the rising stem type. Above ground valves shall have hand wheel operators.

3. Valves sixteen inches (16") in diameter and larger shall contain enclosed gears and also an enclosed worm geared type position indicator.

4. Valves sixteen inches (16") in diameter and larger for vertical buried installation shall be furnished with enclosed spur gearing. Valves for horizontal installation shall be furnished with enclosed beveled gearing. Exposed valves shall have open gearing.

C. Gate valves three inches (3") through twelve inches (12") shall be Clow, M & H, American Flow Control, Mueller, or approved equal; and gate valves fourteen inches (14") and larger shall be Clow, M & H, American Flow Control, Mueller, or approved equal.

D. Resilient-Seated Gate Valves: Resilient wedge gate valves shall be manufactured to meet all applicable requirements of AWWA C509-80, Standard for Resilient-Seated Gate Valve. Valves twelve inches (12") and smaller shall have a working water pressure rating of 200 PSI and shall have non-rising stems, left opening, provided with two inch (2") square operating nut with arrow cast in the metal to indicate direction of opening. Interior surfaces of the valve body shall be coated with a two (2) part, thermosetting, non-toxic epoxy coating, minimum thickness of four (4) mils. Each valve shall have the manufacturer's name, pressure rating and year of manufacture cast on the body and shall be factory tested by hydrostatic pressure equal to twice the specified working pressure prior to shipment. Resilient seated wedge type gate valves shall be as manufactured by Clow, M & H, American Flow Control, Mueller, or approved equal. Contractor shall provide complete submittal data, including detailed drawings showing ASTM numbers of all components, interior coating specifications, and certificates that each valve has met specified pressure test requirements.

E. Above Ground Valves

Gate valves located above ground or inside structures shall be hand wheel operated, non-rising stem type with flanged ends and be of the same general construction as buried valves.

F. Valve Joints

All gate valves shall have mechanical joint ends, flanged ends, or screw joints to fit the pipe run in which they are used, except valves installed on push-on joint pipe shall have mechanical joint ends unless otherwise specified.

2.2 BUTTERFLY VALVES

A. General

Butterfly valves must be used on water mains larger than 24 inches. Butterfly valves shall not be used on pipes 24 inches or smaller. All butterfly valves shall be of the tight closing, rubber seat type with rubber seats which are recess-mounted and securely fastened to the valve body or attached to the valve disc. Valves shall be bubble tight at rated pressures in both directions of flow and shall be satisfactory for applications involving valve operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the fully open position to the tight shut position. Valves shall meet the full structural requirements of the applicable classes of AWWA C504.

B. Valve Bodies

Valve bodies shall be constructed of ductile iron conforming to ASTM A126, Class B, and buried valves shall have integrally cast mechanical joint ends. Above ground valves shall be flanged in accordance with ANSI B16.1, Class 125. Two trunnions for shaft bearings shall be integral with each valve body. Body thickness shall be in accordance with AWWA C504.

C. Valve Discs

Valve discs shall be constructed of Ni-Resist, Type 1 or ductile iron, ASTM A536, Grade 65-45-12 with stainless steel seating edges. All disc seating edges not incorporating recess-mounted rubber seats shall be smooth and polished.

D. Valve Shafts

Valve shafts shall be "Stub Shaft" type or one piece, extending full size through the disc (or a minimum of 1-1/2 shaft diameters per "stub shaft" valves) bearings and into the operating mechanism and shall be constructed of ASTM A276, type 304 stainless steel or a stainless steel with greater overall corrosion and oxidation resistance, or shall be high tensile steel with stainless steel shaft journals, Teflon bushings and shaft seals. Shaft diameters shall meet the minimum requirements of AWWA C504 for Class 150B.

E. Valve Seats

Shall be of a natural rubber or a synthetic rubber compound. Bonded seats shall be simultaneously molded in, vulcanized and bonded into the valve body. Seat bond must withstand 75 lb. pull under test procedure ASTM D429, Method B. Valve seats on 24" diameter valves and larger shall be field adjustable and replaceable without dismantling operator, disc or shaft and without removing the valve from the line. Provision for adjustment shall take the form of heavy corrosion resistant retaining segments which lock the seat rigidly in position after adjustment and which will affect a minimum of 1/8 inch change in seat rise at equal increments around the periphery. Seats attached to the valve disc shall be held in place by a stainless steel, ASTM A296, Grade CF8 retaining ring. Cap screws through the rubber seat and the seat retaining ring must be provided for adjustment of the rubber seat. The mating body seat shall be constructed of type 304 stainless steel.

F. Valve Bearings

Valves shall be fitted with sleeve type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed the published design load for the bearing material, or 1/5 of the compressive strength of the bearing or shaft material.

G. Valve Operators

Manual valve operators shall be of the worm gear or traveling nut type and fully enclosed. Units furnished for buried service shall be fully gasketed and grease packed. Valves located above ground shall be equipped with hand wheel operators and shall have a suitable indicator arrow to give valve position from full open to fully closed. Buried valves, designated to be furnished with above ground operators, shall be equipped with hand wheel operators and position indicators on extended bonnet. The hand wheel for buried valves shall be set 3 feet above finished grade. All other buried butterfly valves shall be furnished

with a 2-inch AWWA nut operator with a valve box and cover. Operator components shall, at the extreme operator positions, withstand, without damage, a pull of 200 lb. for hand wheel or chain wheel operators or an input torque of 300 ft. lb. for operating nuts.

2.3 CHECK VALVES

Check valves shall conform to the requirements of AWWA C508. Check valves larger than 2-inch nominal size shall be iron body, flanged ends, outside lever, spring loaded, swing type with straight-away passageway of full pipe area. The valve shall have renewable bronze seat ring and rubber-faced disc. Check valves larger than 2 inches shall be 150 psi working pressure. Check valves 2 inches and smaller nominal size shall be all brass swing check valves, 200 psi working pressure. Buried check valves shall be installed in an access box with traffic rated cover.

2.4 MISCELLANEOUS VALVES AND APPURTENANCES

A. Tapping Valves

1. General

Tapping valves shall be iron body, bronze mounted gate valves, non-rising stem, open left, resilient seat, 2-inch square operating nut, for vertical mounting in approximately level setting on buried water lines. The valve ends shall be mechanical joint for use with ductile iron pipe on one side and standard flanged (Class 125) on the other. Valves shall conform to the applicable section of these specifications.

2. Disinfection of Tapping or Drilling Machine

Prior to tapping a potable water main, the drilling machine's pilot drill, shell cutter, and cutter hub shall be sterilized in accordance with the following procedure:

Four gallons of potable water shall be combined with 8 oz. of sodium hypochlorite (household bleach); the pilot drill, shell cutter, and cutter hub shall be swabbed until clean or totally immersed in the sterilizing solution and allowed to remain wet at least five minutes before tapping operation commences. It is not necessary to rinse the sterilizing solution from tapping components prior to use.

3. Hydrostatic and Leakage Test

After installing a tapping sleeve and valve, and prior to tapping of a pressurized water main, a hydrostatic and leakage test shall be performed. The test will be conducted by introducing water into a tap or test hole located at the neck of the outlet half of the sleeve, on sleeves furnished with said tap, and with the tapping valve in the closed position. Sleeves shall be provided with a test plug. The sleeve and valve shall be capable of maintaining a test pressure of 150 psi for 30 minutes duration, with no sign of visible leaks. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be re-tested. Such repair and re-testing shall be done until the installation passes the specified test. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps, and other incidental and appurtenant items necessary to complete this work and shall remove same upon completion of the test. A watertight plug shall then be inserted into the test hole.

B. Corporation Stops

All corporation stops to be Ford ball corp. FB 1600 AWWA/cc taper thread inlet by female iron pipe thread outlet or FB1000 ball corps with grip joint, McDonald 4701BT. Corporation stops shall be required on all services regardless of service size.

C. Curb Stop

Curb stops must be either Ford B41-343W-G (3/4' x 1") and B41-344W-G (1") both with grip joints and McDonald 6102 W.T.

Adapters can be Ford C84 series with grip joint or Mueller H-15428.

Separate services to be terminated with a curb stop in meter box one foot (1') off property line and minimum of two feet (2') offside property line. Either Brook #37 with 37H lid, for one-inch (1") Brook #38 with 38H lid for 1½", Brook #65 with 65H for 2" or DPW Model D-1200 for one-inch (1") services. When performing pressure tests, curb stops must be capped or plugged and tested in the open position.

D. Ball Valves

Ball valves shall be limited to 3/4 inch through 2 inches in size and shall have cast bronze body, bronze tee head, stem with check, full roundway opening, and provisions for locking in a closed position. Ball valves for use with copper services shall have an inlet connection with a flare nut fitting for Type K copper tubing and an outlet connection with female iron pipe thread or shall have an inlet connection with a compression joint (insert stiffener will be used with plastic service connections) and an outlet connection with female iron pipe thread. Ball valves for use with Schedule 40 PVC pipe shall have an outlet connection with female iron pipe threads and an inlet connection with either a compression joint or female iron pipe threads. The latter will require the use of an approved Schedule 40 PVC Adapter (MIPT X SLIP). Compression joints will require insert stiffeners. Below grade ball valves on water mains must have two inch (2") operating nuts and be installed in standard valve boxes.

E. Service or Tapping Saddle

Water services to be made with service saddle for C.I., AC or galvanized double strap JCM 402, Mueller H- 10500, Smith-Blair 313, or Ford 202 and must be CC threads (AWWA).

Service saddles for PVC C-900 water pipe are Mueller (H-134—series or Ford S90). Taps to existing water mains will be made with an approved stainless steel tapping sleeve and resilient seat tapping valve.

Taps to existing water mains will be made with an approved stainless steel tapping sleeve and resilient seat tapping valve.

2.5 FIRE HYDRANTS

A. General

Fire hydrants shall be 4 ½ inch ductile iron body, fully bronze mounted, for 150 psi working pressure, complying with AWWA Standard C502. Fire hydrants to be Mueller #A421 or #A423, Clow Medallion, or M&H AWWA C-502 style 129 Traffic Model, 4½" main valve size. Unless otherwise stated, all drain holes must be rocked with 57 stone. The inlet connection shall be a mechanical joint type, with accessories, for 6-inch ductile iron pipe. The hydrant foot shall be epoxy coated and have integral cast tie-back lugs. The integral shut-off valve shall be compression type opening against water pressure, right hand openings. Valve diameter and general interior design shall be sufficient to provide head loss/flow quantity ratios less than specified in the above cited Standard. The main valve seat and the threaded portion of the hydrant into which it screws shall be bronze. The hydrant barrel drain valve and port shall be bronze. The hydrant barrel drain shall be actuated by operation of the main valve stem. The stem operating threads and thrust bearing shall be sealed, by "O" rings, from exposure to moisture and shall be provided with means for lubrication. The hose nozzles shall be bronze with National Standard fire hose coupling screw threads, one 4-inch pumper nozzle and two 2-½-inch hose nozzles. The hydrant operating nut and nozzle cap nuts shall be 1¼" square. Pipe used for fire hydrant laterals shall be ductile iron Pressure Class 350, or Class 150 DR18 PVC. Tees and bends leading to fire hydrants shall be ductile iron only. The nozzle caps shall be securely chained to the hydrant barrel. The chains shall be free from rust or corrosion and painted to match the color of the hydrant. The hydrants shall be "Traffic" type with a frangible flange or lugs and operating stem section at the ground line. The hydrant shall be painted with

the above ground finish color "Traffic Yellow".

B. Installation

Fire hydrants shall be installed at the locations shown on the drawings in accordance with the City of Jacksonville Beach Standard Details.

C. Independent Valve

Independent valve furnished with each hydrant shall be 6-inch, non-rising stem gate valve with mechanical joint ends in conformance with the sub-section entitled "Gate Valves" of these specifications. Independent valves shall be provided with a cast iron valve box in conformance with the sub-section entitled "Valve Boxes".

D. Hydrostatic and Leakage Test

Hydrostatic and leakage tests shall be conducted in accordance with AWWA C502, Section 5.

2.6 VALVE BOXES

A. General

The Contractor shall furnish, assemble, and install a valve box for each buried valve. Each valve box installed in non-paved areas shall be installed with a 24-inch round, 6-inch-thick concrete collar with #4 reinforcing bars, poured around the top of the valve box cover. The concrete shall have a minimum strength of 3000 psi. Provide brass identification tag with “Water”, valve size and valve type epoxied or riveted to interior of valve box. Tag shall be 2-inch diameter, 1/8-inch-thick brass, located a maximum of 2 inches below the top of the valve box.

B. Valve Boxes

Adjustable valve boxes of suitable length shall be used. Cover shall be marked "Water". The top section shall be adjustable for elevation and shall be set to allow equal movement above and below finished grade. The base shall be centered over the valve and shall be online with nut at top of valve stem and the entire assembly shall be plumb. Boxes for paved areas shall be cast iron. Boxes for non-paved areas may be PVC. Cast iron castings shall be manufactured of clean, even grain, gray cast iron conforming to ASTM Designation A48, Class 20B, Gray Iron Castings; and shall be smooth, true to pattern, free from blow holes, sand holes, projections, or other harmful defects and shall be coated with a single thin coat of coal tar epoxy. The cover will not rock after it has been seated in any position in its associated jacket.

C. Debris Cap

Debris caps shall be required in all valve boxes. The debris cap shall be comprised of a hollow member having a cylindrical outer surface, a closure for one end, and three-point resilient contact pads projecting from the outer surface. One contact pad shall be movable by means of a cam having a low angle of advance whereby external forces applied to the cam via the movable contact pad will not cause rotation of said cam. The cap shall have a flexible shirt providing an outward seal preventing debris from getting past the cap. The cap must withstand without slippage, a minimum vertical force of 50 lbs. at a loading rate of 1.0 inches/minute. The cap shall have retaining prongs to retain a standard locating coil, and shall be capable of installing a standard fitting for “Lock-out/Tag-out” in compliance to all standards and requirements of State and Federal OSHA guidelines

2.7 METER BOXES

A. Concrete

Where called for on the drawings, concrete meter boxes shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials and shall be installed in

accordance with the City of Jacksonville Beach Water and Sewer Standard Details. Concrete meter boxes will only be allowed in driveway and sidewalk areas.

B. Copolymer

Where called for on the drawings, copolymer meter boxes shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details. Copolymer meter boxes will be used in all grass areas.

2.8 BACKFLOW PREVENTION DEVICES

A. Double Check Valve Backflow Assembly

Where called for on the drawings, double check valve backflow assembly shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

B. Double Check Valve Detector Assembly

Where called for on the drawings, double check valve detector assembly shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

C. Reduced Pressure Principal Assembly

The reduced pressure backflow preventer shall consist of two independently operating check valves, a hydraulically dependent differential relief valve, and two independent ball valve shut offs. The reduced pressure backflow preventer shall protect against back-siphonage and back-pressure conditions with both checks fouled.

D. Atmospheric (Non-Pressure) Type Vacuum Breaker

Where called for on the drawings, atmospheric (non-pressure) type vacuum breakers shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details, and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

E. Pressure Type Vacuum Breaker

The pressure vacuum breaker shall be a device containing within its structure an approved check valve, vacuum relief, inlet, and shutoff valves, and field-testing cocks. All moving parts shall be corrosion resistant. The device shall meet the requirements of A.S.S.E. Standard 1020.

2.9 WATER METERS

A. Compound Water Meter

Where called for on the drawings, compound water meters shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

B. Turbine Water Meter

Where called for on the drawings, turbine water meters shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standard Details and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

C. Compact Fireline Water Meters

Where called for on the drawings, compact fireline water meters shall be the type as listed in the City of Jacksonville Beach Water and Sewer Standards, Details and Materials and shall be installed in accordance with the City of Jacksonville Beach Water and Sewer Standard Details.

2.10 MATERIAL WARRANTY

The manufacturer of materials furnished on the project shall supply to the City of Jacksonville Beach, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

2.11 CONTRACTOR WARRANTY

The Contractor shall supply to the City of Jacksonville Beach one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

END OF SECTION

SECTION 02661
GRAVITY SEWERS

PART 1 - GENERAL

1.1 Description

A. Scope of Work:

The Contractor shall furnish and install all gravity sewer lines, manholes, fittings and appurtenances required for a complete system as shown on the drawings and specified herein. The work shall also include such connections, reconnections, temporary service, bypassing operations, and all other provisions in regard to existing sewer operations and modifications as is required to perform the new work. All bypass pumping operations required to complete the gravity sewer main/service installations shall be included as part of the unit price for installing the gravity system piping. Bypassing pumps shall be the silent pack type units to minimize the sound associated with the work.

B. Quality Assurance

1. Design Requirements:

Contractor shall provide no less than 6" clearance between all utilities unless otherwise indicated. Maintain a minimum of 10-foot horizontal separation between water mains and sewer mains. Where water mains and sewer mains cross, maintain water main 18 inches above sewer main. Where this is not possible, mains shall be encased in a steel casing or concrete, or as otherwise directed on the Drawings or in writing by the Design Engineer.

C. Submittals

1. Shop Drawings:

The Contractor shall submit to the Engineer 3 sets of shop drawings plus that required by Contractor. At minimum, the shop drawings shall include:

a. Manhole Covers and Frames
b. Pipe and Fittings
c. Manholes

D. Job Conditions

1. Water in Excavation:

Water shall not be allowed in the trenches while the pipes are being laid and/or tested. The Contractor shall not open more trench than the available pumping facilities are able to dewater to the satisfaction of the Engineer. The Contractor shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working. In no case shall the pipelines being installed be used as drains for such water, and the ends of the pipes shall be kept properly and adequately blocked during construction by the use of approved stoppers and not by improvised equipment. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matter into the pipelines. If, on completion of the work, any such material has entered the pipelines, it must be cleaned as directed by the Engineer so that the entire system will be left clean and unobstructed.

PART 2 - PRODUCTS

2.1 Materials

A. General:

All material shall be free from defects impairing strength and durability and be of the best commercial quality for the proposed specified. It shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail. All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer, the batch number, the location of the plant, and strength designation.

B. PVC Pipe SDR 35:

Polyvinyl Chloride Sewer pipe for use in gravity sewer systems shall conform to ASTM D-3034-74 for Type PSM Polyvinyl Chloride (PVC) sewer pipe and fittings for sizes 4 inch through 12 inch in diameter, except as hereinafter modified. The pipe material shall meet or exceed the approved Class 12 454-B, PVC compound conforming to ASTM D1784, latest. The bell shall be extruded integral with the pipe barrel with a thickness equal to or greater than that of the barrel. The laying length shall not exceed 12' - 6" +/- 1" without specific written approval of the Design Engineer.

1. Joints: Joints for PVC pipe and fittings shall be in accordance with ASTM D-3034-74, subparagraphs 6.2 and 6.2.1.

2. Elastomeric Gasket Joint: Provision shall be made for contraction and/or expansion at each joint with a solid cross section rubber ring. The rubber ring shall be factory assembled and secured in the bell, in such a manner so as to prevent sliding or rolling when the spigot end of the adjoining pipe is installed.

3. Fittings: All fittings and accessories shall be manufactured in accordance with ASTM D-3034-74, except that saddle tees or saddle wyes shall not be permitted except by special written approval of the Design Engineer. Said fittings shall have a thickness equal to or greater than that specified in the aforementioned pipe specification and shall be of the bell and spigot configuration.

4. Test Reports: All pipe and fittings delivered to the job site shall be accompanied by independent testing, laboratory reports, certifying that the pipe and fittings conform to the above-mentioned ASTM specification(s).

5. Certification: The Contractor shall submit a notarized statement of certification from the pipe manufacturer as to conformance with the aforementioned ASTM specification(s) and modifications thereto, at the time of submitting shop drawing and data on the pipe and fittings.

C. Ductile Iron Pipe:

Ductile iron pipe, 3-inch through 54-inch, shall conform to ANSI Standard Specification A21.51-76 Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water and Other Liquids with the minimum rated working pressure. The pipe shall have design values of 60,000 P.S.I. tensile strength, 42,000 psi yield strength, and 10% minimum elongation. The wall thickness shall be in accordance with Table 51.2 and the corresponding class designation in Table 51.3 of the above referenced Specification using wall thickness for laying condition "B" and thickness as required to the depth of cut shown on drawings. In addition to the standard required by markings required ANSI A21-51-76, each joint of pipe shall be marked for the depth of cut it is to be used on the project. Such marking shall be stenciled on the pipe exterior. The interior of all ductile iron pipe 8 inches and larger shall be furnished with a factory applied Polyethylene or coal tar epoxy lining. All ductile iron pipe 6-inch diameter and smaller shall be furnished with a factory applied bituminous interior coatings, of either coal tar or an asphalt base at least 1 mil thick. Joints for ductile iron pipe shall be as hereinbefore specified for cast iron pipe.

1. Fittings: Shall conform to ANSI Standard Specifications A21.10-71, American Standard for cast iron fittings, 2 inch through 48-inch for water and other liquids, class 150, Mechanical unless otherwise noted on the drawings.

2. Tapping Saddles: Shall conform to ANSI Standard Specifications A21.10-71, American Standard for

Gray-Iron and Ductile Iron fittings, 2-inch through 48-inch for water and other liquids, class 150, with a Mechanical Joint Socket connection in accordance with ANSI A21.11 latest edition, Table 10.1.

3. Coating: All ductile iron pipes and fittings shall be furnished with a factory applied bituminous coating of either coal tar or asphalt base at least one mil in thickness applied to the outside of the pipe and fittings.

D. The interior of all ductile iron pipe and fittings shall be furnished with factory applied polyethylene lining. The lining material shall be virgin polyethylene complying with ASTM D1248, compounded with sufficient carbon black to resist ultraviolet rays during above ground storage of the pipe. The polyethylene shall be fused to the interior of the pipe by heat forming a tightly bonded lining.

1. Operating Limits: Lining shall have the capability of withstanding operating temperatures from minus 20 degrees F. to plus 170 degrees F. and withstanding sewage with a minimum pH of 4.0.

2. Application: Polyethylene lining is to cover the inner surface of the pipe, extending from the plain or beveled end to the rear of the gasket socket.

3. Adhesion: Each pipe is to be checked at the point of manufacture to assure bond of the lining to the pipe. Any indication of separation of lining from pipe is cause for rejection. The acceptable method of testing is to use a knife to slit the lining to bare metal. This slit will be 1 " to 2" in length and will be made approximately one (1) foot from the plain end of the pipe. The knife point will then be used to attempt to pry the lining from the pipe. If the lining can be readily separated in this manner, the pipe shall be rejected. After testing, the slit shall be repaired with a small torch lightly flaming the slit until the surface has refused.

4. Entrapped Material: Any sizeable protrusion in the lining obviously caused by lining over foreign materials shall be cause for rejection.

5. Separations: Linings which have separations caused by hot slips produced during the lining, operation shall be rejected. A "hot slip" defect would appear as a double, flow or fold in the lining with evidence of separation.

6. Damages to Lining: Injurious mechanical damage such as chuck marks and gouges extending to bare metal are not acceptable. At the discretion of the Engineer, the pipe having such a defect shall either be rejected or shall be field repaired. The only acceptable method of field repair is to trim off the loose ends of the polyethylene, thoroughly dry and clean the bare metal by sanding or wire-brushing, and applying at least two coats of coal tar epoxy to a total thickness of approximately 20 mils.

7. Lining Thickness: Linings of nominal 20 mil thickness shall generally equal or exceed 20 mils throughout the pipe. At pipe ends, lining thickness may taper for a distance of 4 inches from the ends to a minimum of 10 mil thickness.

8. Pinholes and/or Holidays: The size of individual discontinuities shall not exceed 0.1 square inch at the lining surface. At least 99% of the total metal surface, as defined in paragraph 428.2.6, shall be covered with polyethylene.

9. Warranty: A five (5) year warranty shall be furnished by the manufacturer on the serviceability of the lining. This warranty shall include but not be limited to statements that at any time up to the end of the fifth year from the date of pipe shipment:

   a. The lining shall not have disbonded.
   b. The lining shall not have suffered any appreciable underfilm migration.
   c. The interior pipe metal, at points of pinholes or holidays, shall not have suffered detrimental deterioration.

d. The lining shall have maintained its smooth surface characteristics.

This warranty shall be exempt from:

e. Mechanical damage during shipment, unloading, storage stringing, installation, or service; however, the repair of any damaged area in no way jeopardizes the warranty of the balance of the lining.
f. Erosion due to abrasives in the sewage.
g. Sewage with pH below 4.0.

10. Certification: The manufacturer shall furnish notarized certificates of compliance stating that the lining conforms to all requirements of these specifications.

PART 3 - EXECUTION

3.1 General

The method of pipe laying shall be subject to the approval of the Engineer. Each pipe shall be inspected and tested before being laid to ensure that it is sound and of good quality. The pipe laying shall proceed up-grade, beginning at the lower end of the sewer, with all bell ends up-grade. In no case shall the pipe be walked on either before or after the joints have been made. Upon discovery, any defective pipe which may have been laid shall be removed and replaced with sound pipe at no additional cost to the City. Extreme care shall be taken to keep the pipe in exact alignment and elevation. Pipe shall be laid to conform accurately to the lines and grades indicated on the drawings. It shall be the Contractors responsibility to locate all underground utilities in advance of construction, to ensure that no conflicts occur with the proposed line and grade. If approved by the Engineer, minor changes in the alignment but not the grade will be permitted to avoid underground facilities, provided that straight alignment can be maintained between manholes. However, if a conflict is found between an existing utility and proposed grade, the Contractor is to furnish the Design Engineer with all pertinent information, so that remedial design can be performed.

3.2 Laying and Jointing

A. The pipe shall be laid on an unyielding foundation with uniform bearing under the full length of the barrel of the pipe. Suitable excavations shall be made to receive the bell of each pipe, which shall be carefully laid true to line and grade. All adjustments to line and grade must be made by scraping away or filling in under the barrel of the pipe and not by wedging and blocking up any portion of the pipe. The spigot end of each pipe shall abut against the base of the socket of the adjacent pipe in such a manner that there will be no unevenness of any kind along the bottom halves of the pipes. Just before jointing the pipes, the mating ends shall be thoroughly cleaned of all dirt, debris, and foreign material. The pipe shall be jointed in accordance with the recommendations of the manufacturers.

B. Stoppers:

Openings such as stubs, tees, or other services along the lines shall be securely closed by means of an approved stopper that fits into the bell of the pipe and is recommended by the pipe manufacturer. This stopper shall be jointed in such a manner that it may be removed at some future time without injury to the pipe itself. At the close of each day's work, and at other times when pipe is not being laid, the end of the pipe shall be temporarily closed with a close-fitting stopper approved by the Engineer.

C. Cleaning:

All necessary precautions shall be taken to prevent the entrance of mud, sand or other obstructing material into the pipelines. As the work progresses, the interior of the sewer shall be cleaned of all dirt, jointing material, and superfluous materials of every description. The Contractor shall flush all sewer lines constructed under this Contract with clean water, prior to final inspection, to assure complete removal of all debris and foreign material and to the satisfaction of the Engineer.

D. Bedding and Backfill:

For pipe material of Acrylonitrile-Butadine-Styrene, (ABS) either a composite or solid wall sewer pipe and also Polyvinyl Chloride (PVC) Sewer Pipe, sufficient backfill shall be performed to protect the pipe adequately from injury and movement as stipulated in ASTM-D-2321 latest. The bedding for this type of pipe shall be Class B, Type I modified unless under-cutting is required. If unsuitable material shall be removed and replaced with AASHO Class A-3 sand and compacted to the requirements of Section 408 of this set of specifications. The bedding shall be compacted in 6-inch lifts to one (1) foot above the top of pipe and then the remaining backfill shall be placed in 12-inch loose lifts and compacted to 100% maximum density, per ASTM D1557, latest.

3.3 Service Connections

Types of connections shown on the drawings. Although the general location of connections may be shown on the drawings, the actual location shall be determined by the Contractor, subject to approval by the Engineer. Each service connection shall be accurately recorded by stationing on the As-built drawings and shall be furnished to the Engineer.

3.4 Grade and Alignment Stakes

All grade and alignment stakes for construction under this project shall be set by a land surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor. The requirements for this work to be accomplished by a registered land surveyor may be waived by the Engineer in the event the Contractor desires to utilize his own personnel and furnishes, in writing to the Engineer, satisfactory evidence that his personnel are qualified to set the grade and alignment stakes. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

3.5 Tests

General:

A. All work constructed shall be subject to visual inspection for faults or defects and any such deviation or omission shall be corrected at once. All tests shall be made by the Contractor who shall provide necessary equipment for testing and the system in the presence of, and under the supervision and instructions of the Engineer. All costs for testing defined below shall be borne by the Contractor.

B. Deflection and Deformation:

Acrylonitrile-Butadiene-Styrene (ABS) and Polyvinyl Chloride (PVC) pipe shall be tested for deflection and deformation, deflection inspection and/or equipment to be used shall be approved by the Design Engineer prior to any tests being performed. Any pipe found to be deformed and/or deflected in excess of 5% of the nominal diameter of the pipe shall be removed and replaced with new pipe at no additional cost to the City. Results of the test shall be submitted to the City in triplicate, in a report format approved by the Design Engineer. The cost of this service shall be included in the unit price bid for the particular item to which it is related.

1. TV Inspection:

Television inspection prior to paving will be required on all new and/or replacement sewers constructed under this project. This service shall be provided by the Contractor as a part of this Contract. The newly constructed sewers shall be televised in the presence of the Engineer or his representative. A full report, as to the condition of pipe, type, depth, location of services, length, type joint, and distance between manholes, etc., shall be furnished to the Engineer prior to the final acceptance and/or final payment of the Contract. The cost of this service shall be included in the unit price bid for the particular item it is related to. The Contractor shall submit to the Engineer a blank copy of the proposed TV report form for approval prior to any inspection services being performed.

Any pipe found to be cracked, leaking, or otherwise defective shall be removed and replaced with new

pipe at no additional costs to the City.

3.6 Sewer Abandonment

A. Sewer Line Abandonment:

Abandonment of all existing gravity sewer lines falling within the limits of street, easements, alley, or highway rights-of-way shall be treated in the following manner. Existing gravity sewer lines will not be classified as abandoned until such time as all existing service connections have been transferred to a new operating sewer line.

B. Seals:

All abandoned sewer lines where called for on the contract drawings to be sealed shall be sealed at each end and at every break in the line. Seals for all pipe sizes shall be of Class "C" concrete or concrete grout and rubble and shall extend into the sewer for at least 12 inches.

C. Grout Filled:

All abandoned sewer lines where called for on the contract drawings to be grout filled shall be accomplished by the following procedure. Lines to be grout filled shall be completely filled with the sand cement grout by pumping the mixture into the pipelines from downstream or low end of the line with an approved grout pump. The Contractor shall clean the line of all sand and debris prior to grout filling.

D. Grout Mix:

Grout for filling abandoned sewer lines shall consist of at least 15% Portland cement by volume and shall be mixed to a consistency suitable for pumping. Sand used in the grout mixture shall meet the requirements for fine aggregate.

3.7 Remove Existing:

Where shown on the contract drawings or called for elsewhere in the contract documents shall mean the complete removal of the sewer pipe and disposed of as specified by the Engineer.

A. Remove and Construct:

Where shown on the contract drawings or called for elsewhere in the contract documents shall mean the complete removal of the existing sewer pipe and constructing a new sewer pipe in the same trench, but not necessarily in the same documents shall mean the complete removal of the existing sewer pipe and constructing a new sewer pipe in the same trench, but not necessarily in the same elevation. The existing pipe shall be disposed of by the Contractor. Excavation and backfill shall be as specified in Section 02220.

B. Seal at Existing Structures:

When sewers that are to be abandoned or existing lines to be removed fall above or below the new line to be constructed, the opening left in the existing manhole wall shall be thoroughly plugged with "Embeco 167 Mortar" or approved equal non-shrinking mortar applied and cured in strict conformance with the manufacturer's recommendations. The mortar shall be finished smooth and flush with the adjoining interior manhole wall surface.

END OF SECTION

SECTION 02661-B
SANITARY SEWER MANHOLE REHABILITATION

PART 1 - GENERAL

1.1 Summary

A. This specification shall govern all labor, materials, equipment, and appliances necessary for sanitary sewer manhole interior rehabilitation for the purpose of eliminating infiltration and inflow, providing corrosion protection, repair of cracks and voids, and restoration of the structural integrity of the manhole as a result of the application of a monolithic fiber-reinforced structural/structurally enhanced pure calcium aluminate cementitious liner to the wall, ceiling, and bench surfaces of concrete, brick, or any other masonry construction material.

1.2 Submittals

A. Submit manufacturer's material data and application and installation instructions for all products used.

B. Provide documentation that the proposed manhole rehabilitation process has a minimum 5-year history for reconstruction of sanitary sewer manholes on projects of similar size and scope.

1.3 Quality Assurance

A. Use, mix, apply, and cure all products in accordance with the manufacturer's recommendations and instructions.

B. Provide recommended daily or per lot test specimens for compressive strength and other testing per applicable ASTM standards.

PART 2 - PRODUCTS

2.1 Materials

A. Patching Mix:

1. A quick- setting, fiber-reinforced, calcium aluminate-based cementitious material for patching and filling voids and cracks.

2. Material shall have the following minimum requirements:

Compressive Strength	ASTM C-109	6 hr, 1,400 psi
Shrinkage	ASTM C-596	0% at 90% R.H.
Bond	ASTM C-321	28 day, 150 psi
Cement		Sulfate resistant
Density, when applied		105 ± 5 pcf

B. Infiltration Control Mix:

1. A rapid-setting cementitious product specifically formulated for infiltration control.

2. Material shall have the following minimum requirements:

Compressive Strength	ASTM C-109	1 hr, 600 psi
Compressive Strength	ASTM C-109	24 hr, 1,000 psi
Bond	ASTM C-321	1 hr, 30 psi
Bond	ASTM C-321	24 hr, 80 psi

C. Grouting Mix:

1. A rapid-setting cementitious grout specifically formulated for stopping very active infiltration and filling voids.

2. A rapid-setting chemical grout specifically formulated for stopping very active infiltration.

D. Liner Mix:

1. A fiber-reinforced pure-fused calcium aluminate cement and calcium aluminate aggregate to be wet mixed and low-pressure spray applied to form the structural/structurally enhanced monolithic cementitious liner covering all interior manhole surfaces.

2. Material shall be pre-mixed and specially formulated to withstand H_2S (hydrogen sulfide) bacterial corrosion and abrasion in sewer networks.

3. Material shall have the following minimum requirements:

Compressive Strength	ASTM C-495	1 day > 8,000 psi
Compressive Strength	ASTM C-495	7 day > 9,000 psi
Compressive Strength	ASTM C-495	28 day > 9,000 psi
Flexural Strength	ASTM C-293	12 hr > 1,000 psi
Flexural Strength	ASTM C-293	28 day > 1,400 psi
Shrinkage	ASTM C-596	0 % at 95% R.H.

E. Bonding Compound:

Material shall be a modified cementitious bonding compound that protects exposed reinforcement steel and enhances bond of overlay to substrate.

F. Water:

Water shall be clean and potable.

PART 3 - EXECUTION

3.1 Manhole Preparation

A. Place covers over sewer inverts to prevent extraneous material from entering the sewer lines.

B. Remove foreign, loose, and unsound concrete and masonry material from the interior surfaces of the manhole by means of high pressure (1,500 psi minimum) water spray.

C. Loose, unsound, and protruding concrete and masonry material not able to be removed by high pressure water spray may require the use of mason's or mechanical tools for removal.

D. Clean the interior surfaces of the manhole with high pressure (1,500 psi minimum) water spray, using detergent, muriatic acid, antibacterial agent, or other chemicals to remove grease, oil, and other contaminants that would prevent good bond between the existing manhole interior surface and the liner material.

E. Active hydrostatic leaks (infiltration) shall be stopped using one of the rapid-setting grouting mixes specially formulated for control of very active infiltration.

F. Very active hydrostatic leaks (infiltration) shall be stopped using one of the rapid-setting grouting mixes specially formulated for control of very active infiltration.

G. Clean and prepare exposed reinforcement steel and apply and cure bonding compound, in accordance

with the product manufacturer's instructions and recommendations.

H. Prepare cracks and voids to be patched and filled and apply and cure patching mix, in accordance with the product manufacturer's instructions and recommendations.

I. Areas of manholes that are found to be structurally damaged and in need of repair beyond the scope of this specification shall be brought to the attention of the Engineer. A suitable repair method shall be developed for each area and submitted to the Engineer for review prior to commencing the repair.

J. Prepare, clean, and repair manhole benches and inverts in the same manner as prescribed above.

3.2 Liner Application, Curing and Testing

A. Prepare manhole surfaces, wet batch-mix liner material, low pressure spray apply liner mix to manhole ceiling, wall, and bench surfaces and allow liner to cure in accordance with the product manufacturer's instructions and recommendations.

B. Liner application shall be 0.5-inch minimum thickness. The application shall be completed with a minimum of two coats. The first coat shall be applied at a thickness adequate to cover the substrate and be troweled to compact the material into voids and set the bond. The second coat shall be applied to ensure complete coverage at the specified 0.5-inch minimum thickness.

C. Inverts shall be lined with patching mix, trowel applied in one coat to 0.5-inch minimum thickness.

D. Prepare, label, and submit recommended daily or per lot test specimens for testing.

3.3 Cleaning

A. Clean manhole interiors and remove all construction-related materials, equipment, and appliances from the manholes prior to reinstatement of the manholes to service.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Manhole Interior Lining

A. Measurement:

Measurement basis for payment for manhole interior lining shall be square feet of manhole interior surface lined at 0.5-inch minimum thickness.

B. Payment:

Payment for manhole interior lining shall be the number of square feet of manhole interior surface lined times the unit price bid per square foot of manhole interior lining.

C. Incidentals:

Manhole preparation, liner application, curing and testing, and cleaning shall be considered incidental to the unit price bid per square foot of manhole interior lining.

4.2 Manhole Structural Repairs

A. Measurement:

No measurement will be made for payment for manhole structural repairs.

B. Payment:

Payment for manhole structural repairs shall be on the basis of the negotiated time and material rates for each of the identified areas requiring structural repair.

END OF SECTION

SECTION 02662
SEWAGE FORCE MAINS

PART 1 - GENERAL

1.1 SCOPE OF WORK

The Contractor shall furnish and install a forced sewage piping system, complete, tested and ready for operation. The work shall also include connections, reconnections, temporary service, and all other provisions in regard to the existing operation and modification as is required to perform the new work. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated.

PART 2 - MATERIALS

2.1 All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected, and be true to detail.

A. PIPE

Pipe for forced sewage lines in sizes up to and including 48 inches shall be ductile iron or polyvinyl chloride PVC as shown on the drawings and as herein specified. Pipe for forced sewage lines larger than 48 inches shall be ductile iron. Pipe to be used as a casing in sizes 4 inches and larger shall be welded steel pipe as shown on the drawings and as herein specified. Pipe to be installed underground shall be push-on joint type. Pipe installed on bridges, piles, or other above ground installations shall be restrained joint ductile iron pipe or flanged ductile iron pipe as described in these specifications. PVC pipe shall not be used in above ground applications. Underground pipe shall be furnished in nominal 18- or 20-foot laying lengths unless indicated otherwise on the drawings. Pipe shall be cut to length as required to fit installation conditions. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	APPLICATION
Ductile Iron	3 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	sewage force mains above ground or otherwise exposed
PVC DR18	4 inches thru 48 inches	Push-on joint	sewage force mains
PVC SCH 80	2 & 3 inches only	Solvent Weld	
Steel	4 inches and larger	Welded	casing only

1. Ductile Iron Pipe (N/A This Project)

2. Polyvinyl Chloride Pressure Pipe

Pipe shall be virgin polyvinyl chloride (PVC) pipe rated for potable water and shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3139. Electrometric seals shall meet ASTM F477. The pipe material shall be clean, virgin, National Sanitation Foundation No. 14 approved, Class 12454-A or 12454-B PVC compound conforming to ASTM resin specification D1784. Each length shall be clearly marked with the name of the manufacturer, location of the plant, pressure rating, nominal pipe diameter, and length. Storage and handling of PVC pipe shall be in accordance with chapter 6 of AWWA Manual M23. All PVC force main piping shall be green.

a. PVC 1120, Class 100, DR 25 Pipe (N/A This Project)

b. PVC 1120, Class 150, DR 18 Pipe

Pipe shall conform to AWWA Standard C900 for 4-inch through 12-inch pipe, and AWWA Standard C905 for 14-inch through 36-inch pipe. All pipes shall be hydrostatically proof tested at the factory in conformance with UNI-B-11 standards. In case of conflict between standards specified herein, the requirements of AWWA Standard C900 and C905 shall prevail. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters. The pipe shall be designed to pass without failure a sustained pressure test of 500 psi in conformance with ASTM D1598 and a quick burst test of 755 psi in conformance with ASTM D1599.

c. PVC 1120, Schedule 80 Pipe (N/A This Project)

3. Steel Casing Pipe (N/A This Project)

B. Fittings

Fittings shall have joints that match the type of pipe furnished except as follows or as otherwise specified. Fittings 3 inches on PVC pipe shall be solvent weld. Fittings larger than 3 inches on push-on joint pipe installed underground shall be ductile iron with mechanical joint ends or PVC with restrained push on bell type joint. Fittings larger than 3 inches installed above ground shall be ductile iron with flanged ends or restrained joints unless shown otherwise on the drawings.

1. Ductile Iron Fittings

Ductile iron fittings shall have a minimum working pressure of 250 psi. Fittings shall conform to ANSI Specification A21.10 (AWWA C110), A21.11 (AWWA C111), A21.15 (AWWA C115) and/or A21.53 (AWWA C153). Fittings shall also be certified by ISO 9000 by an accredited registrar. Compact fittings sized 3 inches through 16 inches shall normally be installed. Long body fittings shall also be used where the drawings specifically call for long body fittings, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable. All fittings furnished by the approved manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, foundry location, plant code and degrees or fraction of the circle. Cast letters and figures shall be on the outside body of the fitting. The Engineer may require random ductile testing of manufacturer's fittings. All ductile iron pipes shall be externally coated and internally lined as specified in this section.

2. Polyvinyl Chloride Fittings

The fittings shall conform to the appropriate sections of these specifications for PVC Pipe and PVC Pipe Joints.

a. PVC 1120, Class 150, DR18 Fittings.

PVC fittings 4 inches through 8 inches may be used with PVC C900 pipe. Fittings shall be PVC injection molded, made from materials meeting or exceeding the requirements of cell class 12454-B material as defined in ASTM D1784. All PVC fittings must comply with, or exceed, AWWA C907. All fittings must be designed to the pressure class of DR18, with a pressure rating of 150 psi and a 2.5 to 1 factor of safety. Virgin materials only shall be used in the manufacture of PVC pressure fittings. These fittings must have UL-FM approval and shall comply with or exceed all ASTM Standards for PVC fittings. All fittings must have NSF-61 approval. The elastomeric gasket shall comply with the requirements specified in ASTM F477.

b. PVC 1120, Schedule 80 Fittings (N/A This Project)

Fittings 2 inches and 3 inches shall be Schedule 80 PVC with solvent weld joints and shall be in accordance with ASTM D2672.

3. Nonstandard Fittings and Wall Castings

Fittings having nonstandard dimensions and cast specifically for this project shall be of approved design. They shall be manufactured to meet the requirements of the same specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect. Wall castings shall be of the size and types indicated on the drawings. Flanges, facing, and drilling shall conform to the 125-pound American National Standard. Flanges shall be drilled and tapped for studs. Other dimensions shall be substantially equal to corresponding parts of standard bell and spigot fittings.

4. Tapping Sleeves

a. Cast Iron, Mechanical Joint

Cast Iron mechanical joint tapping sleeves shall be rated for 200 psi minimum for 4-inch through 12-inch and 150 psi minimum for sizes 14-inch through 24-inch and shall conform to ASTM A126. Mechanical joint shall conform to section 2.1.B.1. Lining and coating shall conform to section 2.1.D. Tapping sleeves shall have an outlet flange conforming to ANSI B16.1, Class 125 with MSS SP-60.

b. Stainless Steel

Stainless steel tapping sleeves shall be all 316 stainless steel including flanges, bolts, and nuts and shall be rated for 150 psi minimum operating pressure and 200 psi minimum test pressure. The tapping sleeve shall have a pilot flange recessed for tapping per MSS SP-60. The pilot flange shall be pressure rated Class D according to AWWA C207 with 125-pound drilling conforming to ANSI B16. Each sleeve shall be supplied with a flange gasket bonded to the flange. The body gasket shall be a full circle, grid pattern, covering the entire length of the sleeve, cloth reinforced, with attached stainless-steel bridge to support the gasket at the lugs. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases and sewage. The sleeve shall have a 3/4-inch bronze or stainless-steel NPT test plug. All welds shall conform to ASTM A380.

3 Joints

Type of joint used shall be approved by the Engineer prior to installation. Joints shall be made in accordance with approved printed instructions of the manufacturer and shall be absolutely watertight.

PART 3 - EXECUTION

3.1 Mechanical Joints

All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111). All glands shall be made of ductile iron only. Mechanical joint gaskets shall be of a composition suitable for exposure to sewage, sludge, or scum within the pipe.

3.2 Push-On Joints

A. Ductile Iron

Push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111). All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.

B. Polyvinyl Chloride (PVC)

PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM D3139. Elastomeric gaskets shall conform to ASTM F477.

3.3 Ball and Socket Joints

Where sub-aqueous joints are indicated, joints shall be bolted or boltless flexible ball and socket joints conforming to the pressure and thickness requirements of ANSI A21.10 (AWWA C110) and ANSI A21.51 (AWWA C151) and shall be capable of providing a maximum deflection of fifteen degrees at each joint. Joints and gasket material shall be manufacturer's standard for exposure to sludge or sewage. The specific type of joint shall be as shown on the drawings and/or as approved by the Engineer. Installation shall be in accordance with the manufacturer's recommended practice.

3.4 Flanged Joints

Ductile iron flanged joints shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.15 (AWWA C115). Flanges shall be in accordance with ANSI Specification B16.1, Class 125 with any special drilling and tapping as required to ensure correct alignment and bolting. Screwed flanges shall be screwed in tight at the foundry by machine before they are faced and drilled. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true. Gaskets shall be rubber ring type, cloth inserted, minimum thickness of 1/16 inch, and shall be used on all flanges. The entire gasket, including the retainer and sealing ring, shall be one continuous piece. Retainers glued together will not be accepted. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same ANSI standard as the flanges. Bolts and nuts shall be of Grade B conforming to the ASTM Specifications for steel machine bolts and nuts and tap bolts, designation A307. Bolt studs shall be of the same quality as machine bolts. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment. The Contractor shall provide suitable filling rings where the layout of the flange piping is such as to necessitate their use. In materials, workmanship, facing, and drilling, such rings shall conform to ANSI B16.1 Class 125.

3.5 Machined Surfaces

Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.

3.6 Steel Casing Pipe Joints

Steel casing pipe joints shall be electric fusion (arc) welded by operators whose qualifications meet the requirements of the American Welding Society Standard procedures and in conformance with AWWA C206.

3.7 Polyvinyl Chloride Solvent Weld Joints (N/A This Project)

Pipe joints for schedule 80 pipes, 2 and 3 inches only, shall be solvent weld joints. The solvent cement shall comply with ASTM D2564. The joint shall be made in accordance with ASTM D2855. The joint shall conform to ASTM D2672.

3.8 Restrained Joints

A. Restrainers

The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI

A21.11 (AWWA C111) and ASTM A536. The restrainer system shall provide anchoring of PVC pipe to mechanical joint fittings or bell to spigot PVC pipe joints. Restraints shall provide a full 360-degree contact with sufficient gripping action to secure the clamp to the pipe and be designed so that restraint action is increased as a result of increases in line pressure. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance.

B. Retainer Glands

Retainer glands shall be manufactured of ductile iron grade 64-42-10, ASTM A536 or pre- approved equal and shall be designed to fit standard mechanical joint bells conforming to applicable sections of ANSI A21.10 (AWWA C110), ANSI A21.11 (AWWA C111) and ANSI A21.53 (AWWA C153). The restraining device shall be rated for the full working pressure of the pipe including surge allowance and a 2:1 safety factor. Mechanical restraints shall include a restraining mechanism which, when actuated, imparts a wedging action against the pipe, increasing its resistance as the pressure increases. The restraint shall be compatible with the type of joint being installed. The joint deflection shall not exceed 80% of the pipe manufacturer's recommended maximum deflection. Deflection, if necessary, shall be made before tightening the set screws. Bolts and set screws shall be tightened alternately, 180 degrees apart, to the torque recommended by the manufacturer. Retainer glands having set screws that make point contact with the pipe without using a pad to disperse point loading shall not be used on PVC pipe. The restraining device shall not damage or lower the working pressure of the pipe installed.

3.9 Flange Adapters

Flange adapters shall be ductile iron manufactured to ASTM A536 standards. Bolt circles and bolt holes shall meet ANSI B16.1 for 125 pounds. Adapter flanges shall meet or exceed all test requirements of AWWA C900, ASTM D2241 and ASTM D1599.

3.10 Pipe Couplings

The Contractor shall furnish and install pipe couplings as required to complete the work. Pipe couplings used to join two pieces of ductile iron pipe or PVC pipe shall be sized to match the outside diameter of the pipeline. Transition couplings shall be used to join pipes of different outside diameters. The coupling sleeve shall be manufactured of ductile iron conforming to ASTM A536 and be coated with 14 mils of epoxy. The bolts shall be manufactured of a metal of high corrosion resistance and shall conform to ANSI 21.11 (AWWA C111). Gaskets shall be wedge-type and manufactured of virgin SBR for water and sewer services. The installation of all couplings shall be in accordance with the manufacturer's recommendations. After installation, all coupling surfaces including bolts and nuts shall be coated with an approved coating as specified in this section of these specifications.

3.11 Full Circle Repair Clamps

Full circle repair clamps shall have type 304 stainless steel shells, lugs, bolts, nuts, and washers as per ASTM A193, A194, A240, or shall have type 304 stainless steel shells per ASTM A240, ductile iron lugs as per ASTM A536, and 304 stainless steel bolts, washers, and nuts. Gaskets for both types shall be virgin SBR as per ASTM D2000 for water and sewer service.

3.12 Corrosion Protection for Ductile Iron Pipe

A. Interior Lining

The interior of all ductile iron pipe and fittings shall be furnished with an approved coal tar epoxy lining or "Protecto 401" ceramic epoxy.

1. Lining Compound

The material used shall be a two component Coal Tar Epoxy material. The material must have a volume solids content of at least 74%. The material must also meet the following minimum performance requirements:

a. A maximum permeability rating of .25 perms at 14 mils dry film thickness for 2 coats.

b. A minimum direct impact resistance of 60 inch/lb. as measured in ASTM D2794 with no cracking. The material shall be a minimum of 18 mils and a maximum of 22 mils thick. This test shall be performed on 1/4" steel panels.

c. A minimum abrasion resistance of 8 liters of sand per mil as measured in ASTM D968.

d. A minimum elongation of at least 5%.

e. A minimum dielectric strength of at least 300 volts per mil when fully cured.

f. The lining must also undergo the following immersion test without failure of any kind. These tests must be performed on steel panels with a maximum 18 mils DTF thickness.

TEST	DURATION
a. Tap Water 160°F	500 hours
b. 25% Sodium Hydroxide 140°F	60 days
c. 3% Sulfuric Acid 125°	60 days
d. 5% Sodium Hypo chlorite 77°	60 days
e. 5% Sodium Acid Sulfate 77°	60 days

2. Lining Thickness

The Coal Tar Epoxy lining shall cover the entire inner surface of the pipe, extending from the plain or beveled end to a point touching the gasket. The lining compound shall be applied such that a relatively uniform and smooth integral lining results in accordance with the supplier's material to a minimum finished dry thickness of forty (40) mils for the completed lining.

3. Warranty

A five (5) year warranty shall be furnished by the manufacturer on the serviceability of the lining. This warranty shall include but not be limited to statements that at any time up to the end of the fifth year from the date of pipe shipment:

a. The lining shall not have disbonded.

b. The lining shall not have suffered any appreciable underfilm migration.

c. The interior pipe metal, at points of pinholes or holidays, shall not have suffered detrimental deterioration.

d. The lining shall have maintained its smooth surface characteristics. The Contractor and/or manufacturer shall not make any exemption or exception to the above stated conditions or warranty within the limits as stated in this section of these specifications.

4. Pinholes and/or Holidays

The inside surface of each pipe or fitting shall be free of pinholes, holiday discontinuities, and any blister type surface imperfections. The manufacturer shall check each pipe or fitting for holidays at the point of manufacture with a high voltage holiday detection device. Testing shall be conducted at

the voltage as calculated in Section 3: Testing and Voltages of the "Recommended Practice for High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation" as published by the NACE Technical Practices Committee. All actual holiday testing procedures shall conform to NACE standard RP-02-74 and ASTM G62. No holidays will be accepted. Any pipe having holidays or pinholes shall be removed and replaced at no expense to the City of Jacksonville Beach.

5. Field Testing

Each pipe and fitting shall be inspected in the field by the Engineer for conformance to these specifications prior to installation. Any defects as specified herein with any pipe or fittings shall be grounds for rejection. Field testing will be conducted at the expense of the Contractor in the case of dispute. Contractor to provide 48 hours advanced notice for testing.

B. Exterior Coating

All ductile iron pipe and fittings except on bridges, or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and be strongly adherent to the fitting. All bolts, nuts, studs, and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling. Pipes crossing under ditches, culverts, rivers, creeks, etc., shall be considered as buried pipe. All ductile iron pipe shall be color coded green by field painting a green stripe, 3 inches wide, along the crown of the pipe barrel.

C. Polyethylene Wrap (N/A This Project)

In areas where soils are corrosive in nature, ductile iron pipes, fittings, valves, and other appurtenances shall be protected with polyethylene wrap or tubing. The Contractor shall furnish and install polyethylene tube or wrap for ductile iron pipe at the locations shown on the construction drawings.

1. Material

The polyethylene material shall meet or exceed the requirements of AWWA C105 in all respects. The wrap shall be virgin, high density polyethylene, 4 mils thick minimum. The polyethylene wrap shall be white with 2 each, 6-inch wide, continuous green tapes located at the 2:00 and 10:00 o'clock position on the pipe.

2. Installation

Although not intended to be a water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill. Installation shall be done according to one of the methods described in Section 5.4 of AWWA C105, subject to approval by the Engineer and the manufacturer.

3.13 Piping Supports

A. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as specified.

B. Piping within pumping stations shall be adequately supported from floors, walls, ceilings, or beams. Supports from the floor shall be by approved saddle stands or suitable concrete piers as indicated or approved. Pipe saddles shall be shaped to fit the pipe with which they will be used and shall be capable of screw adjustment. Concrete piers shall conform accurately to the bottom one-third to one-half of the pipe. Piping along walls shall be supported by approved wall brackets with attached pipe rolls or saddles or by wall brackets with adjustable hanger rods. For piping supported from the ceiling, approved rod hangers of a type capable of screw adjustment after erection of the piping and with suitable adjustable concrete inserts or beam clamps shall be used. If required, piping supports shall be placed so as to provide a uniform slope in the pipe without sagging. Supports shall be located wherever necessary, and in no case

shall they exceed 8 feet on centers for ductile iron pipe and 4 feet on centers for PVC pipe.

C. Casing Spacers

Casing spacers shall be a two-piece prefabricated unit by a single manufacturer. All casing spacers in a single casing pipe crossing shall be by the same manufacturer. Casing spacers shall have a shell made from either 304 stainless steel, 14-gauge mild steel which has been heat fusion coated with PVC plastic, (PVC coating shall be .01 inch thick over the entire band including the runner studs) or high-density polyethylene. Casing spacers on 16 inches and smaller carrier pipe shall have 8-inch-wide steel bands and casing spacers on 18 inches and larger carrier pipe shall have 12-inch-wide steel bands, except high density polyethylene spacers shall have high density polyethylene bands. All casing spacers for 14 inch and smaller pipe size shall have four 10-gauge or 14-gauge steel risers with runners and casing spacers for 16 inch and larger pipe shall have six 10-gauge or 14-gauge steel risers with runners (two top and four bottom), except high density polyethylene spacers shall have one riser for every diameter inch of carrier pipe. The runners (risers) shall be either glass reinforced plastic, UHMW polymer, or high-density polyethylene. All nuts, bolts, and washers shall be 304 stainless steel. All risers over 2 inches in height shall be reinforced. Wooden skids are not an acceptable alternate.

3.14 Locate Wiring

See Paragraph 3.F.

3.15 Material Warranty

The manufacturer of materials furnished on the project shall supply to the City of Jacksonville Beach a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

3.16 Material Testing

City may perform random testing of all materials furnished for conformance to the following standards. The entire product of any manufacturer or of any one plant may be rejected when, in the opinion of City, the methods of manufacture fail to secure uniform results acceptable to the requirements of these specifications. Pipe and materials shall be tested in, and for conformity with, the latest editions of the following:

Item	Specifications
Ductile Iron Pipe	ANSI A21.50 (AWWA C150)
and Fittings	ANSI A21.51 (AWWA C151)
	ANSI A21.53 (AWWA C153)

Polyvinyl Chloride	ASTM D1598
Pipe and Fittings	ASTM D1599
	ASTM D1784
	ASTM D1785
	ASTM D2122
	ASTM D2241
	ASTM D2672
	ASTM D2837
	ASTM D2855
	ASTM D2837
	ASTM D3139
	ASTM F477
	AWWA C900
	AWWA C905
	AWWA C907

3.17 INSTALLATION

A. Reference Points and Layout

The Contractor shall be responsible for setting all grade stakes, lines and levels. The Contractor or Contractor's Surveyor will provide centerline of construction and will establish a benchmark. Any reference points, points of intersection, property corners, or benchmarks which are disturbed during construction shall be restored by a Land Surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

B. Handling and Cutting Pipe

Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by the City of Jacksonville Beach, may be cut off before the pipe is laid so that the pipe used shall be perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack. Except as otherwise approved, all cutting shall be done with a power driven cut off saw. All cut ends shall be examined for possible cracks caused by cutting.

C. Pipe Installation

1. General Requirements

Force mains shall be constructed of the materials specified and as shown on the drawings. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks. Defective, damaged, or unsound pipe or fittings shall be rejected. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. Any pipe which has its grade or joint disturbed after laying shall be taken up and re-laid. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer. Plugs shall remain in pipe

ends until all water is removed from the trench. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the Engineer. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe.

2. Pipe Cover

The cover over all piping shall be a minimum of 30 inches in unpaved areas and 36 inches in paved areas with a maximum of 60 inches unless specifically approved otherwise. Cover for pipe under pavement shall be measured from finished grade. Any reduction in pipe cover will require approval from the City of Jacksonville Beach and the Engineer. Greater depths will be permitted where required to miss obstructions only. Lines shall be located as shown on the drawings. Lines shall be laid to a grade which will permit entrapped air to flow to a high point for release through air release valves as located on the drawings. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the Engineer of the results of these investigations so that the Engineer may give instructions as to the modifications required. Refer to Section 02200 – Excavating, Backfilling, and Compacting of this specification for backfill and compaction requirements.

3. Installation of Iron Piping (N/A This Project)

All iron pipe and fittings shall be laid in accordance with the pipe manufacturer's recommendations and the American Water Works Association Specification AWWA C600.

4. Thrust Restraint

All non-flanged fittings and valves shall be restrained using one of the following methods:

a. Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified in the following table.

b. Mechanical joints at fittings and valves shall be restrained using an approved restraining device and tie rods along adjacent joints of pipe to a length as specified in the following chart. All pipe sizes 3-inch to 8-inch in diameter shall have a minimum of 2 tie rods per joint, pipe sizes 10-inch to 12-inch in diameter shall have a minimum of 4 tie rods per joint and pipe sizes 14-inch to 20-inch in diameter shall have 6 tie rods per joint. To connect tie rods to fitting, offset eyebolts shall be used. Tie rods shall be 3/4-inch diameter, steel, threaded as required, installed with a washer and nut on either side of the joint and shall be coated with a minimum of 5 mils (dry thickness) asphalt or coal-tar prior to backfilling.

CHART "F"

MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)									
NOMINAL PIPE SIZE (INCHES)	11 1/4° Horizontal Elbow	22 1/2° Horizontal Elbow	45° Horizontal Elbow	90° Horizontal Elbow	Horizontal Tees	Horizontal Plugs and Valves	45° Vertical Offset Upper length/lower length	22½° Vertical Offset Upper length/lower length	Reducer (to 1 size smaller) Length on Larger Size Side
4	2	4	7	18	20 - run 1 - branch	39	16 / 3	8 / 1	n/a
6	2	5	10	25	20 - run 1 - branch	55	23 / 4	11 / 2	28
8	3	6	13	32	20 - run 1 - branch	72	30 / 5	14 / 3	30
10	4	8	16	38	20 - run 1 - branch	86	36 / 6	17 / 3	29
12	4	9	19	45	20 - run 1 - branch	102	42 / 8	20 / 4	50
14	5	10	21	51	20 - run 10 - branch	116	48 / 9	23 / 4	30
16	6	11	23	57	20 - run 26 - branch	131	54 / 10	26 / 5	30
18	6	12	26	62	20 - run 41 - branch	145	60 / 11	29 / 5	29
20	7	13	28	68	20 - run 55 - branch	158	66 / 12	36 / 6	29
24	8	16	32	78	20 - run 58 - branch	185	77 / 11	37 / 7	55
30	9	18	38	92	20 - run 77 - branch	221	92 / 17	44 / 8	77
36	10	21	44	105	20 - run 115 - branch	256	106 / 20	51 / 10	77

NOTE: Table assumptions: PVC pipe, Safety Factor = 1.5, Soil = GM or SM, 3 ft. bury depth to top of pipe, trench type 3, branch on tee is one size smaller than run of tee size and 20 feet of pipe is installed past the tee on the run side (smaller branch sizes must be calculated by the engineer). Vertical offsets are 3 feet deep on top and 8 feet deep on bottom. Reducers are calculated for one size reduction. Test pressure of 150 psi.

c. The use of thrust blocks shall be limited to situations such as point repair where exposing several joints of pipe is not feasible due to existing ground conditions and also must be used with mechanical joint restraining devices when, in the judgment of the Engineer, the nature and criticality of an installation is such as to require positive assurance of stability. Concrete collars with tie rods may be used on dead end lines at the Contractor's discretion. Concrete used for this purpose shall be 2,500 psi minimum. When applicable, schedule and details for the required thrust blocks are included on the drawings. The installation of concrete thrust blocks must be reviewed and approved on an individual basis by the City of Jacksonville Beach City Engineer.

5. Joint Restraint within Carrier Pipe

All joints within steel casing pipe shall be restrained with mechanical restraining devices. End joints shall be tie rodded, with the ends of the rods welded to the end of the casing.

6. Casing Spacer Installation

All carrier pipes in casings shall utilize casing spacers installed on the carrier pipe, inside the casing pipe. Casing spacers shall be installed one foot on both sides of each carrier pipe joint, and at ten feet intervals along the carrier pipe for pipe up to 48 inches. For carrier pipes larger than 48 inches, casing placement shall be as recommended by the casing spacer manufacturer. A casing spacer shall also be installed within two feet of each of the ends of the casing pipe.

D. Field Testing

1. Leakage and Pressure Tests

The Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by City or connecting pipeline to any existing pipeline or facility. All field tests shall be done in the presence of the Engineer. Except as otherwise directed, all pipelines shall be tested. Pipelines laid in excavation (other than trench excavation), shall be tested prior to the backfilling of the excavation. All piping to operate under liquid pressure shall be tested in sections of approved length. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment and all labor required. Gauges used shall be of such size that pressures tested will not register less than 10% no more than 90% of the gauge capacity. Leakage and pressure testing shall be in accordance with AWWA C600 and as outlined below.

a. Prior to pressure and leakage tests, all piping shall be thoroughly cleaned of all dirt, dust, oil, grease, and other foreign matter. This work shall be done with care to avoid damage to any inside coating. All lines shall be thoroughly flushed with clean water to clear all lines of foreign matter. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If blow-offs or other outlets are not available at high points for releasing air, the Contractor shall make the necessary taps at such points and shall plug said holes after completion of the test.

b. Hydrostatic testing shall consist of a combined pressure test and leakage test. Specified test pressures, based on the elevation of the highest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection, and all necessary apparatuses shall be furnished by the Contractor and shall be subject to the approval of the Engineer. All valves shall be hydrostatically tested to ensure sealing (leak allowance) of all line valves.

c. All piping shall be pressure and leakage tested for a minimum of two hours duration at 150 psi. Pressure tests shall be conducted with a pressure loss of not more than 5 psi regardless of length being tested. No pipe will be accepted if pressure loss is greater than 5 psi regardless of leakage test results. All exposed pipes, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory. Repairing, replacing, and retesting shall be done at the Contractor's expense.

d. Leakage tests shall be conducted simultaneously with the pressure tests. At the end of the pressure test, the line will be pumped back to initial test pressure. The quantity of water used to repump the line shall be measured and compared to the limitations calculated using the leakage

equation below. No pipe installation will be accepted if the leakage is greater than determined by the following formula:

$$L = \frac{SD\,P^{1/2}}{133200}$$

In which L is the allowable leakage in gallons per hour, S is the length of pipeline tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test in pounds per square inch. If any test discloses leakage greater than that specified above, the Contractor shall, at its own expense, locate and repair the defective material and retest until the leakage is within the specified allowance.

e. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting, or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

f. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement.

2. Locate Wiring Testing

Installed locate wiring shall be tested by the contractor with an approved testing company using approved equipment. Locate wire testing company must be provided with a copy of the As-Builts.

E. Inspection

All pipes and fittings shall be subject to inspection at the time of delivery and also in the field just prior to installation. All pipes and fittings which in the opinion of the Engineer do not conform to these specifications will be rejected and shall be removed by the Contractor.

F. Locate Wiring

Contractor shall furnish and install locate wiring on all PVC sewage force mains installed. Locate wire must be attached to sewage force mains with plastic zipper type electrical ties at each side of bell joint or fitting and at 10-foot intervals along pipeline. Locate wire shall have approximately 36" of wire cored up inside the valve box or water meter box, as required, at 475-foot intervals. Locate wire shall be installed in either the 1:00 or 11:00 position on the pipe. Locate wire shall be attached to intersecting ductile iron or galvanized pipeline using a three-way splice and brass split ground clamp with wire installed around brass nipple. Locate wiring must have the ability to conduct an electrical current; therefore, the wiring must be continuous with any breaks in the line spliced. Locate wire shall be spliced with Engineer approved wire connectors. All locator wiring will be tested by an approved testing company prior to final acceptance by the City of Jacksonville Beach.

4.1 CONTRACTOR WARRANTY

The Contractor shall supply to City a one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

END OF SECTION

SECTION 02667
AS-BUILT ENGINEERING PLANS

PART 1 - GENERAL

1.1 DESCRIPTION – POTABLE WATER

A. As-Built drawings of all water construction shall be submitted to the City of Jacksonville Beach for review and approval by the Public Works Department. As-Built drawings shall be prepared in CADD by revisions and amendment to a paper and pdf copy and CADD disk of the engineering plans of the project. Each sheet shall be labeled "AS-BUILT" in one-inch-high letters. As-built drawings shall be prepared by a registered land surveyor or a professional engineer who is licensed to practice in the State of Florida according to the provisions of Chapters 471 or 472 of the Florida Statutes. *Two (2) Final approved as-builts shall be submitted to the Public Works Department in the following format: Two (2) CDs, DVDs, or Flash Drives with AutoCAD Release 2016 or latest revision used by City and signed and sealed pdf copies, and Two (2) signed and sealed original full size paper copies.*

B. As-built information shall be recorded and kept current during the progress of the work. Locations and elevations of pipe, fittings, valves, etc. shall be taken before the construction trench is backfilled. In showing changes the same legend that was used on the construction drawings shall be used to identify items on the as-built drawings. The as-built drawings shall bear the name, date, and original signature of the general contractor responsible for the water construction and the name, date, original signature and seal of the surveyor or engineer who prepared the as-built drawings. The signatures shall certify that the as-built drawings do, in fact, reflect the true as-built conditions as located under the direct supervision by the Registered Surveyor and/or Engineer. Where service connections are properly marked on the curb & gutter and/or by marker in the ground, the Public Works Department will accept a certification to the location and depth by the Contractor. All final As-Built Drawings will be prepared on AutoCAD or an approved equal.

C. All valves, fittings, fire hydrants, etc. shall be located in two directions; one location shall be referenced perpendicular to the right-of-way line. The other location shall be parallel to the water main and shall be referenced to the right-of -way line of the nearest street intersection. Locations to pavement, curb, sidewalk, or other utility structures are not acceptable unless these are in turn referenced to right-of -way lines. Centerline of right-of-way may be used for reference in lieu of the right-of-way line.

D. Elevations are required and shall be referenced to an NGVD Survey benchmark. The location and elevation of the benchmark shall be shown on the as-built drawings.

E. All horizontal and vertical control dimensions shall be shown to the nearest hundredth of a foot. Locations and elevations of pipe shall be shown every 500 feet maximum and at every change in location or elevation. Locations of water services shall be given to the center of the metal lid at the top of the meter box. The size and type of water pipe, valves, fittings, etc. shall also be shown (i.e. 8" DR 18 PVC pipe). Special details may be required where installations are not as shown on the construction drawings due to field conditions. All service lines shall be referenced off individual property lines.

1.2 DESCRIPTION-WASTEWATER

A. As-built drawings of all sewer construction shall be submitted to the City of Jacksonville Beach for review and approval by the Public Works Department. As-Built drawings shall be prepared in CADD by revisions and amendment to a paper and pdf copy and CADD disk of the engineering plans of the project. Each sheet shall be labeled "AS-BUILT" in one-inch-high letters. As-built drawings shall be prepared by a registered land surveyor or a professional engineer who is licensed to practice in the State of Florida under the provisions of Chapters 471 or 472 of the Florida Statutes. *Two (2) Final approved as-builts shall be submitted to the Public Works Department in the following format: Two (2) CDs, DVDs, or Flash Drives with AutoCAD Release 2016 or latest revision used by City and signed and sealed pdf copies, and Two (2) signed and sealed original full size paper copies.*

B. As-built information shall be recorded and kept current during the progress of the work. Locations and elevations of pipes, fittings, valves, etc. shall be taken before the construction trench is backfilled. The

same legend that was used on the construction drawing shall be used to identify items on the as-built drawings. The as-built drawings shall bear the name, date, and original signature of the general contractor responsible for the sewer construction and the name, date, original signature, and seal of the surveyor or engineer who prepared the as-built drawings. The signature shall certify that the as-built drawings do, in fact, reflect the true as-built condition as located under the direct supervision of the registered surveyor and/or engineer. All final As-Built Drawings shall be prepared on AutoCAD or an approved equal.

C. Where service connections are properly marked on the curb and gutter and/or by marker in the ground, the Public Works Department will accept a certification to the location and depth by the contractor.

D. All pipes, manholes, valves, fittings, etc. shall be located in two directions. One location shall be referenced perpendicular to the right-of-way line. The other location shall be parallel to the sewer main and shall be referenced to the right-of-way line of the nearest street intersection. Locations to pavement, curb, sidewalk, or utility structures are not acceptable unless these are, in turn, referenced to right-of-way lines.

E. Centerline of right-of-way may be used for reference in lieu of the right-of-way line. Elevations where required shall be referenced to an NGVD Survey benchmark. The location and elevation of the benchmark shall be shown on the as-built drawings. All services shall be referenced off individual property lines.

1.3 DESCRIPTION-STORMWATER

A. As-Built drawings of all stormwater construction shall be submitted to the City of Jacksonville Beach for review and approval by the Public Works Department. As-Built drawings shall be prepared in CADD by revisions and amendment to a paper and pdf copy and CADD disk of the engineering plans of the project. Each sheet shall be labeled "AS-BUILT" in one-inch-high letters. As-built drawings shall be prepared by a registered land surveyor or a professional engineer who is licensed to practice in the State of Florida according to the provisions of Chapters 471 or 472 of the Florida Statutes. *Two (2) Final approved as-builts shall be submitted to the Public Works Department in the following format: Two (2) CDs, DVDs, or Flash Drives with AutoCAD Release 2016 or latest revision used by City and signed and sealed pdf copies, and Two (2) signed and sealed original full size paper copies.*

B. As-built information shall be recorded and kept current during the progress of the work. Locations and elevations of pipe, inlet inverts, and inlet grates shall be taken before the construction trench is backfilled. In showing changes the same legend that was used on the construction drawings shall be used to identify items on the as-built drawings. The as-built drawings shall bear the name, date, and original signature of the general contractor responsible for the water construction and the name, date, original signature, and seal of the surveyor or engineer who prepared the as-built drawings. The signatures shall certify that the as-built drawings do, in fact, reflect the true as-built conditions as located under the direct supervision by the Registered Surveyor and/or Engineer. Where service connections are properly marked on the curb & gutter and/or by marker in the ground, the Public Words Department will accept a certification to the location and depth by the Contractor. All final As-Built Drawings will be prepared on AutoCAD or an approved equal.

C. All pipes and inlets shall be located in two directions; one location shall be referenced perpendicular to the centerline of construction stationing. The other location shall be parallel to the centerline of construction stationing. Locations to pavement, curb, sidewalk, or other utility structures are not acceptable unless these are in turn referenced to centerline of construction stationing.

D. Elevations are required and shall be referenced to an NGVD Survey benchmark. The location and elevation of the benchmark shall be shown on the as-built drawings.

E. All horizontal and vertical control dimensions shall be shown to the nearest hundredth of a foot. Locations and elevations of pipe shall be shown every 500 feet maximum and at every change in

location or elevation. Locations of inlets shall be given to the grate or in the case of manholes to the center of the manhole cover. The size and type of pipe shall also be shown throughout the drawings. Special details may be required where installations are not as shown on the construction drawings due to field conditions.

1.4 DESCRIPTION -ROADWAY

A. As-Built drawings of all roadway construction shall be submitted to the City of Jacksonville Beach for review and approval by the Public Works Department. As-Built drawings shall be prepared in CADD by revisions and amendment to a paper and pdf copy and CADD disk of the engineering plans of the project. Each sheet shall be labeled "AS-BUILT" in one-inch-high letters. As-built drawings shall be prepared by a registered land surveyor or a professional engineer who is licensed to practice in the State of Florida according to the provisions of Chapters 471 or 472 of the Florida Statutes. *Two (2) Final approved as-builts shall be submitted to the Public Works Department in the following format: Two (2) CDs, DVDs, or Flash Drives with AutoCAD Release 2016 or latest revision used by City and signed and sealed pdf copies, and Two (2) signed and sealed original full size paper copies.*

B. As-built information shall be recorded and kept current during the progress of the work. Locations and elevations of curb, gutter, edge of pavement, and sidewalk are to be documented using stationing and offset from the center line of construction. In showing changes the same legend that was used on the construction drawings shall be used to identify items on the as-built drawings. The as-built drawings shall bear the name, date, and original signature of the general contractor responsible for the water construction and the name, date, original signature, and seal of the surveyor or engineer who prepared the as-built drawings. The signatures shall certify that the as-built drawings do, in fact, reflect the true as-built conditions as located under the direct supervision by the Registered Surveyor and/or Engineer. All final As-Built Drawings will be prepared on AutoCAD or an approved equal.

C. All curbs, gutters, edges of pavement, and sidewalks shall be located in two directions. One location shall be referenced perpendicular to the centerline of construction stationing. The other location shall be parallel to the centerline of construction stationing. Locations to pavement, curb, sidewalk, or other utility structures are not acceptable unless these are in turn referenced to centerline of construction stationing.

D. Elevations are required and shall be referenced to an NGVD Survey benchmark. The location and elevation of the benchmark shall be shown on the as-built drawings.

E. All horizontal and vertical control dimensions shall be shown to the nearest hundredth of a foot. Locations and elevations of curb, gutter, edge of pavement, and sidewalk shall be shown at all curb returns and changes from tangency to radii. Special details may be required where installations are not as shown on the construction drawings due to field conditions.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 POTABLEWATER

A. General Requirements

1. All Engineering Construction Plans As-builts shall be 24" x 36"; therefore, all as-builts shall be 24" x 36" and shall bear the name of contractor or subcontractor who prepared the drawing and the date it was prepared.

2. Surveyor's Statement (embossed seal) and original signature on each sheet.

3. Contractor's statement and original signature on each sheet.

   a. Statements shall verify that As-built drawings reflect the true conditions.

   b. As-built shall be labeled on each sheet in 1-inch-high letters.

   c. Street names shall be on all streets.

   d. Location and elevation of the benchmark shall be shown on drawings.

B. Water Locations

1. Locate valves, fittings, fire hydrants, etc. in two directions.

2. Locations shall be:

   a. perpendicular of right-of-way.

   b. parallel to water main and referenced perpendicular to right-of-way line of nearest street)

3. Center line may be used in lieu of right-of-way line.

4. Structures, which are properly located, may be used, providing ties are perpendicular or parallel to said structure. Radial ties are not acceptable.

   a. All horizontal and vertical distances to be shown to the nearest tenth of a foot.

   b. Show all sizes and types of valves, fittings, pipe, hydrants, etc.

   c. Special detail drawings will be required where installations were not shown on contract drawings due to field conditions or where required for clarity.

   d. Elevations on pipe and fittings every 500 feet maximum except where changes in direction and/or elevations occur. Then locations are required at those points.

   e. Locations on pipe every 500 feet except where changes in direction occur; then those locations are required.

   f. Locate and give elevations for beginning, middle, and end of deflected pipe.

3.2 WASTEWATER

A. Gravity Sewers - All horizontal control dimensions shall be shown to the nearest tenth of a foot. All elevations shall be shown to the nearest hundredth of a foot. The locations of all manholes shall be given to the center of the manhole cover. Elevations shall be given for the top of the manhole cover and for each pipe invert. Locations of sewer connections shall be given to the plug or to the point where the connection is joined to the consumer's service. Elevations shall be given if the end of the connection is less than 36" or more than 60" deep. The size and type of pipe and manholes shall also be given (i.e., type "A" manhole, SDR 35 PCV pipe).

B. Force Mains - Horizontal and vertical control dimensions shall be shown to the nearest tenth of a foot. Locations and elevations of the pipe shall be shown every 500 feet maximum, or at every change in location or elevation and at the points of connection. The size and type of pipe, fittings, valves, etc.

shall also be shown (i.e., 8" 45-degree bend).

C. Pump Stations (N/A This Project) - The following information will be required.

1. The size and location of the wet well to the nearest tenth of a foot.

2. All utilities within the pump station site shall be located relative to property lines and/or right- of-way lines.

3. Elevations shall be given for the top of the wet well cover and for each pipe invert and at ground adjacent to wet well. All utilities materials and sizes of lines and fittings shall be indicated.

4. All schedules on the construction drawings, which show pump, motor, or electrical data shall be amended to show as-built conditions.

5. Special details may be required where installations are not as shown on the construction drawings due to field conditions.

6. As-built information should be provided for the pump station site plan. Within the pump station boundaries, the following shall be located horizontally: pump-out, water spigot and cross-connection control device, wet well, control panel, bends, fittings, manholes, generator and fuel tank, transformer, irrigation system, fence, and auxiliary electrical enclosures, as applicable.

7. All buried electrical conduit shall be labeled and located including electrical service from utility transformer to station meter and to control panel.

3.3 STORMWATER

A. General Requirements

1. All Engineering Construction Plans As-builts shall be 24” x 36”; therefore, all As-builts shall be 24” x 36” and shall bear the name of contractor or subcontractor who prepared the drawing and the date it was prepared.

2. Surveyor’s Statement (embossed seal) and original signature on each sheet.

3. Contractor’s statement and original signature on each sheet.

a. Statements shall verify that As-built drawings reflect the true conditions.

b. As-built shall be labeled on each sheet in 1-inch-high letters.

c. Street names shall be on all streets.

d. Location and elevation of the benchmark shall be shown on drawings.

B. Stormwater

1. Summary of Drainage Structures

a. Changes in types of inlets or manholes that were added, revised, or deleted.

b. Changes to plan lengths of pipe to reflect the actual construction length when an authorized field change is made, or a plan error is noted.

c. Type of pipe material used at each structure.

d. Changes in size of structures.

2. Drainage Structure Sheets

a. Inlets, manholes, box culverts, and end walls that were added, relocated, revised, or deleted.

b. Changes in stations or offset dimensions.

c. Changes to flow line elevations.

d. Changes in size of structures.

e. Types of inlets and manholes constructed shall be indicated.

3. Plan and Profile Sheets

a. Changes in types of inlets or manholes that were added, revised, or deleted.

b. Changes to plan lengths of pipe to reflect the actual construction length when an authorized field change is made, or a plan error is noted.

c. Type of pipe material used at each structure.

d. Changes in size of structures.

e. Changes in stations or offset dimensions.

f. Changes to flow line elevations.

C. Pump Stations (N/A This Project) - The following information will be required.

1. The size and location of the wet well to the nearest tenth of a foot.

2. All utilities within the pump station site shall be located relative to property lines and/or right-of- way lines.

3. Elevations shall be given for the top of the wet well cover and for each pipe invert and at ground adjacent to wet well. All utilities materials and sizes of lines and fittings shall be indicated.

4. All schedules on the construction drawings, which show pump, motor, or electrical data shall be amended to show as-built conditions.

5. Special details may be required where installations are not as shown on the construction drawings due to field conditions.

6. As-built information should be provided for the pump station site plan. Within the pump station boundaries the following shall be located horizontally: pump-out, water spigot and cross-connection control device, wet well, control panel, bends, fittings, manholes, generator and fuel tank, transformer, irrigation system, fence, and auxiliary electrical enclosures, as applicable.

7. All buried electrical conduit shall be labeled and located including electrical service from utility transformer to station meter and to control panel.

3.4 ROADWAY

A. General Requirements

1. All Engineering Construction Plans As-builts shall be 24" x 36"; therefore, all as-builts shall be 24" x 36" and shall bear the name of contractor or subcontractor who prepared the drawing and the date it was prepared.

2. Surveyor's Statement (embossed seal) and original signature on each sheet.

3. Contractor's statement and original signature on each sheet.

   a. Statements shall verify that As-built drawings reflect the true conditions.

   b. As-built shall be labeled on each sheet in 1-inch-high letters.

   c. Street names shall be on all streets.

   d. Location and elevation of the benchmark shall be shown on drawings.

B. Roadway

1. Plan and Profile Sheets

   a. Revisions to the horizontal and vertical alignments as shown on the original plans.

   b. Stations or equations that have been introduced or revised during construction.

   c. Intersection or crossover details that have been modified or relocated.

   d. All sidewalk or brick pavers that were modified in thickness or location, all curb and gutter and shoulder gutter that was added, revised, or deleted.

   e. All driveways that were not shown on the original plans or were shown but are no longer in existence or were modified in thickness or location.

   f. Changes in fence locations

   g. Sign locations changed and pavement markings that were modified.

   h. All lighting details or locations that have been modified during construction.

2. Grading Sheets

   a. Revisions to the final grades, elevations, stations, and offsets of all edges of pavement, points of transition, horizontal curves, vertical curves, curb and gutter, sidewalk, brick pavers, or other callouts made on the grading plans that were modified during construction.

END OF SECTION

SECTION 02720
DRAINAGE STRUCTURES, PIPES, AND FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

Scope of Work: The work covered and described in this Section includes the furnishing and construction of storm sewers, inlets, and other drainage structures as shown on the Drawings and specified herein.

1.2 QUALITY ASSURANCE

Provide certification of quality by manufacturer to Engineer ten (10) days prior to installation.

1.3 SUBMITTALS

A. Shop Drawings: Shop drawings for the following items shall be submitted to the Engineer for approval in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples.

1. Grates, manhole frames, covers, and other castings.

2. Precast structures.

B. Pipe certification of quality by producer shall be delivered to Engineer ten (10) days prior to delivery to the job site.

1.4 JOB CONDITIONS

Existing Drainage System: Maintain operational existing drainage system, prevent siltation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: The Contractor must furnish the type of drainage pipe as shown on the Drawings.

B. Polyvinyl chloride pipe: Gravity storm sewer pipe 24-inch and smaller shall be polyvinyl chloride pipe. Plastic gravity storm sewer pipe and fittings shall be unplasticized polyvinyl chloride (PVC) and conform to the requirements of ASTM Designation D-3034 or ASTM F-679, Class 12454-B PVC compound conforming to ASTM resin specification D-1784 with wall thickness T-1, SDR 26. Pipe shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D-3212. Elastomeric seals shall meet ASTM F-477 or ASTM F-913. PVC pipe and fittings shall be manufactured by Johns-Manville, Scepter, or equal.

C. Concrete pipe: Gravity storm sewer pipe larger than 24-inch shall be reinforced concrete pipe. Concrete pipe shall be reinforced concrete pipe conforming to ASTM Designation C-76, Table III, except when otherwise indicated. Reinforced concrete horizontal elliptical pipe shall conform to the requirements of ASTM Designation C-507, Class HE III. Pipe joints shall be rubber gasket joints, and the pipe joint shall be manufactured to meet the requirements of the approved type of gasket to be used. Pipe joints and rubber gaskets shall conform to the requirements of Sections 941 and 942 of the FDOT Standard Specifications. Pipe walls shall have no holes and joints shall be double wrapped with TNS-R035 filter fabric as produced by TNS Advanced Technologies, Greer, South Carolina or Geotex 351 filter fabric as produced by Synthetic Industries, Inc., Chattanooga, Tennessee. Fabric shall be secured to pipe with steel or plastic strapping.

D. Brick: Brick for drainage structures shall be dense, hard burned, shale or clay brick conforming to ASTM Designation C-32, Grade MM or C-62, Grade MW, except that brick absorption shall be between five and twenty-five grams of water absorbed in one minute by dried brick, set flat face down, in 1/8 inch of water.

II. Cement Mortar: Cement mortar for inlet/manhole construction shall be one part cement and two parts clean sharp sand to which may be added lime in the amount of not over twenty-five percent volume of cement. It shall be mixed dry and then wetted to proper consistency for use. Cement mortar for manhole construction shall be as specified in ASTM Designation C-270, Type M, except that the cement shall be Portland Type II. No mortars that have stood for more than one hour shall be used.

E. Concrete and reinforcing steel: Concrete and reinforcing steel shall conform to the following requirements. Concrete classes for the various purposes shall be as follows:

1. Inlet bottoms: Class A – 4,000 psi

2. Pipe and riser encasement: Class B – 3,000 psi

3. Protective slabs: Class B – 3,000 psi

4. Manhole bottoms: Class A – 4,000 psi

F. Precast Concrete Units: Precast concrete units shall conform to applicable requirements of Division 3: Concrete of these Specifications. Concrete for use in precast units shall be Class A.

G. Castings: Castings for inlets and other items shall conform to the ASTM Designation A-48, Class 25. Castings for manhole frames, covers, and other items shall conform to ASTM Designation A-48, Class 30, and shall be U.S. Foundry and Manufacturing Corp., No. 32, or equal. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the service intended. The seating between frames and covers shall be machined to fit true. No plugging or filling will be allowed. Lifting or "pick" holes shall be provided but shall not penetrate the cover. Casting patterns shall conform to those shown or indicated on the Drawings.

H. Wetwells, Inlets, and Manholes: Refer to Section 03480 – Precast Concrete Specialties.

I. Pipe Connections: All openings for PVC pipes in inlets and manholes shall be sealed watertight by Kor-N-Seal, Link Seal, or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Pipe Trenches:

1. Pipe trenches shall be of necessary widths for the proper laying of the pipe and the banks shall be as nearly vertical as practicable. In paved areas, the trench shall be vertical and sheeted, if required; the clearance between the pipe and trench wall or back of sheeting shall not exceed 18 inches. The bottom of the trenches shall be excavated to a depth of the outside bottom of the pipe barrel. Any over excavation shall be replaced with suitable compacted material. Excavation for inlets and other appurtenances shall be sufficient to provide a clearance between their outer vertical surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.

2. Soft, spongy, or otherwise unstable material encountered below the established grade of the excavation which will not provide a firm foundation for subsequent work shall be removed and replaced as directed. Unless otherwise directed, all such unstable materials shall be removed for the full width of the excavation and replaced with approved fill material.

3. Where sheeting and bracing are necessary to prevent caving of the trench sidewalls or sidewalls of excavation for other structures, and to safeguard the workmen, the trench or excavation for other structures shall be dug to such width that the proper allowance is made for the space occupied by the

sheeting and bracing to provide clearance as specified above.

3.2 INSTALLATION

A. Laying Drainage Pipe:

1. All pipes shall be carefully laid true to the line and grade shown on the Drawings. Any deviation from true alignment or grade which would result in a displacement from the normal position of the gasket of as much as 1/4 inch, or which would produce a gap exceeding 1/2 inch between sections of pipe for more than 1/3 of the circumference of the inside of the pipe, will not be acceptable and where such occurs, the pipe shall be re-laid without additional compensation. No mortar, joint compound, or other filler, which would tend to restrict the flexibility of the gasket joint, shall be applied to the gap. Pipes having defects that have not caused their rejection are to be so laid that these defects will be in the upper half of the sewer.

2. Before installation of the pipe gasket, the gasket and the surface of the pipe joint, including the gasket recess, shall be clean and free from grit, dirt, or other foreign matter at the time the joints are made. In order to facilitate closure of the joint, application of an approved vegetable soap lubricant immediately prior to closing of the joint will be permitted.

3. All pipes shall be laid with bells or grooves uphill. As the pipes are laid throughout the work, they must be thoroughly cleaned and protected from dirt and water. No length of pipe shall be laid until the two preceding lengths have been thoroughly embedded in place so as to prevent any movement or disturbance of the finished joint. No walking on or working over the pipes after they are laid, except as may be necessary in tamping earth and refilling, will be permitted until they are covered to a depth of one (1) foot. No pipe shall be laid except in the presence of the authorized inspector. Fill placed around the pipe shall be deposited on both sides simultaneously to approximately the same elevation and uniformly compacted. Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement due to caving of the banks or from other injury and a suitable stopper is to be inserted therein.

B. Drainage Structures: Precast inlets, manholes, or other structures shall conform to the Drawings. Grates are to be set in place in mortar to the proper line and grade. Manhole frames and covers shall be set accurately to grade to conform to the finished grade of the adjacent areas. Drainage structures shall be set plumb to a tolerance of 0.25-inch horizontal per 10 feet vertical.

C. Backfilling for Pipe and Drainage Structures:

1. After the pipe has been installed, approved selected material from excavation at a moisture content which will facilitate compaction shall be placed alongside the pipe in layers not exceeding 6 inches loose measure in depth. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted by rolling or tamping with mechanical rammers. This method of filling and compacting shall be continued until the fill is 12 inches above the pipe, and then the remainder of the backfill shall be placed in lifts not exceeding 9 inches. The operation of heavy equipment shall be conducted so that no damage to the pipe will result. Backfill material 12 inches and above the top of the pipe shall be compacted to not less than 95 percent of maximum density as determined by AASHTO Designation T 180. Selected material for backfill shall not contain any stones or rock larger than 3 inches. Tests for density of compaction may be made at the option of the Engineer, and deficiencies shall be corrected by the Contractor without additional cost to the City.

2. Backfill for drainage structures shall be placed and compacted in the same manner as specified above for pipe, except the concrete shall be permitted to cure for not less than 5 days before the backfill is placed.

3.3 FIELD QUALITY CONTROL

A. Workmanship: It is imperative that the Contractor adhere rigidly to the specifications for materials and workmanship.

B. Inspection: On completion of each block or section of storm sewer, or such other items as the City may direct, the block or section of storm sewer shall be cleaned, tested, and inspected by CCTV-ing of the system piping. Each drainage structure or other appurtenances to the system shall be of the specified size and form, neatly and substantially constructed, with the top set permanently to exact position and grade. All repairs shown necessary by the inspection shall be made; broken or cracked pipe replaced; all deposits removed, and the storm sewer left true to line and grade, entirely clean, and ready for use.

END OF SECTION

SECTION 02922
LOAMING, SEEDING, AND MULCHING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The Contractor shall furnish all labor, materials, equipment, and incidentals necessary and place loam finish grade, seed, and maintain all seeded areas as specified herein including all areas disturbed by the Contractor's operations where solid sodding is not specifically required.

B. Related Work Described Elsewhere:

Right-of-Way Clearing: Section 02105

1.2 GUARANTEE

All restoration and revegetation work shall be subject to the one (1) year guarantee period of the Contract as specified in the General Conditions of the Contract herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Loam (topsoil) shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, peat, weeds, and sod, and obtained from naturally well-drained areas. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth. Topsoil stockpiled under other Sections of this Division may be used, but the Contractor shall furnish additional loam at his own expense, if required. All areas disturbed by the Contractor's operations, which are not to be sodded shall be seeded as specified herein, in addition to those areas delineated on the plans for seeding.

B. Fertilizer shall be complete commercial fertilizer, 5-10-10 grade. It shall be delivered to the site in the original unopened containers, each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.

C. Lime shall be ground limestone.

D. Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity not less than 85, and shall have not more than one percent weed content.

E. Seed shall be a Scarified Argentine Bahia applied at a rate of 400 pounds per acre.

F. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

G. Mulch shall be clean small-grain straw.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Loam shall be placed to a minimum depth of 4 inches.

B. Lime shall be applied at the rate necessary to achieve a pH of 6 to 7.

C. Fertilizer shall be applied at the rate of 800 pounds per acre.

D. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots, and stones larger than 2-inches shall be removed. Loam shall be spread and lightly compacted to finished grade.

END OF SECTION

SECTION 02934
SOLID SODDING

PART 1 - GENERAL

1.1 DESCRIPTION

Scope of Work: The work specified in this Section consists of establishing a stand of grass, within the areas indicated on the Drawings, by furnishing and placing grass sod. Also included are watering and maintenance as required to assure a healthy stand of grass.

1.2 SUBMITTALS

A certification of sod quality by the producer shall be delivered to the Engineer ten (10) days prior to use.

PART 2 - PRODUCTS

2.1 GRASS SOD

A. Grass sod shall be St. Augustine or Bermuda grass sod as directed by the City Project Representative. All sod shall be well matted with grass roots. The sod shall be taken in rectangles, preferably 12-inch by 24-inch, shall be a minimum 2 inches thick and shall be live, fresh, and uninjured at the time of planting.

B. It shall be reasonably free of weeds and other grasses and shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. The sod shall be planted as soon as possible after being dug and shall be shaded and kept moist until it is planted.

2.2 WATER FOR GRASSING

The water used in the sodding operations shall be obtained as provided for in Section 01500: Temporary Facilities.

PART 3 - EXECUTION

3.1 PREPARATION OF GROUND

The area over which the sod is to be placed shall be scarified or loosened to a depth and then raked smooth and free from debris. Where the soil is sufficiently loose and clean, the Engineer, at his discretion, may authorize the elimination of ground preparation.

3.2 PLACING SOD

A. The sod shall be placed on the prepared surface, with edges in close contact and shall be firmly and smoothly embedded by light tamping with appropriate tools.

B. Sod, which has been cut for more than 72 hours shall not be used unless specifically authorized by the Engineer after his inspection thereof. Sod, which is not planted within 24 hours after cutting, shall be stacked in an approved manner and maintained and properly moistened. Any pieces of sod which, after placing, show an appearance of extreme dryness shall be removed and replaced by fresh, uninjured pieces.

C. Sodding shall not be performed when weather and soil conditions are, in the Engineer's opinion, unsuitable for proper results.

3.4 WATERING

The areas on which the sod is to be placed shall contain sufficient moisture, as determined by the Engineer, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least 2 weeks. Thereafter, the Contractor shall apply water as needed until the sod roots and starts to grow for a minimum of 60 days (or until final acceptance, whichever is the latest).

3.5 MAINTENANCE

A. The Contractor shall, at his expense, maintain the sodded areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include repairing of any damaged areas and replacing areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

B. Replanting or repairing necessary due to the Contractor's negligence, carelessness, or failure to provide routine maintenance shall be at the Contractor's expense.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work included in this section consists of providing all labor, materials and equipment necessary for providing and installing formwork for concrete.

B. Related Work Described Elsewhere:

1. Concrete Reinforcement: Section 03200.

2. Concrete Joints and Waterstops: Section 03262.

3. Cast-in-Place Concrete: Section 03300.

4. Concrete Finishing and Curing: Section 03345.

C. General Design: The Contractor shall be responsible for the design of all formworks and for safety in its construction and removal.

1.2 QUALITY ASSURANCE

A. Qualifications: Formwork shall be constructed in accordance with the specified standards, as well as all pertinent codes and regulations. Where provisions of pertinent codes conflict with the requirements of this section of these specifications, the more stringent provisions shall govern.

B. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:

1. Standard Building Code.

2. ACI 347 "Recommended Practice for Concrete Formwork".

3. Local Codes and Regulations.

C. Preplacement checklist. The Contractor, as part of his Quality Control Plan, shall develop and submit for approval a Preplacement Checklist form to cover the following items:

1. Reference Drawings covering the placement for all trades and disciplines.

2. Date and time scheduled for placement and the actual date and time of placement.

3. Foreman name, placement number, number of truckloads and number of cylinders.

4. Checklist items such as embeds (list each), subgrade, rebar, forms, alignment, plumbness, etc.

5. Signoffs for foreman, Contractor's Quality Control representative, each subcontractor foreman (major subs, mechanical, electrical, plumbing, etc.) and Resident Project Representative.

D. Tolerances: Formwork shall be constructed to insure that finished concrete surfaces will be in accordance with the tolerances listed in A.C.I. 347. Camber shall be provided as necessary to compensate for anticipated deflection in formwork and concrete due to weight and pressure of fresh concrete and other construction loads.

E. No concrete may be placed until the checklist is properly and completely signed off. Failure to

comply with this provision can be grounds for rejecting the work. The checklist shall be weather protected and located with the foreman or at the foreman's station.

1.3 SUBMITTALS

Materials: Submit manufacturer's literature on form ties, spreaders, corner formers, form coatings, and bond breakers.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Form Lumber: Use form lumber when in contact with exposed concrete, conforming to one of the following, a combination thereof, or equivalent as approved by the Engineer.

1. Lumber: Douglas Fir-Larch No. 2 grade, seasoned, surfaced on foursides.
2. Plywood: "Plyform", Class I or II, bearing the label of the Douglas Plywood Association. (Minimum 3/4-inch thickness).

B. Fiber Forms: Column forms for round columns shall be seamless fiber forms intended for this purpose. The three plies nearest to the interior surface of the form shall be deckled or scarfed and overlapped to minimize the spiral gaps or seams on the column surface.

C. Form Ties: Use form ties which do not leave an open hole through the concrete, and which permit neat and solid patching at every hole. Use embedded rods with integral waterstops and cones to provide a 1-inch breakback. Wire ties and wood spreaders will not bepermitted.

D. Form Coatings: Form release coating shall be a paraffin base oil or mineral oil coating which effectively prevents absorption of moisture, prevents bonding with concrete, is non-staining to concrete and leaves the concrete with a paintable surface.

E. Chamfer Strips: Chamfer strips shall be polyvinyl strips or approved equal, designed to be nailed in the forms to provide a 3/4-inch chamfer (unless indicated otherwise) at exposed edges of concretemembers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Construction of Formwork: Forms shall be sufficiently strong to withstand the pressure resulting from the placement and vibration of concrete and shall be sufficiently rigid to maintain specified tolerances. Forms shall be sufficiently tight to prevent loss of mortar, and shall be adequately braced against lateral, upward, or downward movement.

B. Coating of Forms: Apply form coating to board forms prior to placing reinforcing. Keep form coatings off steel reinforcing, items to be embedded, and previously placedconcrete.

C. Form Erection:

1. Provide a means of holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects of the finished concrete. Ensure that forms may be removed without injury to the surface of the finished concrete.

2. Provide a positive means of adjustment of shores and struts. Ensure that all settlement is taken up

during concrete placing.

3. Temporary openings shall be provided in wall forms to limit the free fall of concrete to a maximum of 6 feet unless an elephant trunk is used. Such openings shall be located to facilitate placing and consolidation and shall be spaced no more than 8 feet apart. Temporary openings shall also be provided in the bottom of wall and column forms and elsewhere as necessary to facilitate cleaning and observation immediately prior to placing.

4. Do not embed any form-tying device or part thereof other than metal in concrete.

5. Form surfaces of concrete members except where placement of the concrete against the ground is shown on the drawings. The dimensions of concrete members shown on the drawings apply to formed surfaces, except where otherwise indicated.

D. Formwork Reuse: Reuse only forms which maintain a uniform surface texture on exposed concrete surfaces. Apply light sanding between uses to obtain such a uniform texture. Plug unused tie rod holes with corks, shave flush, and sandpaper on the concrete surfaceside.

E. Removal of Forms:

1. Forms and shoring for elevated structural slabs, girders, and/or beams shall remain in place until the concrete has reached a compressive strength equal to the specified 28-day compressive strength as determined by test cylinders. The following table indicates the minimum allowable time after the last concrete is placed before forms, shoring, and/or bracing may beremoved.

Structural Item		Minimum Allowable Time
1.	Bottom side of slabs girders, beams beams	When concrete reaches specified 28-day compressive strength and minimum 4-days
2.	Vertical sides of girders, beams	48 hours
3.	Walls not supporting vertical or horizontal loads	48 hours
4.	Walls supporting vertical or horizontal loads	When concrete reaches specified 28-day compressive strength and minimum 4 days
5.	Footing, pipe encasements, pipe supports	24 hours

2. Do not remove forms from concrete, which have been placed with outside air temperature below 50 degrees Fahrenheit (°F) without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired and finished as specified.

F. Formed Openings: Openings shall be of sufficient size to permit final alignment of the items within it without deflection or offsets of any kind and to allow space for packing where the items pass through the wall to ensure water tightness around openings so formed. Provide openings with continuous keyways with waterstops where required and provide a slight flare to facilitate grouting and the escape of entrained air during grouting. Provide formed openings with reinforcement as indicated and specified. Reinforcing steel shall be at least 2 inches clear from the opening.

G. Embedded Items: Set anchor bolts and other embedded items accurately and hold securely in position in the forms until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting. Check all nailing, blocks, plugs, and strips necessary for the attachment of trim, finish and similar work prior to concreting.

H. Pipes and Wall Spools Cast in Concrete:

1. Install wall spools, wall flanges and wall anchors before placing concrete. Do not weld, tie, or otherwise connect the wall spools to the reinforcing steel.

2. Support pipe and fabricated fittings to be encased in concrete-on-concrete piers or pedestals. Carry concrete supports to firm foundations so that no settlement will be possible during construction.

I. Form Tolerances:

1. Failure of the forms to produce the specified concrete surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no cost to the City. Comply with A.C.I. 347 if more stringent than listed herein.

2. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	Maximum Tolerance (inches per 10 feet length)
Sleeves and inserts	+1/3 to -1/4
Projected ends of anchors	+1/4 to -0.0
Anchor bolt setting	+1/4 to -1/4
Finished concrete, all locations	+1/4 to -1/4 in Class B +1/8 to –1/8 in Class A per Section 03300: Cast-in-Place Concrete

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and Inserts	Centerline of sleeve or insert
Projected ends of anchors	Plane perpendicular to the end of the anchor as located on the drawings
Anchor bolt setting	Centerline of anchor bolt
Finish Concrete	The concrete surface as located on the drawings.

3. Where equipment is to be installed, comply with manufacturer's tolerances if more severe than above.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: This section consists of providing all labor, materials, equipment and incidentals required to install all steel bars, steel wire and wire fabric required for the reinforcement of concrete, as shown on the Drawings, and as specified herein.

B. Related Work Described Elsewhere:

1. Concrete Formwork: Section 03100.
2. Concrete Joints and Waterstops: Section 03262.
3. Cast-in-Place Concrete: Section 03300.
4. Concrete Finishing and Curing: Section 03345.
5. Shop Drawings: Section 01340.

1.2 QUALITY ASSURANCE

Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:

1. Standard Building Code.
2. ACI 315 "Details and Detailing of Concrete Reinforcement", latest edition.
3. CRSI Manual of Standard Practices.
4. Local codes and regulations.

1.3 SUBMITTALS

Materials and Shop Drawings:

1. Submit mill test certificates identifying chemical and physical analyses for each load of reinforcing steel delivered.
2. Submit Shop Drawings for review in accordance with Section 01340: Shop Drawings, Working Drawings and Samples. Submit reinforcing bending lists and placing drawings for all reinforcing. Placing drawings shall indicate all openings (mechanical, electrical, equipment), including additional reinforcing at openings and intersecting wall, beam and footing arrangements as indicated on the structural drawings and specified herein. Placing drawings shall be coordinated with the concrete placing schedule. Each bending list and placing drawing submitted shall be complete for each major element of a structure (grade slabs, footings, walls, floor or beams), including all dowels and other bars as required. Furnishing such lists shall not be construed that the list will be reviewed for accuracy. The contractor shall be wholly and completely responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown on the plans and as specified.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Reinforcement shall be shipped to the work with bars of the same size and shape fastened in bundles with

metal identification tags giving size and mark securely wired on. The identification tags shall be labeled with the same designation as shown on the submitted bar lists and shop drawings.

B. All bars shall be stored off the ground and shall be protected from moisture and be kept free from dirt, oil, or injurious contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete reinforcement in sizes No. 3 (3/8-inch) and larger shall be deformed steel bars of the same sizes and shapes indicated on the Drawings. The steel shall be newly rolled stock of domestic manufacture, substantially free from mill scale rust, dirt, grease, or other foreign matter. Bars shall be of intermediate grade, deformed billet steel conforming to ASTM Specification A615, Grade 60, including all supplementary requirements.

B. Rail-steel bars will not be allowed in the work.

C. Reinforcement shall be accurately fabricated to the dimensions indicated on the Drawings. Particular care shall be exercised not to have stirrups oversized in order to maintain proper coverage of concrete. Stirrups and tie bars shall be made around a pin having a diameter not less than two (2) times the maximum thickness of the bar. Bends for other bars shall be made around a pin having a diameter not less than five (5) times the minimum thickness of the bar except for bars larger than 1 inch, in which case the bends shall be made around a pin of eight (8) bar diameters. All bars shall be bent cold. Bars reduced in section or with kinks or bends not shown on the Drawings will not be accepted.

D. Wire fabric shall not be allowed. Commercial grade fiber-mesh shall be used in lieu of wire fabric in all concrete sidewalks, driveways and slabs as noted on the construction drawings.

E. Wire tie shall be 16-gauge minimum, zinc coated annealed.

F. Bar supports in beams and slabs exposed to view after for stripping shall be galvanized or epoxy coated. Use concrete supports for reinforcing in concrete placed in grade.

G. Coupler Splice Devices: Croweled, tension couplers capable of developing the ultimate strength of the bar as manufactured by Erico Products, Inc., Solon, Ohio, or equal and where approved by the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. No reinforcing bars shall be welded either during fabrication or erection without prior written approval from the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work.

B. Unless otherwise shown on the Drawings, splices in reinforcement shall be lapped not less than 36 bar diameters. Splice all horizontal bars in circular structures with Class "C" tension splices. All bar splices shall be staggered wherever possible. When splicing bars of different diameters, the length of the lap is based on the larger bar. Unless indicated on the Drawings or where conventional cap splices cannot be achieved, full positive tension connection shall be provided. Such coupler devices shall be installed in accordance with the recommendations of the manufacturer.

C. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt, and other coatings that reduce or destroy bond. Where there is delay in depositing concrete after

reinforcement is in place, bars shall be reinspected and cleaned when necessary.

D. Reinforcement shall be accurately positioned as indicated on the Drawings and secured against displacement by using zinc coated annealed iron wire ties of not less than No. 16 gauge, or suitable clips at intersections.

E. All accessories such as chairs, chair bars, and the like are an integral part of the reinforcement and shall be furnished and installed in sufficient quantity to satisfactorily position all steel, in accordance with the latest (ACI 315) Manual of Standard Practice for Detailing Reinforced Concrete Reinforcement.

F. Except as otherwise indicated on the Drawings, bars in slabs, beams and girders shall be spliced as per requirements in ACI 315. Splices and laps in columns, piers and struts shall be sufficient to transfer full stress by bond. Splices in adjacent bars shall be staggered if required.

G. Except as otherwise indicated on the Drawings, reinforcement shall be installed with clearance for concrete coverage as follows:

1. Footing bottoms: 3 inches.

2. All other surfaces: 2 inches

H. All slab reinforcing shall be supported on concrete cubes or wafers of the correct height. Wafers shall contain soft steel wires embedded therein for fastening to reinforcing. Wafers shall have a minimum compressive strength of 3,500 psi and shall have been cured as specified for concrete. Masonry units will not be permitted for supporting steel in bottom mats or elsewhere. For supporting the top steel in slabs, the Contractor shall furnish extra steel supports, such as channels if required, and shall construct blocks of concrete having the same quality as specified for the structure for use in supporting both top and bottom mat steel. Wood blocks, stones, brick chips, etc., cinder blocks, or concrete building blocks will not be allowed. Alternative methods for supporting top steel in slabs, such as vertical reinforcing fastened to bottom and top mats, may be used if approved by the Engineer.

I. Alternate methods of supporting bottom reinforcement for slabs and beams not exposed to the weather (such as plastic chairs, but not plastic-tipped bolsters) may be used only if specifically approved by the Engineer.

J. Reinforcement for vertical surfaces (beams, columns, walls) shall be properly and firmly positioned from the forms at all points by means of stainless steel (tipped) bolsters or equal, subject to Engineer's approval.

K. Reinforcement, which is to be exposed for a considerable length of time after being placed shall be painted with a heavy coat of neat cement slurry.

L. In no case shall any reinforcing steel be covered with concrete until the amount and position of the reinforcement has been checked by the Resident Project Representative and has permission given to proceed with the concreting. The Resident Project Representative shall be given a minimum of 24-hour notice of the availability of set reinforcement for checking.

M. Do not straighten or rebend reinforcing steel in a manner that will injure the material. Do not use bars with bends not shown on the Drawings.

N. Place reinforcement a minimum of 2-inches clear of any metal pipe or fittings.

O. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

END OF SECTION

SECTION 03262
CONCRETE JOINTS AND WATERSTOPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work included in this section consists of providing all labor, materials and equipment necessary to install expansion joints, construction joints, and waterstops.

B. Related Work Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 01340.

2. Concrete Formwork: Section 03100.

3. Concrete Reinforcement: Section 03200.

4. Cast-in-place concrete: Section 03300.

5. Concrete Finishing and Curing: Section 03345.

1.2 SUBMITTALS

Materials:

1. Submit manufacturer's literature, including a statement of compliance with ASTM and U.S. Federal Specifications.

2. Submit materials and samples of waterstops.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Preformed expansion joint filler shall be ¾-inch thick, or as shown on the drawings, and shall be a self-expanding cork, Servicized Products, W.R. Grace and Company, Code No. 4314, or approved equal.

B. Joint sealant for continuous immersion shall be a multi-part, gray, polyurethane sealant meeting U.S. Federal Specification TT-S-00227E (3) Type I, Class A for horizontal joints and Type II, Class A for vertical joints. Additionally, the sealant must be recommended by the manufacturer for continuous immersion in water. Products meeting this specification include PRC 270 of Products Research and Chemical Corporation and Vulkem 227 of Mameco International.

C. Waterstops shall be extruded from a PVC compound and shall be 9-inch by 3/8-inch flat dumbbell and/or center bulb type as shown on the Drawings. Center bulb waterstops shall be used at expansion joints. Waterstops shall comply with Corps of Engineers Specification CRD-C-572. All material shall be virgin material. The uses of reworked PVC or other substitute will not be permitted.

D. Tongue and grove joint forms: Tongue and grove joint forms shall be 24-gauge steel forms complete with steel stakes and splice plates. Forms shall be designed for joints not to receive a poured seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Construction Joints:

1. Provide construction joints where shown on the Drawings, or as recommended by the Contractor and approved by the Engineer. In case of emergency, place additional construction joints. (An interval of 45 minutes between two consecutive batches of concrete shall constitute cause for an emergency construction joint.)

2. Construction joints shall be keyed, unless otherwise detailed. Form keyways by beveled strips or boards placed at right angles to the direction of shear. Except where otherwise shown on the Drawings or specified, keyways shall be at least 1-1/2 inches in depth over at least 25 percent of the area of the section.

3. When it is necessary to make a joint because of an emergency, furnish and place reinforcing dowels across the joint. Embed dowels 48 bar diameters each side of the joint. Size and number of dowels shall match reinforcing in the member. Furnishing and placing such reinforcing steel shall be at the Contractor's expenses.

4. After the pour has been completed to the construction joint and the concrete has hardened, thoroughly clean the entire surface of the joint of surface laitance, loose or defective concrete, and foreign material, and expose clean aggregate by sandblasting the surface of construction joints before placing the new concrete. Cover horizontal construction joints with mortar. Spread uniformly and work thoroughly into all irregularities of the surface. The mortar shall be flowable and shall consist of sand, water, and a minimum of 12 sacks of cement per cubic yard. Provide positive measuring device, such as a bucket, or other device that will contain only enough mortar for depositing in one place in the wall or column to ensure that portion of the form does not receive too much mortar. Do not deposit mortar from pump hoses or large concrete buckets unless inspection windows close to the joint are available to allow visual measurement of mortar thickness and means for mortar removal are available for removal of excess grout. The water-cement ratio of the mortar in place shall not exceed that of the concrete to be placed upon it, and the consistency of the mortar shall be suitable for placing and working.

B. Expansion Joints:

1. Provide expansion joints of sizes and at locations as shown on the Drawing.

2. Place expansion joint fillers every 30 feet in straight runs of walkways, at right angle turns and wherever concrete butts into vertical services.

C. Bonding at Construction Joints: Before depositing new concrete on or against concrete that has set, thoroughly clean the surfaces of the set concrete so as to expose the coarse aggregate and remove laitance coatings, foreign matter and loose particles. Retighten forms. Dampen, but do not saturate the hardened concrete of joints and then thoroughly cover with a coat of cement grout of similar proportions to the mortar in the concrete. Place the fresh concrete before the grout has attained its initial set.

D. Time Between Pours: At least two (2) hours shall elapse after depositing concrete in columns or walls before depositing in beams, girders or slabs supported thereon. Place beams, girders, brackets, column capitals and haunches monolithically as part of the floor or roof system.

E. Joint Sealants: Joint sealants shall be required where indicated on the Drawings. Preparation of surfaces, priming and the handling and preparation of materials shall be in complete compliance with the manufacturer's instructions as approved.

F. Waterstops:

1. Waterstops shall be properly heat spliced at ends and intersections to ensure continuity. Construct

forms for construction joints in such a manner as to prevent injury to waterstops. Hold waterstops securely in position in the construction joints by wire ties, continuous bars, and rings as required. Install waterstops in construction joints in hydraulic structures, which will contain liquid or resist the entry of groundwater.

2. Make field splices with a thermostatically controlled heating iron in conformance with the manufacturer's current recommendations. Allow at least 10 minutes before pulling or straining the new splice in any way. The finished splices shall provide a cross section that is dense and free of porosity with tensile strength of not less than 80 percent of the unspliced materials. Where prefabricated intersections such as tees, crosses, and elbows are available, provide them in lieu of field-fabricated intersections.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1-GENERAL

1.01 SUMMARY

A. This section includes integrally colored cast in place concrete

B. Related Sections: The following sections contain requirements that relate to this section:

1. Section 02200 “Excavating, Backfilling, and Compacting,” for subgrade preparation, grading and subbase course.

1.02 SUBMITTALS

A. Product Data: Submit product data and samples for proprietary materials and items, including integral pigments, reinforcement, form facing materials, form release agents, forming accessories, admixtures, joint systems, curing compounds and others requested by Owner.

B. Shop Drawings: Submit shop drawings indicating joint spacing and locations.

C. Design Mixes: Submit design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, projects conditions, weather, test results, or other circumstances warrant adjustments.

D. Samples: Submit pigment manufacturer’s color chart and sample color chips for color selection or if selection has been made submit sample chips of specified colors indicating pigment numbers and required dosage rates. Submittals are for general color selection and may vary somewhat from concrete finished in field according to Specifications.

1.03 QUALITY ASSURANCE

A. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.

1. American Concrete Institute (ACI) 301, “Section 6 - Landscape Architectural Concrete”
2. ACI 318, “Building Code Requirements for Reinforced Concrete.”
3. ACI 305R, “Hot Weather Concreting.”
4. ACI 306R, “Cold Weather Concreting.”
5. Concrete Reinforcing Steel Institute (CRSI), “Manual of Standard Practice.”
6. ASTM C309, “Liquid Membrane-Forming Compounds for Curing Concrete.”
7. ASTM C979, “Pigments for Integrally Colored Concrete.”

B. Installer: Engage an installer/applicator who is certified by ACI as a Concrete Flatwork Finisher. The Installer shall be a company trained by the manufacturer specializing in decorative concrete work.

C. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests and to design concrete mixes.

E. Field-Constructed Mockup: Prior to installation of colored concrete work, erect sample panels in place to further verify selections.

1. Provide minimum 4' x 4' mock-up. Construct at least two weeks before start of other concrete work to allow concrete to cure before observation. Mock-up may be located off-site; however, it must be located within a 30-minute drive of project site.
2. Mockup shall demonstrate each forming and finishing condition required on Project using materials, workmanship, joint treatment, form ties, curing method and patching techniques to be used throughout Project.
3. Retain samples of cements and aggregates used in mock-up for comparison with materials used in remaining work.
4. When Owner determines that mockup does not meet requirements, demolish and remove it from the site and cast another until the mockup is accepted.
5. Keep accepted mockup undisturbed during construction as a standard for judging completed work.
6. Photos in lieu of field visit by Owner and/or City representative may be submitted; however, mock-up must be made available for inspection at any time during approval process.
7. Demolish accepted mockup and remove from site or undamaged mockup may be incorporated into the Work, when directed by Owner

F. Delivery, Storage and Handling: Obtain each material from the same source to maintain a high degree of consistency in workmanship throughout Project. Deliver pigments to job site or batch plant in original, unopened packaging. Store in dry conditions.

PART 2 – PRODUCTS

2.01 FORMS

A. Form Materials: Provide smooth, non-porous surfaces such as steel, plastic, or high- density overlaid plywood to provide full-depth, continuous, straight, smooth exposed surfaces.

B. Form Ties: Fiberglass rods tinted to match concrete or other approved method.

C. Form Release: Form release agent shall be non-staining. Provide "Concrete Wall Form Release" manufactured by Increte Systems Inc.

2.02 CONCRETE MATERIALS

A. Minimum Compressive Strength: 3000 psi at 28 days.

B. Pigments for Integrally Colored Concrete: Pre-weighed and packaged dry high-grade coloring pigment complying with ASTM C979. Color as selected by Owner from manufacturer's standards, unless indicated otherwise. (Refer to Color-Crete spec and data, and product usage chart.)

C. Manufacturer: Color-Crete manufactured by Increte Systems Inc.; phone 800-752-4626.

1. Substitutions: Comply with General Conditions for substitution request procedures.

D. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured Batch-Ready disintegrating bags to minimize job site waste.

E. Colors: Concrete mix shall contain Color-Crete Liquid pigment "Desert Rose" at its prescribed dosage rate. Dosage rate based on total weight of Portland cement, fly ash, silica fume, lime and

other cementitious materials but not aggregate or sand.

F. Portland Cement: ASTM C 150, Type I (gray) (white). Use one brand of cement throughout Project unless otherwise acceptable to Owner.

G. Fly Ash: ASTM C 618, Type F.

H. Normal-Weight Aggregates: Provide aggregates from a single source, ASTM C 33, Class 4, as follows:

1. Do not use fine or coarse aggregates that contain substances that cause spalling.
2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength durability by special tests or actual service may be used when acceptable to Owner.

I. Water: Potable.

J. Fiber Reinforcement: Synthetic fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III. Provide "Mono Fiber" manufactured by Increte Systems Inc. or approved equal.

K. Sand: Color shall be locally available natural sand.

L. Select Aggregate: Color shall be locally available.

M. Admixtures: Do not use calcium chloride admixtures.

2.03 ACCESSORIES

A. Curing Compound for Colored Concrete: Curing compound shall comply with ASTM C309 and be approved by pigment manufacturer for use with colored concrete. Provide "Increte Cure and Seal" manufactured by Increte Systems Inc.

B. Sealers: Concrete sealers shall be low VOC (<350g/L) solvent-based sealer formulated with exempt solvents and clear acrylic resins, resistant to salt-spray, acids, alkali, water, ultraviolet rays, and wet and dry abrasion.

1. Increte Systems Inc. 'Clear Seal Classic' or approved equal.

C. Texture Skin: rubber or other flexible seamless imprinting tool for applying synthetic textures to uncured concrete.

1. Increte Systems Inc. "Olde English Slate" seamless skin.

D. Glass Beads: FDOT approved (AASHTO M247-TYPE 1) glass beads.

2.04 MIXES

A. Pigments: Mix in accordance with manufacturer's instructions. Mix until pigments are uniformly dispersed throughout mixture and disintegrating bags, if used, have disintegrated. Schedule delivery of concrete to provide consistent mix times from batching until discharge.

PART 3 - EXECUTION

3.01 FORMS

A. Installing: Provide watertight joints, sealed to prevent leakage. Rustication strips are required at construction joints or between pours.

B. Stripping: Leave forms in place as long as practical. Remove forms when concrete has reached a consistent age to maintain uniformity of curing conditions throughout Project.

3.02 FINISHES ON FORMED SURFACES

A. Provide the following finishes in accordance with ACI 301:

1. Textured skin finish.

B. Broadcast glass beads across colored and textured concrete surface, insuring even distribution across broadcast area. Do not press beads into textured surface with float or another tool which may disturb textured surface. Beads which fall off without adhering to wet concrete may be collected and re-broadcast, provided that no dirt or other debris is collected with the beads and cast into concrete.

3.03 JOINTS

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

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints at 10’ on-center or as noted in the drawings with power saws equipped with shatterproof abrasive or diamond- rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.04 PATCHING

A. Fill holes and defects in concrete surface within 48 hours of form removal. Use the same patching materials and techniques that were approved on mock-up. Make patches with a stiff mortar made with materials from the same sources as the concrete. Adjust mortar mix proportions so dry patch matches dry adjacent concrete. Add white cement to mortar mix if necessary to lighten it. (With exposed aggregate finished, add aggregate to mortar mix so patches will have the same texture and appearance as adjacent concrete.)

3.05 CURING

A. Curing: Maintain concrete between 65 and 85 ºF (18 to 29 ºC) degrees during curing. (Curing with water, membranes, or non-approved compounds can discolor concrete.)

B. Colored Concrete: Apply curing compound in accordance with manufacturer’s instructions.

3.06 TOLERANCES

A. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of un-pigmented concrete, are acceptable.

END OF SECTION

SECTION 03345
CONCRETE FINISHING AND CURING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: This section describes materials and methods of concrete finishes, curing, repair of defects and surface protection.

B. Related Work Described Elsewhere:

1. Concrete Formwork: Section 03100.

2. Concrete Reinforcement: Section 03200.

3. Concrete Joints and Waterstops: Section 03262.

4. Cast-In-Place Concrete: Section 03300.

5. Leakage Testing of Hydraulic Structures: Section 03800.

1.2 SUBMITTALS

Curing Compound: Submit manufacturer's statement of compliance with these specifications and recommend coverage to meet or exceed the specified tests. Submit manufacturer's application instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. See Section 03300: Cast-In-Place Concrete.

B. Curing Compound:

1. Curing compound shall conform to ASTM C 309, Type 2, Class BN.

2. Curing compound shall be compatible with required finishes and coatings.

3. Curing compounds for exposed concrete not to receive special finishes, protective coatings and/or concrete toppings shall be "Super Rez-Seal", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.

4. Curing compound for exposed concrete to receive special finishes, protective coatings and/or concrete toppings shall be "Kurez-DR", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.

C. Mortar for Repair of Concrete: Mortar used for repair of concrete shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than one (1) part cement to two and one-half (2-1/2) parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

D. Burlap Mats: Conform to AASHTO Specification M182.

E. Sisal-Kraft Paper and Polyethylene Sheets for Curing: Conform to ASTM C 171.

PART 3 - EXECUTION

3.1 CONCRETE FINISHES

A. Complete concrete surfaces in accordance with the following schedule:

Finish Designation	Area Applied
F-1	Exterior walls below grade not exposed to water.
F-2	Exterior and interior walls exposed to water.
F-3	Walls of structures or buildings exposed to view. Underside of formed floors or slabs.
S-2	Slabs and floors not water bearing.
S-3	Slabs and floors, which are water bearing. Slab surfaces on which mechanical equipment moves.
S-4	Slabs, beams, girders, columns, and floors of structures.
S-5	Slabs and floors at slopes greater than 10 percent.
E-1	Exposed edges of slabs, floors, and walls tops.

B. Concrete surface repair.

1. Finish F-1: Repair defective concrete, fill depressions deeper than ½-inch, and fill tie holes.

2. Finish F-2: Repair defective concrete, remove fins, fill depressions ¼-inch or deeper, and fill tie holes.

3. Finish F-3: In addition to Finish F-2, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one (1) part cement and one-half (1/2) parts sand by damp loose volume, over the surface of clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap.

4. Finish S-2: Smooth steel trowel finish.

5. Finish S-3: Steel trowel finish free from trowel marks and all irregularities.

6. Finish S-4: Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.

7. Finish S-5: Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines parallel to the direction of slope drainage.

8. Finish E-1: Exposed edges of slabs, floors, and tops of walls, finish with a ¼-inch radius edge if a chamfer is not indicated.

3.2 FINISHING OF FORMED SURFACES

A. Water cure surfaces until finishing and repairing are completed.

B. As soon as possible after forms are removed, remove fins and irregularities by grinding or rubbing, fill depressions deeper than specified with mortar, and fill tie holes.

C. Ream tie holes with toothed reamers until surface of hole is rough and clean. Coat surface with epoxy bonding compound and fill with mortar.

D. Finish tapered tie holes as follows:

1. Sandblast tie rod hole and blow clean prior to filling.

2. Drive rubber plug, with one end open to the center of the hole. Plug size shall be larger in diameter than the diameter of the hole at the center of the wall.

3. Coat entire annular surface of the hole with epoxy prior to filling with mortar. Apply epoxy in accordance with manufacturer's instructions.

4. Fill each side of hole with mortar. Apply mortar to the "wet" side of the wall first. Consolidate mortar solidly into the hole.

5. Notify City's Representative of tie rod filling schedule.

3.3 REPAIR OF SURFACE DEFECTS

A. Remove honeycombed and other defective concrete down to sound concrete. Edges shall be perpendicular to surface. Sandblast surfaces to receive repair.

B. Coat sandblasted surface with epoxy bonding compound.

C. Place mortar in layers having a compacted thickness of 3/8-inch. Scratch surface of each layer to promote bonding with next layer.

D. Finish repair shall match adjacent concrete, and cure as specified.

E. Repair defective areas of more than 1-foot square and deeper than the reinforcing steel as above, except fill the area with pneumatically applied concrete.

3.4 REPAIR OF CRACKED CONCRETE (REFER TO STRUCTURAL STANDARDS DETAILS)

A. Alternate methods of crack repair may be submitted by the Contractor for review by the Resident Project Representative.

3.5 CURING AND PROTECTION

A. Cure concrete surfaces in accordance with the following schedule:

Curing Method	Area Permitted
1.	All surfaces
2.	All surfaces
3.	Slabs and floors
4.	All surfaces when maximum ambient temperature will not exceed 80 degrees Fahrenheit (°F) and humidity will not drop below 40 percent on the day of concrete placement and for the three days following. Where wooden forms are used, wet them immediately before concreting and keep them moist by sprinkling until removed. Keep all exposed surfaces of formed concrete moist until curing method is applied.

B. Cure concrete for not less than 14 days after placing in accordance with one of the following appropriate methods:

1. Method 1 - Water Spray Method: Tightly close off concrete surfaces to be cured by bulkheads or other means or entirely surround by tight enclosures, and keep the concrete surfaces moist by sprinkling, spraying or other means.

2. Method 2 - Wet-Burlap-Mat Method: Thoroughly wet and cover concrete surfaces to be cured with wet burlap mats as soon as the forms have been stripped or as soon as the concrete has set sufficiently to avoid marring the surface. Keep entire concrete surface and burlap continuously and completely wet during the entire curing period.

3. Method 3 - Curing Blanket Method: Thoroughly wet concrete surfaces to be cured and cover with curing blankets as soon as the concrete has set sufficiently to avoid marring the surface. The curing blankets shall be weighted to maintain close contact with the concrete surface during entire curing period. Should the curing blankets become torn or otherwise ineffective, keep surfaces moist and replace damaged sections. The curing blankets shall consist of one (1) of the following two (2) types:

   a. Sheets of heavy waterproof sisal-kraft paper laid with the edges butted together and with the joints between strips sealed with 2-inch-wide strips of sealing tape or with the edges lapped not less than three inches and fastened together with waterproof cement to form continuous watertight joints; or

   b. Sheets of clean polyethylene, having a minimum thickness of four mils, laid with edges butted together and with the joints between sheets sealed with 1-inch-wide strips of acetate tape.

   c. During the curing period, do not permit traffic of any nature or depositing of objects, temporary or otherwise, on the curing blankets.

4. Method 4 - Curing Compound Method: Spray the surface with two (2) coats of liquid curing compound. Apply in accordance with the manufacturer's instructions to cover the surface with a uniform film, which will seal thoroughly. Apply the second coat at 90 degrees of the first coat.

   a. Apply curing compound immediately after completion of the finish on unformed surfaces and within two (2) hours after removal of forms on formed surfaces. Repair formed surfaces within the said 2-hour period; provided, however, that any such repairs which cannot be made within the said 2-hour period shall be delayed until after Method 1, 2, or 3 has been applied. When repairs are to be made to an area on which curing compound has been applied, first sandblast the area to remove the curing compound, and then repair.

   b. Wherever curing compound may have been applied to surfaces against which concrete subsequently is to be placed and to which it is to adhere, remove the curing compound entirely by sandblasting prior to the placing of new concrete.

   c. Where the curing compound method is used, exercise care to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, repair the damaged portions immediately by the application of additional curing compound.

3.6 CONCRETE SURFACES TO BE COATED

Concrete surfaces on which paints or coatings are to be applied shall be of even color, gray or gray-white. The surface shall have no pits, pockets, holes or sharp changes of surface elevation. Scrubbing with a stiff bristle fiber brush shall produce no dusting or dislodging of cement or sand.

END OF SECTION

SECTION 03480
PRECAST CONCRETE SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: This section includes providing all materials, labor and equipment to construct and install the precast concrete wet wells, inlets and manholes as described here and/or shown on the Drawings.

B. Related Work Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 01340.

2. Drainage Structures, Pipes and Fittings: Section 02720

3. Excavating, Backfilling and Compacting: Section 02200.

4. Grouting: Section 03600.

1.2 SUBMITTALS

Materials and Shop Drawings: Submit manufacturer's catalog data on precast concrete wet wells, inlets, manholes, and accessories. Show all dimensions and materials of construction by ASTM reference and grade.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Precast Concrete Wet Wells:

1. Precast concrete wet wells shall be manufactured in a plant especially designed for that purpose and shall conform to the shapes and dimensions indicated on the drawings. Precast wet wells shall be manufactured by Taylor Precast, Green Cove Springs; Standard Precast, Florida; or equal. The equivalent product of another manufacturer or cast-in-place structure may be utilized where approved in advance.

2. Design loads shall consist of dead load, live load, impact, and loads due to water table, as well as other loads, which may be imposed upon the structure. If cast-in-place concrete is to be used, the Contractor shall submit complete design data and drawings for approval at least two (2) weeks in advance of construction.

3. Forms used for precast concrete shall be of metal and sufficiently designed and braced to maintain their alignment under pressures of the concrete during placing.

B. Precast Manholes

1. Precast units shall conform to the requirements of ASTM Designation C 478, Precast Reinforced Concrete Manhole Sections, with reinforcement of Grade 60 bars and the following modifications thereto:

a. Cement shall be Type II.
b. Joints shall be filled with performed plastic joint sealer “Ram-Nek” as manufactured by the K.T. Snyder Co. or equal.
c. Lifting holes through the structures are not permitted.
d. The reinforced concrete bottom and top slabs shall be as shown on the Drawings and the bottom slab shall be cast monolithically with the lower wall section and the longitudinal cylindrical

reinforcement shall be as shown on the Drawings or as otherwise approved by the Engineer.

e. Exterior surfaces of sanitary sewer manholes shall be coated prior to installation with two (2) coats (8 mils each) of Koppers 300M (Coal Tar Epoxy) or approved equal.

2. Concrete classes for the various purposes shall be as follows:

   a. Manhole bottoms: Class A.
   b. Precast manholes: Class A.
   c. Protective slabs: Class B.

3. Casting: Gray iron castings for manhole frames, covers, and other items shall conform to the ASTM Designation A 48, Class 30. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength, or otherwise make them unfit for the service intended. The seating surfaces between frames and cover shall be machined to fit true. No plugging or filling will be allowed. Lifting or "pick" holes shall be provided but shall not penetrate the cover. Casting patterns shall conform to those shown or indicated on the Drawings. The word STORM SEWER shall be cast in all storm sewer manhole covers, and the word SANITARY shall be cast in all sanitary sewer manhole covers. All manhole frames and covers shall be traffic bearing unless otherwise specified.

4. Cement Mortar: Cement mortar for manhole construction shall be as specified in ASTM Designation C-270, Type M, except that the cement shall be Portland Type II. No mortars that have stood for more than one hour shall be used.

C. Precast Catch Basins

1. Precast catch basin units shall conform to the requirements of ASTM C-890 and C-913.

   a. Cement shall be Type II.
   b. Joints shall be filled with performed plastic joint sealer "Ram-Nek" as manufactured by the K.T. Snyder Co. or equal.
   c. Lifting holes through the structures are not permitted.
   d. The reinforced concrete bottom and top slabs shall be as shown on the Drawings and the bottom slab shall be cast monolithically with the lower wall section and the longitudinal cylindrical reinforcement shall be as shown on the Drawings or as otherwise approved by the Engineer.

2. Concrete classes for the various purposes shall be as follows:

   a. Catch basin bottoms: Class A.
   b. Precast catch basins: Class A.
   c. Protective slabs: Class B.

3. Castings: Castings for inlets and other items shall conform to the ASTM Designation A-48, Class 25. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength or otherwise make them unfit for the service intended. No plugging or filling will be allowed. Casting patterns shall conform to those shown or indicated on the Drawings.

4. Cement Mortar: Cement mortar for inlet construction shall be one-part cement and two-parts clean sharp sand to which may be added lime in the amount of not over twenty-five percent volume of cement. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one hour shall be used.

C. Concrete:

1. Aggregates: All aggregates, fine and coarse, other than lightweight aggregates, fine and coarse, shall conform to ASM C-330. Aggregates shall be free of deleterious substances causing reactivity with oxidized hydrogen sulfide. Both types of aggregate shall be graded in a manner so as to produce a homogenous concrete mix. All materials are to be accurately weighed at a central batching facility for mixing.

2. Cement shall be Portland cement conforming to ASTM C-150, Type V. Cement content shall be sufficient to produce minimum strength of 3,000 psi.

3. Placing: All concrete shall be handled from the mixer or transport vehicle to the place of final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients, until the approved unit is completed. Concrete shall be placed in layers not over 2-feet deep. Each layer shall be compacted by mechanical internal or external vibrating equipment. Duration of the vibration cycle shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation.

4. Curing:

   a. For purposes of early reuse of forms, precast concrete may be steam cured after an initial set has taken place. The steam temperature shall not exceed 160 degrees Fahrenheit (□F), and the temperature shall be raised from normal ambient temperatures at a rate not to exceed 40 □F per hour.

   b. The steam-cured unit shall not be removed from the forms until sufficient strength is obtained for the unit to withstand any structural strain to which it may be subjected during the form stripping operation. After the stripping of forms, further curing by means of water spraying or a membrane-curing compound may be used, and shall be of a clear or white type, conforming to ASTM C-309.

5. Reinforcing steel shall be sufficiently tied to withstand any displacement during the pouring operation. All bars shall be intermediate or hard grade billet steel conforming to ASTM A-615.

D. Sealing Compound and Grout: Plastic sealing compound shall comply with Federal Specifications SS-S-02210. Mortar shall comply with ASTM C-387, Type S, or use grout complying with Section 03600: Grout.

E. Pipe Openings: Wall and top openings shall be blocked out to the dimensions shown on the Plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Earthwork: The Contractor shall prepare an excavation large enough to accommodate the structure and permit sealing of openings, waterproofing, and backfilling operations. Earthwork shall conform to the applicable sections of Division 2: Site Work.

B. Sealing and Grouting: Fill all joints between precast sections with a joint sealant, as recommended by the structure manufacturer.

C. Installing Wet Well Sections:

1. Set each precast concrete unit plumb on a bed of sealant or grout to make a watertight joint at least 1/2 inch thick with the concrete base or with the preceding unit. Point the inside joint and wipe off the excess sealant or grout.

2. Assemble units so that the cover conforms to the elevations shown on the Drawings.

3. Upon completion of installation, all voids or openings in the wet well walls around pipes shall be filled with 3,000 psi concrete or mortar, using an approved epoxy for bonding concrete surfaces.

D. Waterproofing: All exterior vertical surfaces of precast concrete wet wells (below finished grade) shall be waterproofed. All interior surfaces of precast concrete wet wells shall be coal-tar epoxy coated.

E. Backfill: After the structure and all appurtenances are in place and approved, backfill shall be placed to the original ground line or to the limits designated on the Drawings. Backfill material shall consist of sand or loose earth, free from stones, clods, or other deleterious material. It shall be placed in horizontal layers not exceeding 12-inches in depth and shall be moistened and thoroughly compacted to a minimum relative density conforming to the requirements of Division 2: Site Work.

END OF SECTION

SECTION 03600
GROUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work included in this Section consists of grouting the various items listed hereinafter and indicated on the Drawings.

B. Related Work Described Elsewhere: Cast-in-Place Concrete, Section 03300.

1.2 SUBMITTALS

Materials and Shop Drawings: Section 01340: Shop Drawings, Working Drawings and Samples for submittal requirements. Manufacturer's literature shall be submitted for review on nonshrink grout data shall include grout properties, mixing, surface preparation and installation instructions.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

Grouting materials shall be delivered and stored in unbroken containers with seals and labels intact as packaged by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Nonshrink, Nonmetallic Grout: Sauereisen F-100 Level Fill, Master Builders Masterflow 713, Burke Non-Ferrous, Non-Shrink Grout or equal pre-mixed type.

B. Nonshrink Metallic Grout: Master Builders Embeco 636 Grout pre-mixed type, or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. All bonding surfaces shall be clean and dust and oil free.

3.2 INSTALLATION

A. Nonshrink Grout:

1. Nonshrink, nonmetallic grout shall be used for grouting column base plates, anchor bolts, reinforcing bars, pipe sleeves, machinery supports and pump base plates.

2. Nonshrink grout shall be mixed and placed as recommended by the manufacturer.

3. Grout shall be mixed as close to the work area as possible and transported quickly to its final position in a manner, which will not permit segregation of materials.

4. Nonshrink grout shall be cured with water-saturated burlap for at least 3 days.

5. Machinery set on grout pads shall not be operated until the grout has cured for at least 36 hours.

END OF SECTION

SECTION 03601
PRESSURE GROUTING

PART I - GENERAL

1.1 DESCRIPTION

A. Scope of Work: The work included in this Section consists of injecting suspension grout under pressure and shall include furnishing of all materials, labor, and equipment as described, specified, and otherwise required for performance of the work described in this section.

B. Related Work Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Section 01340.
2. Cast-in-Place Concrete: Section 03300.

1.2 SUBMITTALS

A. Materials: Satisfactory evidence shall be submitted indicating that materials to be used, including cement, aggregates, and admixtures meet the specified requirements.

B. Design Mix: The design mix to be used shall be prepared by qualified persons and submitted for approval. The design of the mix is the responsibility of the Contractor subject to the limitations of the Specifications. Approval of this submittal will in no way alter the responsibility of the Contractor to furnish a grout mixture meeting the requirements of this Specification.

PART 2- PRODUCTS

2.1 MATERIALS

A. Cement

1. Cement for the grout shall be domestic Portland cement conforming to the requirements of ASTM designation C-150, Type II.

   Only one brand of cement shall be used unless otherwise approved by the Engineer. Cement, which has been damaged, partially set, lumpy or caked, shall not be used and the entire contents of the sack or container, which contains such cement, will be rejected. No salvaged or reclaimed cement shall be used.

B. Aggregate: Sand for grout shall conform to the material specification included in Section 3300, and to the following graduation:

Sieve Designation (U.S. Std. Square Mesh)	Percent Passing By Weight
16	100
50	20-50
100	10-30
200	0-5

C. Bulk Filters: Bulk filter shall be fly ash, meeting the requirements of ASTM C-618, Class F, and of Section 929 of the Florida Department of Transportation Standard Specifications.

D. Water: Clean and free from injurious amounts of deleterious materials.

E. Fluidifier shall be a compound possessing characteristics, which will increase the flowability of the grout mixture and neutralize the setting shrinkage of the grout. Fluidifier shall meet the requirements of ASTM C-937. Fluidifier shall be furnished in moisture-resistant paper sacks shipped in sealed containers and

shall be stored so as to avoid absorption of moisture, or other damage to the containers or material. Material, which has become caked due to moisture absorption, will be rejected.

F. Bentonite shall be sodium cation, powdered montmorillonite. Bentonite may be added to the grout mixture at the discretion of the Contractor. If used, it shall be added to the cement grout 2-percent and 5-percent by weight of the cement. *If used,* a separate colloidal bentonite mixer is required to mix the bentonite and coater to ensure fully dispensing and hydrating the bentonite before adding the grout mixer. Bentonite shall be handled and stored so as to avoid adsorption of moisture or damage. Material, which has become caked due to moisture adsorption, will be rejected.

PART 3- EXECUTION

3.1 GROUTING EQUIPMENT

A. General: The equipment shall be capable of mixing and pumping grout having a mix ratio, by volume, of one part water, one part cement, and two parts bulk filter (sand and fly ash, if used). Bentonite may be added to the mix at 2-percent to 5-percent by weight of cement. Water shall be metered to control water/cement ratio. Fluidifier shall be added as recommended by the manufacturer to increase the flowability of the grout. The grout mixture may be modified by the contractor as necessary due to field conditions determined during the grouting operation if approved by the Engineer.

B. Mixers: Mixers shall be of the high-speed colloidal type, capable of thoroughly mixing water, cement, bulk filters, and additives to produce a grout of uniform texture and consistency. A separate colloidal mixer shall be used for mixing and hydrating bentonite if bentonite is used in the grout.

C. Holdover tank: A holdover tank, or sump, shall be furnished for holding the mixed batch of grout if a single compartment mixer is used. It shall be equipped with mechanical agitators to prevent segregation of the grout and shall have a sufficient capacity to temporarily hold a mixed batch of grout to provide a continuous supply to the grout pump.

D. Grout Pump: Grout pump shall be of the long stroke, multiple piston type or of helical screw type.

E. Miscellaneous: Miscellaneous equipment items such as values, pressure gauges, pressure hose, supply lines, and small tools shall be included as necessary to provide a continuous supply of grout at the pressures necessary for the grouting operation.

3.2 PIPE GROUTING PROCEDURE

A. Preliminary Work

1. Provide bulkheads at the ends of the piping system as needed to control the placement of the grout during the grouting operation.

2. Provide a connection or connections as necessary for the introduction of the grout into the annular space between the two pipes.

3. Expose the top of the existing pipe at approximate intervals of 50 feet, and carefully drill or break observation holes in the top of the existing, taking care not to damage the interior pipe. These holes may also be used as ventilation holes to allow air to escape from the annular space as the grout is introduced, as well as allowing visual observation of the grout placement. Provide removable plugs for the observation holes as needed. The spacing of the observation holes may be decreased at the discretion of the Contractor as necessary for the control of the grouting operation.

4. A grout header may be used at the option if the Contractor to inject grout at several points along the length of the pipe to increase the efficiency of the grouting operation and to ensure the complete

filling of annular space.

B. Grouting Procedure

1. The grouting shall be performed as a continuous operation. If, in the opinion of the Contractor, a staged operation will provide better results than a continuous operation, a staged operation may be used if approved by the Engineer.

2. The pumping rate shall be approximately 3 cubic feet per minute unless otherwise approved by the Engineer. Grout pressure shall be sufficient to ensure the complete filling of the annular space between the two pipes.

3. Grout not used within 2 hours of mixing shall be discarded and removed from the site of the work.

4. If grout loss through cracks or joints in the 24-inch RCP is excessive, Contractor may increase the amount of bulk filter in the grout consistent with the pumpability and flowability of the grout, and/or may add an accelerator to the mix to increase the rate of grout setting. The pumping rate may also be decreased to minimize excessive grout loss.

C. Clean-Up: During the grouting operation, the Contractor shall maintain the work site in a clean condition and shall contain and clean up all spills of grout or the materials used in the grout mix. At the completion of the grouting operation, the Contractor shall fill all holes or excavations, grade the surface, and replant with the same plant materials in place prior to excavation. All equipment and materials used in the grouting operation shall be removed from the site, and the site shall be restored to the same, or better, condition than existed prior to the commencement of the work.

END OF SECTION

SECTION 03800
LEAKAGE TESTING OF HYDRAULIC STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION

Scope of Work: This section describes the method of testing concrete hydraulic structures for leakage.

PART 2 - PRODUCTS

2.1 GENERAL

Provide water, piping, and equipment to test concrete structures for leakage.

PART 3 - EXECUTION

3.1 INSTALLATION

Hydrostatically test reinforced concrete structures, which are intended to contain water to determine that they are watertight and free of detectable leaks.

3.2 INSPECTION AND TESTING

A. Prior to testing, clean exposed surfaces by thorough hosing and remove the loosened matter and wash water from the structures.

B. Conduct testing before backfill is placed against walls and after all concrete has attained the specified compressive strength.

C. Fill hydraulic structures to be subjected to leakage tests with water to the normal liquid level line. Filling shall not exceed 18-inches of water depth per day. Repair any running leaks, which appear during filling before continuing. After the structure has been kept full for 48 hours, it will be assumed, for the purposes of the test, that the absorption of moisture by the concrete in the structure is complete. Then, close all valves and gates to the structure and measure the change in water surface each day for a five-day period.

D. During the test period, examine all exposed portions of the structure, and mark all visible leaks or damp spots. Such leaks or damp spots shall be repaired later. If the drop in water surface in a 24-hour period exceeds 1/10 of 1 percent of the normal volume of liquid contained in the structure, the leakage shall be considered excessive.

E. If the leakage is excessive, drain the structure, repair leaks and damp spots, and refill the structure and again test for leakage. Continue this process until the drop in water surface in a 24-hour period, with the structure full, is less than 1/10 of 1 percent of the volume of liquid held in the structure.

F. Repairs and additional tests shall be made by the Contractor at no additional cost to the City.

G. Apply specified coatings only after acceptance of leakage testing by the Engineer.

3.3 REPAIR METHODS

A. Methods for repairing concrete not passing the leakage test shall be described herein.

1. Remove honeycombed and other defective concrete down to sound concrete. Edges shall be perpendicular to surface. Sandblast surfaces to receive repair.

2. Coat sandblasted surface with epoxy bonding compound.

3. Place mortar in layers having a compacted thickness of 3/8-inch. Scratch the surface of each layer to promote bonding with next layer.

4. Mortar used for repair of concrete shall be made of the same materials as used for the concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than one (1) part cement to two and one half (2-1/2) parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

5. Finish repair shall match adjacent concrete, and cure as specified.

6. Repair defective areas of more than one (1) foot square and deeper than the reinforcing steel as above, except fill the area with pneumatically applied concrete.

END OF SECTION

FOUR WATERS
ENGINEERING

Appendix A:

10th Street South Infrastructure Improvements – Phase 2

Geotechnical and Groundwater Sampling Report

CSIGeo

Geotechnical • CMT • CEI

Geotechnical Exploration and Evaluation Report

Jacksonville Beach 10th Street South Drainage Improvements
Jacksonville Beach, Florida

CSI Geo Project No.: 71-24-310-34

Prepared by:

CSI Geo, Inc.
2394 St. Johns Bluff Road S., Suite 200
Jacksonville, FL 32246
Tel: (904) 641-1993

Prepared for:

Four Waters Engineering, Inc.

December 13, 2024

CSI Geo, Inc.
2394 St. Johns Bluff Road South, Suite 200
Jacksonville, FL 32246

December 13, 2024

Mr. Michael Klink, P.E
Four Waters Engineering, Inc.
324 6th Avenue North
Jacksonville Beach, Florida, 32250

RE: Jacksonville Beach 10th Street Drainage Improvements
Jacksonville Beach, Florida

Subject: Geotechnical Exploration and Evaluation Report
CSI Geo Project No.: 71-24-310-34

Dear Mr. Klink:

CSI Geo, Inc. has performed the authorized geotechnical exploration and laboratory testing program for the proposed Jacksonville Beach 10th Street South Drainage Improvements project in Jacksonville Beach, Florida. This report presents our understanding of the subsurface conditions along with our engineering evaluation and recommendations.

We have enjoyed working with you on this project and look forward to continued association with you on future projects. If you have any questions concerning this report, please do not hesitate to contact us.

Sincerely,

CSI Geo, Inc.

Nader Amer, Ph.D.
Geotechnical Engineer

JOHN IYA LICENSE No. 77294 STATE OF FLORIDA PROFESSIONAL ENGINEER

John A. Iya, P.E.
Senior Geotechnical Engineer
Registered, Florida No. 77294

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- Site Location Map
- Field Exploration Map
- Report of SPT Borings
- Existing Pavement System Thickness
- Recommended Design Soil Parameters for Horizontal Directional Drilling
- Summary of Laboratory Test Results
- Pre-Discharge Groundwater and Soil Sampling Test Results
- Key to Soil Classification
- Field and Laboratory Test Procedures

1.0 Project Information

1.1 General Project Information

The purpose of this geotechnical exploration program was to develop information concerning the subsurface conditions in order to evaluate the site with respect to the proposed Jacksonville Beach 10th Street South Drainage Improvements project in Jacksonville Beach, Florida. This report describes the field and laboratory testing activities performed and presents the findings. The report also includes the subsurface soil and groundwater conditions encountered, soil parameters for use in pipeline crossings design, and general site preparation recommendations for the proposed construction.

Information regarding this project was provided to CSI Geo, Inc. (CSI Geo) by Mr. Michael Klink, P.E., of Four Waters Engineering, Inc. (Four Waters).

1.2 Existing Conditions and Project Description

The project consists of the replacement of all sewer and some water mains along 10th Street South between 1st Avenue North and 5th Avenue South, in Jacksonville Beach, Florida. A Site Location Map included in the **Appendix**. The pipelines will cross Beach Boulevard located just south of 1st Avenue North. The replacement pipelines will be installed by means of open-cut excavation method of installation except at the Beach Boulevard roadway crossing where Horizontal Directional Drilling (HDD) method of installation will be used to install the pipelines.

We understand that the pipeline near 1st Avenue North will be installed adjacent to a gas station (Circle K). Therefore, groundwater testing for contamination has been conducted to evaluate the pre-discharge groundwater condition at that location.

2.0 Geotechnical Exploration

2.1 Field Exploration

The boring locations and depths were provided to us by Four Waters and located in the field by personnel from CSI Geo using a handheld Global Positioning System (GPS). Therefore, the locations should be considered approximate. All borings were grouted to full depth after boring completion. It should be noted that several test borings were offset on site from their initial locations due to the presence of heavily congested underground utilities at the test boring locations and due to maintenance of traffic restrictions.

Generally, soil samples collected were visually classified in the field and then transported to our laboratory for re-classification and testing. Representative soil samples obtained during our field exploration program were visually classified using the American Association of State Highway and Transportation Officials (AASHTO) Soil Classification System. The approximate locations of the soil borings are shown on the Field Exploration Plan sheets included in the **Appendix**.

2.1.1 HDD Method of Pipe Installation

The subsurface conditions along the areas of HDD method of installation at the Beach Boulevard crossing were explored by means of two (2) SPT borings (B-1 and B-2) drilled to a depth of 30 feet below the existing ground surface.

2.1.2 Open-Cut Method of Pipe Installation

The subsurface conditions along the areas of open-cut method of installation were explored by means of a total of six (6) SPT borings (B-3 through B-8) drilled to a depth of 10 feet below the existing ground surface.

2.2 Laboratory Testing

Laboratory testing was performed on representative soil samples to better define their composition. Laboratory tests performed were percent fines and natural moisture content. A Summary of Laboratory Test Results and the Field and Laboratory Test Procedures are included in the **Appendix**.

2.3 Pre-Discharge Groundwater

One (1) groundwater sample was collected from the location of boring B-1 performed south of the Circle K gas station located north of Beach Boulevard. The groundwater sampling and testing were conducted in order to compare the existing groundwater detected compound concentrations to the Florida Department of Environmental Protection (FDEP) standard screening limits to determine if groundwater treatment is required during dewatering.

3.0 Geotechnical Subsurface Conditions

3.1 General

An illustrated representation of the subsurface conditions encountered is shown on the Report of SPT Borings sheets presented in the **Appendix**. The soil conditions outlined below highlight the major subsurface stratification. The Report of SPT Borings in the **Appendix** should be consulted for a detailed description of the subsurface conditions encountered at the boring location. When reviewing the subsurface profiles, it should be understood that soil conditions may vary outside of the explored area.

3.2 Subsurface Conditions

3.2.1 HDD Method of Pipe Installation

Review of test borings B-1 and B-2 indicates that the area of the HDD pipe crossing is generally underlain by loose to medium dense sands and slightly silty sands (A-3; AASHTO Classification system) and silty sands (A-2-4) until the borings termination depth. An isolated layer of clayey sands (A-2-6) was encountered in boring B-1 between the depths of 27 and 30 feet below the existing ground surface.

3.2.2 Open-Cut Method of Pipe Installation

Review of test borings B-3 through B-8 indicates that the open-cut pipe alignment is generally underlain by loose to medium dense sands and slightly silty sands (A-3) and silty sands (A-2-4) until the boring termination depths.

3.3 Existing Pavement System Thickness

Pavement cores were performed at boring locations B-4 through B-8 to determine the thickness of the existing pavement system. Generally, the existing pavement system was found to consist of 1-7/8 to 5 inches of asphalt over 6 to 7 inches of limerock base. The results of the pavement cores are presented in the Existing Pavement System Thickness table, included in the **Appendix**.

3.4 Groundwater Conditions

The groundwater level was measured and recorded as encountered at the time of drilling. The depth of the groundwater level at each test location is marked on the Report of SPT Borings sheets presented in the **Appendix**. The depth of groundwater level measured at the time of drilling ranged between 4 and 6 feet below the existing grades.

Fluctuations of the groundwater level should be anticipated as a result of urbanization/development, topographic changes, seasonal climatic variations, surface water runoff patterns, fluctuations of adjacent water bodies, construction activities, and other factors. During seasonal high precipitation, groundwater levels can be expected to rise. Therefore, design drawings and specifications should account for the possibility of groundwater level variations, and construction planning should be based on the assumption that such variations will occur.

3.5 Pre-Discharge Groundwater and Soil Sampling Test Results

The pre-discharge groundwater testing results are presented in the Pre-Discharge Groundwater Sampling Test Results, included in the **Appendix**. The results indicate that the groundwater sampling was either below detection limits or did not exceed FDEP discharge sampling levels or JEA discharge limits.

4.0 Design Recommendations

4.1 General

Our geotechnical evaluation of the site and the subsurface conditions are based on our understanding of the proposed project, our observations, and results of field and laboratory testing. If the project location is changed or if field conditions encountered during construction are different from those presented in this report, the information should be provided to CSI Geo for evaluation. The recommendations provided in this report present construction methods and techniques that are appropriate for the proposed construction. We recommend that CSI Geo be given the opportunity to review the design plans and specifications to ensure that our recommendations have been properly included and implemented.

4.2 Open-Cut Excavations

In general, we consider the subsurface soil conditions at the site to be favorable for support of the proposed replacement pipes over a properly prepared and compacted subgrade, provided that the site preparation and earthwork construction recommendations in this report are performed.

The (A-3) type soils are considered select material. Silty sands (A-2-4) can be treated as select material; however, they may contain excess moisture and may be difficult to dry and to compact. Clayey sands (A-2-6) should be considered as plastic material and should be excavated to a minimum depth of one foot below the design invert elevations and replaced with suitable fill material. If encountered during construction, organic soils (A-8) are considered unsuitable and should be removed in their entirety and replaced with suitable fill material.

We anticipate that the buried pipelines will exert little downward pressure on the subgrade soils. In areas where the surrounding groundwater level is above the pipe invert elevation, the line should be designed to resist lateral earth pressures and hydrostatic uplift pressures appropriate to its depth below the existing grade and the seasonal high-water level.

4.3 Recommended Design Soil Parameters for HDD Pipe Crossings

We understand that the proposed replacement pipelines will be installed beneath the existing roadway at the Beach Boulevard crossing by means of HDD method of installation. Pipe installation should follow the City of Jacksonville Beach specifications and project technical specifications. We recommend that soil parameters and assumptions for design follow the information provided in the Recommended Design Soil Parameters for Horizontal Directional Drilling table, included in the **Appendix**. Soil parameters provided in the tables are representative of the soil conditions encountered at variable depths and have been generated based on N-values that were corrected for hammer efficiency and overburden pressure.

5.0 Site Preparation & Earthwork Recommendations

5.1 Existing Utilities

The areas of the proposed replacement pipelines are moderately to heavily congested with underground utilities. The locations of existing utilities should be established prior to construction. Provisions should be made to relocate utilities interfering with the proposed alignments and construction, as needed. Underground pipes that are not operational should be either removed, plugged, or grouted in place otherwise they may become conduits for subsurface erosion and cause settlements.

5.2 Temporary Groundwater Control

Groundwater level was encountered at the time of drilling at a depth between 4 and 6 feet below the existing ground surface. Therefore, groundwater control should be anticipated. The groundwater level should be maintained at a minimum of two feet below the subgrade of the proposed inverts. Dewatering may be achieved by conventional open pumping using ditches graded to a sump and by using a well point system or deep wells. Dewatering should continue until sufficient weight is placed over the proposed pipes to resist uplift.

5.3 Excavation Protection

All excavations should meet OSHA Excavation Standard Subpart P regulations for Type C soils. A braced sheet pile structure may be required to support the open excavations. The soil support system should be designed by a Florida registered Professional Engineer.

5.4 Pipe Backfill and Compaction of Pipe Backfill

Plastic and highly plastic material should be excavated to a minimum depth of one foot below the design invert elevations and replaced with select sands (A-3) material, structural fill, and/or #57 stone. If encountered, organic and unsuitable soils should be removed in their entirety and replaced with select sands (A-3) material, structural fill, and/or #57 stone.

The backfill material within the excavation should be placed in thin loose lifts not exceeding 6 inches in thickness. The backfill material should be compacted by the use of hand-operated equipment. The backfill material should be A-3 fill with less than 10 percent material passing the no. 200 mesh sieve and containing less than 3 percent organic matter. The backfill material should be compacted to a minimum density of 98% or 95% of maximum dry density obtained from the Modified Proctor compaction test (ASTM D1557). The moisture content during compaction should be maintained within ± 3 percent of the optimum moisture content as obtained from the Modified Proctor compaction test.

The use of any heavy compaction equipment on the site should be restricted to static mode compaction only due to the close proximity to existing structures. Handheld compaction equipment should be used for the backfill placed around pipes and to a height of 2 feet above pipes. Heavier equipment may be used on the remaining backfill lifts placed above the 2 feet above the pipes. However, care should be taken not to damage the pipe below. The pipe should be designed to withstand the anticipated dead (overburden) and live loads.

6.0 Report Limitations

The subsurface exploration program including our evaluation and recommendations was performed in general accordance with accepted geotechnical engineering principles and standard practices. CSI Geo is not responsible for any independent conclusions, opinions, or interpretations made by others based on the data presented in this report.

This report does not reflect any variations that may occur adjacent or between soil borings. The discovery of any site or subsurface condition during construction that deviates from the findings and data as presented in this report should be reported to CSI Geo for evaluation. If the locations of the proposed project features are changed, our office should be contacted so our recommendations can be re-evaluated. We recommend that CSI Geo be given the opportunity to review the final design drawings and specifications to ensure that our recommendations are properly included and implemented.

APPENDIX

- Site Location Map
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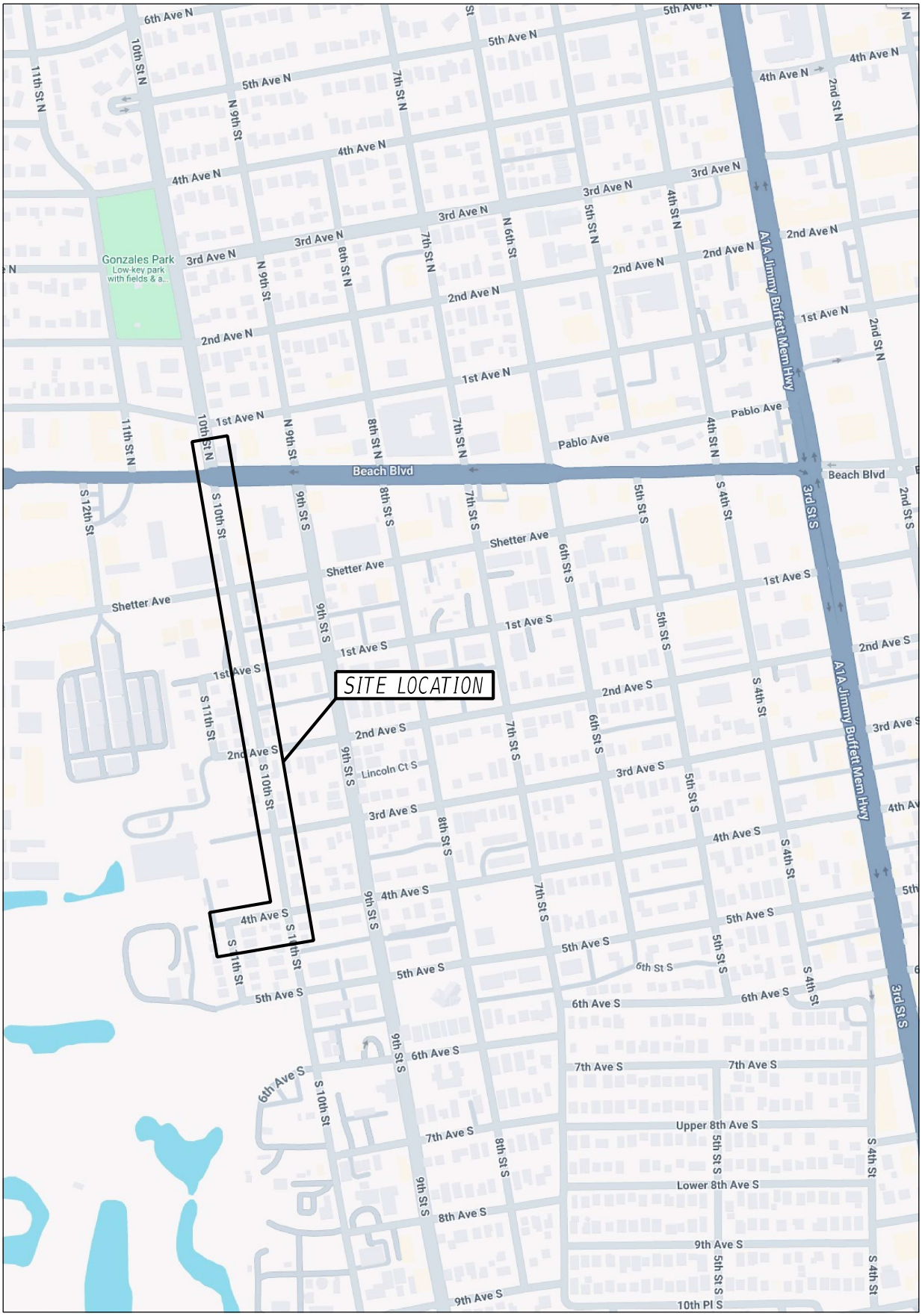
Site Location Map



CSI GEO, INC.
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JACKSONVILLE, FLORIDA 32246

SITE LOCATION MAP

JACKSONVILLE BEACH 10TH ST. SOUTH
DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

Field Exploration Map

LEGEND

STANDARD PENETRATION TEST (SPT) BORING LOCATION

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GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIAL TESTING
CONSTRUCTION ENGINEERING INSPECTION

FIELD EXPLORATION PLAN

JACKSONVILLE BEACH 10TH ST. SOUTH
DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

LEGEND

STANDARD PENETRATION TEST (SPT) BORING LOCATION

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FIELD EXPLORATION PLAN

JACKSONVILLE BEACH 10TH ST. SOUTH
DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

Report of SPT Borings

LEGEND

ASPHALT

LIMEROCK

FINE SAND; SLIGHTLY SILTY FINE SAND (A-3)

CLAYEY SAND (A-2-6)

SILTY FINE SAND (A-2-4)

(A-3) AASHTO SOIL CLASSIFICATION SYSTEM

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FT UNLESS OTHERWISE NOTED, NUMBERS TO THE LEFT OF BORING INDICATE N-VALUES.

B.T. SPT BORING TERMINATED

GROUNDWATER LEVEL AT TIME OF DRILLING

W / -200 NATURAL MOISTURE CONTENT (%) FINES PASSING NO.200 SIEVE (%)

GRANULAR MATERIALS

RELATIVE DENSITY	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

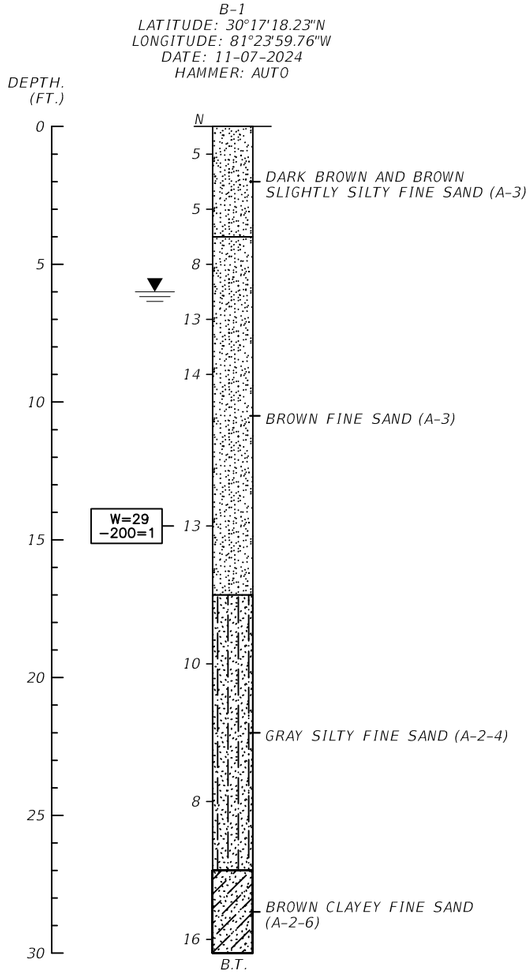
STANDARD PENETRATION TEST DATA

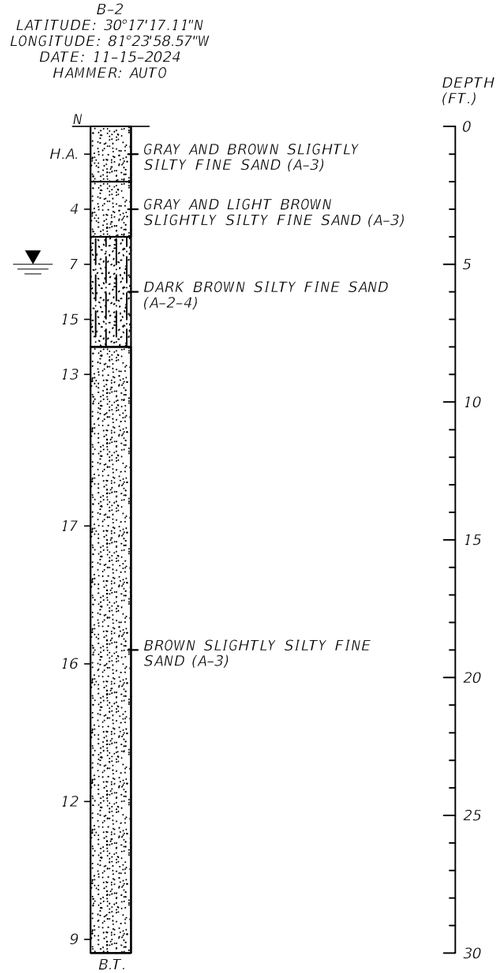
SPOON INSIDE DIA.	1.5 INCHES
SPOON OUTSIDE DIA.	2.0 INCHES
ASTM STANDARD DROP HAMMER, AUTO	
AVG. HAMMER DROP	30.0 INCHES
HAMMER WEIGHT	140.0 LBS

NOTES:

1) DRILL AND PENETRATION TESTING WAS PERFORMED IN ACCORDANCE WITH ASTM D-1586.

2) LAYER BOUNDARIES ARE APPROXIMATE AND MAY VARY BETWEEN OR AWAY FROM BORING LOCATIONS.





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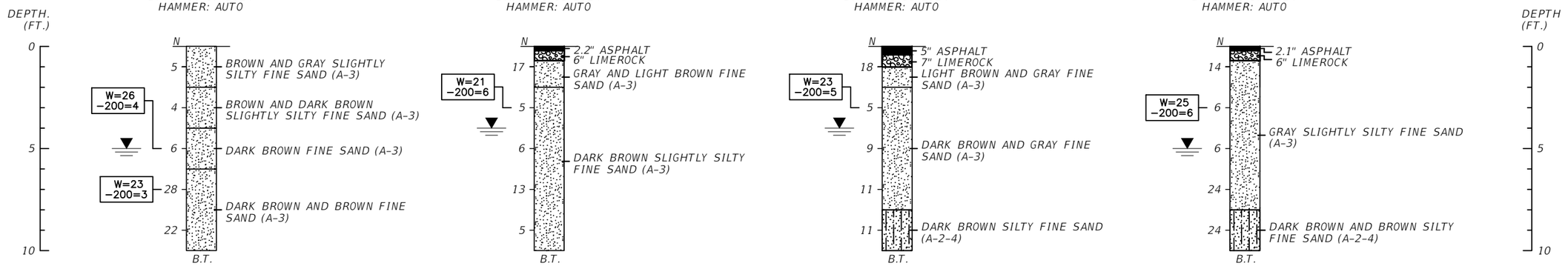
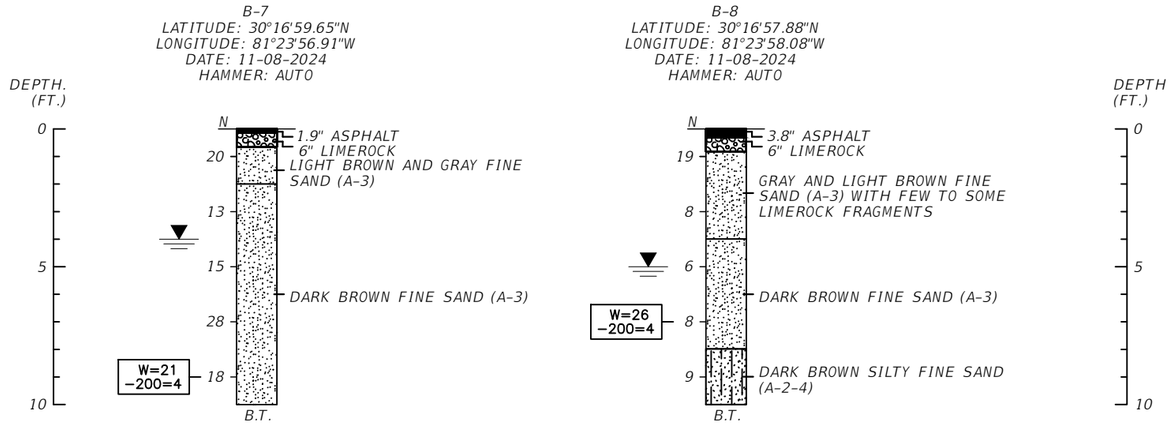
CONSTRUCTION MATERIAL TESTING
CONSTRUCTION ENGINEERING INSPECTION

REPORT OF SPT BORINGS
JACKSONVILLE BEACH 10TH ST. SOUTH DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA





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REPORT OF SPT BORINGS
JACKSONVILLE BEACH 10TH ST. SOUTH DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

Existing Pavement System Thickness

Existing Pavement System Thickness

Jacksonville Beach 10th Street South Drainage Improvements
Jacksonville Beach, Florida

Boring / Core No.	Core Location	Latitude	Longitude	Asphalt Thickness (in)	Limerock Thickness (in)
B-4	1st Avenue South	30°17'9.80"N	81°23'56.13"W	2 1/4	6
B-5	10th Street South	30°17'5.63"N	81°23'56.76"W	5	7
B-6	10th Street South	30°17'2.03"N	81°23'56.07"W	2 1/8	6
B-7	4th Avenue South	30°16'59.65"N	81°23'56.91"W	1 7/8	6
B-8	11th Street South	30°16'57.88"N	81°23'58.08"W	3 3/4	6

Recommended Design Soil Parameters for Horizontal Directional Drilling

Recommended Design Soil Parameters for Horizontal Directional Drilling

Jacksonville Beach 10th Street South Drainage Improvements

Borings B-1 and B-2

Soil Parameter*	Loose Sands & Silty Sands	Medium Dense Sands, Silty Sands, & Clayey Sands
Depth (ft)	0 to 6	6 to 30
Saturated Unit Weight – γ (pcf)	110	115
Submerged Unit Weight – γ' (pcf)	48	53
Angle of Internal Friction – ϕ (degrees)	29	31
Cohesion – Undrained C (psf)	---	---
At Rest Earth Pressure Coefficient – K_o	0.52	0.50
Active Earth Pressure Coefficient - K_a	0.35	0.33
Passive Earth Pressure Coefficient - K_p	2.88	3.00

* Representative soil parameters based on N-values corrected for hammer efficiency and overburden

Summary of Laboratory Test Results

SUMMARY OF LABORATORY TEST RESULTS

Jacksonville Beach 10th Street South Drainage Improvements
Jacksonville Beach, Florida

Boring No.	Sample No.	Approximate Depth (ft)	Natural Moisture Content (%)	Organic Content (%)	Percent Passing Sieve Size (%)						Atterberg Limits		Soil Classification Symbol
					#4	#10	#40	#60	#100	#200	LL	PI	
B-1	6	13.5 - 15.0	29							1			A-3
B-3	3	4.0 - 6.0	26							4			A-3
B-3	4	6.0 - 8.0	23							3			A-3
B-4	2	2.0 - 4.0	21							6			A-3
B-5	2	2.0 - 4.0	23							5			A-3
B-6	2	2.0 - 4.0	25							6			A-3
B-7	5	8.0 - 10.0	21							4			A-3
B-8	4	6.0 - 8.0	26							4			A-3

Pre-Discharge Groundwater and Soil Sampling Test Results

PRE-DISCHARGE GROUNDWATER SAMPLING & ANALYSIS RESULTS
Jacksonville Beach 10th Street South Drainage Improvements
Jacksonville Beach, Florida

COMPARISON OF GROUNDWATER RESULTS TO FDEP SCREENING LIMITS
Date Sampled: 11/6/24

Screening Parameter	Parameter Sample Point MW-12 (ug/L)	FDEP Screening Limit Freshwater Discharges (for MW-12) (ug/L)	JEA Industrial Local Discharge Limits (ug/L)
Total Hardness	55		
ph, standard units	7.33	6.0 - 8.5	6.0 - 8.5
Mercury (total recoverable)	0.0032 I	0.012	6
Cadmium	1.2 U	0.17	1200
Copper	5.0 U	5.60	820
Lead	0.5 U	1.49	700
Zinc	30 U	12.32	2610
Molybdenum	2.5 U	No Standard	2660
Nickel	6.2 U	27.99	3980
Silver	2.5 U	0.07	430
Cadmium (dissolved)	1.2 U	0.17	1200
Copper (dissolved)	5.0 U	5.60	820
Lead (dissolved)	0.5 U	1.49	700
Zinc (dissolved)	30 U	12.32	2610
Molybdenum (dissolved)	2.5 U	No Standard	2660
Nickel (dissolved)	6.2 U	27.99	3980
Silver (dissolved)	2.5 U	0.07	430
Cyanide	4.0 U	5.20	3380
Chromium	6.0 I	13.43	10000
Benzene	0.75 U	2	NA
Naphthalene	3.8 U	100	NA

Cadmium standard is e^(0.7409*ln[hardness]) - 4.719)
Copper standard is e^(0.8545*ln[hardness] - 1.702)
Lead standard is e^(1.273*ln[hardness] - 4.705)
Zinc standard is e^(0.8473*ln[hardness] - 0.884)
Cr (III) standard is e^(0.819*ln[hardness] - 0.6848)
Ni standard is e^(0.846*ln[hardness] - 0.0584)
NA = Not Applicable
NS = Not Sampled
U = Compound was analyzed for but not detected
I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

Key to Soil Classification

KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

Granular Materials			Silts and Clays	
Relative Density	**Auto Hammer SPT N-Value (Blows/foot)**		**Consistency**	**Auto Hammer SPT N-Value (Blows/foot)**
Very Loose	Less than 3		Very Soft	Less than 1
Loose	3 – 8		Soft	1 – 3
Medium Dense	8 - 24		Firm	3 - 6
Dense	24 - 40		Stiff	6 - 12
Very Dense	Greater than 40		Very Stiff	12 - 24
-			Hard	Greater than 24

Particle Size Identification (Unified Soil Classification System)

Boulders:	Diameter exceeds 12 inches
Cobbles:	3 to 12 inches in diameter
Gravel:	Coarse – ¾ to 3 inches in diameter
	Fine – 4.76 mm to ¾ inch in diameter
Sand:	Coarse 2.00 mm to 4.76 mm in diameter
	Medium 0.42 mm to 2.0 mm in diameter
	Fine 0.074 mm to 0.42 mm in diameter

Modifiers

Approximate Fines Content	Modifiers
5% Fines to 12%	Slightly Silty or Slightly Clayey
12% Fines to 30%	Silty or Clayey
30% Fines to 50%	Very Silty or Very Clayey

(These modifiers provide our estimate of the amount of fines (silt or clay size particles) in soil samples)

Approximate Content By Weight	Modifiers
< 5%	Trace
5% to 10%	Few
15% to 25%	Little
30% to 45%	Some
50% to 100%	Mostly

(These modifiers provide our estimate of shell, rock fragments, or roots in the soil sample)

Organic Content	Modifiers
1% to 3%	Trace
3% to 5%	Slightly Organic
5% to 20%	Organic
20% to 75%	Highly Organic (Muck)
> 75%	Peat

(These modifiers provide our estimate of organic content in the soil sample)

Field and Laboratory Test Procedures

FIELD TEST PROCEDURES

Standard Penetration Test (SPT) Borings – Standard Penetration Tests (SPT) borings were made in general accordance with ASTM D-1586/D-1586M-18, "Penetration Test and Split-Barrel Sampling of Soils". The borings were sampled at 2 foot intervals to 10 feet then at 18 inches every 5 feet to the termination depth. The borings were advanced below the groundwater levels using rotary drilling techniques with side discharge and circulating bentonite fluid for borehole flushing and stability. The drilling tools were removed from the borehole and a split-barrel sampler inserted to the borehole bottom and driven 24 inches into the material using a 140-pound SPT hammer falling on the average 30 inches per hammer blow. The number of hammer blows for the second and third six inch intervals of penetration is termed the "penetration resistance, blow count, or N-value". After driving the sampler 18 inches or to refusal at each test interval, the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel was placed in a glass jar or plastic bag and sealed. After completing the drilling operations, the samples for the borings were transported to our laboratory where they were examined by one of our geotechnical engineers to verify the driller's field classifications.

LABORATORY TEST PROCEDURES

Percent Fine Content – To determine the percentage of soils finer than No. 200 sieve, the dried samples were washed over a 200 mesh sieve. The material retained on the sieve was oven dried and then weighed and compared with the unwashed dry weight in order to determine the weight of the fines. The percentage of fines in the soil sample was then determined as the percentage of weight of fines in the sample to the weight of the unwashed sample. This test was conducted in accordance with ASTM D 1140.

Natural Moisture Content – The water content is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the solid particles. This test was conducted in the general accordance with AASHTO T 265.

FOUR WATERS
ENGINEERING

Appendix B:

10th Street South Infrastructure Improvements – Phase 2

Pipe Inspection Logs

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			

SPR	5	MPR	22	PO Number	Customer
SPRI	2.5	MPRI	2.79999995231628		
QSR	3121	QMR	4431	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
27	tcp	Downstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
2.70000004768372	123456	Heavy Cleaning	13:06	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			13:30	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 27									
0	Miscellaneous Water Level				25	☐			
0.8	Miscellaneous Water Level Sag				30	☐			2
5.5	Miscellaneous Material Change					☐			
Remarks: VCP									
5.5	Joint Offset Medium					☐			3
13.7	Infiltration Stain					☐	12		1
48.1	Tap Factory Activity		4			☐	10		
99.8	Tap Factory Activity		4			☐	10		
105.1	Infiltration Runner Joint					☑	1		4
129.4	Infiltration Dripper Joint					☑	12		3
148.6	Tap Factory Activity		4			☐	10		
181.3	Infiltration Stain Joint					☑	12		1
200.3	Tap Factory Activity		4			☐	10		
249.1	Tap Factory Activity		4			☐	10		
266.8	Infiltration Runner Joint					☑	2		4
296.9	Infiltration Runner Joint					☑	8		4
297.8	Tap Factory Activity		4			☐	10		
300	Infiltration Runner Joint					☑	9		4
328	Infiltration Stain Joint					☑	12		1
339	Miscellaneous General Observation					☐			
Remarks: TAR AT JOINT									
350	Access Point Manhole					☐			
Remarks: 10									

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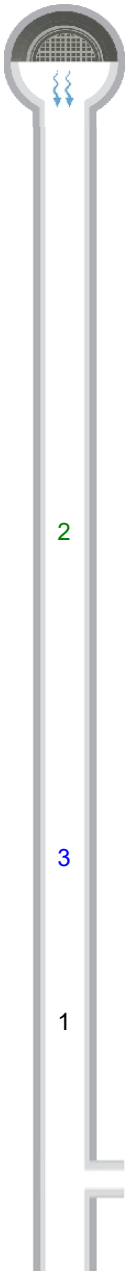
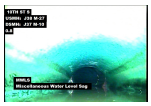
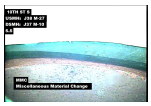
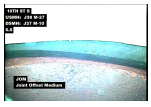
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J38 M-27	0	4	Circular			
Downsstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J37 M-10	350	9	10			

SPR	5	MPR	22	PO Number	Customer
SPRI	2.5	MPRI	2.79999995231628		
QSR	3121	QMR	4431	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
27	tcp	Downstream	09/24/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
2.70000004768372	123456	Heavy Cleaning	13:06	Dry - No Precipitation During Survey
Date Cleaned			**End Time**	**Additional Info**
09/24/2020			13:30	



0 ft.	Access Point Manhole			27
0 ft.	Miscellaneous Water Level			
0.8 ft.	Miscellaneous Water Level Sag		2	
5.5 ft.	Miscellaneous Material Change			VCP
5.5 ft.	Joint Offset Medium		3	
13.7 ft.	Infiltration Stain		1	
48.1 ft.	Tap Factory Activity			

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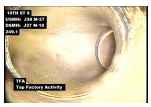
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			

99.8 ft.	Tap Factory Activity		
105.1 ft.	Infiltration Runner Joint		4
129.4 ft.	Infiltration Dripper Joint		3
148.6 ft.	Tap Factory Activity		
181.3 ft.	Infiltration Stain Joint		1
200.3 ft.	Tap Factory Activity		
249.1 ft.	Tap Factory Activity		
266.8 ft.	Infiltration Runner Joint		4
296.9 ft.	Infiltration Runner Joint		4

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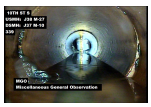
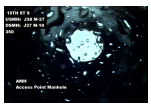
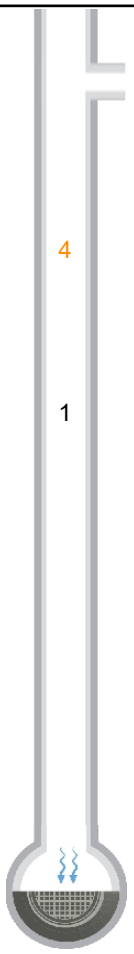
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J38 M-27	0	4	Circular			
Downsstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J37 M-10	350	9	10			

297.8 ft.	Tap Factory Activity			
300 ft.	Infiltration Runner Joint		4	
328 ft.	Infiltration Stain Joint		1	
339 ft.	Miscellaneous General Observation			TAR AT JOINT
350 ft.	Access Point Manhole			10



J37 M-10

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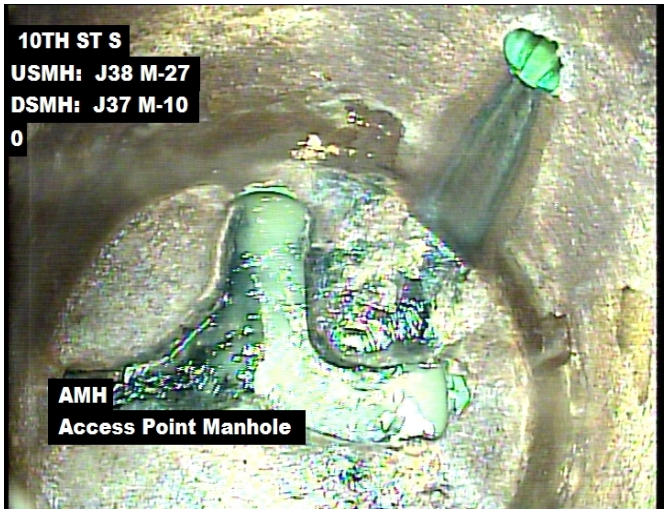
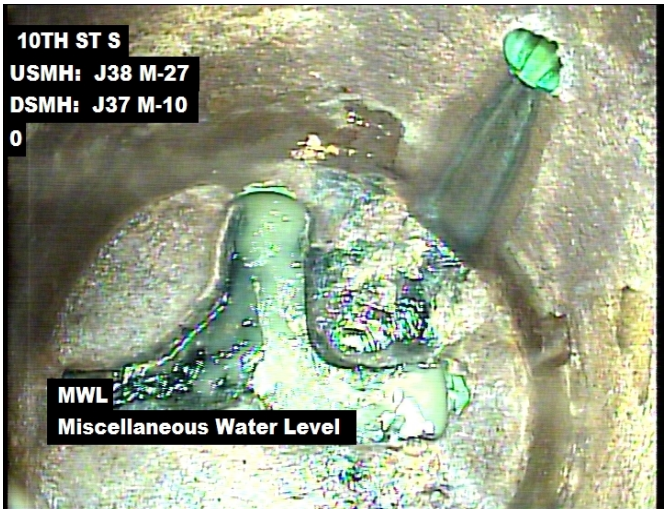
4 Image Report

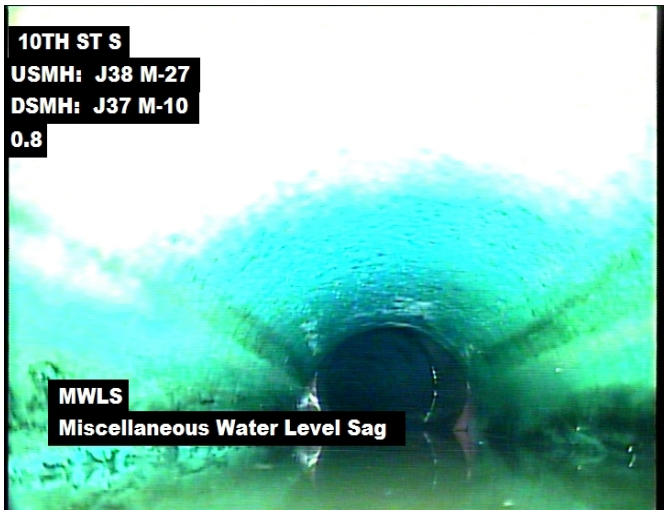
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			



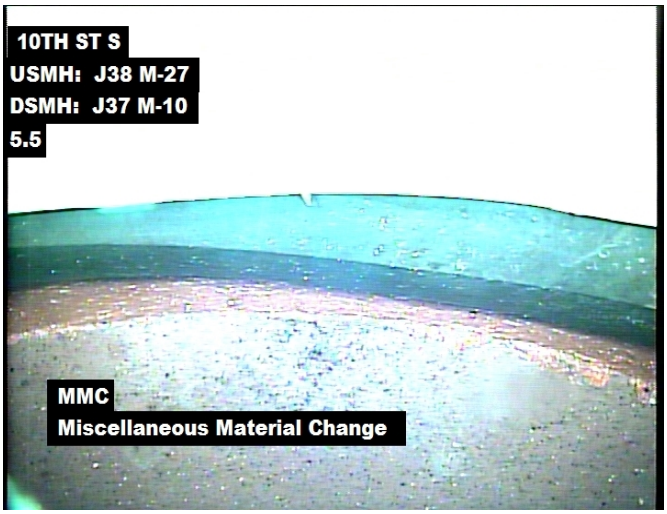
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 27



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 0.8 ft. Grade: 2
Condition: Miscellaneous Water Level Sag
Remarks: N/A



Distance: 5.5 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP

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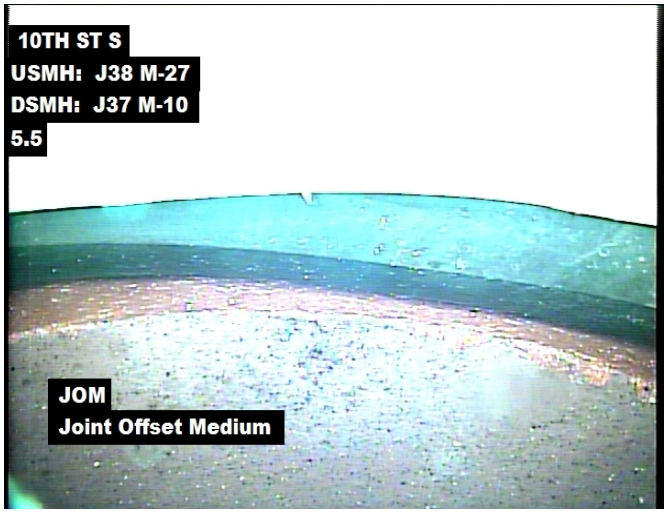
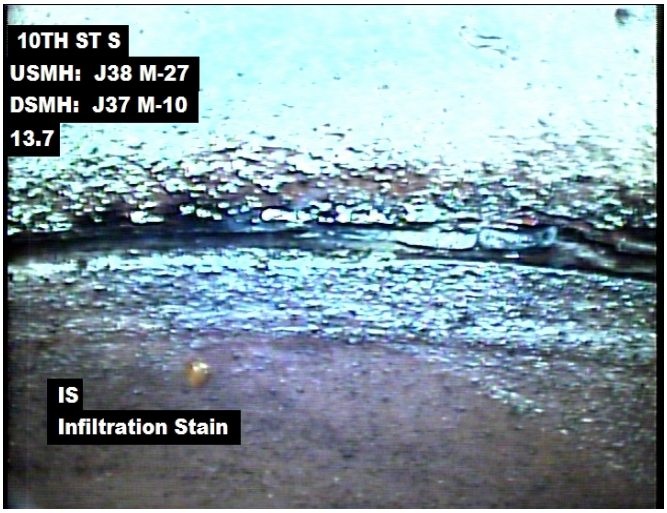
4 Image Report

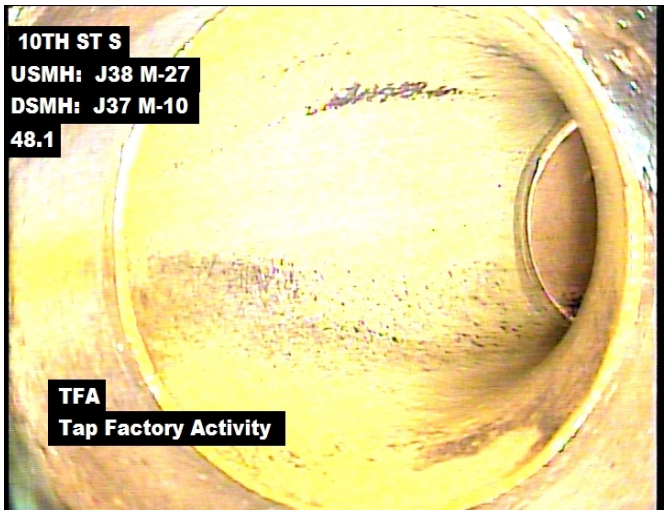
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			



Distance: 5.5 ft. Grade: 3
Condition: Joint Offset Medium
Remarks: N/A



Distance: 13.7 ft. Grade: 1
Condition: Infiltration Stain
Remarks: N/A



Distance: 48.1 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 99.8 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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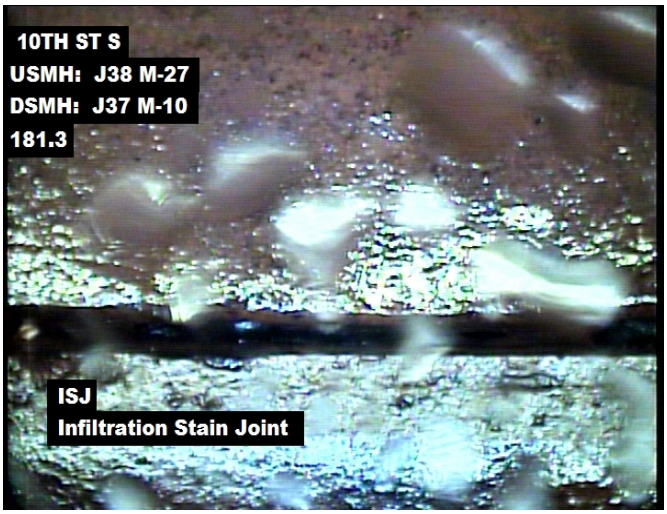
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			

Distance: 105.1 ft. Grade: 4
Condition: Infiltration Runner Joint
Remarks: N/A

Distance: 129.4 ft. Grade: 3
Condition: Infiltration Dripper Joint
Remarks: N/A

Distance: 148.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 181.3 ft. Grade: 1
Condition: Infiltration Stain Joint
Remarks: N/A

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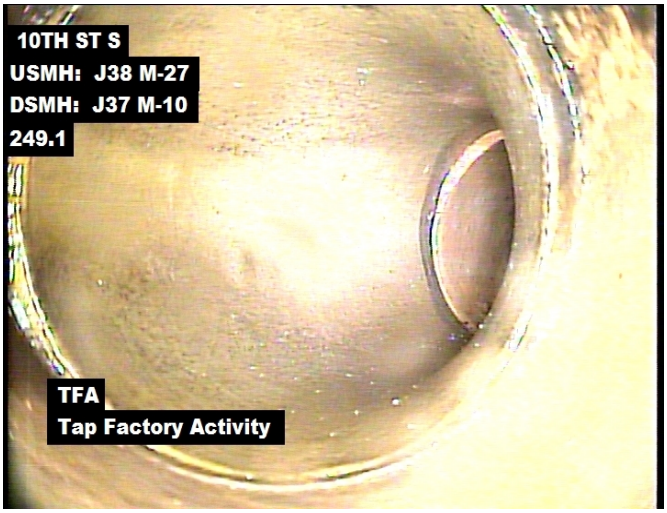
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			

Distance:	200.3 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	249.1 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	266.8 ft.	Grade:	4
Condition:	Infiltration Runner Joint		
Remarks:	N/A		

Distance:	296.9 ft.	Grade:	4
Condition:	Infiltration Runner Joint		
Remarks:	N/A		

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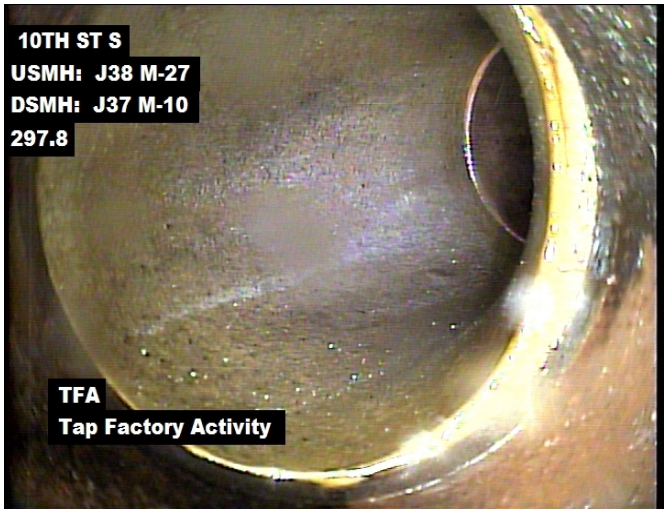
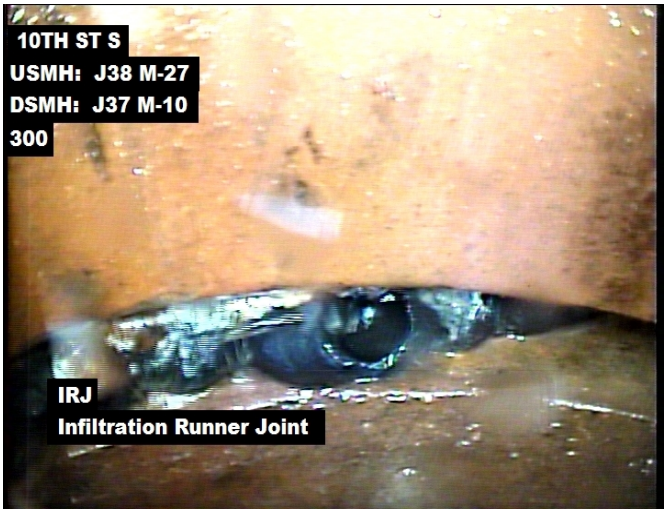
4 Image Report

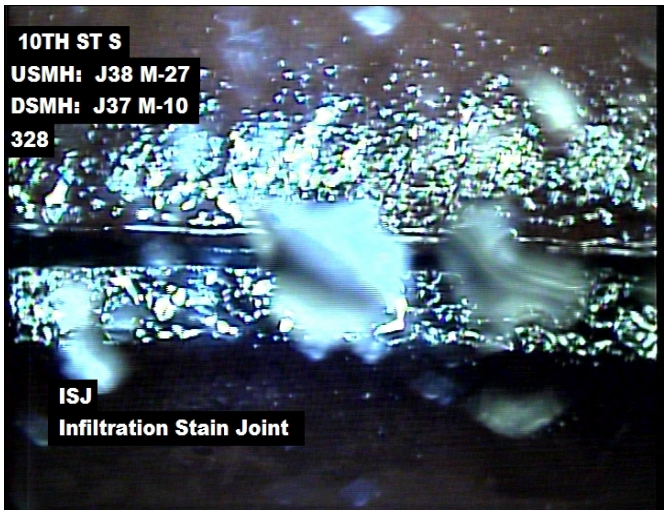
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			



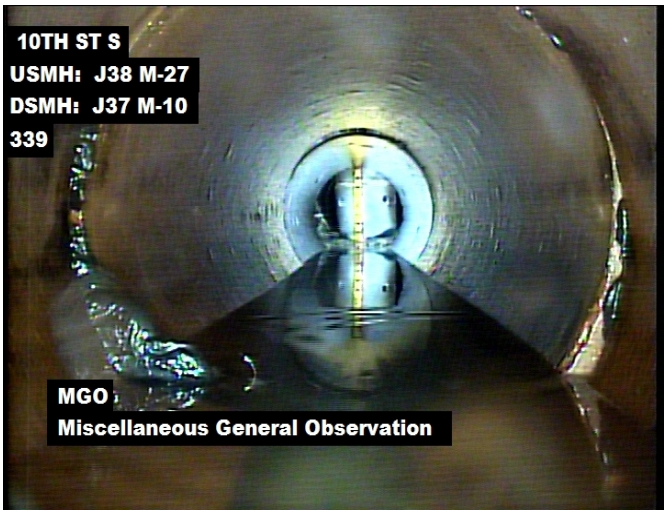
Distance: 297.8 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 300.0 ft. Grade: 4
Condition: Infiltration Runner Joint
Remarks: N/A



Distance: 328.0 ft. Grade: 1
Condition: Infiltration Stain Joint
Remarks: N/A



Distance: 339.0 ft. Grade: 0
Condition: Miscellaneous General Observation
Remarks: TAR AT JOINT

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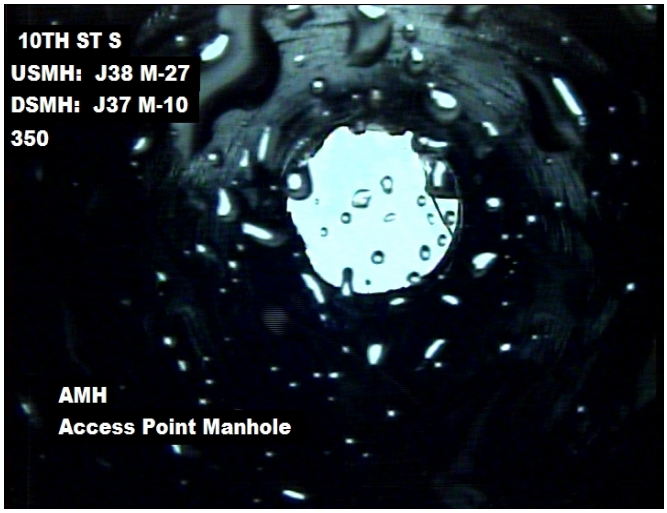
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC1	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-27	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J37 M-10	350	9	10			



Distance:	350.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	10		

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC2	JACKSONVILLE BEACH	1ST AVE S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-25	109	4	6			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Upstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	09:47	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			09:54	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 25									
0	Miscellaneous Water Level				5	☐			
46.2	Tap Factory Made Capped		4			☐	2		
52.9	Tap Factory Activity		4			☐	2		
108.1	Tap Factory Activity		4			☐	2		
109	Access Point Manhole					☐			
Remarks: STUBOUT									

Infrastructure Technologies
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Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC2	JACKSONVILLE BEACH	1ST AVE S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-25	109	4	6			

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Upstream	09/24/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
0	123456	Heavy Cleaning	09:47	Dry - No Precipitation During Survey
Date Cleaned			**End Time**	**Additional Info**
09/24/2020			09:54	

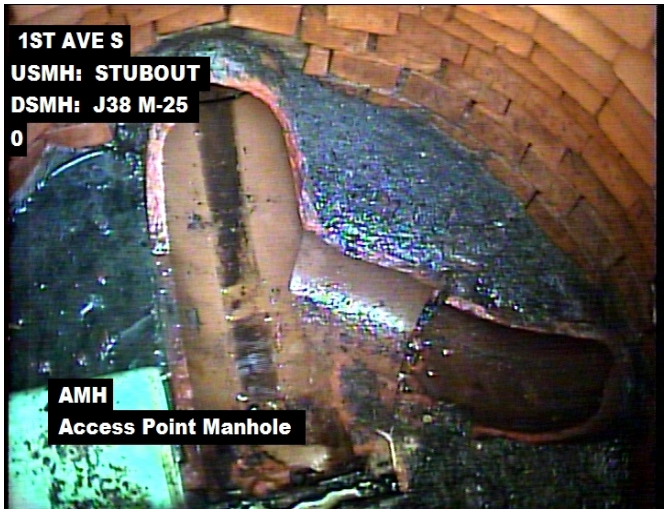
0 ft.	Access Point Manhole		25
0 ft.	Miscellaneous Water Level		
46.2 ft.	Tap Factory Made Capped		
52.9 ft.	Tap Factory Activity		
108.1 ft.	Tap Factory Activity		
109 ft.	Access Point Manhole		STUBOUT

J38 M-25

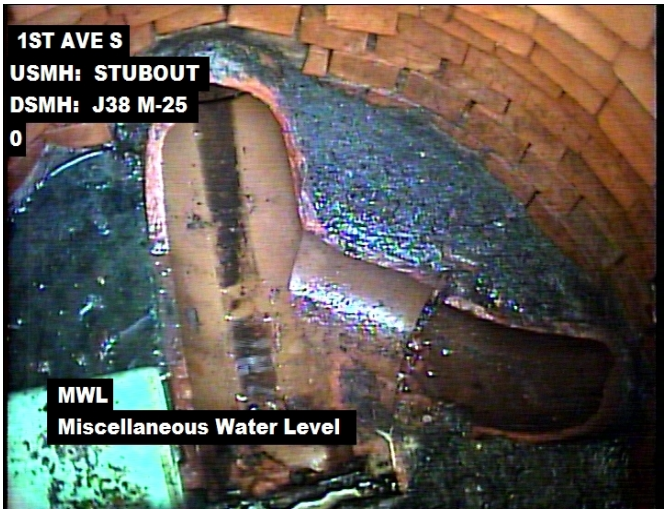
Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC2	JACKSONVILLE BEACH	1ST AVE S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-25	109	4	6			

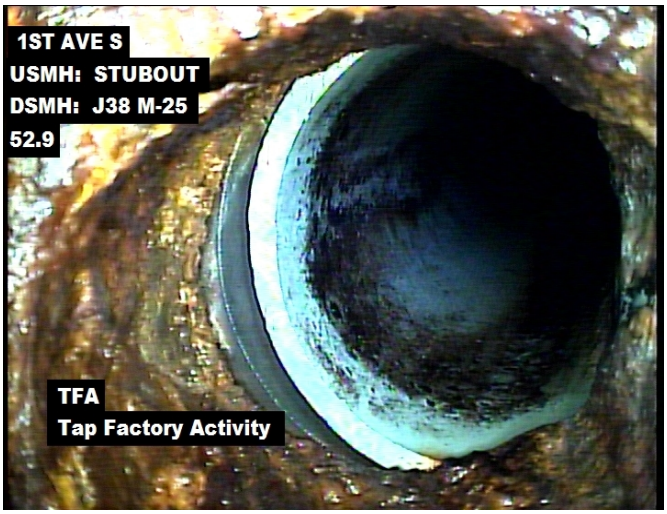


Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 25



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A

Distance: 46.2 ft. Grade: 0
Condition: Tap Factory Made Capped
Remarks: N/A



Distance: 52.9 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC2	JACKSONVILLE BEACH	1ST AVE S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-25	109	4	6			

Distance: 108.1 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 109.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: STUBOUT

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC3	JACKSONVILLE BEACH	1ST AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-25	200	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-24	200	4	8			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	09:58	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			10:07	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 25									
0	Miscellaneous Water Level				5	☐			
33.5	Tap Factory Made Capped		4			☐	2		
56.8	Tap Factory Activity		4			☐	2		
Remarks: INFILTRATION AROUND SERVICE									
200	Access Point Manhole					☐			
Remarks: 24									

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Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC3	JACKSONVILLE BEACH	1ST AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-25	200	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-24	200	4	8			

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/24/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
0	123456	Heavy Cleaning	09:58	Dry - No Precipitation During Survey
Date Cleaned			**End Time**	**Additional Info**
09/24/2020			10:07	

0 ft.	Access Point Manhole		25
0 ft.	Miscellaneous Water Level		
33.5 ft.	Tap Factory Made Capped		
56.8 ft.	Tap Factory Activity		INFILTRATION AROUND SERVICE
200 ft.	Access Point Manhole		24

J38 M-24

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Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC3	JACKSONVILLE BEACH	1ST AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-25	200	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-24	200	4	8			

Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	25		

Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		

Distance:	33.5 ft.	Grade:	0
Condition:	Tap Factory Made Capped		
Remarks:	N/A		

Distance:	56.8 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	INFILTRATION AROUND SERVICE		

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Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC3	JACKSONVILLE BEACH	1ST AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-25	200	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J38 M-24	200	4	8			

Distance:	200.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	24		

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	114	4	8			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	10:23	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			10:33	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks:	24								
0	Miscellaneous Water Level				5	☐			
45.4	Tap Factory Activity		4			☐	2		
113.1	Miscellaneous General Observation					☐			
Remarks:	PIPE THROUGH PIPE								
114	Miscellaneous Survey Abandoned					☐			
Remarks:	DUE TO PIPE THROUGH PIPE								

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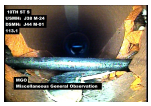
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	114	4	8			

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	10:23	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			10:33	

0 ft.	Access Point Manhole		24
0 ft.	Miscellaneous Water Level		
45.4 ft.	Tap Factory Activity		
113.1 ft.	Miscellaneous General Observation		PIPE THROUGH PIPE
114 ft.	Miscellaneous Survey Abandoned		DUE TO PIPE THROUGH PIPE

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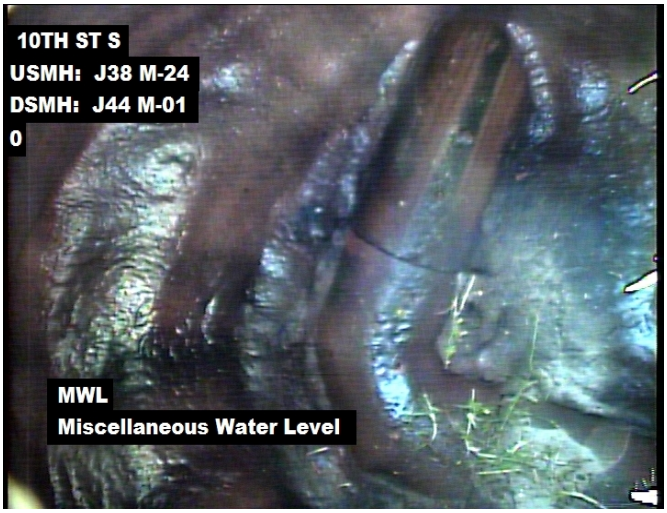
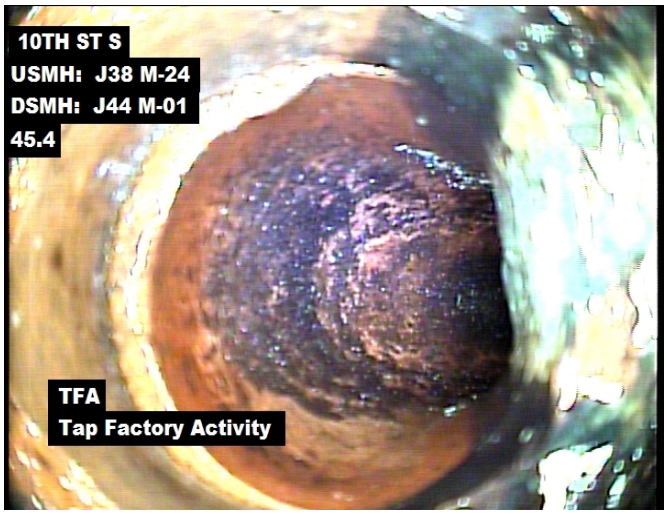
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	114	4	8			

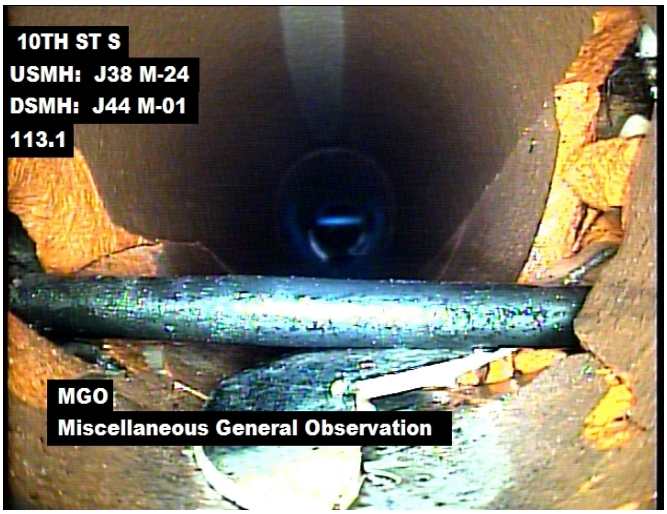
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 24



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 45.4 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 113.1 ft. Grade: 0
Condition: Miscellaneous General Observation
Remarks: PIPE THROUGH PIPE

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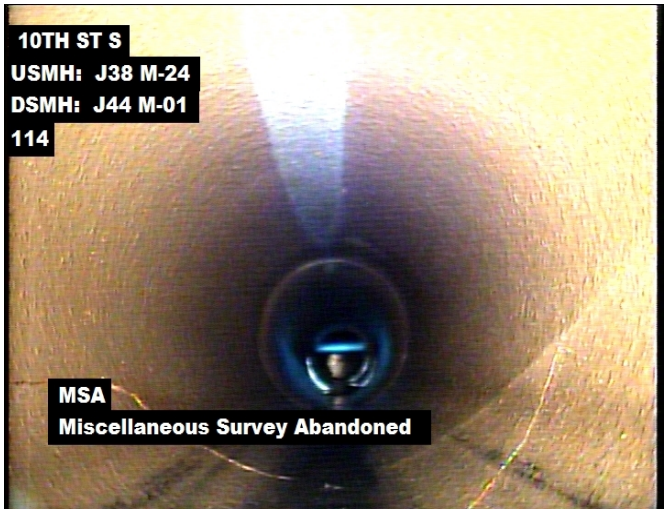
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	114	4	8			



Distance: 114.0 ft. Grade: 0
Condition: Miscellaneous Survey Abandoned
Remarks: DUE TO PIPE THROUGH PIPE

Project Information

Project Name:	Project Number:	Date:
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Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	27.9	4	8			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Upstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	10:47	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			10:56	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks:	01								
0	Miscellaneous Water Level				5	☐			
8	Miscellaneous General Observation					☐			
Remarks:	GLUE IN JOINT								
27.1	Miscellaneous General Observation					☐			
Remarks:	PIPE THROUGH PIPE - DIFFERENT PIPE								
27.9	Miscellaneous Survey Abandoned					☐			
Remarks:	DUE TO PIPE								

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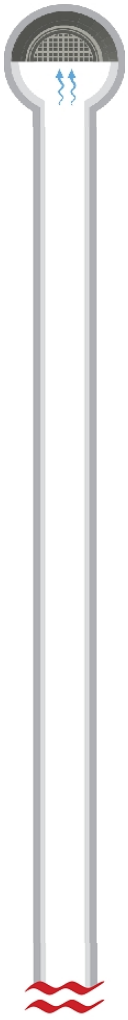
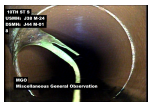
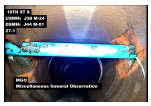
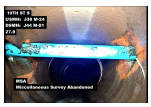
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	27.9	4	8			

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose
					Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Upstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	10:47	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			10:56	



0 ft.	Access Point Manhole		01
0 ft.	Miscellaneous Water Level		
8 ft.	Miscellaneous General Observation		GLUE IN JOINT
27.1 ft.	Miscellaneous General Observation		PIPE THROUGH PIPE - DIFFERENT PIPE
27.9 ft.	Miscellaneous Survey Abandoned		DUE TO PIPE

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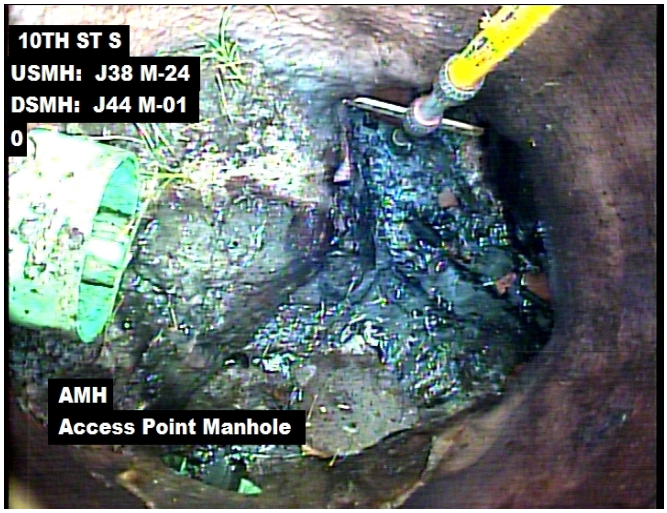
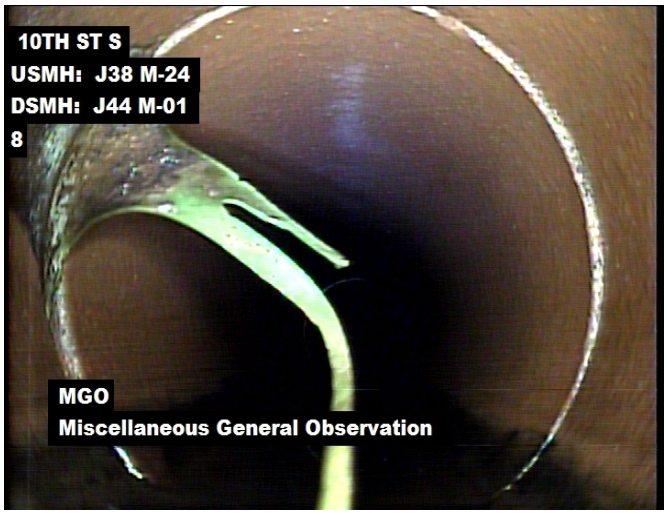
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	27.9	4	8			

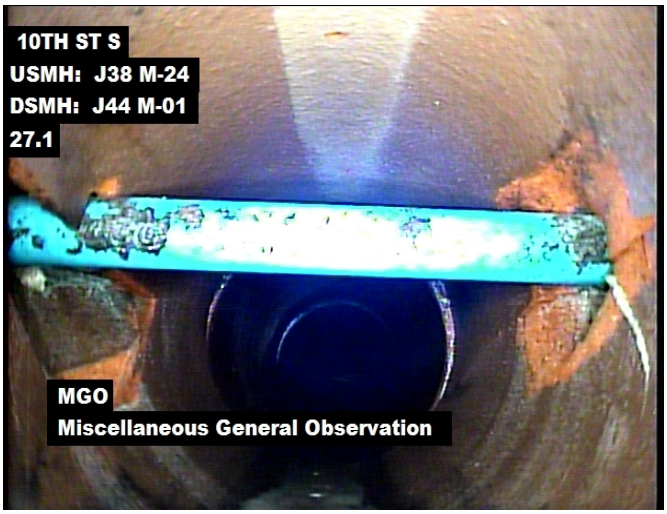


Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	01		

Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		



Distance:	8.0 ft.	Grade:	0
Condition:	Miscellaneous General Observation		
Remarks:	GLUE IN JOINT		



Distance:	27.1 ft.	Grade:	0
Condition:	Miscellaneous General Observation		
Remarks:	PIPE THROUGH PIPE - DIFFERENT PIPE		

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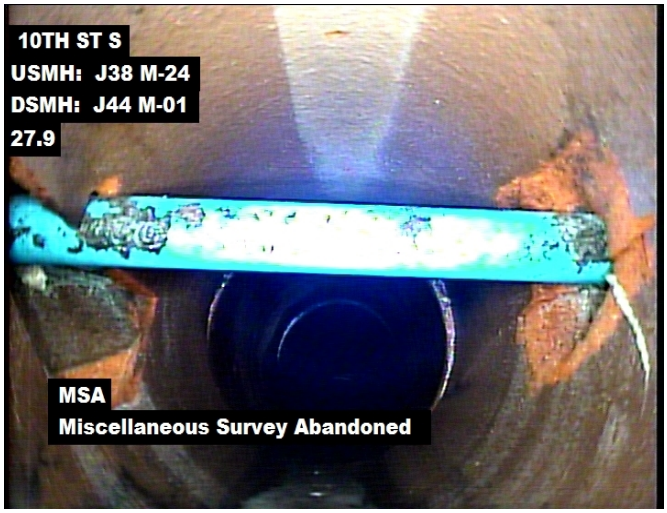
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC4	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J38 M-24	153	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-01	27.9	4	8			



Distance:	27.9 ft.	Grade:	0
Condition:	Miscellaneous Survey Abandoned		
Remarks:	DUE TO PIPE		

Project Information

Project Name:	Project Number:	Date:
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Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			

SPR	6	MPR	1	PO Number	Customer
SPRI	2	MPRI	1		
QSR	3121	QMR	1100	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
7	tcp	Downstream	09/24/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
1.79999995231628	123456	Heavy Cleaning	11:00	Dry - No Precipitation During Survey
Date Cleaned			End Time	Additional Info
09/24/2020			11:20	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 01									
0	Miscellaneous Water Level				5	☐			
9	Miscellaneous Material Change					☐			
Remarks: PVC									
19.9	Miscellaneous Material Change					☐			
Remarks: CLAY									
19.9	Joint Offset Medium					☐			3
57.5	Tap Factory Activity		4			☐	10		
64.9	Tap Factory Activity		4			☐	10		
67.1	Crack Circumferential					☐	8	12	1
84.8	Tap Factory Activity		4			☐	2		
144.9	Tap Factory Activity		4			☐	2		
149.1	Tap Factory Activity		4			☐	10		
222.8	Roots Fine Joint					☑	3		1
224.5	Tap Factory Activity		4			☐	10		
239.6	Tap Factory Activity		4			☐	2		
264.9	Tap Factory Activity		4			☐	2		
274.6	Tap Factory Activity		4			☐	10		
296.2	Miscellaneous Water Level Sag				20	☐			2
340.4	Miscellaneous Material Change					☐			
Remarks: PVC									
389.9	Access Point Manhole					☐			
Remarks: 5									

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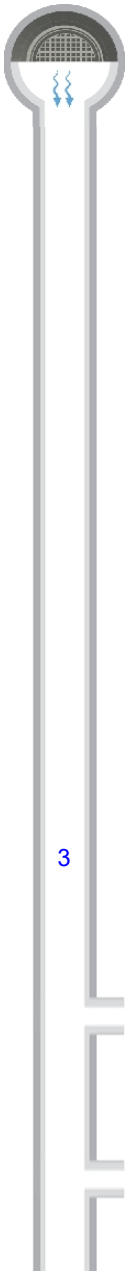
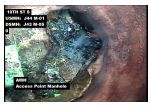
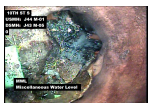
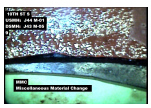
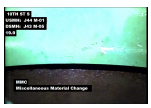
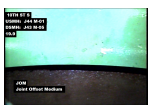
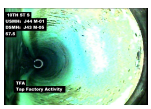
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J44 M-01	0	4	Circular			
Downstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J43 M-05	389.9	4	8			

SPR	6	MPR	1	PO Number	Customer
SPRI	2	MPRI	1		
QSR	3121	QMR	1100	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
7	tcp	Downstream	09/24/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
1.79999995231628	123456	Heavy Cleaning	11:00	Dry - No Precipitation During Survey
Date Cleaned			**End Time**	**Additional Info**
09/24/2020			11:20	



0 ft.	Access Point Manhole		01
0 ft.	Miscellaneous Water Level		
9 ft.	Miscellaneous Material Change		PVC
19.9 ft.	Miscellaneous Material Change		CLAY
19.9 ft.	Joint Offset Medium		
57.5 ft.	Tap Factory Activity		
64.9 ft.	Tap Factory Activity		

Infrastructure Technologies
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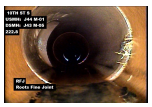
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			

67.1 ft.	Crack Circumferential		1
84.8 ft.	Tap Factory Activity		
144.9 ft.	Tap Factory Activity		
149.1 ft.	Tap Factory Activity		
222.8 ft.	Roots Fine Joint		1
224.5 ft.	Tap Factory Activity		
239.6 ft.	Tap Factory Activity		
264.9 ft.	Tap Factory Activity		
274.6 ft.	Tap Factory Activity		

Infrastructure Technologies
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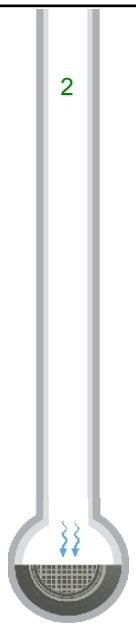
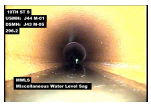
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			



296.2 ft. Miscellaneous Water Level Sag



340.4 ft. Miscellaneous Material Change

PVC

389.9 ft. Access Point Manhole

5

Infrastructure Technologies
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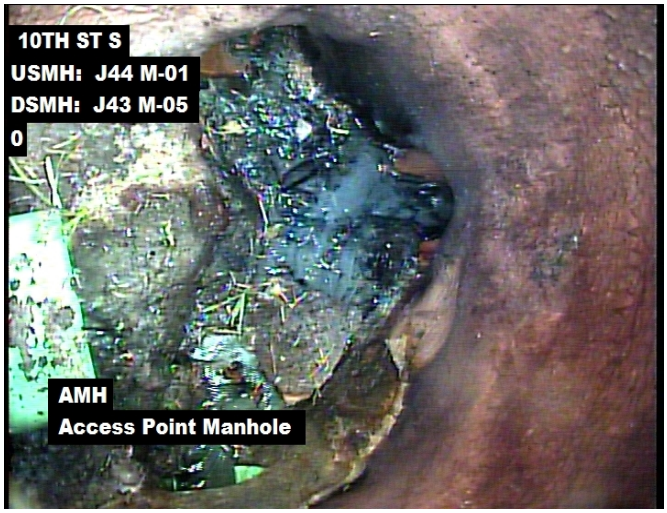
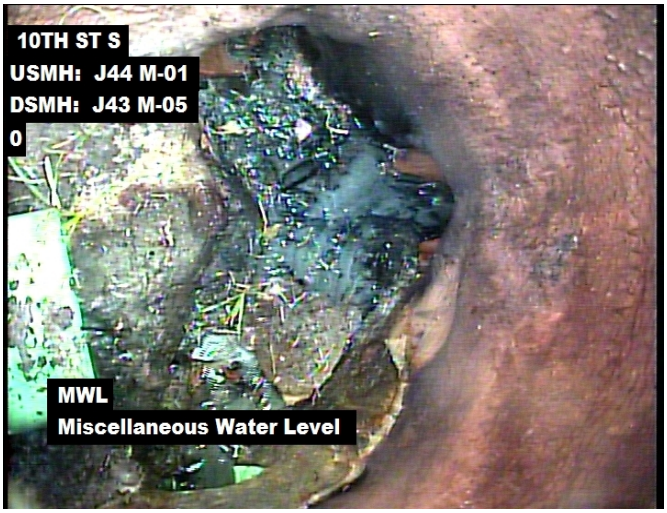
4 Image Report

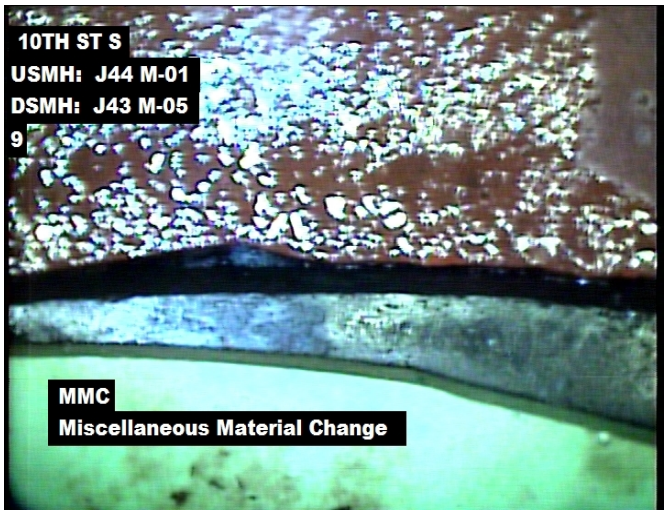
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			



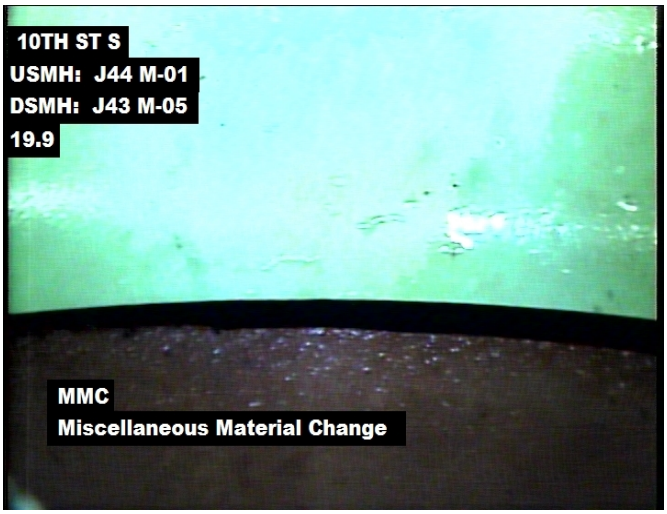
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 01



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 9.0 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 19.9 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: CLAY

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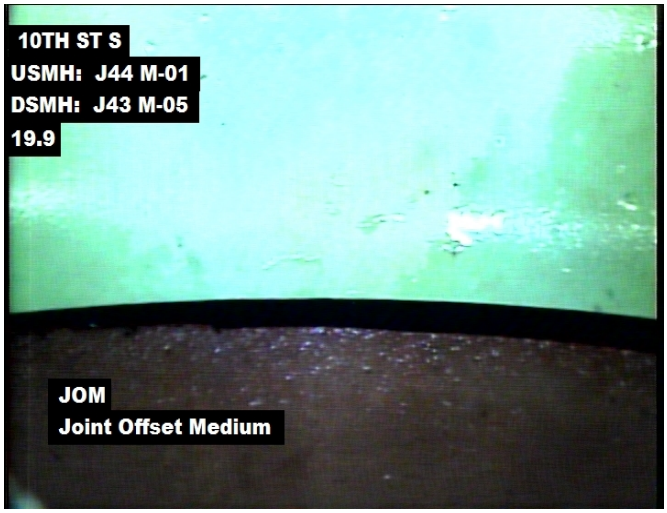
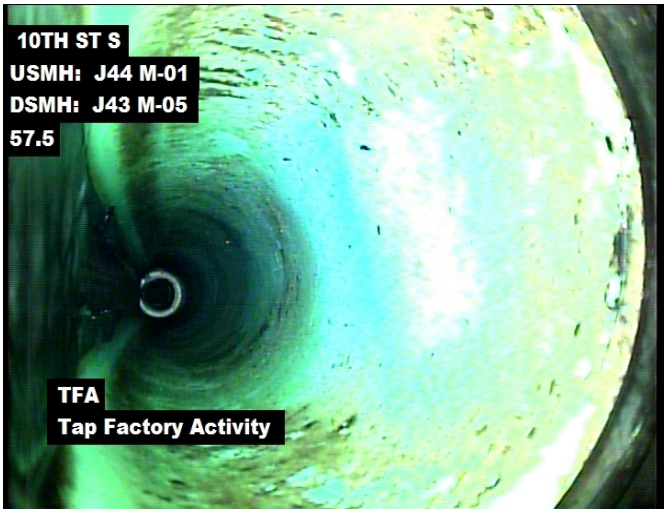
4 Image Report

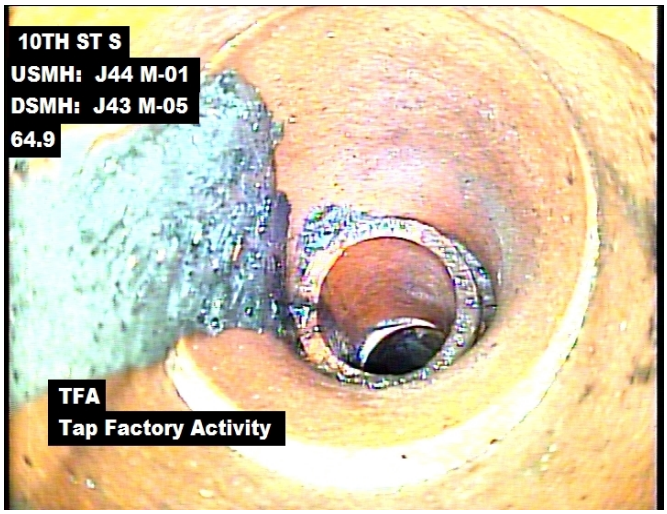
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			



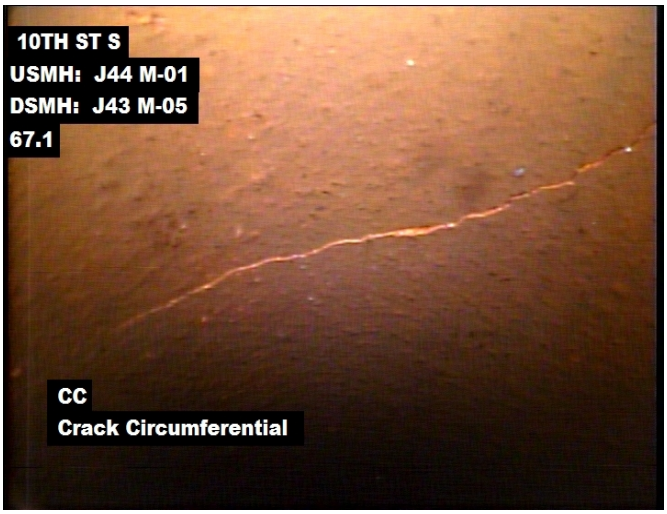
Distance: 19.9 ft. Grade: 3
Condition: Joint Offset Medium
Remarks: N/A



Distance: 57.5 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 64.9 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 67.1 ft. Grade: 1
Condition: Crack Circumferential
Remarks: N/A

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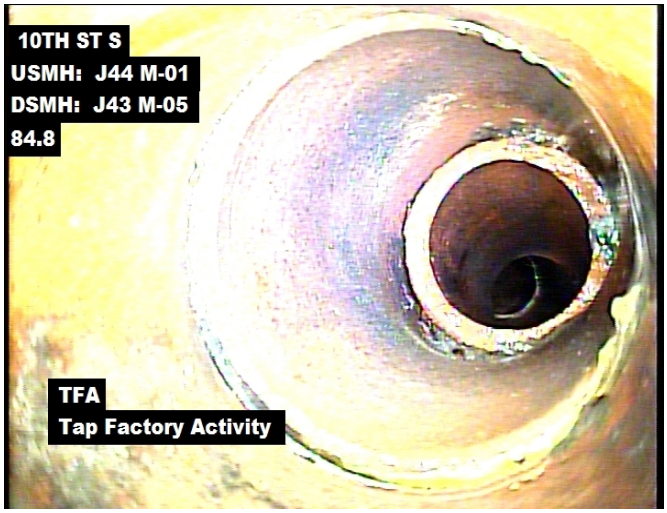
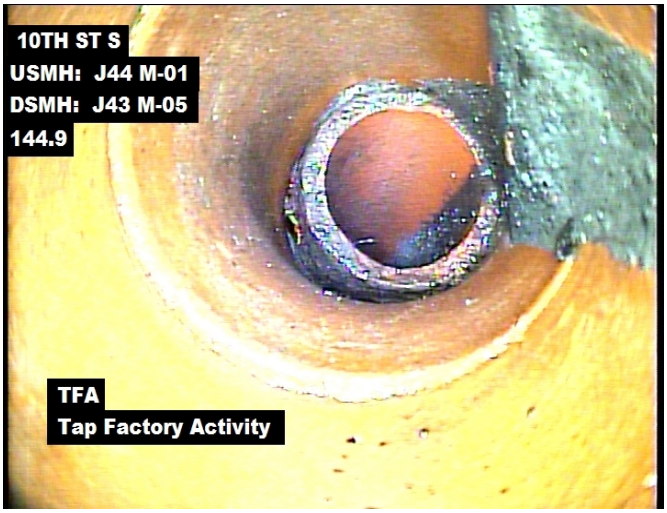
4 Image Report

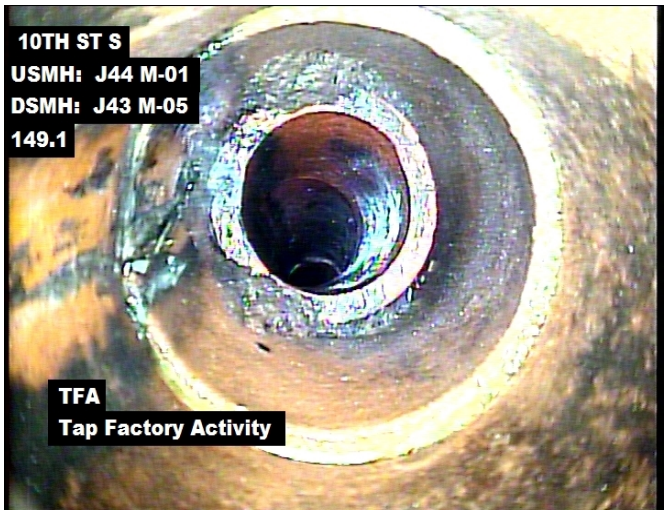
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			



Distance: 84.8 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 144.9 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 149.1 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 222.8 ft. Grade: 1
Condition: Roots Fine Joint
Remarks: N/A

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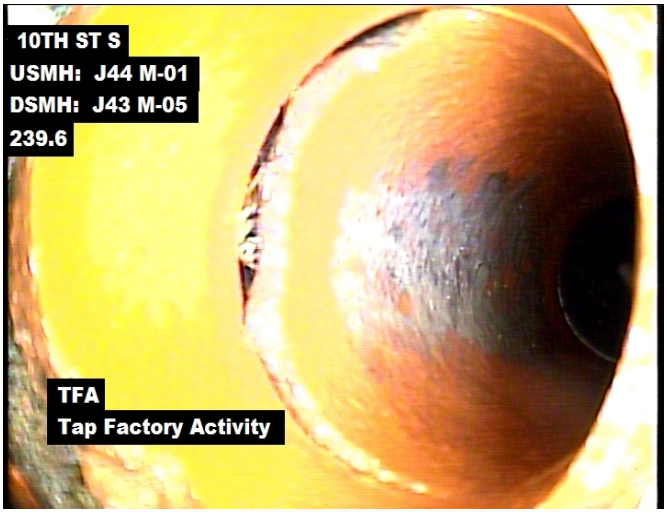
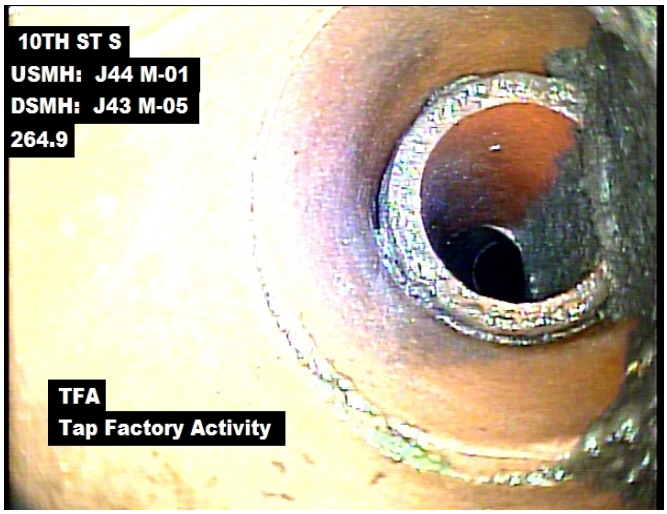
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			

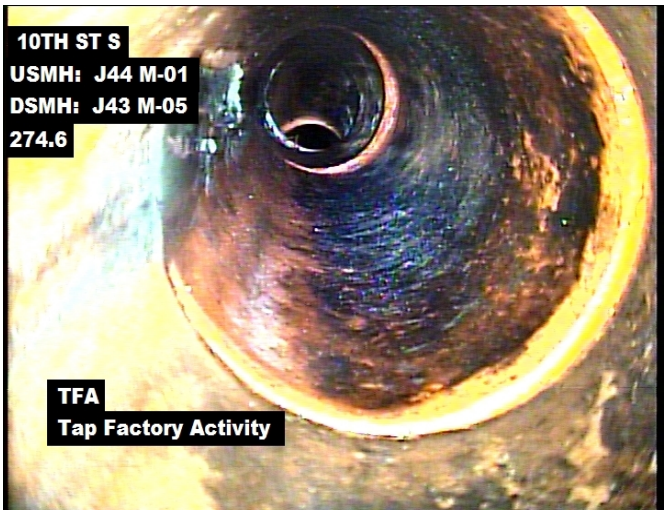
Distance: 224.5 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 239.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 264.9 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 274.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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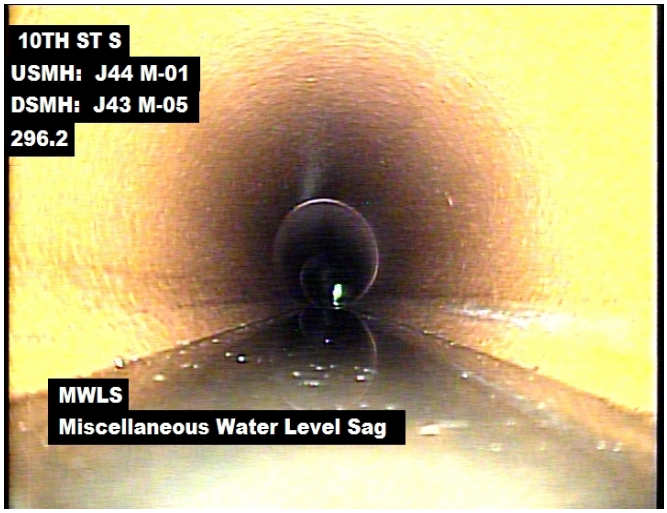
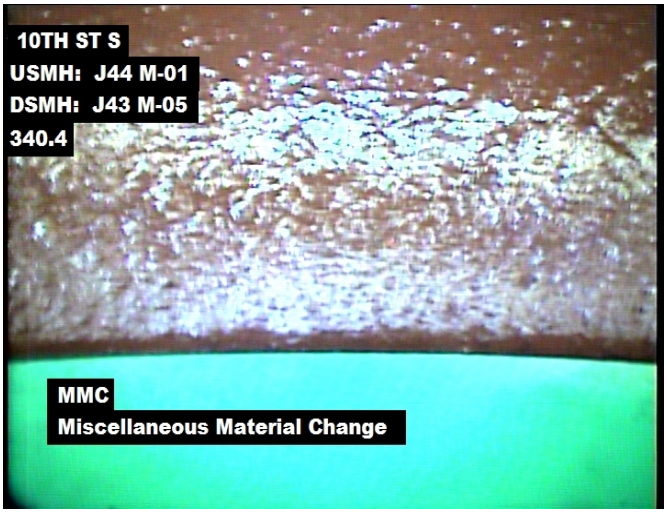
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC5	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-01	0	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-05	389.9	4	8			



Distance: 296.2 ft. Grade: 2
Condition: Miscellaneous Water Level Sag
Remarks: N/A



Distance: 340.4 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC

Distance: 389.9 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 5

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Albuquerque, NM
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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			

SPR	0	MPR	5	PO Number	Customer
SPRI	0	MPRI	2.5	142268	
QSR	0000	QMR	4111	Work Order Number	Purpose
					Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
5	tcp	Upstream	09/22/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
2.5	123456	Heavy Cleaning	01:38	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/22/2020			02:07	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 03									
0	Miscellaneous Water Level				10	☐			
18	Tap Factory Activity		4			☐	2		
32.6	Miscellaneous Material Change					☐			
Remarks: VCP									
32.6	Miscellaneous Shape/Size Change		6			☐			
Remarks: 8 TO 6									
82.4	Tap Factory Activity		4			☐	2		
117.5	Tap Factory Activity		4			☐	2		
Remarks: FULL OF ROOTS									
132.9	Roots Fine Joint					☑	4		1
143.6	Tap Factory Activity		4			☐	2		
147.2	Roots Medium Barrel				30	☐	6		4
150	Miscellaneous Survey Abandoned					☐			
Remarks: DUE TO ROOTS / STUB OUT									

Infrastructure Technologies
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Defect Listing Plot

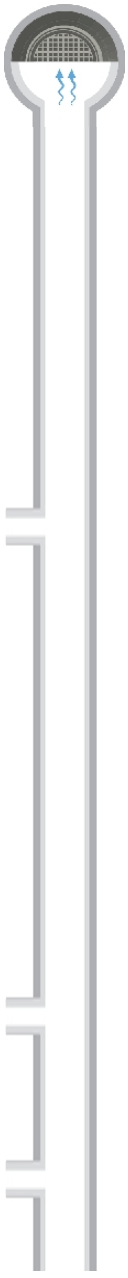
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			

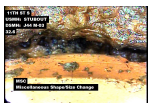
SPR	0	MPR	5	PO Number	Customer
SPRI	0	MPRI	2.5	142268	
QSR	0000	QMR	4111	Work Order Number	Purpose
					Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
5	tcp	Upstream	09/22/2020	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather
2.5	123456	Heavy Cleaning	01:38	Dry Weather/Wet Ground

Date Cleaned	End Time	Additional Info
09/22/2020	02:07	



0 ft.	Access Point Manhole		03
0 ft.	Miscellaneous Water Level		
18 ft.	Tap Factory Activity		
32.6 ft.	Miscellaneous Material Change		VCP
32.6 ft.	Miscellaneous Shape/Size Change		8 TO 6
82.4 ft.	Tap Factory Activity		
117.5 ft.	Tap Factory Activity		FULL OF ROOTS

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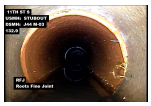
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			

132.9 ft. Roots Fine Joint



143.6 ft. Tap Factory Activity

147.2 ft. Roots Medium Barrel

150 ft. Miscellaneous Survey Abandoned

1

4

DUE TO ROOTS / STUB OUT

Infrastructure Technologies
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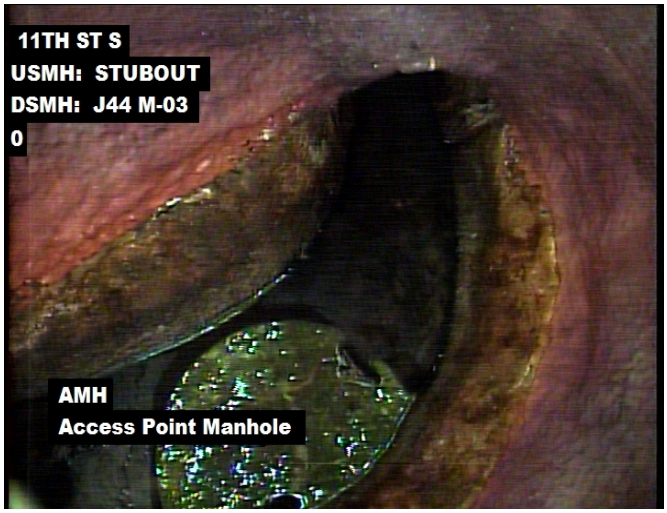
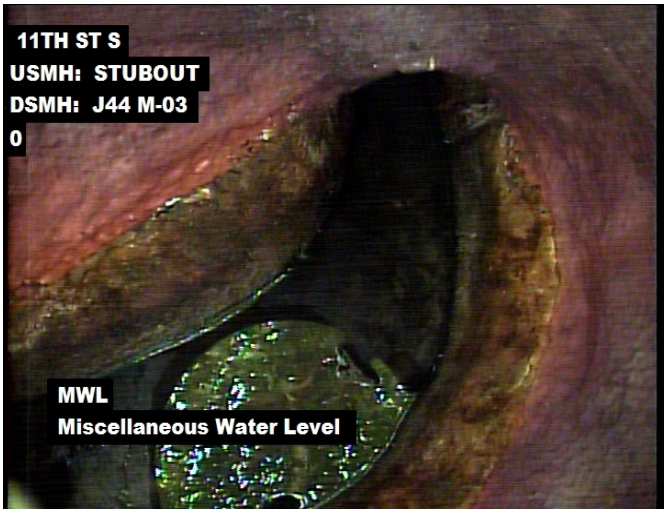
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			

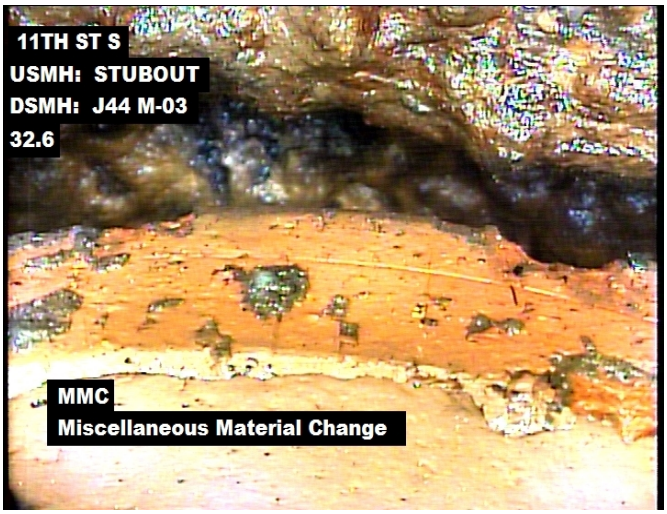


Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	03		



Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		

Distance:	18.0 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



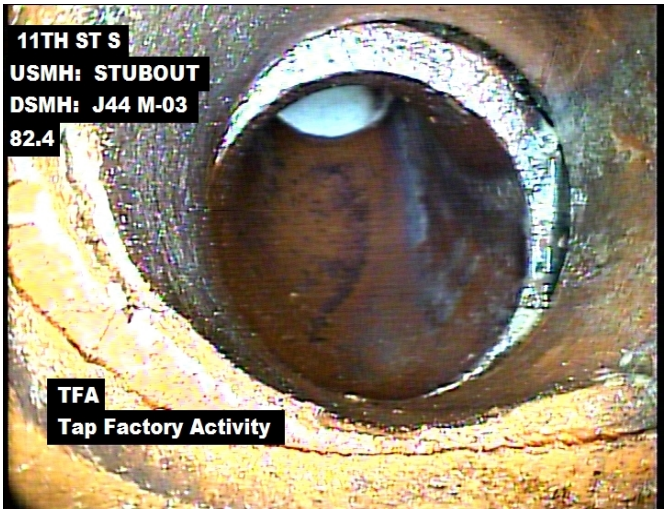
Distance:	32.6 ft.	Grade:	0
Condition:	Miscellaneous Material Change		
Remarks:	VCP		

Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

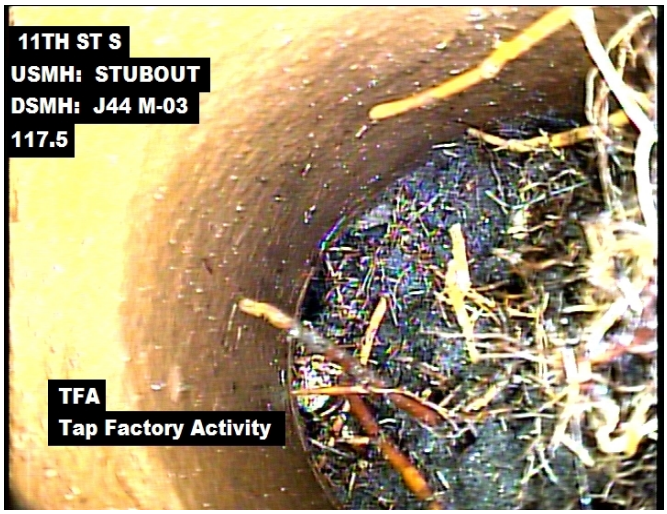
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			

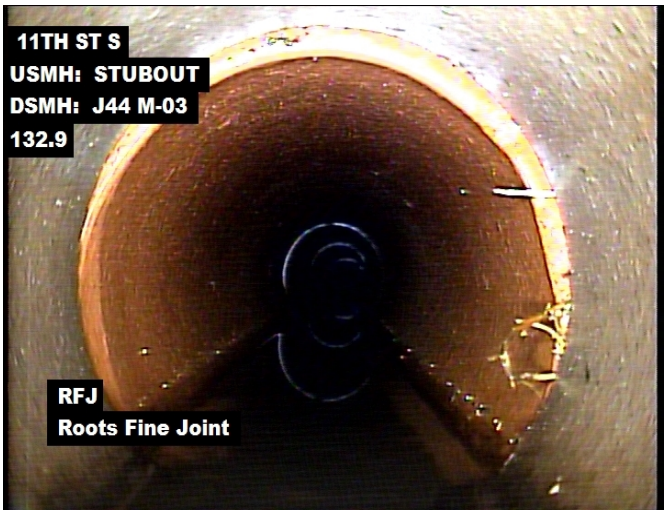
Distance: 32.6 ft. Grade: 0
Condition: Miscellaneous Shape/Size Change
Remarks: 8 TO 6



Distance: 82.4 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 117.5 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: FULL OF ROOTS

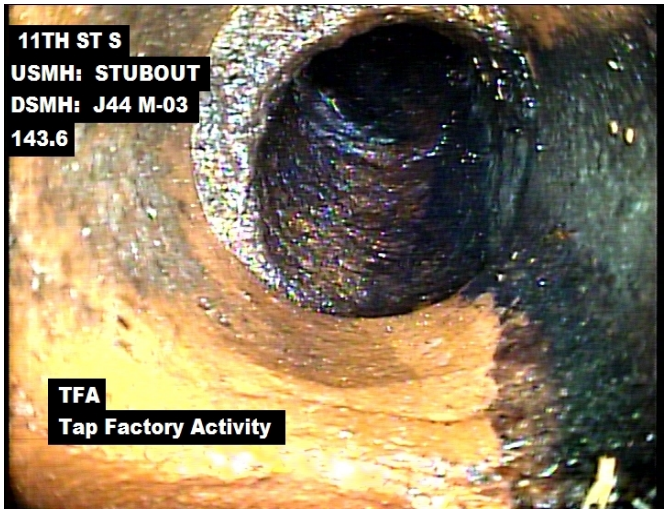


Distance: 132.9 ft. Grade: 1
Condition: Roots Fine Joint
Remarks: N/A

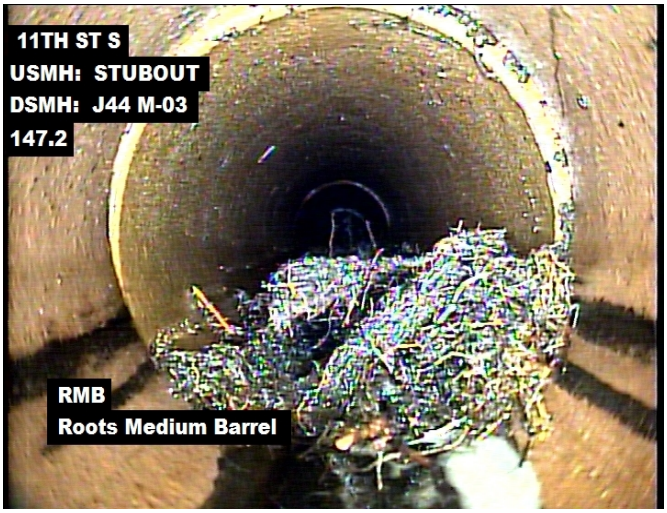
Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC6	JACKSONVILLE BEACH	11TH ST S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
STUBOUT		0	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-03	150	7	8			



Distance: 143.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 147.2 ft. Grade: 4
Condition: Roots Medium Barrel
Remarks: N/A

Distance: 150.0 ft. Grade: 0
Condition: Miscellaneous Survey Abandoned
Remarks: DUE TO ROOTS / STUB OUT

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Albuquerque, NM
877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

SPR	15	MPR	0	PO Number	Customer
SPRI	3.79999995231628	MPRI	0		
QSR	5141	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
15	tcp	Downstream	09/22/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
3.79999995231628	123456	Heavy Cleaning	02:19	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/22/2020			02:35	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 03									
0	Miscellaneous Water Level				10	☐			
37.4	Tap Factory Activity		4			☐	2		
Remarks: FULL OF ROOTS									
38.4	Hole Soil Visible					☐	12		5
39.3	Broken Pipe					☐	12	12	4
43.5	Tap Factory Made Capped		4			☐	10		
46.3	Crack Multiple					☐	12	12	3
Remarks: INFILTRATION									
52.9	Miscellaneous Material Change					☐			
Remarks: IRON									
76.9	Miscellaneous Material Change					☐			
Remarks: VCP									
81	Miscellaneous Material Change					☐			
Remarks: PVC									
87.3	Miscellaneous Material Change					☐			
Remarks: VCP									
88.4	Crack Multiple					☐	12	12	3
91.4	Tap Factory Activity		4			☐	10		
135	Tap Factory Activity		4			☐	11		
138.4	Tap Factory Activity		4			☐	10		
Remarks: FULL OF SAND									
170.2	Tap Factory Activity		4			☐	10		
Remarks: FULL OF ROOTS									
251	Access Point Manhole					☐			
Remarks: 02									

Infrastructure Technologies
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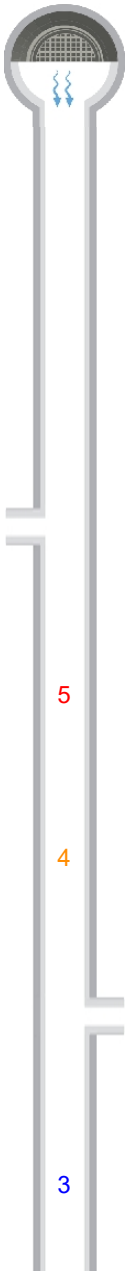
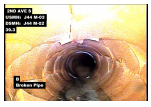
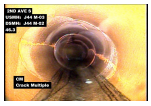
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

SPR	15	MPR	0	PO Number	Customer
SPRI	3.79999995231628	MPRI	0		
QSR	5141	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
15	tcp	Downstream	09/22/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
3.79999995231628	123456	Heavy Cleaning	02:19	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/22/2020			02:35	



0 ft.	Access Point Manhole		03
0 ft.	Miscellaneous Water Level		
37.4 ft.	Tap Factory Activity		FULL OF ROOTS
38.4 ft.	Hole Soil Visible		
39.3 ft.	Broken Pipe		
43.5 ft.	Tap Factory Made Capped		
46.3 ft.	Crack Multiple		INFILTRATION

Infrastructure Technologies
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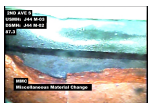
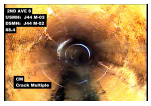
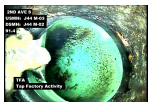
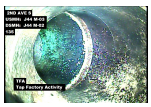
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

52.9 ft.	Miscellaneous Material Change			IRON
76.9 ft.	Miscellaneous Material Change			VCP
81 ft.	Miscellaneous Material Change			PVC
87.3 ft.	Miscellaneous Material Change			VCP
88.4 ft.	Crack Multiple		3	
91.4 ft.	Tap Factory Activity			
135 ft.	Tap Factory Activity			
138.4 ft.	Tap Factory Activity			FULL OF SAND
170.2 ft.	Tap Factory Activity			FULL OF ROOTS

Infrastructure Technologies
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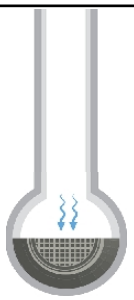
877-ITpipes

Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

251 ft. Access Point Manhole 02



J44 M-02

Infrastructure Technologies
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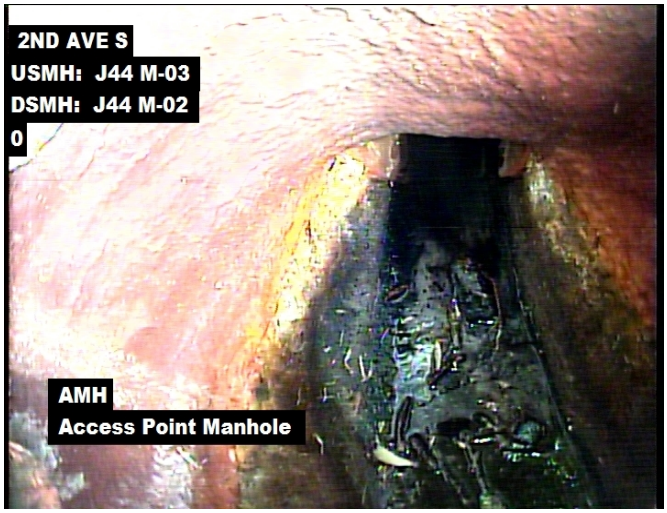
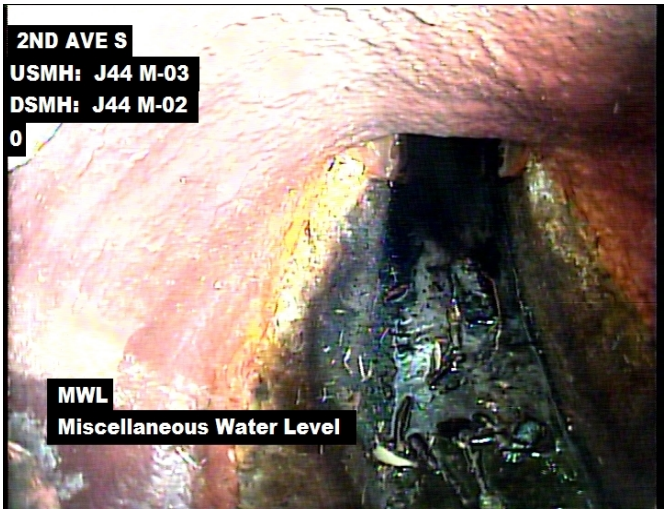
Albuquerque, NM
877-ITpipes

4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			



Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 03



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A

Distance: 37.4 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: FULL OF ROOTS

Distance: 38.4 ft. Grade: 5
Condition: Hole Soil Visible
Remarks: N/A

Infrastructure Technologies
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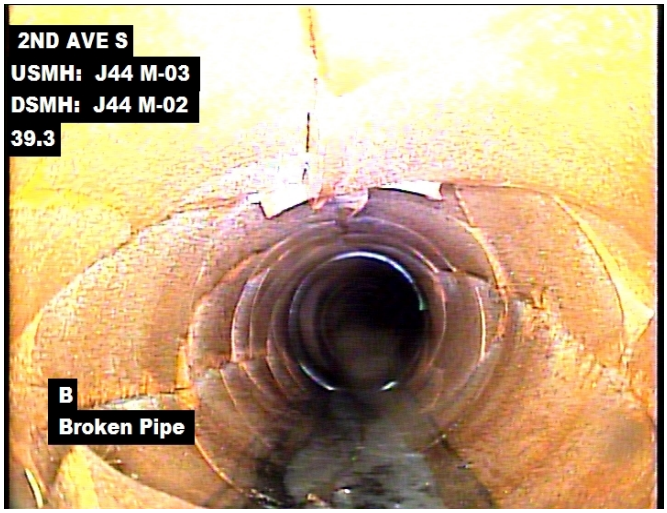
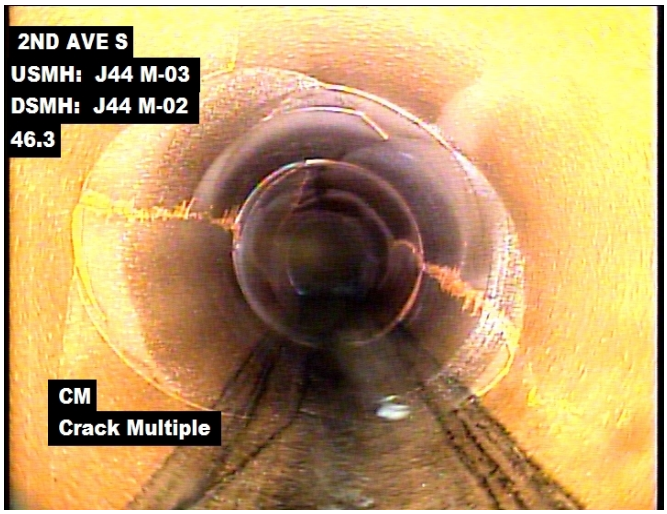
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

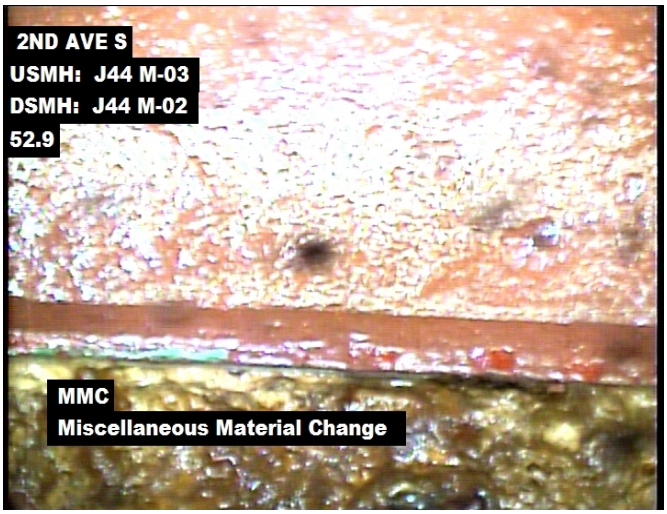


Distance: 39.3 ft. Grade: 4
Condition: Broken Pipe
Remarks: N/A

Distance: 43.5 ft. Grade: 0
Condition: Tap Factory Made Capped
Remarks: N/A



Distance: 46.3 ft. Grade: 3
Condition: Crack Multiple
Remarks: INFILTRATION



Distance: 52.9 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: IRON

Infrastructure Technologies
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Albuquerque, NM
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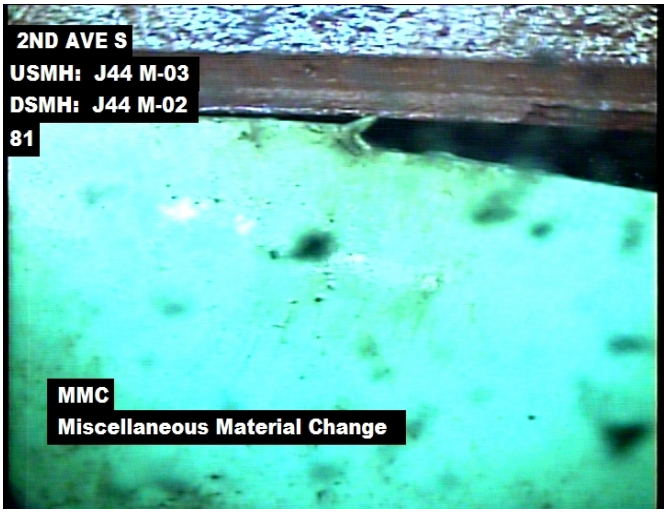
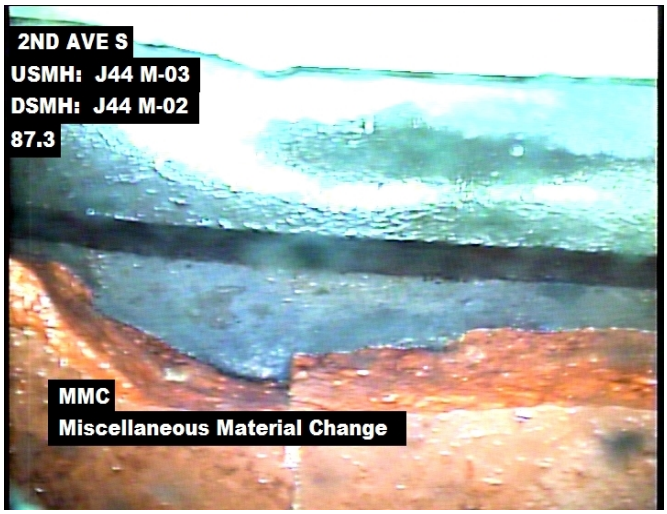
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

Distance: 76.9 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP



Distance: 81.0 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 87.3 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP

Distance: 88.4 ft. Grade: 3
Condition: Crack Multiple
Remarks: N/A

Infrastructure Technologies
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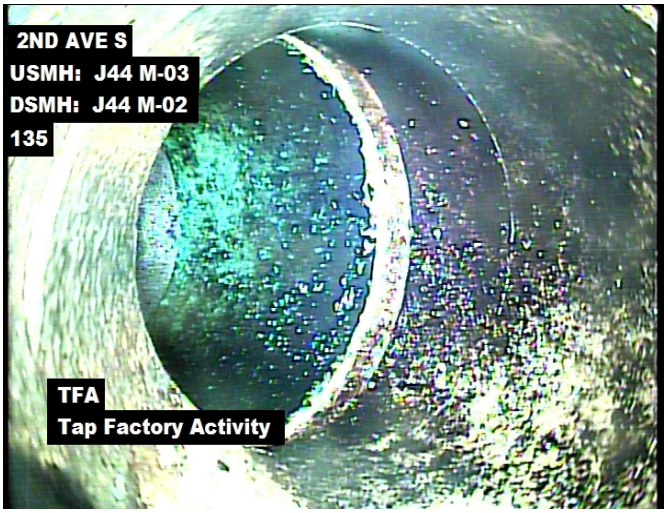
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			

Distance:	91.4 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	135.0 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	138.4 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	FULL OF SAND		

Distance:	170.2 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	FULL OF ROOTS		

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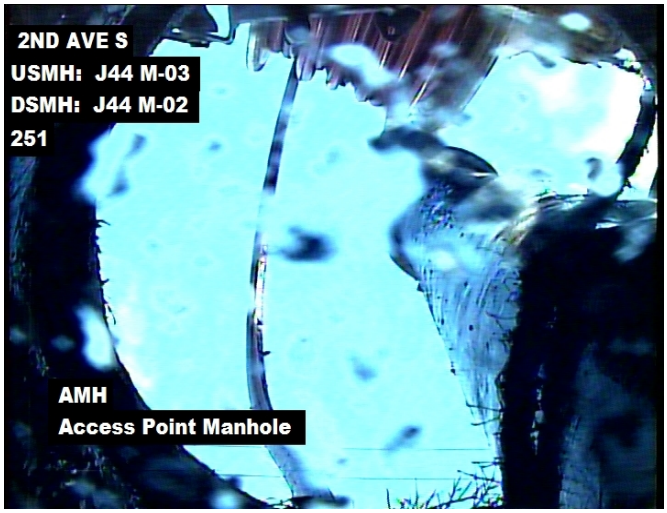
877-ITpipes

4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC7	JACKSONVILLE BEACH	2ND AVE S	Ductile Iron Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-03		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-02	251	7	8			



Distance:	251.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	02		

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	0	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	12	6	8			

SPR	3	MPR	0	PO Number	Customer
SPRI	3	MPRI	0		
QSR	3100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
3	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
3	123456	Heavy Cleaning	02:48	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			02:57	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 02									
0	Miscellaneous Water Level				15	☐			
7	Miscellaneous Material Change					☐			
Remarks: IRON									
12	Surface Damage Corrosion					☐	12	12	3
Remarks: 25%									
12	Miscellaneous Survey Abandoned					☐			
Remarks: DUE TO IRON BUILD UP									

Infrastructure Technologies
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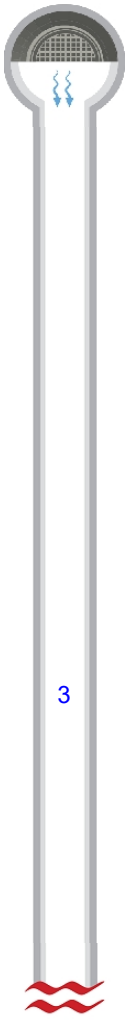
Albuquerque, NM
877-ITpipes

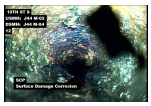
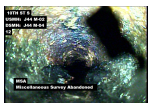
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J44 M-02	0	3	Circular			
Downstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J44 M-04	12	6	8			

SPR	3	MPR	0	PO Number	Customer
SPRI	3	MPRI	0		
QSR	3100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
3	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3	123456	Heavy Cleaning	02:48	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			02:57	



0 ft.	Access Point Manhole		02
0 ft.	Miscellaneous Water Level		
7 ft.	Miscellaneous Material Change		IRON
12 ft.	Surface Damage Corrosion		25%
12 ft.	Miscellaneous Survey Abandoned		DUE TO IRON BUILD UP

Infrastructure Technologies
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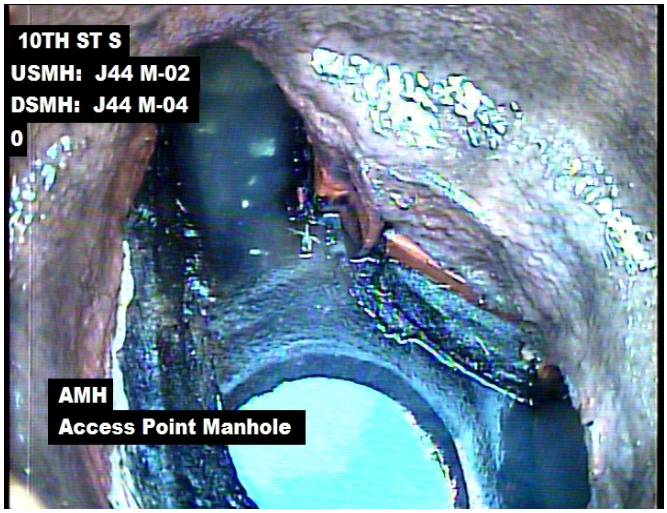
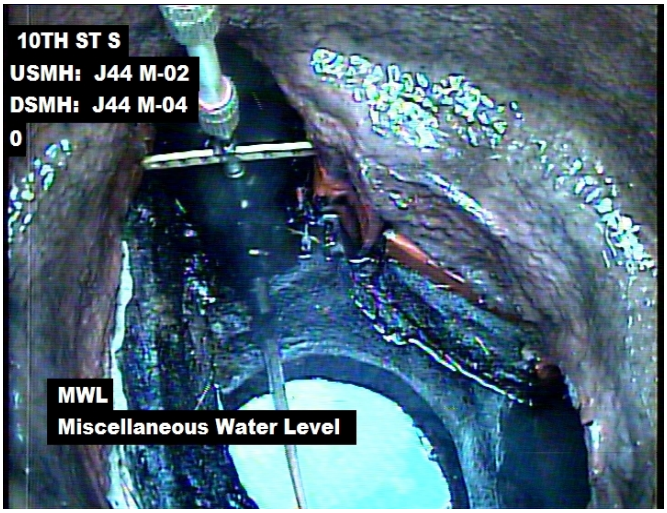
4 Image Report

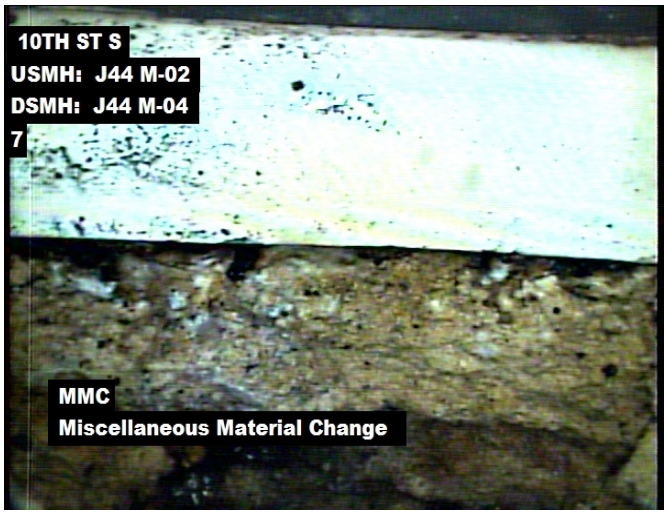
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	0	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	12	6	8			



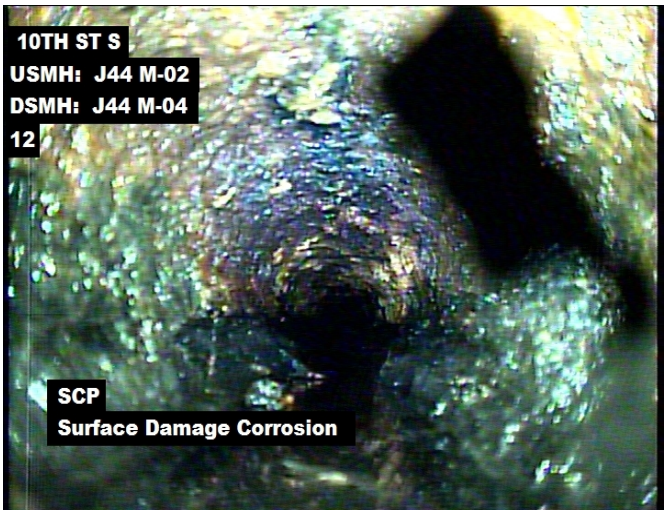
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 02



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 7.0 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: IRON



Distance: 12.0 ft. Grade: 3
Condition: Surface Damage Corrosion
Remarks: 25%

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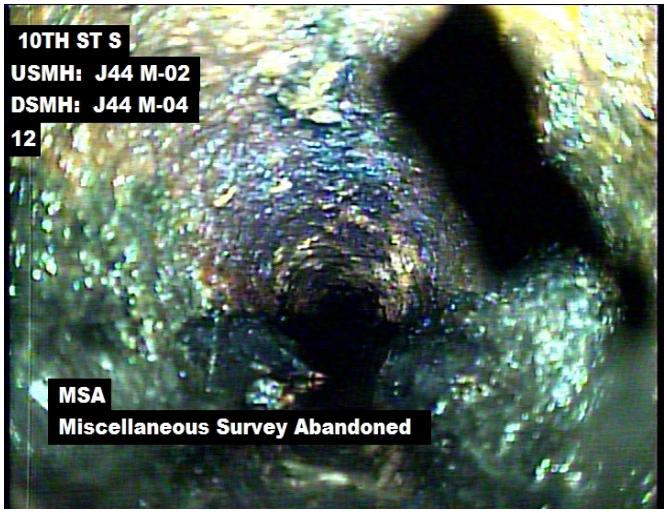
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	0	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	12	6	8			



Distance: 12.0 ft. Grade: 0
Condition: Miscellaneous Survey Abandoned
Remarks: DUE TO IRON BUILD UP

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			

				PO Number	Customer
SPR	5	MPR	0		
SPRI	2.5	MPRI	0	Work Order Number	Purpose
QSR	3121	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
5	tcp	Upstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
2.5	123456	Heavy Cleaning	03:11	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			03:24	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks:	04								
0	Miscellaneous Water Level				15	☐			
27.6	Miscellaneous Material Change					☐			
Remarks:	PVC TO VCP								
68.2	Tap Factory Activity		4			☐	10		
Remarks:	FULL OF DIRT								
98.3	Tap Factory Activity		4			☐	10		
Remarks:	FULL OF DEBRIS								
120.1	Crack Longitudinal					☐	11		2
Remarks:	INFILTRATION								
139.2	Miscellaneous Material Change					☐			
Remarks:	PVC - SMALL OFFSET								
145.1	Miscellaneous Material Change					☐			
Remarks:	VCP - SMALL OFFSET								
155.4	Miscellaneous Material Change					☐			
Remarks:	IRON								
157	Surface Damage Corrosion					☐	12	12	3
Remarks:	30%								
157	Miscellaneous Survey Abandoned					☐			
Remarks:	DUE TO IRON BUILD UP								

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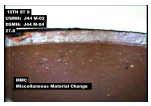
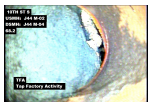
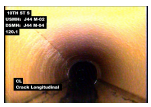
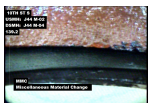
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			

SPR	5	MPR	0	PO Number	Customer
SPRI	2.5	MPRI	0		
QSR	3121	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
5	tcp	Upstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
2.5	123456	Heavy Cleaning	03:11	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			03:24	

0 ft.	Access Point Manhole		04
0 ft.	Miscellaneous Water Level		
27.6 ft.	Miscellaneous Material Change		PVC TO VCP
68.2 ft.	Tap Factory Activity		FULL OF DIRT
98.3 ft.	Tap Factory Activity		FULL OF DEBRIS
120.1 ft.	Crack Longitudinal		INFILTRATION
139.2 ft.	Miscellaneous Material Change		PVC - SMALL OFFSET

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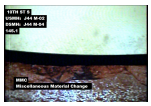
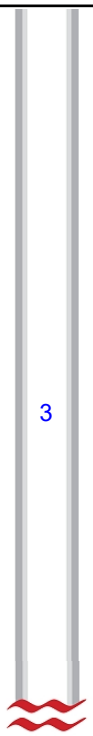
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			

145.1 ft.	Miscellaneous Material Change		VCP - SMALL OFFSET
155.4 ft.	Miscellaneous Material Change		IRON
157 ft.	Surface Damage Corrosion		30%
157 ft.	Miscellaneous Survey Abandoned		DUE TO IRON BUILD UP



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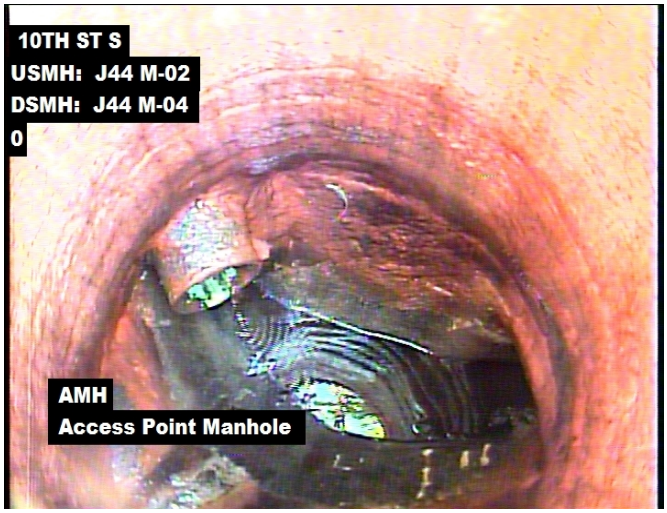
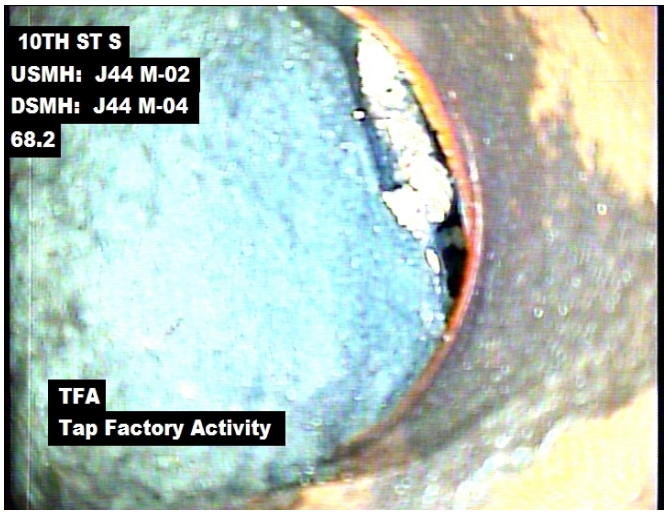
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			



Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 04

Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 68.2 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: FULL OF DIRT

Distance: 98.3 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: FULL OF DEBRIS

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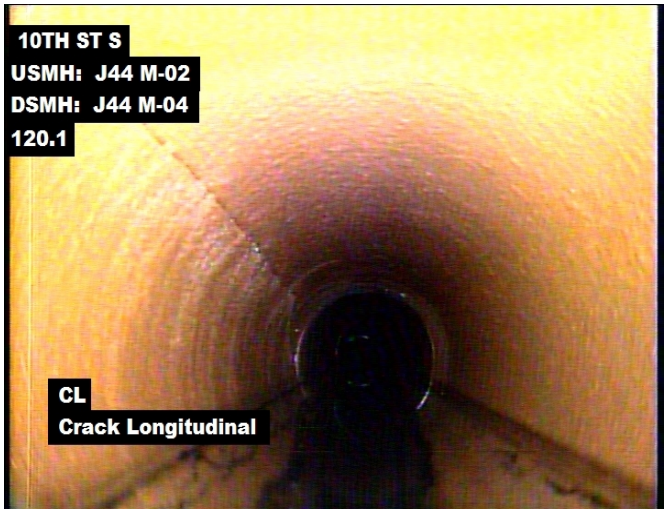
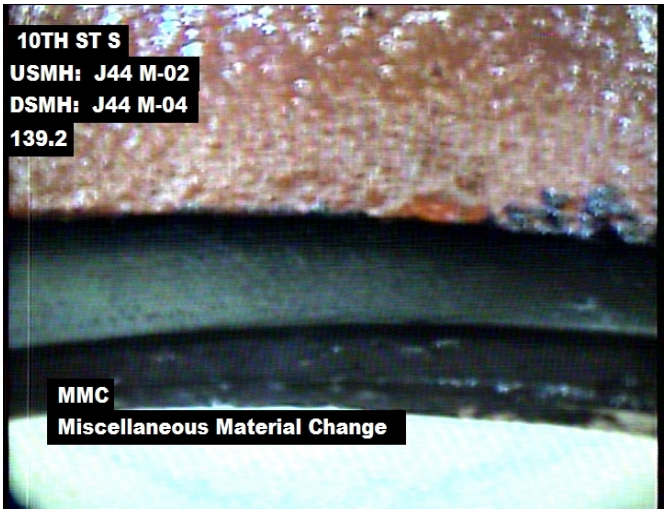
4 Image Report

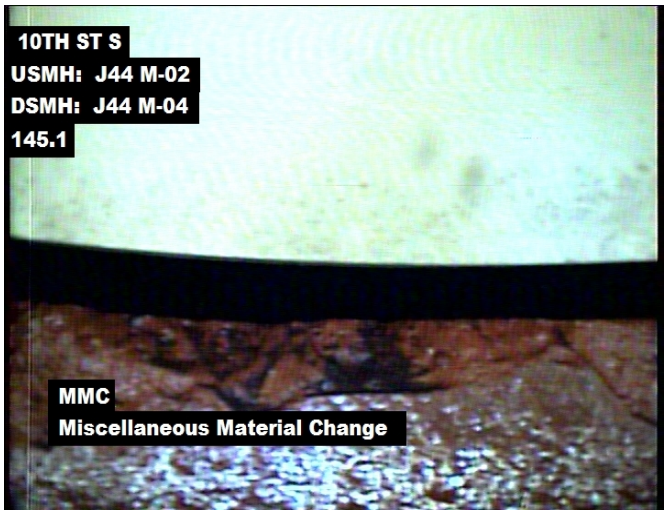
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			



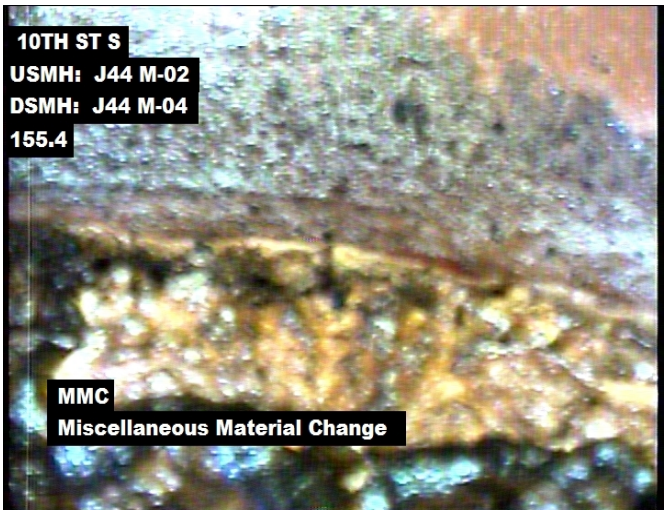
Distance: 120.1 ft. Grade: 2
Condition: Crack Longitudinal
Remarks: INFILTRATION



Distance: 139.2 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC - SMALL OFFSET



Distance: 145.1 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP - SMALL OFFSET



Distance: 155.4 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: IRON

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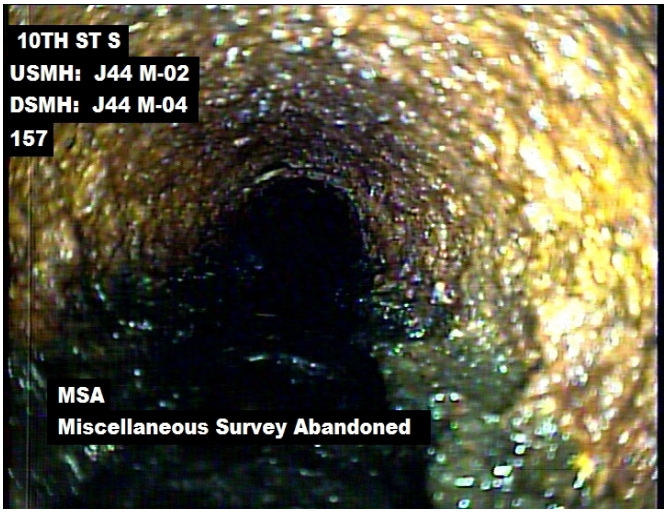
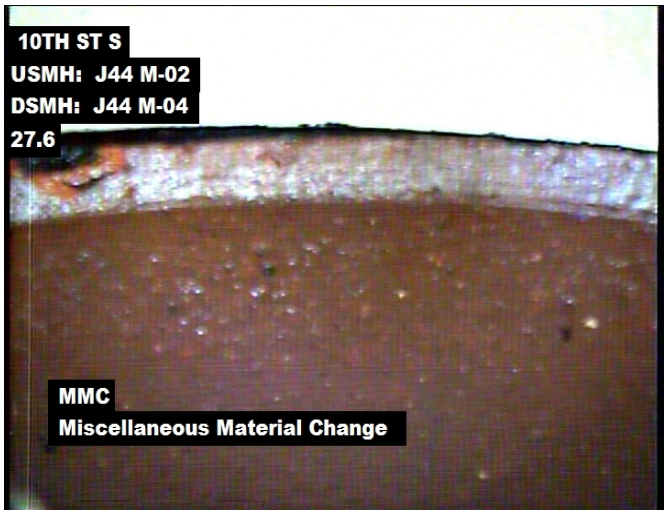
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC8	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-02	188	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J44 M-04	157	6	8			

Distance: 157.0 ft. Grade: 3
Condition: Surface Damage Corrosion
Remarks: 30%



Distance: 157.0 ft. Grade: 0
Condition: Miscellaneous Survey Abandoned
Remarks: DUE TO IRON BUILD UP



Distance: 27.6 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC TO VCP

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-04	397	6	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27A	35.9	6	8			

SPR	4	MPR	0	PO Number	Customer
SPRI	4	MPRI	0		
QSR	4100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
4	123456	Heavy Cleaning	03:31	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			03:47	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 04									
0	Miscellaneous Water Level				10	☐			
5	Tap Factory Activity		4			☐	2		
9.5	Tap Factory Activity		4			☐	2		
12.6	Miscellaneous Material Change					☐			
Remarks: PVC									
12.6	Miscellaneous General Observation					☐			
Remarks: LINE DEVIATES DOWN									
17.7	Miscellaneous Water Level Sag				75	☐			4
35.9	Access Point Manhole					☐			
Remarks: 27A - BURIED MH NOT ON MAP									

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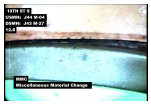
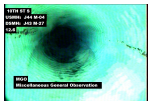
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J44 M-04	397	6	Circular			
Downstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J43 M-27A	35.9	6	8			

SPR	4	MPR	0	PO Number	Customer
SPRI	4	MPRI	0		
QSR	4100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
4	123456	Heavy Cleaning	03:31	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			03:47	

0 ft.	Access Point Manhole		04
0 ft.	Miscellaneous Water Level		
5 ft.	Tap Factory Activity		
9.5 ft.	Tap Factory Activity		
12.6 ft.	Miscellaneous Material Change		PVC
12.6 ft.	Miscellaneous General Observation		LINE DEVIATES DOWN
17.7 ft.	Miscellaneous Water Level Sag		

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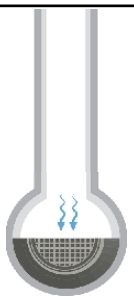
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-04	397	6	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27A	35.9	6	8			

35.9 ft. Access Point Manhole



J43 M-27A

27A - BURIED MH NOT ON MAP

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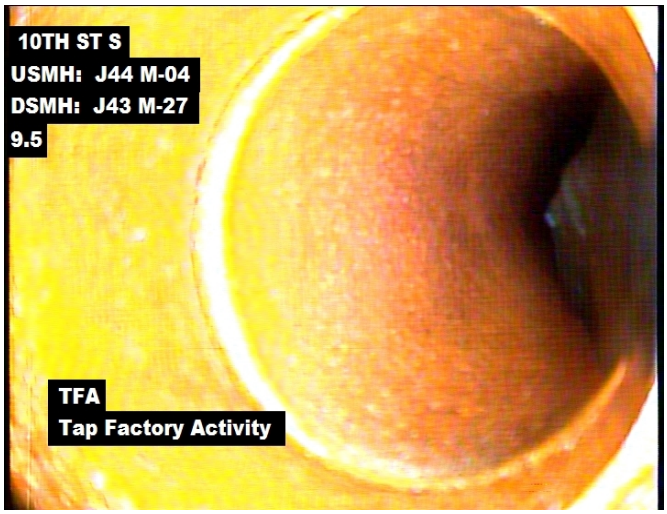
4 Image Report

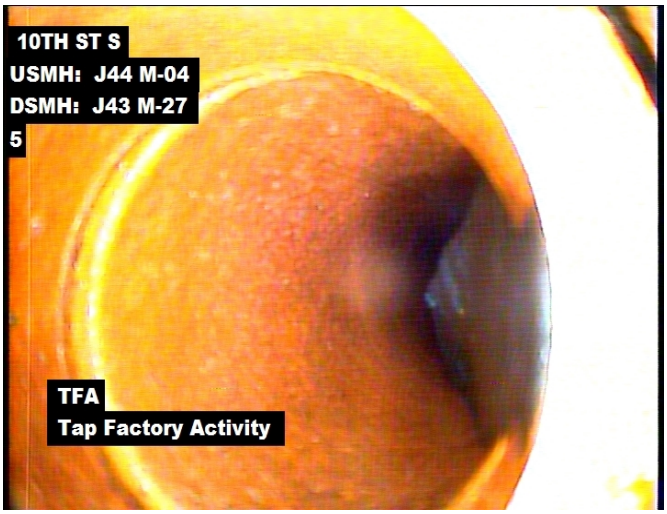
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-04	397	6	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27A	35.9	6	8			

Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 04

Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 9.5 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 5.0 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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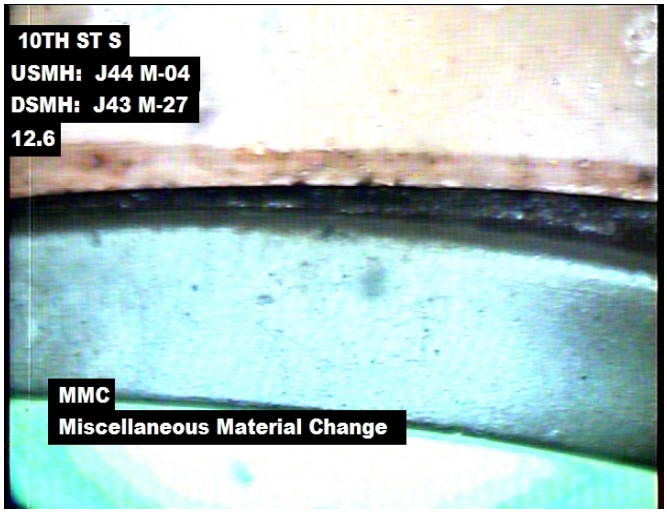
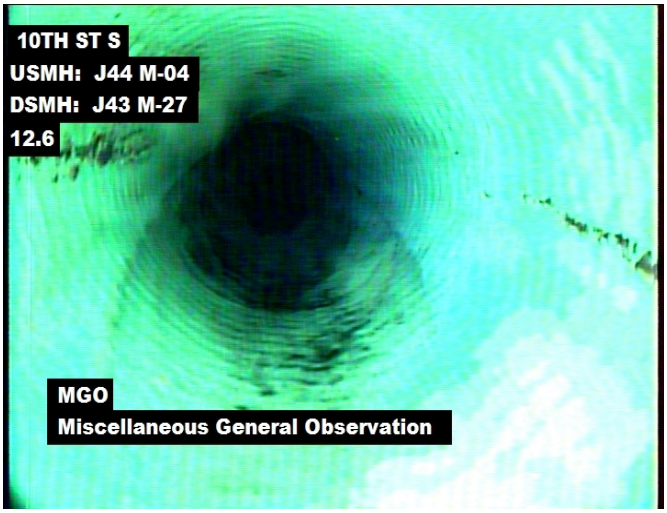
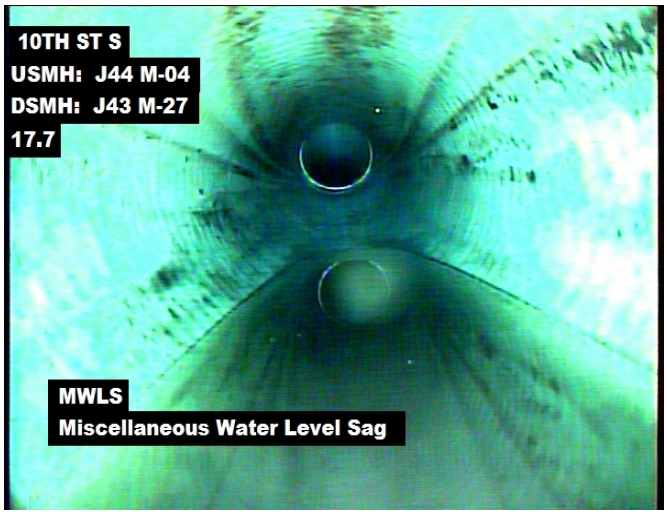
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-04	397	6	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27A	35.9	6	8			



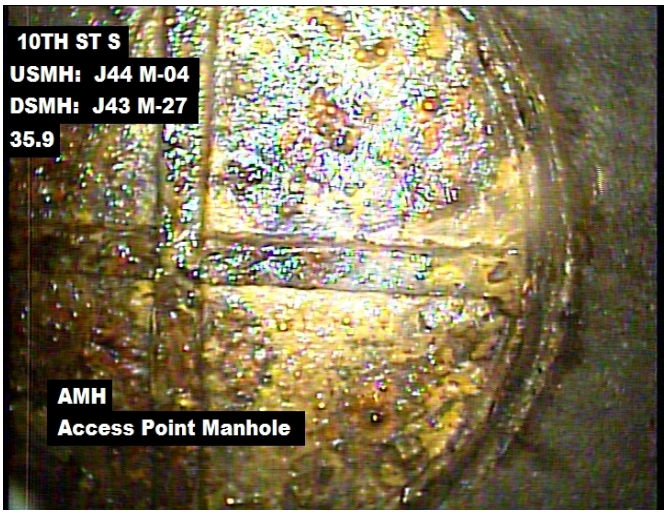
Distance: 12.6 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 12.6 ft. Grade: 0
Condition: Miscellaneous General Observation
Remarks: LINE DEVIATES DOWN



Distance: 17.7 ft. Grade: 4
Condition: Miscellaneous Water Level Sag
Remarks: N/A



Distance: 35.9 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 27A - BURIED MH NOT ON MAP

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Albuquerque, NM
877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

SPR	0	MPR	0	PO Number	Customer
SPRI	0	MPRI	0		
QSR	0000	QMR	0000	Work Order Number	Purpose
					Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/23/2020	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
0	123456	Heavy Cleaning	03:54	Dry Weather/Wet Ground	

Date Cleaned	End Time	Additional Info
09/23/2020	04:11	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 27A									
0	Miscellaneous Water Level				10	☐			
48.9	Tap Factory Activity		4			☐	10		
53.9	Tap Factory Activity		4			☐	2		
66.8	Tap Factory Activity		4			☐	2		
89	Tap Factory Activity		4			☐	10		
123.2	Tap Factory Activity		4			☐	10		
139.2	Tap Factory Activity		4			☐	2		
173.7	Tap Factory Activity		4			☐	2		
175.4	Tap Factory Activity		4			☐	10		
199.4	Tap Factory Activity		4			☐	12		
203.3	Tap Factory Activity		4			☐	2		
234	Tap Factory Activity		4			☐	10		
261.2	Tap Factory Activity		4			☐	10		
283.8	Tap Factory Activity		4			☐	2		
299.4	Tap Factory Activity		4			☐	2		
351	Access Point Manhole					☐			
Remarks: 27									

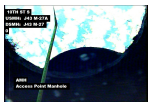
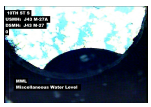
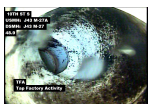
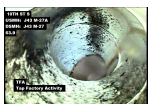
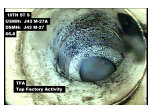
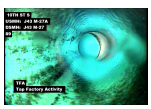
Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	**Shape**		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	**Height**	**Width**	Pipe Joint Length	
J43 M-27	351	4	8			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	Time	Weather
0	123456	Heavy Cleaning	03:54	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			04:11	

0 ft.	Access Point Manhole		27A
0 ft.	Miscellaneous Water Level		
48.9 ft.	Tap Factory Activity		
53.9 ft.	Tap Factory Activity		
66.8 ft.	Tap Factory Activity		
89 ft.	Tap Factory Activity		
123.2 ft.	Tap Factory Activity		

Infrastructure Technologies
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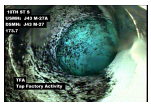
Defect Listing Plot

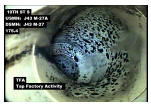
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

139.2 ft. Tap Factory Activity

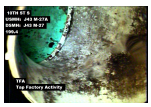
173.7 ft. Tap Factory Activity



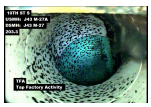
175.4 ft. Tap Factory Activity



199.4 ft. Tap Factory Activity

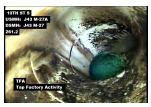


203.3 ft. Tap Factory Activity

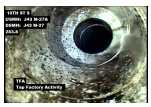


234 ft. Tap Factory Activity

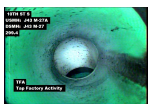
261.2 ft. Tap Factory Activity



283.8 ft. Tap Factory Activity



299.4 ft. Tap Factory Activity



Infrastructure Technologies
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Albuquerque, NM
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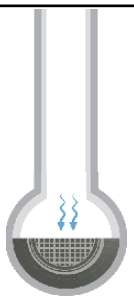
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

351 ft. Access Point Manhole



27

J43 M-27

Infrastructure Technologies
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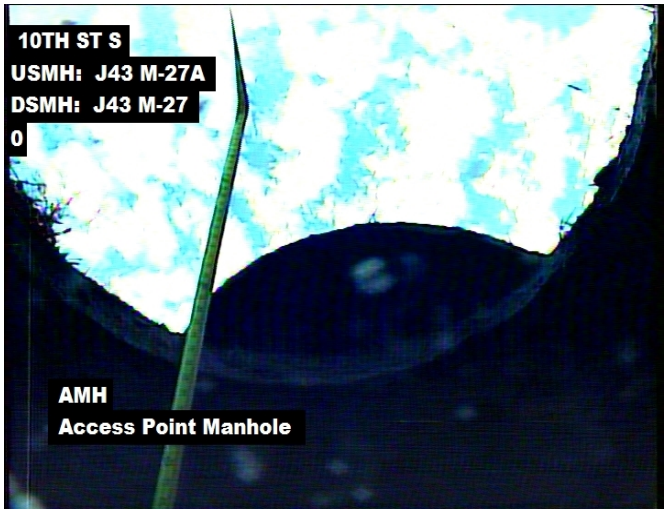
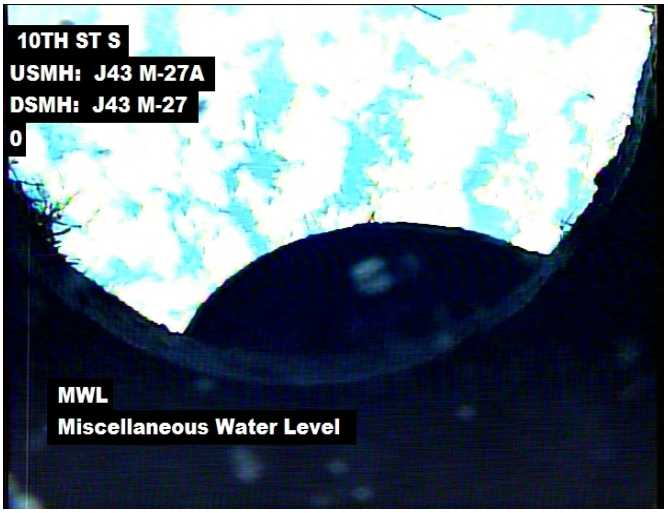
4 Image Report

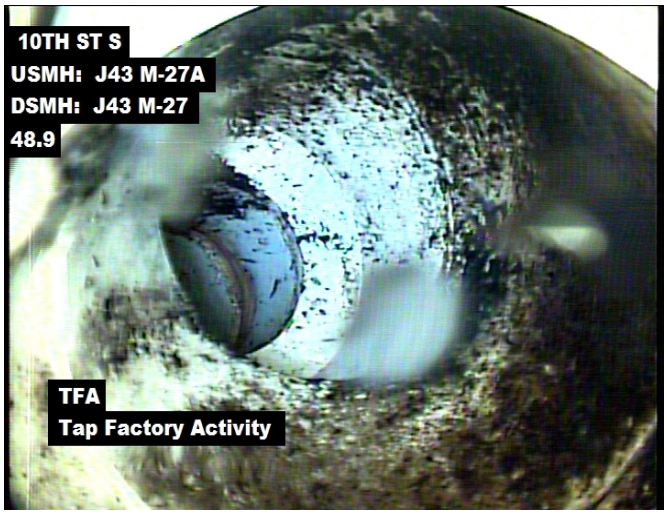
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			



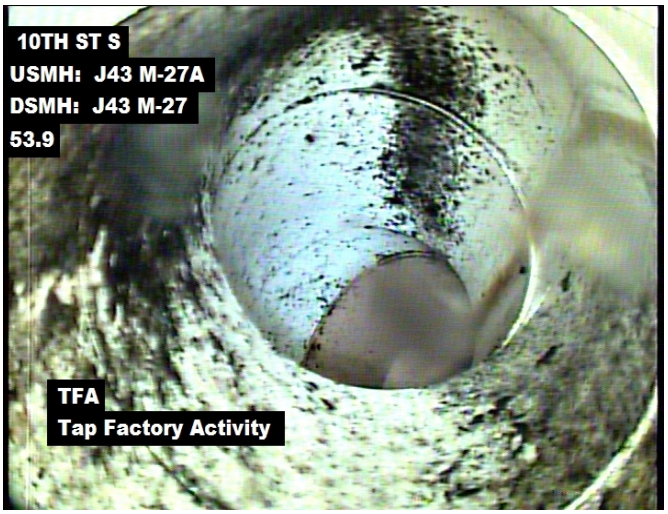
Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	27A		



Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		



Distance:	48.9 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	53.9 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Infrastructure Technologies
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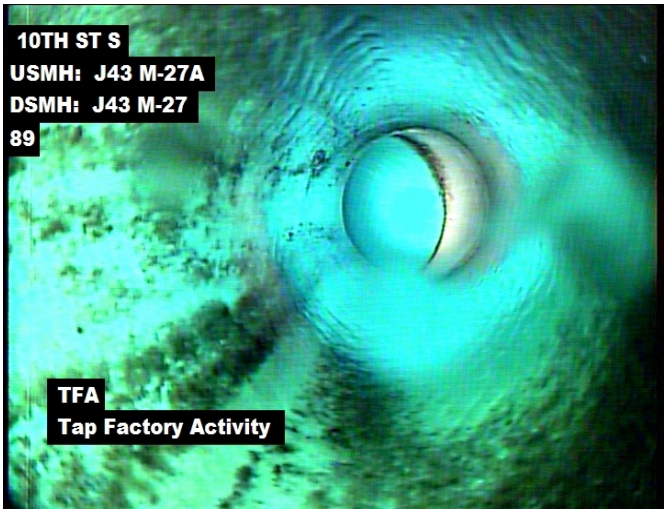
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

Distance:	66.8 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	89.0 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	123.2 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	139.2 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

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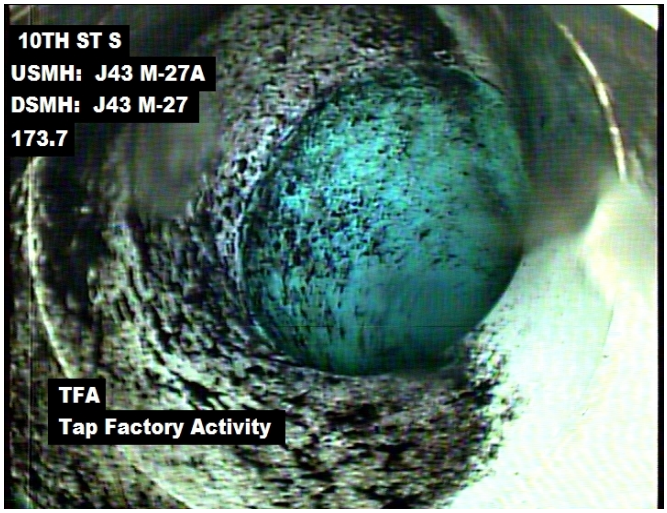
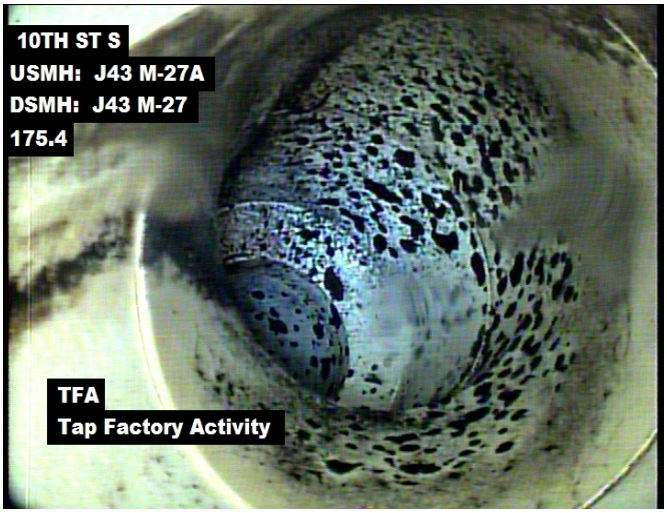
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

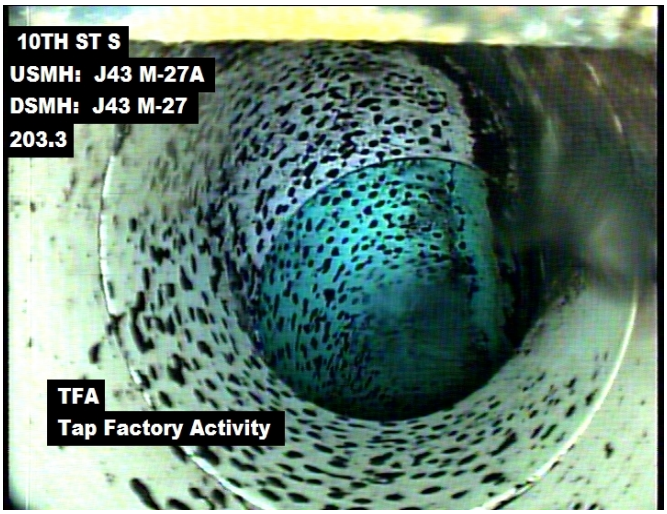


Distance:	173.7 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	175.4 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	199.4 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		



Distance:	203.3 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Infrastructure Technologies
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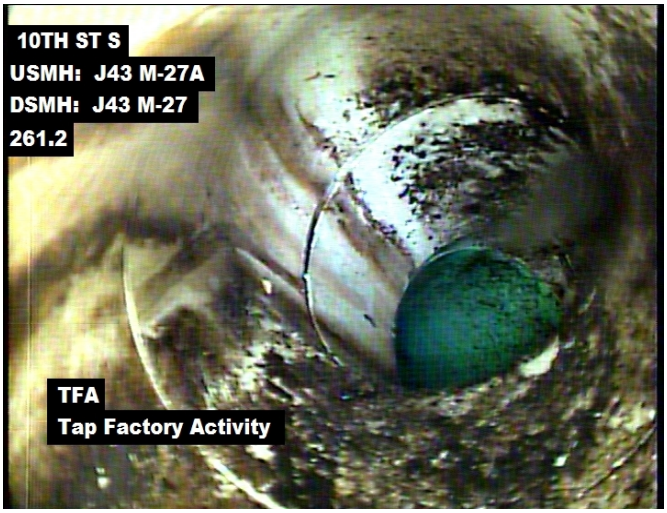
4 Image Report

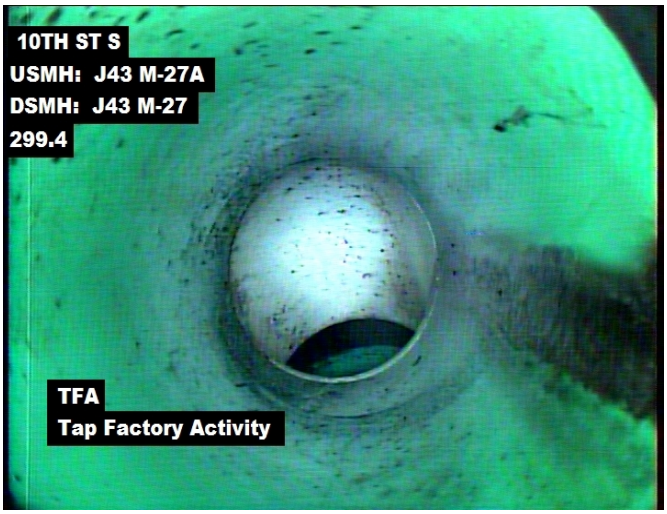
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			

Distance: 234.0 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 261.2 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 283.8 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 299.4 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Infrastructure Technologies
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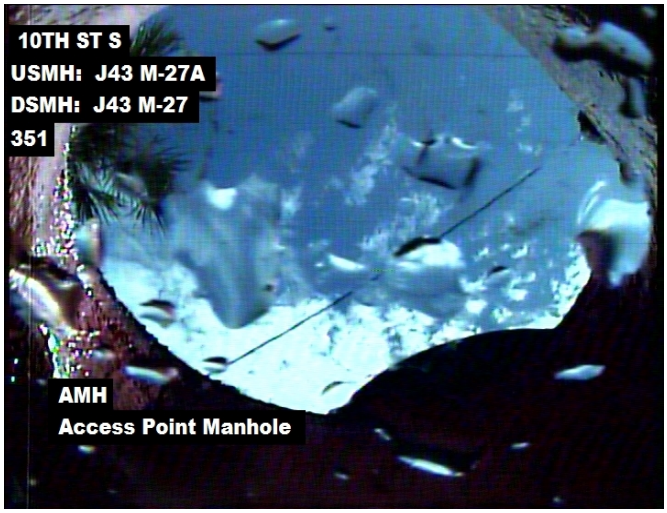
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC9	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-27A	361	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-27	351	4	8			



Distance:	351.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	27		

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-05	36	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17A	36	4	6			

SPR	3	MPR	0	PO Number	Customer
SPRI	3	MPRI	0		
QSR	3100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
3	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3	123456	Heavy Cleaning	05:08	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			05:16	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 05									
0	Miscellaneous Water Level				5	☐			
5.5	Miscellaneous Material Change					☐			
Remarks: PVC									
19	Miscellaneous Material Change					☐			
Remarks: CLAY									
31.1	Miscellaneous Material Change					☐			
Remarks: PVC									
31.1	Joint Offset Medium					☐			3
36	Access Point Manhole					☐			
Remarks: 17A									

Infrastructure Technologies
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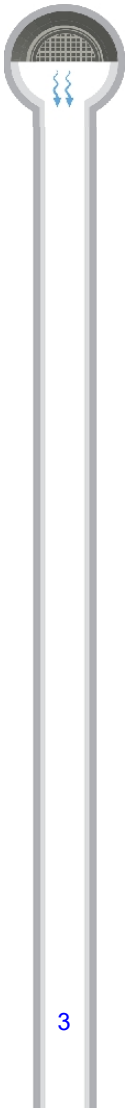
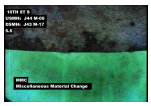
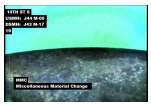
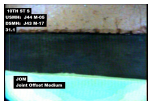
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
J44 M-05	36	4	Circular			
Downstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
J43 M-17A	36	4	6			

SPR	3	MPR	0	PO Number	Customer
SPRI	3	MPRI	0		
QSR	3100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
3	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3	123456	Heavy Cleaning	05:08	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			05:16	



0 ft.	Access Point Manhole		05
0 ft.	Miscellaneous Water Level		
5.5 ft.	Miscellaneous Material Change		PVC
19 ft.	Miscellaneous Material Change		CLAY
31.1 ft.	Miscellaneous Material Change		PVC
31.1 ft.	Joint Offset Medium		

Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
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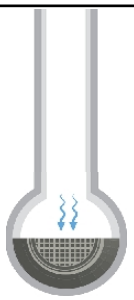
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-05	36	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17A	36	4	6			

36 ft. Access Point Manhole 17A

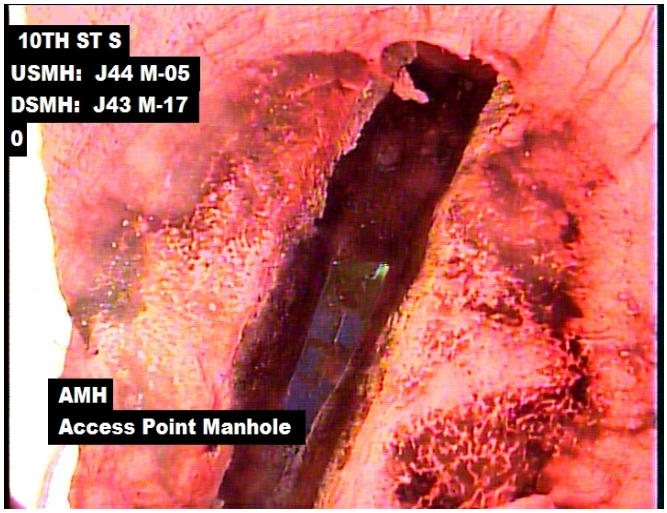


J43 M-17A

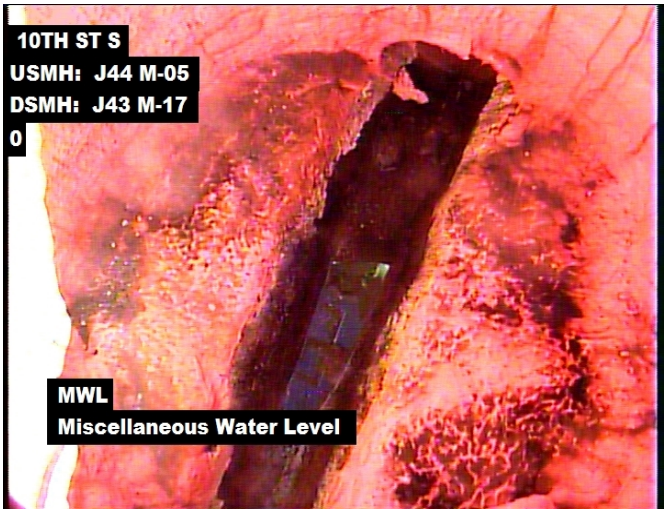
Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

4 Image Report

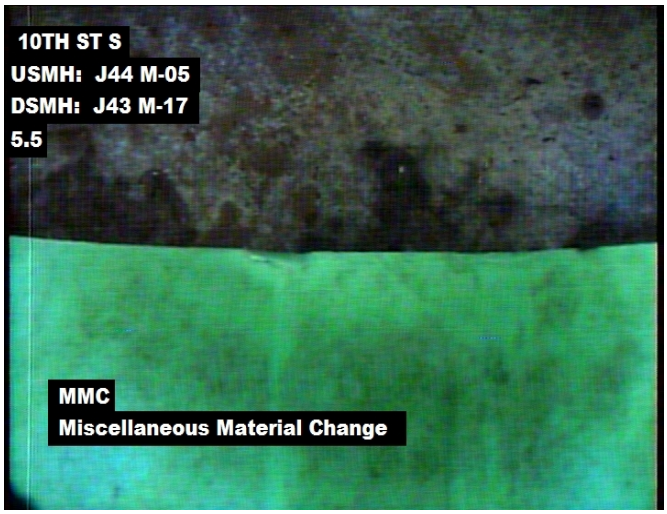
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-05	36	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17A	36	4	6			



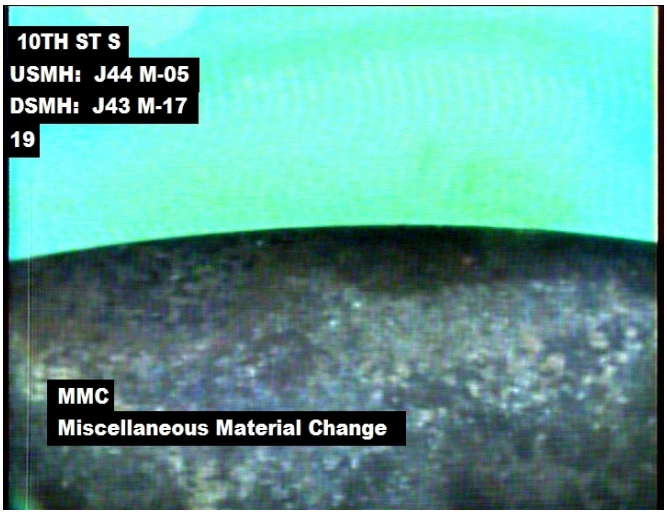
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 05



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 5.5 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 19.0 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: CLAY

Infrastructure Technologies
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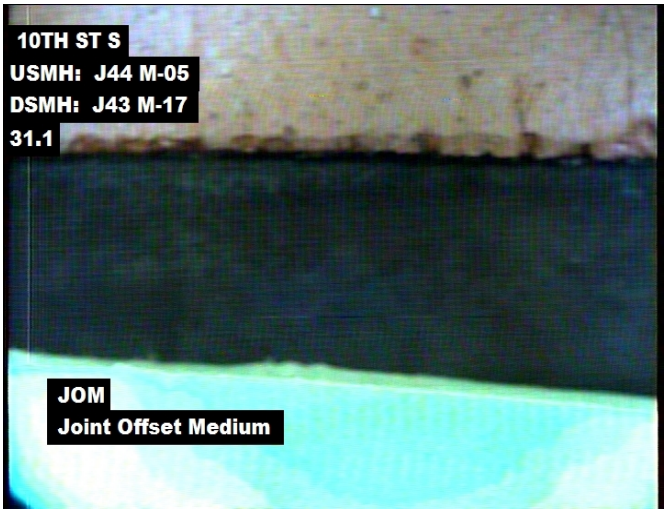
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10	JACKSONVILLE BEACH	10TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J44 M-05	36	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17A	36	4	6			

Distance: 31.1 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 31.1 ft. Grade: 3
Condition: Joint Offset Medium
Remarks: N/A

Distance: 36.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 17A

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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877-ITpipes

Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
0	123456	Heavy Cleaning	05:19	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			05:30	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks:	17A - BURIED MH								
0	Miscellaneous Water Level				5	☐			
42.9	Tap Factory Activity		4			☐	10		
46.7	Tap Factory Activity		4			☐	2		
78.1	Tap Factory Activity		4			☐	10		
114.8	Tap Factory Activity		4			☐	2		
162	Tap Factory Activity		4			☐	10		
201.3	Tap Factory Activity		4			☐	10		
216.2	Tap Factory Activity		4			☐	2		
239.6	Tap Factory Activity		4			☐	2		
247.8	Tap Factory Activity		4			☐	10		
273.2	Tap Factory Activity		4			☐	10		
301.2	Tap Factory Activity		4			☐	2		
370	Access Point Manhole					☐			
Remarks:	17								

Infrastructure Technologies
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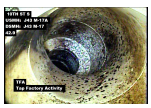
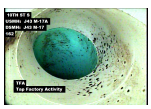
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			

				PO Number	Customer
SPR	0	MPR	0		
SPRI	0	MPRI	0	Work Order Number	Purpose
QSR	0000	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
0	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
0	123456	Heavy Cleaning	05:19	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			05:30	

0 ft.	Access Point Manhole		17A - BURIED MH
0 ft.	Miscellaneous Water Level		
42.9 ft.	Tap Factory Activity		
46.7 ft.	Tap Factory Activity		
78.1 ft.	Tap Factory Activity		
114.8 ft.	Tap Factory Activity		
162 ft.	Tap Factory Activity		

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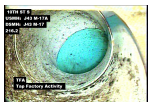
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			

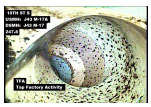
201.3 ft. Tap Factory Activity

216.2 ft. Tap Factory Activity



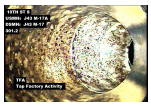
239.6 ft. Tap Factory Activity

247.8 ft. Tap Factory Activity

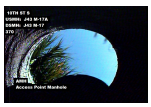


273.2 ft. Tap Factory Activity

301.2 ft. Tap Factory Activity



370 ft. Access Point Manhole



17

J43 M-17

Infrastructure Technologies
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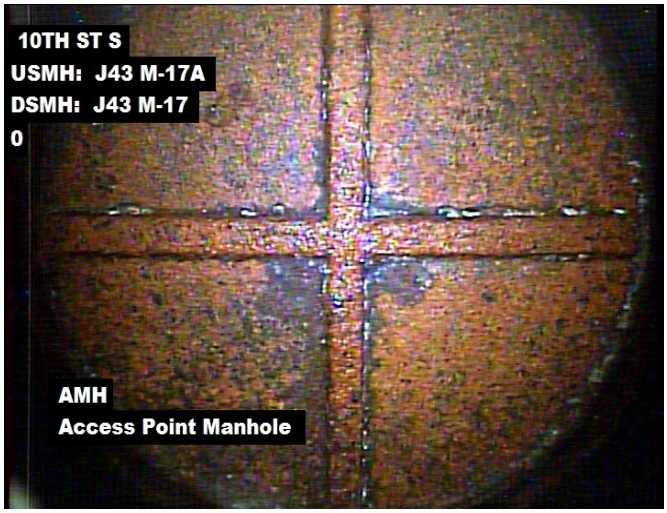
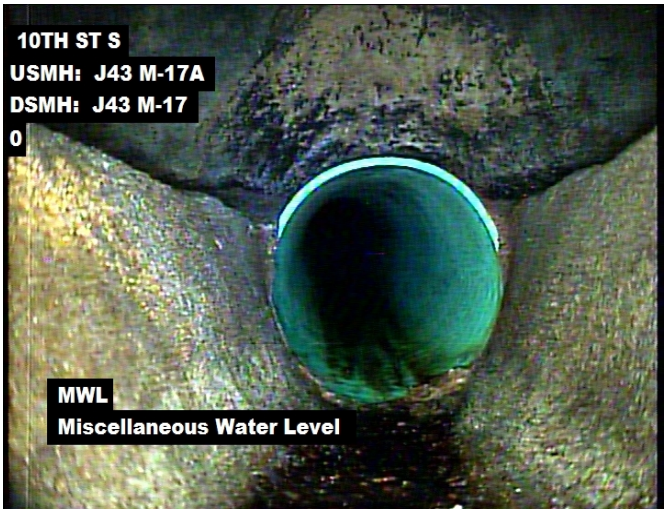
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			



Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 17A - BURIED MH



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A

Distance: 42.9 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 46.7 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			

Distance:	78.1 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	114.8 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	162.0 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	201.3 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

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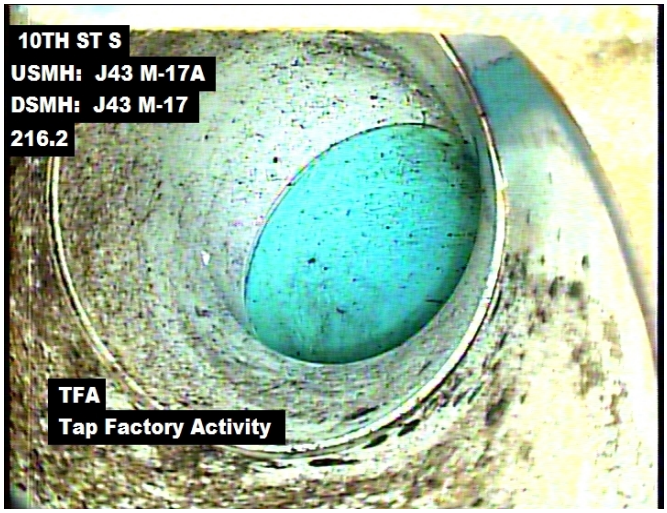
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			



Distance: 216.2 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 239.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 247.8 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 273.2 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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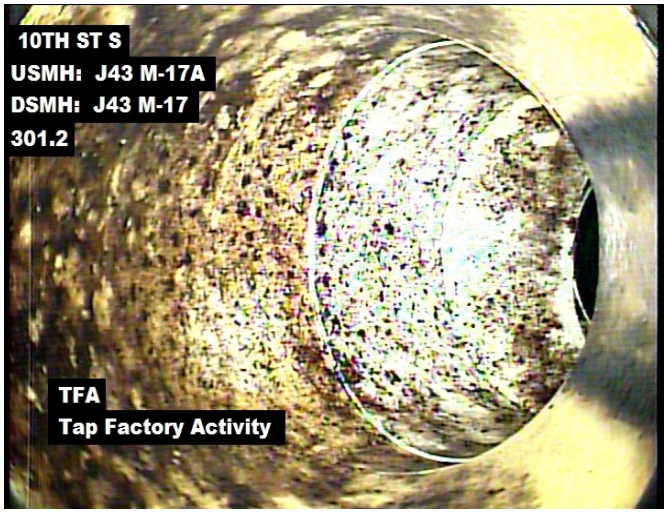
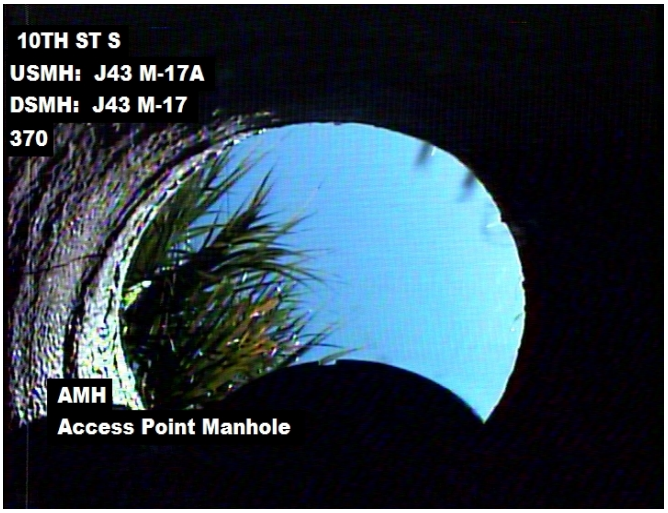
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC10 A	JACKSONVILLE BEACH	10TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
J43 M-17A		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
J43 M-17	370	4	6			



Distance: 301.2 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 370.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 17

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			

SPR	0	MPR	1	PO Number	Customer
SPRI	0	MPRI	1		
QSR	0000	QMR	1100	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
1	tcp	Downstream	09/23/2020	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
1	123456	Heavy Cleaning	07:54	Dry Weather/Wet Ground	

Date Cleaned	End Time	Additional Info
09/23/2020	08:16	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 07									
0	Miscellaneous Water Level				5	☐			
24	Tap Factory Activity		4			☐	2		
25.7	Tap Factory Made Capped		4			☐	10		
71.6	Tap Factory Activity		4			☐	2		
73.2	Tap Factory Made Capped		4			☐	10		
103.6	Roots Fine Joint					☑	1		1
115.1	Tap Factory Made Capped		4			☐	10		
116.6	Tap Factory Activity		4			☐	2		
166.6	Tap Factory Made Capped		4			☐	10		
168	Tap Factory Activity		4			☐	2		
216.1	Tap Factory Made Capped		4			☐	10		
217.7	Tap Factory Activity		4			☐	2		
250	Access Point Manhole					☐			
Remarks: 03									

Infrastructure Technologies
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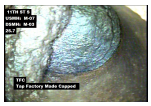
877-ITpipes

Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	**Shape**		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	**Height**	**Width**	Pipe Joint Length	
M-03	250	3	6			

				PO Number	Customer
SPR	0	MPR	1		
SPRI	0	MPRI	1	Work Order Number	Purpose
QSR	0000	QMR	1100		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
1	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	Time	Weather
1	123456	Heavy Cleaning	07:54	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			08:16	

0 ft.	Access Point Manhole		07
0 ft.	Miscellaneous Water Level		
24 ft.	Tap Factory Activity		
25.7 ft.	Tap Factory Made Capped		
71.6 ft.	Tap Factory Activity		
73.2 ft.	Tap Factory Made Capped		
103.6 ft.	Roots Fine Joint		

Infrastructure Technologies
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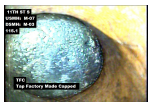
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			

115.1 ft. Tap Factory Made Capped



116.6 ft. Tap Factory Activity

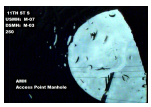
166.6 ft. Tap Factory Made Capped

168 ft. Tap Factory Activity

216.1 ft. Tap Factory Made Capped

217.7 ft. Tap Factory Activity

250 ft. Access Point Manhole



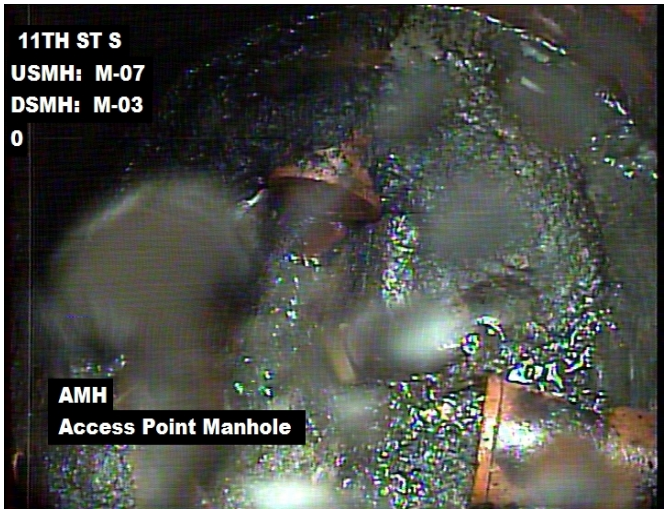
03

M-03

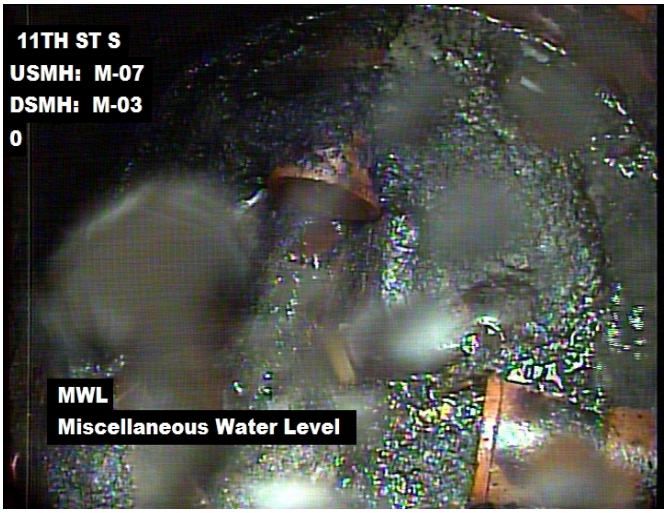
Infrastructure Technologies
4921 Alexander Blvd
Albuquerque, NM
877-ITpipes

4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			



Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	07		



Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		

Distance:	24.0 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	25.7 ft.	Grade:	0
Condition:	Tap Factory Made Capped		
Remarks:	N/A		

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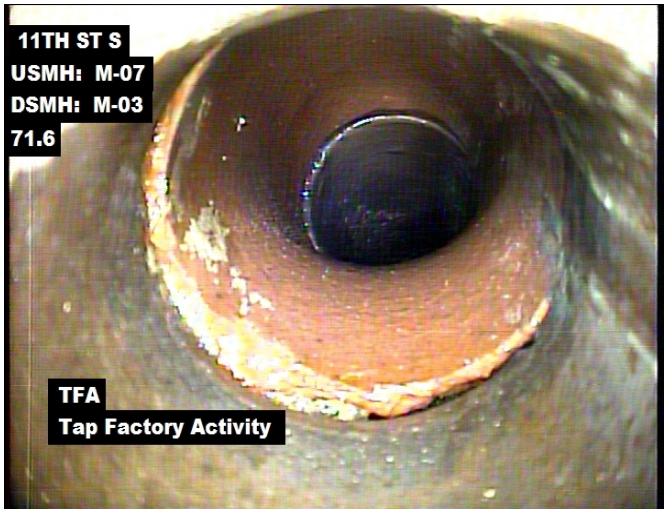
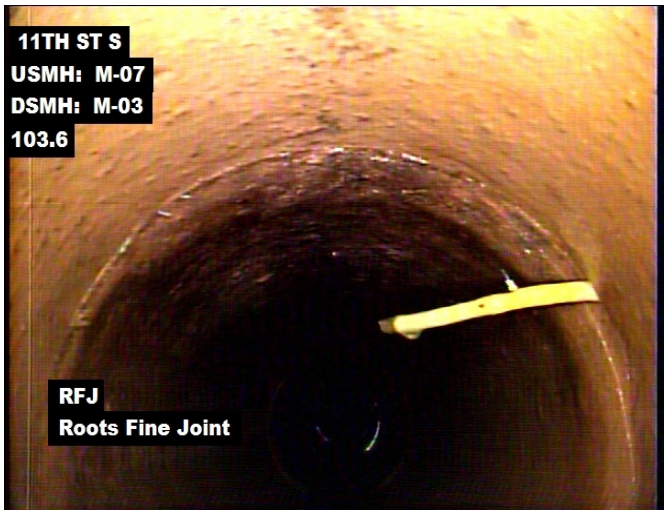
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			



Distance:	71.6 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	73.2 ft.	Grade:	0
Condition:	Tap Factory Made Capped		
Remarks:	N/A		



Distance:	103.6 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		

Distance:	115.1 ft.	Grade:	0
Condition:	Tap Factory Made Capped		
Remarks:	N/A		

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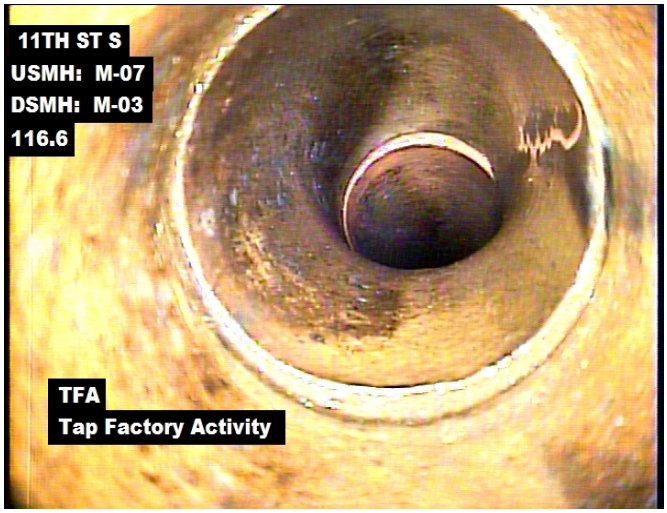
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			



Distance: 116.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 166.6 ft. Grade: 0
Condition: Tap Factory Made Capped
Remarks: N/A

Distance: 168.0 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 216.1 ft. Grade: 0
Condition: Tap Factory Made Capped
Remarks: N/A

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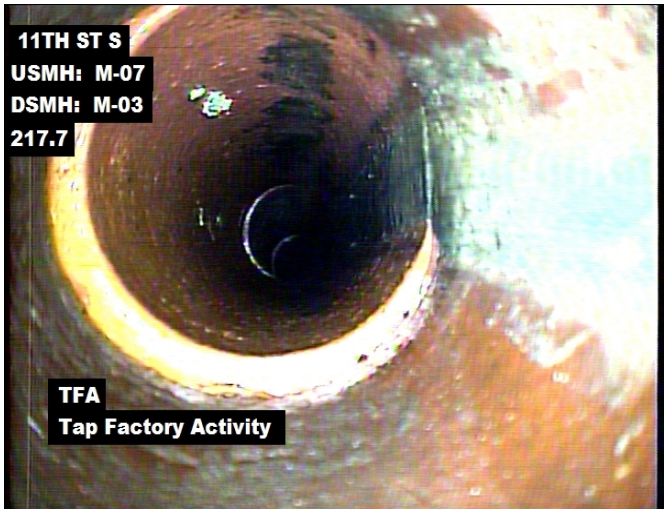
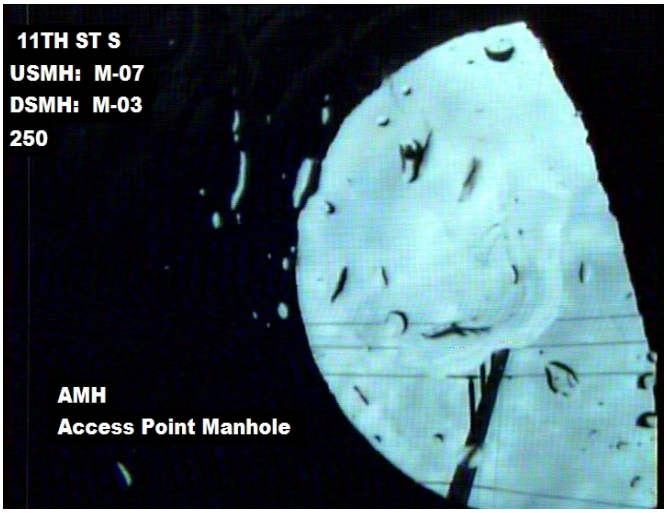
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC11	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-07	250	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-03	250	3	6			



Distance: 217.7 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 250.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 03

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC13	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-03		3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	34	3	6			

				PO Number	Customer
SPR	4	MPR	0		
SPRI	4	MPRI	0	Work Order Number	Purpose
QSR	4100	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
4	123456	Heavy Cleaning	08:35	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			08:45	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 03									
0	Miscellaneous Water Level				5	☐			
9.5	Miscellaneous Water Level Sag				75	☐			4
34	Access Point Manhole					☐			
Remarks: 02									

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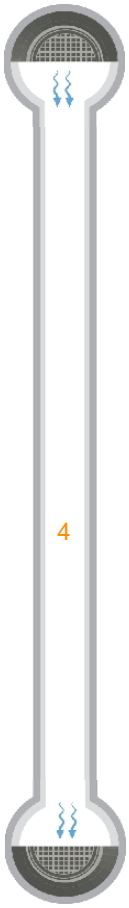
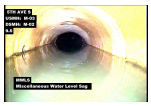
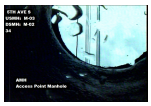
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC13	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-03		3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	34	3	6			

				PO Number	Customer
SPR	4	MPR	0		
SPRI	4	MPRI	0	Work Order Number	Purpose
QSR	4100	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
4	123456	Heavy Cleaning	08:35	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			08:45	



0 ft.	Access Point Manhole		03
0 ft.	Miscellaneous Water Level		
9.5 ft.	Miscellaneous Water Level Sag		
34 ft.	Access Point Manhole		02

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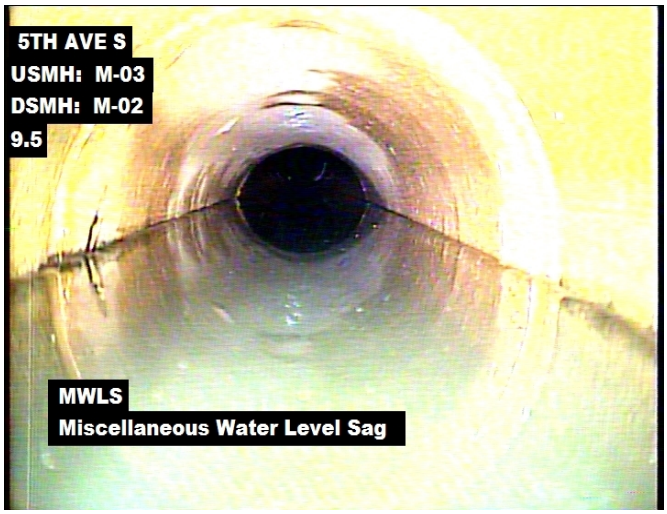
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC13	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-03		3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	34	3	6			

Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 03

Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 9.5 ft. Grade: 4
Condition: Miscellaneous Water Level Sag
Remarks: N/A

Distance: 34.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 02

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-06	251	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	252	4	6			

SPR	0	MPR	2	PO Number	Customer
SPRI	0	MPRI	1		
QSR	0000	QMR	1200	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
2	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
1	123456	Heavy Cleaning	07:09	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			07:25	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 06									
0	Miscellaneous Water Level				5	☐			
26.5	Roots Fine Joint					☑	2		1
49.6	Tap Factory Activity		4			☐	10		
93.7	Tap Factory Activity		4			☐	10		
124.2	Miscellaneous Material Change					☐			
Remarks: PVC									
125.8	Miscellaneous Material Change					☐			
Remarks: VCP									
143.7	Tap Factory Activity		4			☐	10		
184	Roots Fine Joint					☑	11	1	1
191.6	Tap Factory Activity		4			☐	10		
237.6	Tap Factory Activity		4			☐	10		
252	Access Point Manhole					☐			
Remarks: 02									

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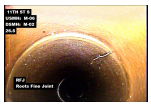
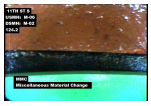
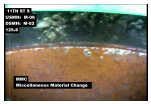
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
M-06	251	3	Circular			
Downsstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
M-02	252	4	6			

SPR	0	MPR	2	PO Number	Customer
SPRI	0	MPRI	1		
QSR	0000	QMR	1200	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
2	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
1	123456	Heavy Cleaning	07:09	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			07:25	

0 ft.	Access Point Manhole		06
0 ft.	Miscellaneous Water Level		
26.5 ft.	Roots Fine Joint		
49.6 ft.	Tap Factory Activity		
93.7 ft.	Tap Factory Activity		
124.2 ft.	Miscellaneous Material Change		PVC
125.8 ft.	Miscellaneous Material Change		VCP

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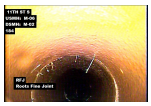
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-06	251	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	252	4	6			

143.7 ft. Tap Factory Activity

184 ft. Roots Fine Joint



191.6 ft. Tap Factory Activity

237.6 ft. Tap Factory Activity

252 ft. Access Point Manhole

02

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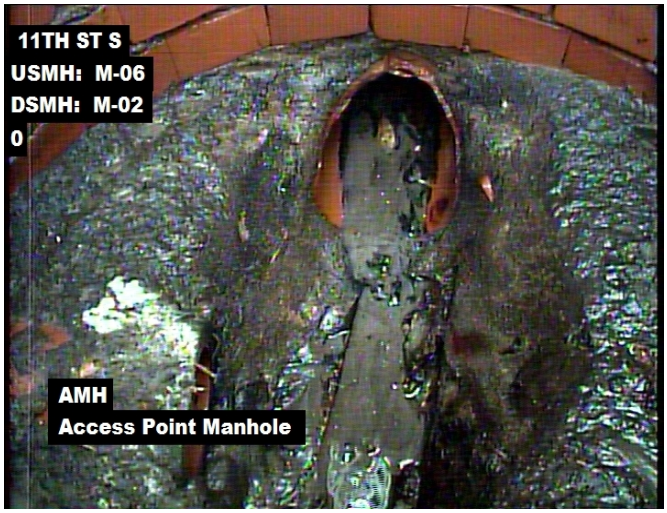
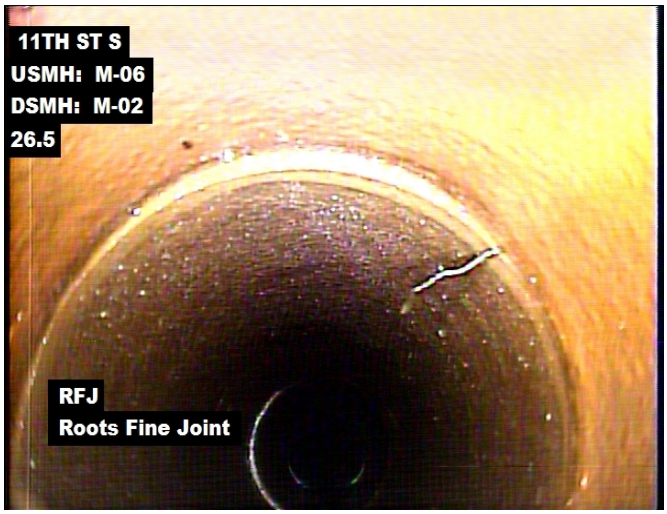
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-06	251	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	252	4	6			



Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 06

Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 26.5 ft. Grade: 1
Condition: Roots Fine Joint
Remarks: N/A

Distance: 49.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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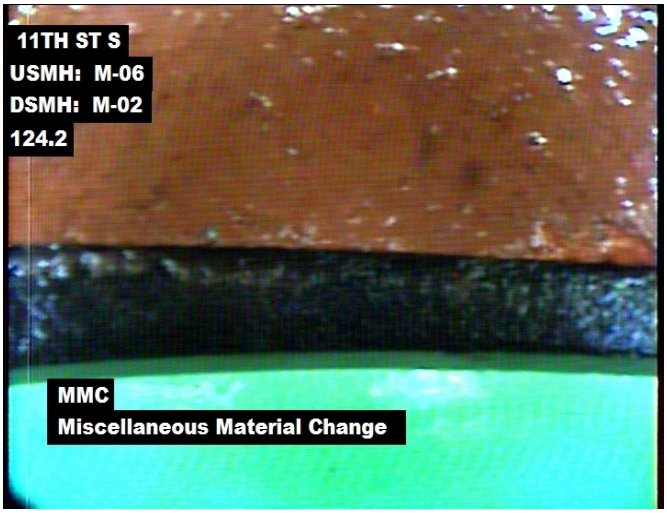
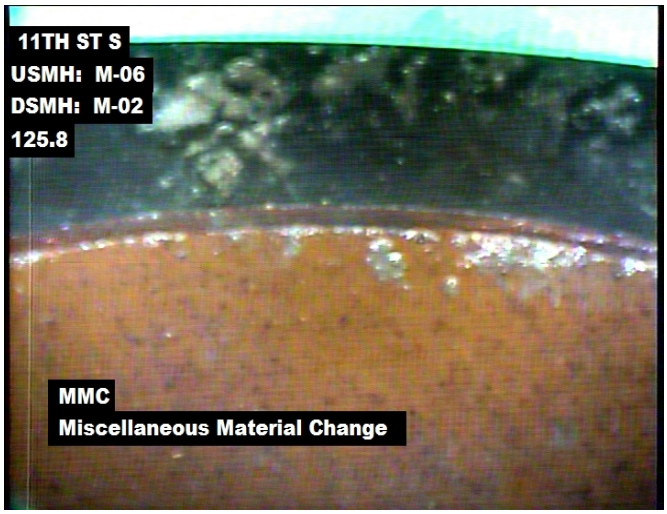
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-06	251	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	252	4	6			

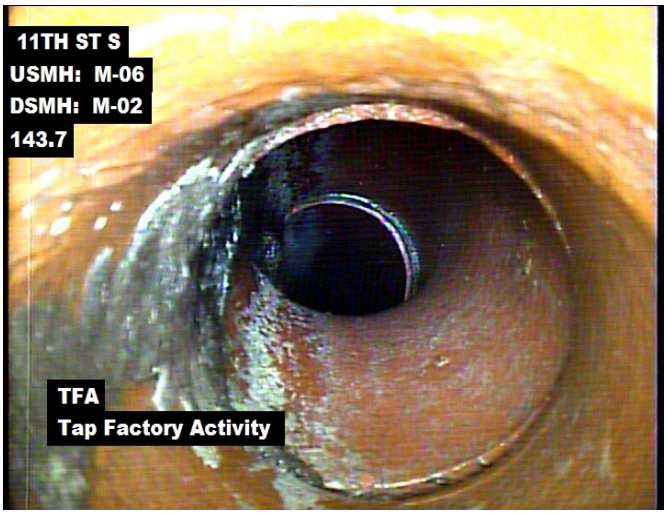
Distance: 93.7 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 124.2 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: PVC



Distance: 125.8 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP



Distance: 143.7 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

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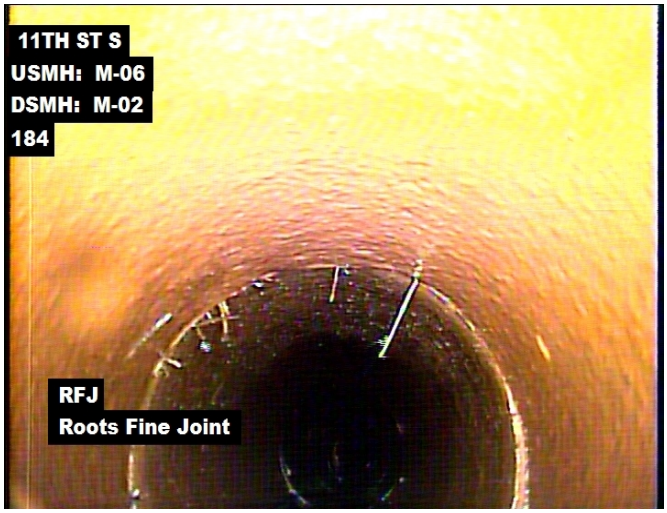
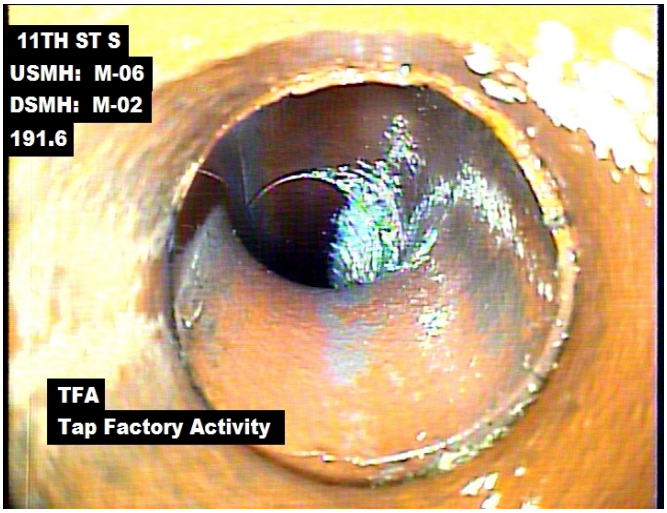
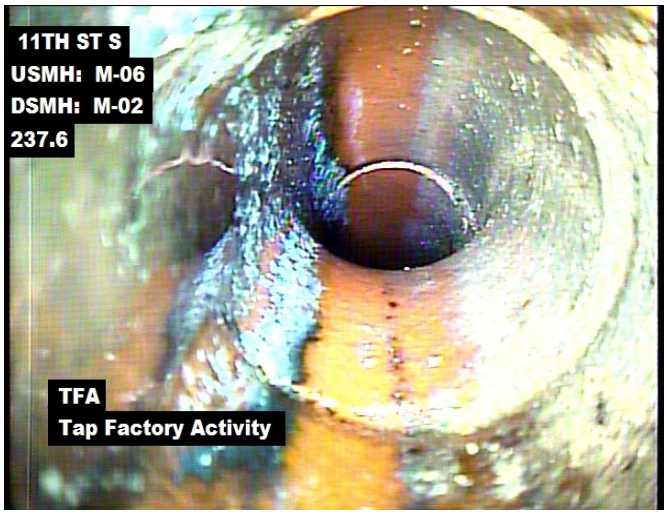
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC12	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-06	251	3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-02	252	4	6			



Distance: 184.0 ft. Grade: 1
Condition: Roots Fine Joint
Remarks: N/A



Distance: 191.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A



Distance: 237.6 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Distance: 252.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 02

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC16	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-02		3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-01	216	3	6			

				PO Number	Customer
SPR	0	MPR	1		
SPRI	0	MPRI	1	Work Order Number	Purpose
QSR	0000	QMR	1100		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
1	tcp	Downstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
1	123456	Heavy Cleaning	08:46	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			08:54	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 02									
0	Miscellaneous Water Level				5	☐			
211.9	Roots Fine Joint					☑	10		1
216	Access Point Manhole					☐			
Remarks: 01									

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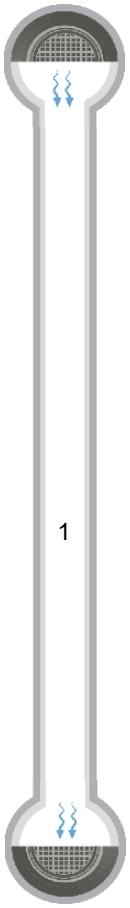
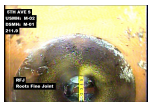
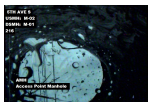
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC16	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
M-02		3	Circular			
Downsstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
M-01	216	3	6			

				PO Number	Customer
SPR	0	MPR	1		
SPRI	0	MPRI	1	Work Order Number	Purpose
QSR	0000	QMR	1100		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
1	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
1	123456	Heavy Cleaning	08:46	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			08:54	



0 ft.	Access Point Manhole		02
0 ft.	Miscellaneous Water Level		
211.9 ft.	Roots Fine Joint		
216 ft.	Access Point Manhole		01

Infrastructure Technologies
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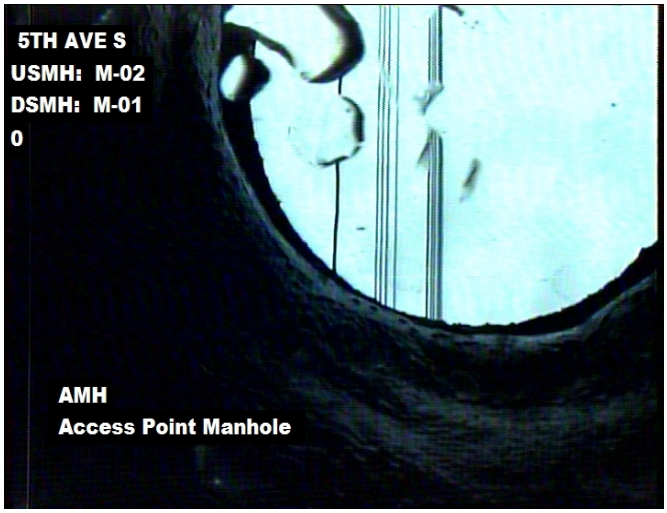
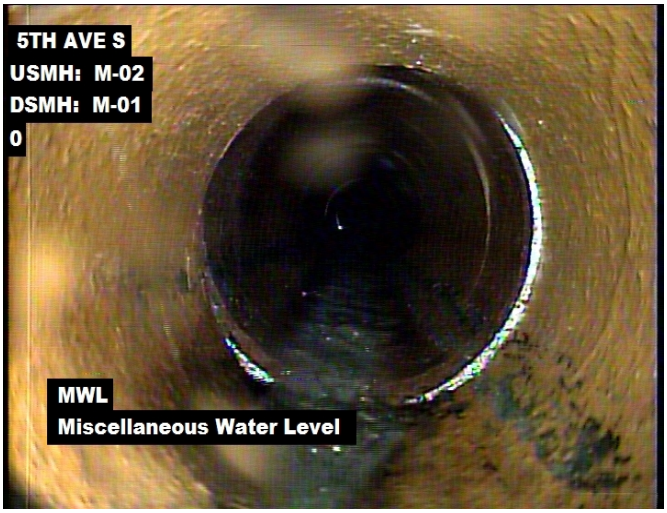
4 Image Report

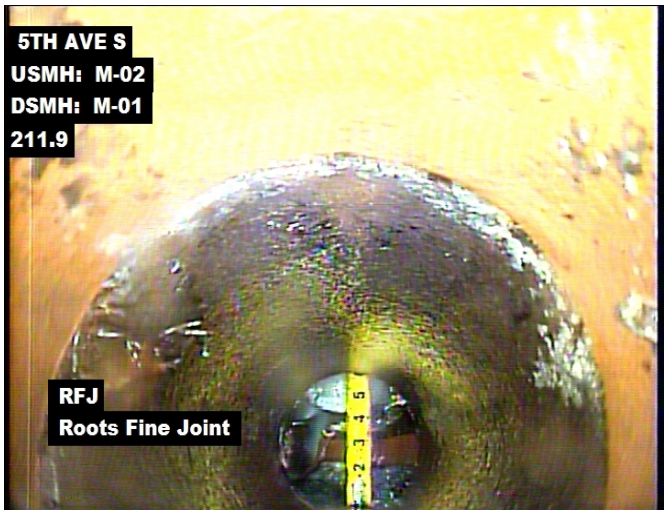
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC16	JACKSONVILLE BEACH	5TH AVE S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-02		3	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-01	216	3	6			



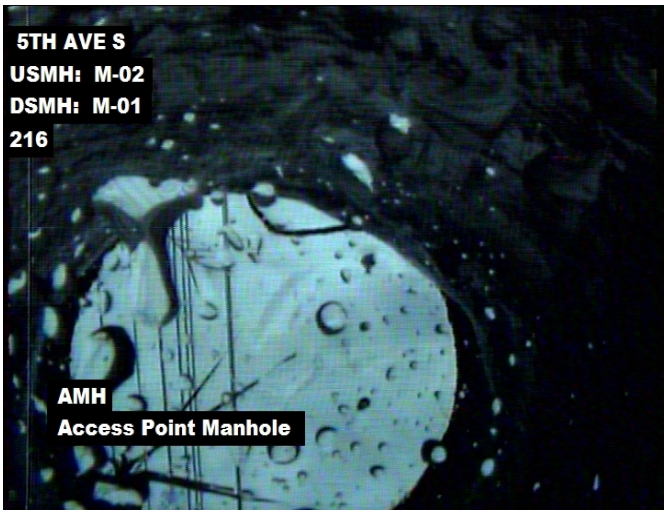
Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	02		



Distance:	0.0 ft.	Grade:	0
Condition:	Miscellaneous Water Level		
Remarks:	N/A		



Distance:	211.9 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		



Distance:	216.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	01		

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	1.1	4	6			

SPR	4	MPR	0	PO Number	Customer
SPRI	4	MPRI	0		
QSR	4100	QMR	0000	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
4	123456	Heavy Cleaning	09:13	Dry Weather/Wet Ground	

Date Cleaned	End Time	Additional Info
09/23/2020	09:19	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 01									
0	Miscellaneous Water Level				15	☐			
1.1	Joint Offset Large					☐			4
1.1	Miscellaneous Survey Abandoned					☐			
Remarks: DUE TO OFFSET									

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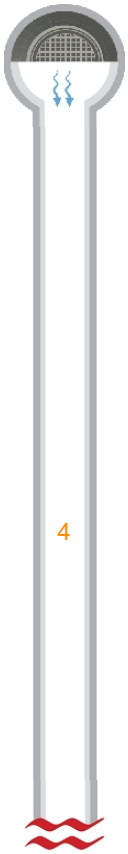
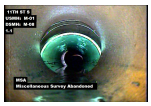
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	**Total Length**	**Up Rim to Invert**	**Shape**		**Location Details**	
M-01		4	Circular			
Downsstream MH	**Length surveyed**	**Down Rim to Invert**	**Height**	**Width**	**Pipe Joint Length**	
M-08	1.1	4	6			

				PO Number	Customer
SPR	4	MPR	0		
SPRI	4	MPRI	0	Work Order Number	Purpose
QSR	4100	QMR	0000		Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
4	tcp	Downstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
4	123456	Heavy Cleaning	09:13	Dry Weather/Wet Ground
Date Cleaned			**End Time**	**Additional Info**
09/23/2020			09:19	



0 ft.	Access Point Manhole		01
0 ft.	Miscellaneous Water Level		
1.1 ft.	Joint Offset Large		
1.1 ft.	Miscellaneous Survey Abandoned		DUE TO OFFSET

Infrastructure Technologies
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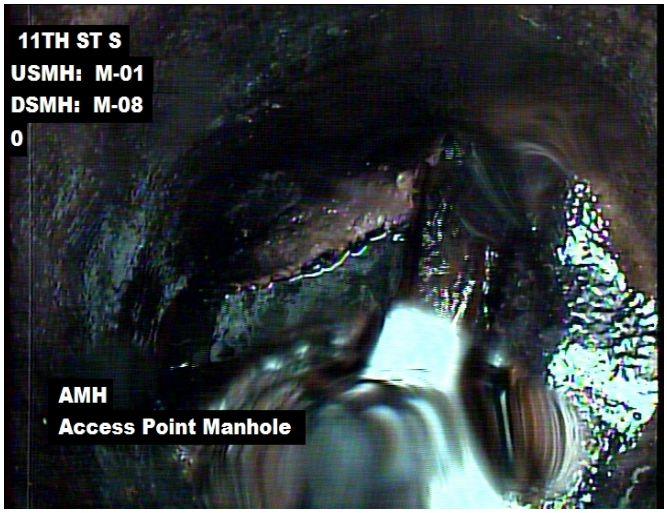
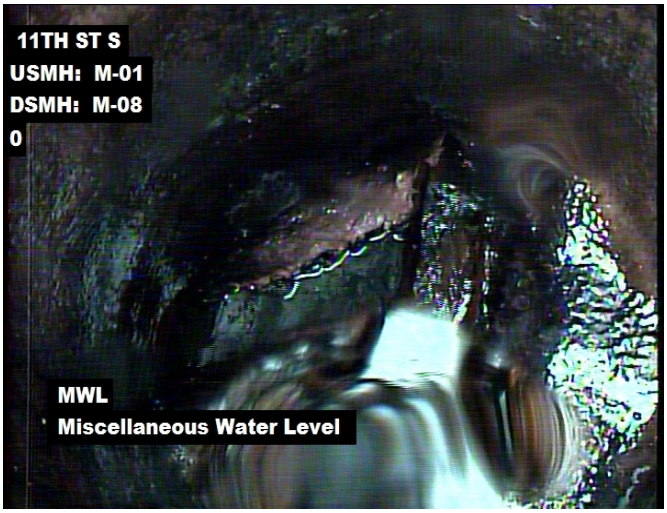
4 Image Report

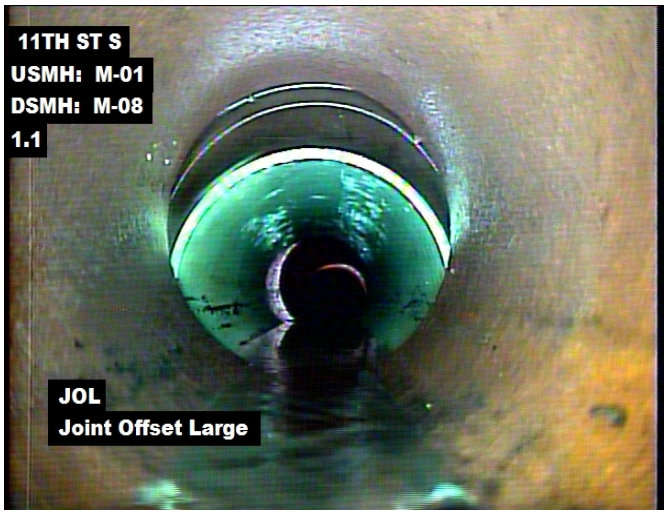
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	Vitrified Clay Pipe		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01		4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	1.1	4	6			



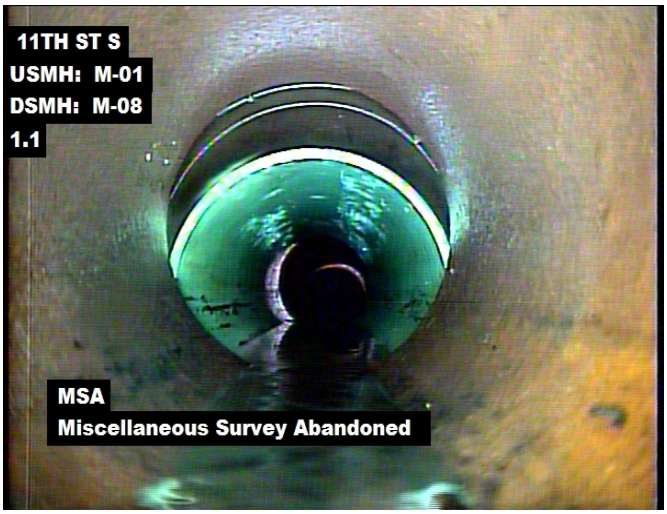
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 01



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 1.1 ft. Grade: 4
Condition: Joint Offset Large
Remarks: N/A



Distance: 1.1 ft. Grade: 0
Condition: Miscellaneous Survey Abandoned
Remarks: DUE TO OFFSET

Project Information

Project Name:	Project Number:	Date:
Nassco_v7_Test		

Notes:

Infrastructure Technologies
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Defect Listing

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	109	4	6			

SPR	9	MPR	4	PO Number	Customer
SPRI	4.5	MPRI	1		
QSR	5141	QMR	1400	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
13	tcp	Upstream	09/23/2020	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
2.20000004768372	123456	Heavy Cleaning	09:27	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			09:38	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0	Access Point Manhole					☐			
Remarks: 08									
0	Miscellaneous Water Level				5	☐			
5	Miscellaneous Material Change					☐			
Remarks: VCP									
12.7	Tap Factory Activity		4			☐	2		
36.1	Roots Fine Joint					☑	3		1
38.3	Tap Factory Activity		4			☐	2		
49.2	Hole Soil Visible					☐	10		5
61.2	Roots Fine Joint					☑	10	3	1
71.2	Roots Fine Joint					☑	11	1	1
91.3	Roots Fine Joint					☑	10	2	1
108.5	Miscellaneous Water Level Sag				95	☐			4
109	Miscellaneous Survey Abandoned					☐			
Remarks: DUE TO SAG AND OFFSET									

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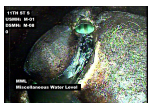
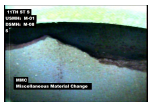
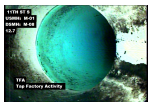
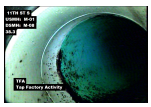
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	**Shape**		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	**Height**	**Width**	Pipe Joint Length	
M-08	109	4	6			

SPR	9	MPR	4	PO Number	Customer
SPRI	4.5	MPRI	1		
QSR	5141	QMR	1400	Work Order Number	Purpose: Maintenance Related

OPR	Surveyed By	Direction	Date	Media label
13	tcp	Upstream	09/23/2020	
OPRI	**Certificate Number**	**Pre-Cleaning**	Time	Weather
2.20000004768372	123456	Heavy Cleaning	09:27	Dry Weather/Wet Ground
Date Cleaned			End Time	Additional Info
09/23/2020			09:38	

0 ft.	Access Point Manhole		08
0 ft.	Miscellaneous Water Level		
5 ft.	Miscellaneous Material Change		VCP
12.7 ft.	Tap Factory Activity		
36.1 ft.	Roots Fine Joint		
38.3 ft.	Tap Factory Activity		
49.2 ft.	Hole Soil Visible		

Infrastructure Technologies
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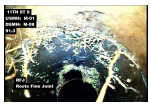
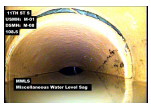
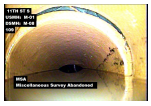
Defect Listing Plot

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back r	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	109	4	6			

61.2 ft.	Roots Fine Joint		1	
71.2 ft.	Roots Fine Joint		1	
91.3 ft.	Roots Fine Joint		1	
108.5 ft.	Miscellaneous Water Level Sag		4	
109 ft.	Miscellaneous Survey Abandoned			DUE TO SAG AND OFFSET

Infrastructure Technologies
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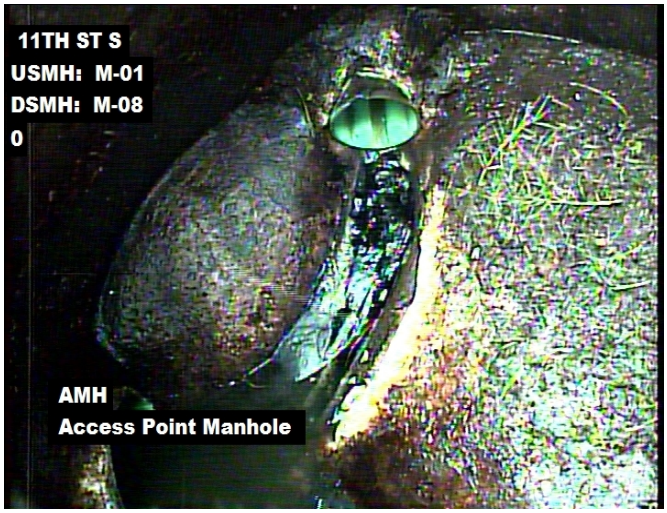
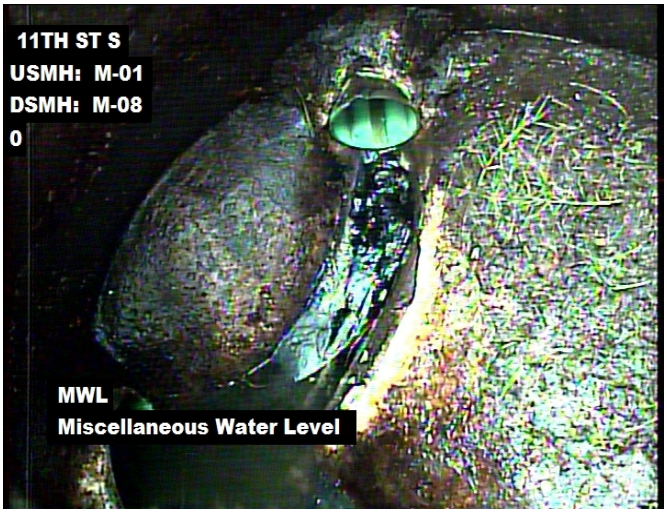
Albuquerque, NM
877-ITpipes

4 Image Report

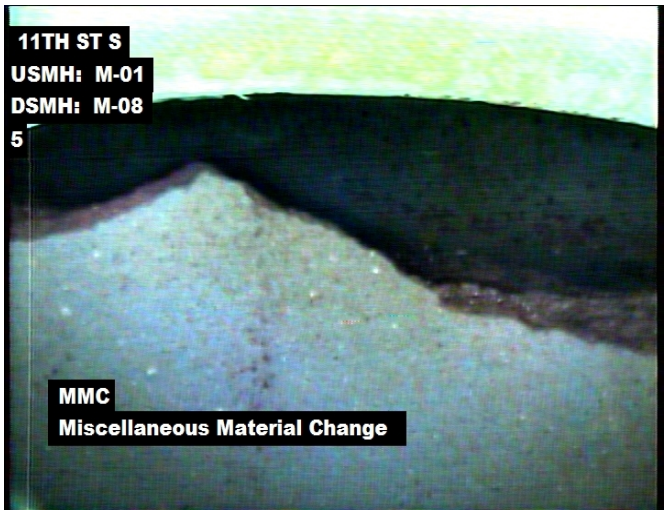
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	109	4	6			



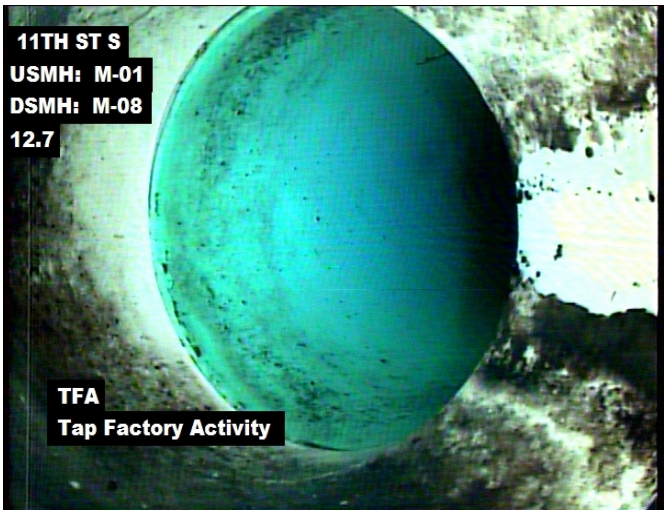
Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: 08



Distance: 0.0 ft. Grade: 0
Condition: Miscellaneous Water Level
Remarks: N/A



Distance: 5.0 ft. Grade: 0
Condition: Miscellaneous Material Change
Remarks: VCP



Distance: 12.7 ft. Grade: 0
Condition: Tap Factory Activity
Remarks: N/A

Infrastructure Technologies
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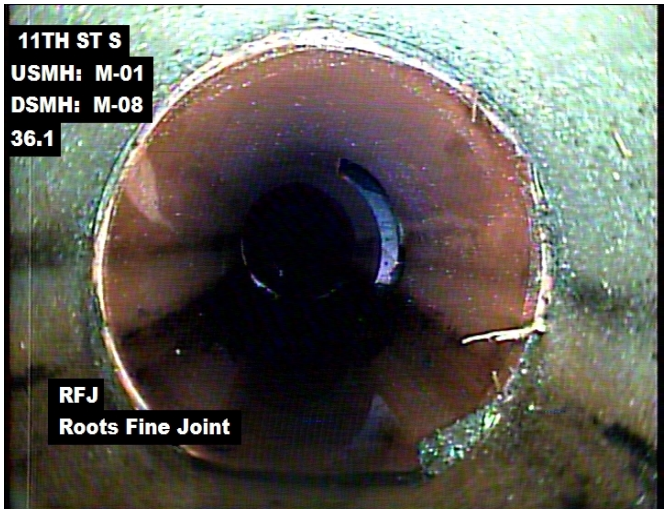
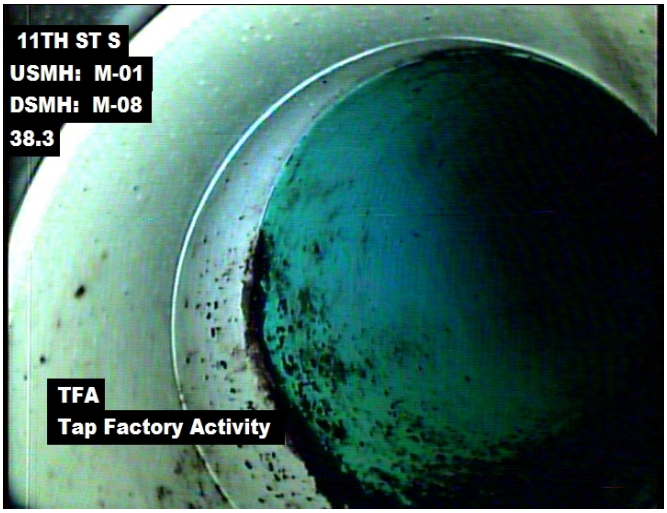
4 Image Report

Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	109	4	6			



Distance:	36.1 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		



Distance:	38.3 ft.	Grade:	0
Condition:	Tap Factory Activity		
Remarks:	N/A		

Distance:	49.2 ft.	Grade:	5
Condition:	Hole Soil Visible		
Remarks:	N/A		

Distance:	61.2 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		

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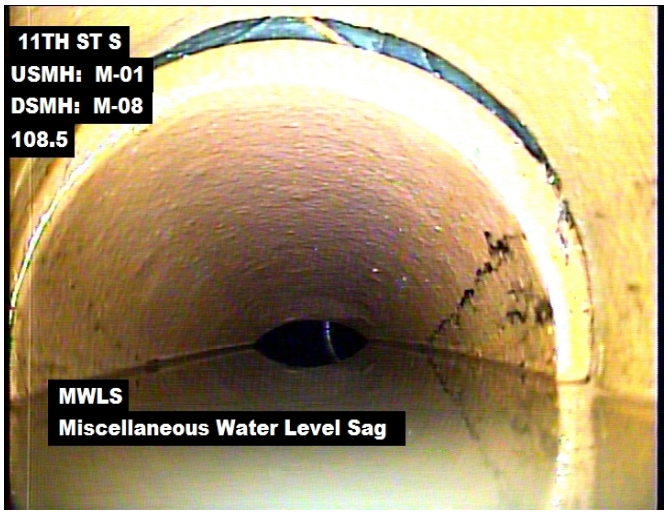
4 Image Report

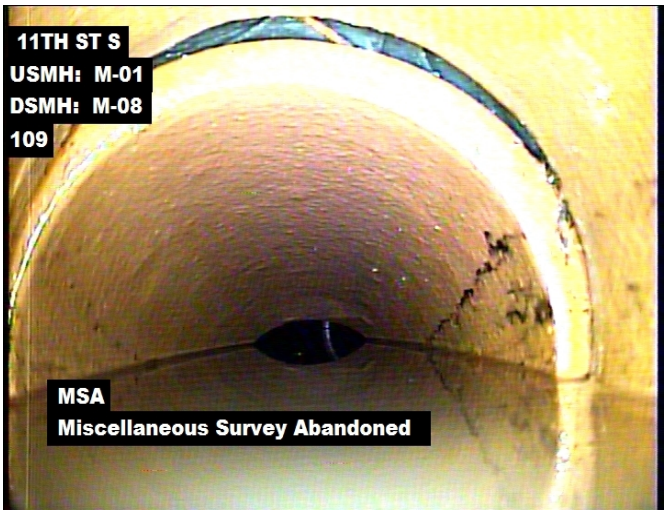
Pipe Segment Reference	City	Street	Material		Location Code	Pipe Use
SEG CC15	JACKSONVILLE BEACH	11TH ST S	PolyVinyl Chloride		Local rural streets with light traffic, town and city back s	Sanitary Sewage Pipe
Upstream MH	Total Length	Up Rim to Invert	Shape		Location Details	
M-01	151	4	Circular			
Downsstream MH	Length surveyed	Down Rim to Invert	Height	Width	Pipe Joint Length	
M-08	109	4	6			

Distance:	71.2 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		

Distance:	91.3 ft.	Grade:	1
Condition:	Roots Fine Joint		
Remarks:	N/A		



Distance:	108.5 ft.	Grade:	4
Condition:	Miscellaneous Water Level Sag		
Remarks:	N/A		



Distance:	109.0 ft.	Grade:	0
Condition:	Miscellaneous Survey Abandoned		
Remarks:	DUE TO SAG AND OFFSET		

FOUR WATERS
ENGINEERING

Appendix C:

10th Street South Infrastructure Improvements – Phase 2

Permits

St. Johns River
Water Management District
Michael A. Register, P.E., Executive Director

7775 Baymeadows Way • Suite 102 • Jacksonville, FL 32256 • 904-730-6270 • www.sjrwmd.com

August 1, 2025

Rachel Perley
Four Waters Engineering, Inc.
324 6th Ave N
Jax Bch, FL 32250-5726
Sent via email: rperley@4weng.com

Re: City of Jacksonville Beach: Reconstruction of 10th Street South
PDEX: 18166-24

Dear Ms. Perley:

On July 01, 2025, the St. Johns River Water Management District received your application, construction plans, and determination fee requesting an exemption verification for the above referenced project. Based on this submittal, the proposed project involves repair and reconstruction of several blocks of roadway in Jacksonville Beach, including construction of a limited amount of ROW parking, modification of access drives, and installation of a limited amount of stormwater collection piping connecting to the existing municipal pipe network on 9th St. S. The proposed work does not exceed 4,000 sq. ft. of new impervious area.

Pursuant to 62-330.051(4)(c) Florida Administrative Code (F.A.C.) and 62-330.051(15) F.A.C., an Environmental Resource Permit is not required since the project meets the requirements of the referenced exemptions.

Please be advised that this determination only applies to the District and does not relieve you from the permitting requirements of other agencies. Thank you for your cooperation with the permitting and compliance process. If you have any questions, please contact the District at (904) 448-7939 or by email at jreindl@sjrwmd.com.

Sincerely,

Jeffrey A. Reindl
Supervising Professional Engineer
Division of Regulatory Services

CC: Regulatory File

GOVERNING BOARD

Rob Bradley, CHAIR
FLEMING ISLAND

Maryam H. Ghyabi-White, VICE CHAIR
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COCOA

Janet Price
FERNANDINA BEACH

FLORIDA DEPARTMENT OF TRANSPORTATION

UTILITY PERMIT

December 14, 2016

PERMIT NO: 2025-H-294-00345

STATE ROAD INFORMATION

County:	Section:	State Road No:	Beginning Mile Post:	Ending Mile Post:
Duval	72190000	SR 212	14.111	14.826

APPLICANT INFORMATION

The Utility Agency Owner (UAO) shall be identified in this Applicant Information Box. When the UAO is a City or County and desires to have the Utility Builder make a joint permit applicant, as prescribed in Section 2.1(4) of the 2017 Utility Accommodation Manual (UAM), the Utility Builder shall also be identified in this Applicant Information Box. A Utility Builder alone cannot apply for a utility permit without the City or County adding them as a joint applicant.

Utility Agency/Owner (UAO)

Name: KAYLE MOORE
Contact Person: KAYLE MOORE
Address: 1460-A Shetter Avenue
City: JACKSONVILLE BEACH
State: Florida
Zip: 32250
Telephone: (904) 247-6213 ext. _____
Email: _____

Utility Builder (only applicable when the UAO is a City or County)

Name: _____
Contact Person: _____
Address: _____
City: _____
State: _____
Zip: _____
Telephone: _____
Email: _____

WORK DESCRIPTION

The Applicant(s) requests permission from the Florida Department of Transportation (FDOT) to construct, operate, and maintain the utilities as described below and as depicted in the incorporated documentation.

The project consists of teh installation of approximatelyt 431 linear feet (LF) of 8" FPVC water main by horizontal directional drilling (HDD) and approximately 645 LF of 16" FPVC sewer forcemain by HDD beneath Beach Boulevard at 9th Street in Jacksonville Beach. The work is not anticipated to impact Beach Boulevard as the drill and pull back pits will be located at least 135 feet away from the Beach Boulevard right of way lines.

Utility Work No:

Additional sheets are attached and are incorporated into this permit Yes ☑ No ☐

For FDEP certification, the FDOT agency report is attached in accordance with UAM Section 2.4.1 (13) Yes ☐ No ☑

TRAFFIC CONTROL (TCP)

☑ The TCP will comply with the following 600 series index(es) 603, 604, 605, 660

☐ A TCP has been attached and incorporated into this permit application in compliance with UAM Section 2.4.2.

MOT Technician's contact information (may be supplied at the two (2) business day notification to FDOT):

Name: _____ Telephone _____ Email: _____

COMMENCEMENT OF WORK

The UAO and/or Utility Builder shall commence actual construction in good faith within sixty (60) calendar days after approval of the permit application. If the beginning date is more than sixty (60) calendar days from the date of approval, the UAO and/or Utility Builder must review the permit with the FDOT Approving Engineer listed to make sure no changes have occurred to the transportation facility that would affect the permit's continued approval. The UAO and/or Utility Builder shall make good faith efforts to expedite the work and complete the work within the calendar days indicated.

Anticipated Start Date: 10/6/2025

Calendar days needed to completed: 450

Approved
2025-H-294-00345
Jason Quijano
8/20/2025

Florida Department of Transportation

UTILITY PERMIT

PERMIT NO: 2025-H-294-00345

APPLICANT SIGNATURE

By the below signature(s) the UAO and/or Utility Builder agree(s) to construct, operate, and maintain the work as noted in the above Work Description, shown in plans and incorporated documents, in compliance with the UAM, all instructions noted in the FDOT Special Instructions Box, and special instructions incorporated into this permit. The UAO and/or Utility Builder declares, the location of all existing utilities that it owns or has an interest in, both aerial and underground, are accurately shown on the plans of the work areas. In accordance with UAM Section 2.8, the UAO and/or Utility Builder further declares that a letter of notification was delivered to the owners of other facilities within the work areas and that those listed below are the only facility owners known to be involved or potentially impacted by the proposed work.

Date Notified:	Name of other facility owners (attach additional sheets if necessary).
1/24/2025	AT&T
1/24/2025	Beaches Energy
1/24/2025	Comcast
1/24/2025	Crown Castle
1/24/2025	Ferrellgas

Utility Agency/Owner	Utility Builder (when applicable)
Signature: KAYLE MOORE (digital signature) Date: 8/6/2025	Signature: _____ Date: _____
Name (printed): KAYLE MOORE	Name (printed): _____
Title: _____	Title: _____

FDOT PROJECT INFORMATION

Pursuant to UAM Section 2.1(10), the utility work is within FDOT projects listed below and must have a Utility Work Schedule for each project approved prior to commencement of work within the FDOT project limits:

There are NO FDOT constructions (proposed or underway).
This work is NOT related to an approved Utility Work Schedule.

FDOT SPECIAL INSTRUCTIONS

In accordance with UAM Section 2.7, FDOT incorporates the below and attached special instructions into this permit.

* Contact Inspector Manager, Tim Collins, at timothy.collins@dot.state.fl.us or 904-360-5462, a minimum of two (2) business days prior to starting work within FDOT Right of Way to schedule a pre-construction meeting. Any lane closure request will require 2 weeks' notice for approval and may be restricted to night work only. Be advised that a pre-construction meeting must be held with an FDOT inspector prior to any work commencing within FDOT Right of Way ... (see special instructions cont. page)

Additional FDOT Special Instructions are attached and incorporated into this permit. Yes ☐ No ☑

PERMIT APPROVAL

By signature below, FDOT gives permission to the UAO and /or Utility Builder to construct, operate, and maintain the utilities indicated in this Utility Permit in compliance with the UAM, all incorporated documents, and special instructions. Any changes to the approved work must be approved by the FDOT's Approving Engineer and attached and incorporated into this permit in accordance with UAM Section 2.11.

Approving Engineer: Jason Quijano (digital signature) Date: 8/20/2025
Name: Jason Quijano
Title: MAINTENANCE PROGRAM ENGINEER

Notification of Utility Work to be provided to: Telephone (904) 360-5462 ext. _____ or Email: timothy.collins@dot.state.fl.us

An FDOT Representative is required to be present on the worksite prior to commencement of work. Yes ☑ No ☐

Rep. Name: Timothy Collins Telephone 9043605462 Email: timothy.collins@dot.state.fl.us

Approved
2025-H-294-00345
Jason Quijano
8/20/2025

Florida Department of Transportation

UTILITY PERMIT

PERMIT NO: 2025-H-294-00345

CERTIFICATION

I, the undersigned UAO and/or Utility Builder, hereby CERTIFY that the utilities were constructed and inspected in compliance with the UAM all incorporated documents, and special instructions. Pursuant to UAM Section 2.11, all changes have been approved by the FDOT's Approving Engineer and incorporated into this permit along with all other material certifications, test results, bore logs, approved plans changes, as-built plans or other required documentation.

I also CERTIFY that work began on _____ and was completed on _____ and that the area was left in as good or better condition than when the work began.

Utility Agency/Owner	Utility Builder (when applicable)
Signature: _____ Date _____	Signature:_____ Date _____
Name (printed): _____	Name (printed): _____
Title: _____	Title: _____

FINAL INSPECTION OF WORK

☐ The work was inspected and found to be in non-compliance as noted below:

☐ All issues of non-compliance listed above have been brought into compliance and/or FDOT has no outstanding issues that need to be addressed by the UAO and/or Utility Builder. However, this final inspection does not release the UAO and/or Utility Builder of their continuing responsibilities pursuant to Rule 14-46.001, the UAM, all incorporated documents, and special instructions.

FDOT Inspector: _____ Date: _____

Name: _____

Title: _____

Approved
2025-H-294-00345
Jason Quijano
8/20/2025

PERMIT NO.: 2025-H-294-00345

STATE ROAD INFORMATION:

NAME OF OTHER FACILITY OWNERS / DATE NOTIFIED:
Facility Name: IQ Fiber, Date Notified: 1/24/2025

FDOT PROJECT INFORMATION:
There are NO FDOT constructions (proposed or underway).
This work is NOT related to an approved Utility Work Schedule.

THE WORK WAS INSPECTED AND FOUND TO BE IN NON-COMPLIANCE AS NOTED BELOW:

Approved
2025-H-294-00345
Jason Quijano
8/20/2025

PERMIT NO.: 2025-H-294-00345

The complete special instructions could not fit in the space allotted on Page 2 of the Utility Permit so they are displayed below.

Special FDOT Instructions

* Contact Inspector Manager, Tim Collins, at timothy.collins@dot.state.fl.us or 904-360-5462, a minimum of two (2) business days prior to starting work within FDOT Right of Way to schedule a pre-construction meeting. Any lane closure request will require 2 weeks' notice for approval and may be restricted to night work only. Be advised that a pre-construction meeting must be held with an FDOT inspector prior to any work commencing within FDOT Right of Way.

* Provide as built plans after permit project completion.
* Any disturbed areas will be restored with sod or like material immediately.
* Any disturbed sidewalk (joint to joint) will be restored to current standards in original or better condition within 24 hours.
* No Hay Bales for erosion or sedimentation controls are allowed in the FDOT Right of Way.
* This permit covers work within FDOT Right of Way only.
* All direction boring will be in accordance with FDOT Specification 555 latest edition.
* Complete HDD Bore Log and submit upon completion.

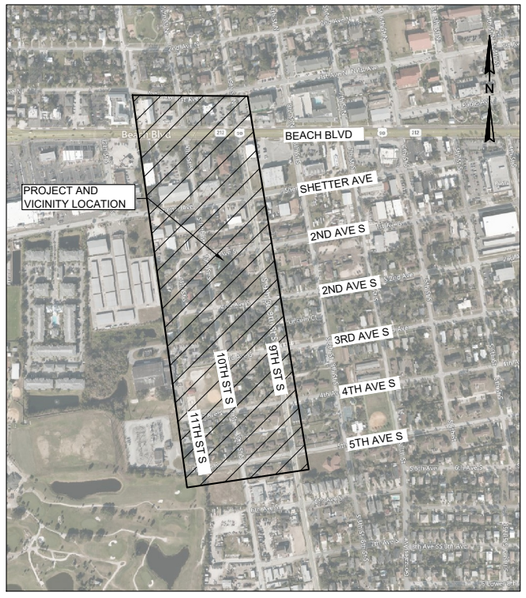
Approved
2025-H-294-00345
Jason Quijano
8/20/2025

CONSTRUCTION DRAWINGS FOR:

10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS - PHASE II

FOR THE
CITY OF JACKSONVILLE BEACH

CITY BID No. XXXX-XX



PROJECT LOCATION
AND VICINITY

JACKSONVILLE BEACH, FLORIDA
FIRST COAST'S FINEST BEACH

PREPARED BY:

FOUR WATERS ENGINEERING
324 6th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-414-2400 C.O.A.# 31101 WWW.4WENG.COM

PROJECT #: 19-1023

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MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF FLORIDA
PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by MICHAEL R KLINK, PE, per date noted. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

DATE: JANUARY 2025

ISSUE: PERMIT SUBMITTAL

Approved
2025-H-294-00335
Jason Quijano
8/20/2025

CITY BID No. XXXX-XX 10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS - PHASE II

BRIAN HAMIL LOCATION R:\19-1023 COJB 10TH ST\X\CDS\COVER AND DETAILS.DWG

UTILITY SEPARATION NOTES

1. UTILITY SEPARATION FROM WATER MAINS SHALL BE IN ACCORDANCE WITH 62-555.314, FAC. ALL DISTANCES NOTED ARE FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE.

2. HORIZONTAL SEPARATION BETWEEN WATER MAIN AND STORM SEWER, STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER REGULATED UNDER PART III OF 62-610, FAC SHALL BE A MINIMUM OF THREE FEET; BETWEEN WATER MAIN AND ANY VACUUM-TYPE SANITARY SEWER SHALL BE TEN FEET (PREFERRED) BUT A MINIMUM OF THREE FEET; BETWEEN WATER MAIN AND GRAVITY OR PRESSURE-TYPE SANITARY SEWER, WASTEWATER FORCEMAIN, OR PIPELINE CONVEYING RECLAIMED WATER NOT REGULATED UNDER PART III OF 62-610, FAC SHALL BE TEN FEET (PREFERRED) BUT A MINIMUM OF SIX FEET. THE MINIMUM OF THE HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS AND GRAVITY-TYPE SANITARY SEWERS SHALL BE REDUCED TO THREE FEET WHERE THE BOTTOM OF THE WATER MAIN IS AT LEAST SIX INCHES ABOVE THE TOP OF THE SEWER. HORIZONTAL SEPARATION BETWEEN WATER MAIN AND ALL PARTS OF ANY "ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEM" SHALL BE A MINIMUM OF TEN FEET.

3. VERTICAL SEPARATION BETWEEN WATER MAIN AND GRAVITY OR VACUUM-TYPE SANITARY SEWER OR STORM SEWER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS 12 INCHES (PREFERRED) BUT A MINIMUM OF SIX INCHES ABOVE OR AT LEAST 12 INCHES BELOW THE OTHER PIPELINE. VERTICAL SEPARATION BETWEEN WATER MAIN AND PRESSURE-TYPE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST 12 INCHES ABOVE OR BELOW THE OTHER PIPELINE. PREFERENCE IS FOR THE WATER MAIN TO BE ABOVE THE OTHER PIPELINE.

4. FOR UTILITY CROSSINGS WITH WATER MAINS, ONE FULL LENGTH (20 FEET) OF WATER MAIN QUALITY PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THAT THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. WATER QUALITY PIPE STANDARD SHALL BE PVC DR18 FOR WATER MAIN. THE CONTRACTOR SHALL VERIFY, RECORD, AND REPORT THE VERTICAL SEPARATION FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE AT THE CROSSING.

5. NO WATER MAIN SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SANITARY SEWER MANHOLE, A STORM SEWER MANHOLE, OR A STORM SEWER INLET STRUCTURE.

6. NEW OR RELOCATED FIRE HYDRANTS WITH UNDERGROUND DRAINS SHALL BE LOCATED SO THAT THE DRAINS ARE AT LEAST THREE FEET FROM ANY EXISTING OR PROPOSED STORM SEWER, STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER REGULATED UNDER PART III OF 62-610, FAC; AT LEAST THREE FEET, AND PREFERABLY TEN FEET, FROM ANY EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER; AT LEAST SIX FEET, AND PREFERABLY TEN FEET, FROM ANY EXISTING OR PROPOSED GRAVITY- OR PRESSURE-TYPE SANITARY SEWER, WASTEWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER NOT REGULATED UNDER PART III OF 62-610, FAC; AND AT LEAST TEN FEET FROM ANY EXISTING OR PROPOSED "ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEM" AS DEFINED IN SECTION 381.0065(2), FS, AND RULE 64E-6.002, FAC

ABBREVIATIONS

A.G.	ALLEY GRATE
℄	BASE LINE
B.M.	BENCH MARK
C.B.	CATCH BASIN
C.I.	CAST IRON
℄	CENTER LINE
CLF	CHAIN LINK FENCE
CONC.	CONCRETE
CONST.	CONSTRUCTION
C.M.P.	CORRUGATED METAL PIPE
C.M.P.A.	CORRUGATED METAL PIPE ARCHED
CULV.	CULVERT
C&G	CURB & GUTTER
C	CUT
CTVB	CABLE TV BOX
D.B.I.	DITCH BOTTOM INVERT
D.W.	DRIVEWAY
D.I.	DUCTILE IRON
EC	EDGE OF CONCRETE
E.O.P.	EDGE OF PAVEMENT
ELEV.	ELEVATION
EXP. JT.	EXPANSION JOINT
F	FILL
F.H.	FIRE HYDRANT
℉	FLOW LINE
GALV.	GALVANIZED
G	GAS
GIS-GAS	INDICATES GAS MAIN INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
GIS-FM	INDICATES FORCE MAIN INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
GIS-FOC	INDICATES FIBER OPTIC CABLE INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
GIS-SAN	INDICATES GRAVITY SEWER MAIN INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
GIS-STM	INDICATES STORM WATER MAIN INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
GIS-WAT	INDICATES WATER MAIN INFORMATION PROVIDED BY GIS INFORMATION FROM THE CITY OF JACKSONVILLE BEACH
G.V.	GAS VALVE
H.W.	HEAD WALL
H.C.	HIGH CURB
INT.	INTERSECTION
INV.	INVERT
I.P.	IRON PIPE
LT.	LEFT
M.H.	MANHOLE
N.T.S.	NOT TO SCALE
O.H.L.	OVERHEAD LINES
P.R.M.	PERMANENT REFERENCE MONUMENT
P.V.C.	POLYVINYL CHLORIDE
r	RADIUS
R	RATE
R.C.P.	REINFORCED CONCRETE PIPE
RT	RIGHT
R/W	RIGHT OF WAY
R.D.	ROOF DRAIN
S/D	SIDE WALK
S.B.T.	SOUTHERN BELL TELEPHONE
STA	STATION
TJB	TELEPHONE JUNCTION BOX
TOB	TOP OF BANK
TOS	TOE OF SLOPE
U.G.E.	UNDERGROUND ELECTRIC
U.G.T.	UNDERGROUND TELEPHONE
U.S.C. & G.S.	UNITED STATES COASTAL & GEODETIC SURVEY DATUM
V.C.	VITRIFIED CLAY
WM	WATER METER
WPP	WOOD POWER POLE
W.V.	WATER VALVE

GENERAL NOTES

1. ALL ELEVATIONS BASED ON U.S.C. & G.S. DATUM AND SHOWN IN FEET.

2. ELEVATIONS:

   ALL ELEVATIONS FOR THE SURVEYED AREAS BASED ON THE NORTH AMERICAN VERTICAL DATUM (N.A.V.D.) OF 1988 PER DURDEN SURVEYING AND MAPPING, INC. 1825-B 3RD STREET NORTH, JACKSONVILLE BEACH, FL 32250 PHONE (904) 853-6822 FAX (904) 853-6825

3. COORDINATE SYSTEMS:

   THE HORIZONTAL COORDINATES FOR THE THE SURVEYED AREAS ARE BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM (SPC), EAST ZONE, U.S. FEET, NORTH AMERICAN DATUM (NAD) 1983, ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN DATUM OF 1988 (NAVD88) AND ARE EXPRESSED IN FEET.

4. IN ACCORDANCE WITH GENERAL CONDITIONS, IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND AVOID ALL UTILITIES, OTHER STRUCTURES AND OBSTRUCTIONS BOTH ABOVE AND BELOW THE GROUND SURFACE. ALL DAMAGE RESULTING FROM THE CONTRACTOR'S FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

5. THE CONTRACTOR SHALL MAINTAIN UNINTERRUPTED SERVICE AT ALL SERVICE CONNECTIONS. THE MANNER IN WHICH THIS IS ACCOMPLISHED SHALL BE LEFT TO THE DISCRETION OF THE CONTRACTOR, SUBJECT TO THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS.

6. STATIONING SHOWN ON DRAWINGS REFERS TO CENTERLINE OF ROAD OR RIGHT-OF-WAY LINE.

7. ALL PIPE LENGTHS SHOWN ON PLAN AND PROFILES ARE FROM CENTER TO CENTER OF INLETS OR MANHOLES OR ALONG FORCEMAIN OR WATER MAINS.

8. THE CONTRACTOR SHALL PROVIDE NO LESS THAN A 6 INCH CLEARANCE BETWEEN ALL UTILITIES, OTHER THAN WATER MAINS UNLESS OTHERWISE DIRECTED. NO SPECIAL PAYMENT ALLOWED.

9. MINIMUM PIPE COVER SHALL BE 30 INCHES IN UNPAVED AREAS AND 36 INCHES IN PAVED AREAS. EXCEPT AS DIRECTED.

10. CONTRACTOR SHALL EMPLOY A LAND SURVEYOR, REGISTERED IN THE STATE OF FLORIDA, TO REFERENCE AND RESTORE PROPERTY CORNERS AND LANDMARKS WHICH MAY BE DISTURBED BY CONSTRUCTION.

11. EXISTING UTILITIES HAVE BEEN SHOWN FROM THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL NOTIFY THE PROPER UTILITY REPRESENTATIVE AT LEAST 48 HOURS PRIOR TO COMMENCING EXCAVATION NEAR UTILITY. CONTRACTOR IS RESPONSIBLE FOR LOCATION OF ALL SUCH UTILITIES IN THE PATH OF CONSTRUCTION. THE LOCATION SHALL BE MADE WELL IN ADVANCE OF CONSTRUCTION SO THAT CONFLICTS IN CONSTRUCTION MAY BE RESOLVED.

12. THE DEPARTMENT OF TRANSPORTATION IS TO BE NOTIFIED 48 HOURS IN ADVANCE AND RAILROAD COMPANY 7 DAYS IN ADVANCE OF CONSTRUCTION WITHIN THEIR RESPECTIVE RIGHT OF WAY.

13. UTILITY CONTACTS
    COMCAST CABLE COMMUNICATIONS – JAMES GRAHAM (904-380-6341)
    AT&T-PK PATEL (904-727-1658)
    BEACHES ENERGY SERVICES, LIGHTING – JIM TRIMBLE (904-247-6297)
    BEACHES ENERGY SERVICES, ELECTRIC – LAMAR WHITAKER (904-247-6206)
    CITY OF JACKSONVILLE BEACH PUBLIC WORKS (WPCP&PS) – ROBERT DELGADO (904-831-2092)
    – BARTOLO JIMENEZ (904-626-5950)
    CITY OF JACKSONVILLE BEACH PUBLIC WORKS (WATER/SEWER) – DAVID McDONALD (904-247-6211)
    CITY OF JACKSONVILLE BEACH PUBLIC WORKS (STREETS/STORMWATER) – DAVID McDONALD (904-247-6211)
    CITY OF JACKSONVILLE BEACH PUBLIC WORKS (CONSTRUCTION MANAGER)–DENNIS DUPRIES (904-509-0268)
    FERRELL GAS CO. – J.D. BAIN (352-622-8298)
    TECO / PEOPLES GAS – BEN MOBLEY (904)-545-8958 (PRIMARY CONTACT)
    JAMES FARRISS (904)-669-6519 (SECONDARY CONTACT)

14. THE LOCATION(S) OF THE UTILITIES SHOWN IN THE PLANS ARE BASED ON LIMITED INVESTIGATION TECHNOLOGIES AND SHOULD BE CONSIDERED APPROXIMATE ONLY.

15. CONTACT SUNSHINE STATE ONE-CALL OF FLORIDA, INC. AS REQUIRED BY CHAPTER 556 OF THE FLORIDA STATUTES.

16. CONTRACTOR TO LOCATE, PROTECT AND SUPPORT ALL WATER, SEWER, GAS AND ELECTRIC UTILITIES ENCOUNTERED DURING CONSTRUCTION.

17. IF THE CONTRACTOR ENCOUNTERS GROUNDWATER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR UTILIZING DEWATERING SYSTEM(S) TO REMOVE WATER FROM THE EXCAVATIONS. PRIOR TO BEGINNING ANY DEWATERING, THE CONTRACTOR SHALL SUBMIT A DEWATERING PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL COMPLY WITH SAMPLING REQUIREMENTS LISTED IN THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) DEWATERING REGULATIONS (62-621.300(2) F.A.C.) BEFORE ANY DEWATERING CAN BEGIN. CONTRACTOR SHALL SECURE THE FDEP GENERIC PERMIT FOR THE DISCHARGE OF GROUND WATER AND SJRWMD PERMIT, AS NECESSARY

18. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS DO NOT STAND BY THEMSELVES. ALSO TO BE INCLUDED ARE THE SPECIFICATIONS AND DETAILS.

19. CONTRACTOR TO FURNISH DETOUR AND CONSTRUCTION SIGNING AND LIGHTING AS REQUIRED IN FLORIDA DEPARTMENT OF TRANSPORTATION MANUAL ON TRAFFIC CONTROLS AND SAFE PRACTICE FOR STREET AND HIGHWAY CONSTRUCTION, AND OTHER SPECIAL ADVANCED DETOUR SIGNS AS NECESSARY.

20. ALL POTABLE WATER PIPE SHALL BE NSFPW RATED

21. CONTRACTOR SHALL MAINTAIN WATER AND SEWER SERVICE THROUGHOUT CONSTRUCTION. SERVICE CONNECTIONS SHALL ONLY BE TRANSFERRED TO THE NEW WATER MAIN AFTER FDEP ISSUES PARTIAL CLEARANCE. CONTRACTOR SHALL PROVIDE NECESSARY FITTINGS TO TEMPORARILY ISOLATE THE EXISTING WATER MAINS THROUGHOUT CONSTRUCTION.

22. IF SOLVENT CONTAMINATION IS FOUND IN THE PIPE TRENCH, WORK SHALL BE STOPPED AND THE PROPER AUTHORITIES NOTIFIED. WITH APPROVAL OF THE PERMITTING AGENCY, DUCTILE IRON PIPE, FITTINGS AND SOLVENT RESISTANT GASKET MATERIAL SHALL BE USED IN THE CONTAMINATED AREA. THE DUCTILE IRON PIPE SHALL EXTEND AT LEAST 100 FEET BEYOND ANY SOLVENT NOTED.

23. PIPE JOINT DEFLECTION, WHERE ALLOWED BY EXCEPTION, SHALL NOT EXCEED 80% OF THE MAXIMUM RECOMMENDED BY THE MANUFACTURER FOR THE SIZE AND TYPE OF JOINT.

24. ALL PVC FORCEMAIN AND WATER MAIN PIPING SHALL HAVE A NO. 10 SOLID COPPER TRACER WIRE TAPED ALONG THE TOP OF THE PIPE. THE TRACER WIRE SHALL BE TERMINATED AT A MAXIMUM OF 500' INTERVALS WITH A GROUND LEVEL TYPE BOX/LID FOR FORCEMAIN OR AT EACH VALVE BOX FOR WATER MAIN WITH APPROXIMATELY 3' OF COILED UP WIRE INSIDE EACH BOX ALONG THE ENTIRE LENGTH OF THE FORCEMAIN OR WATER MAIN.

25. CONTRACTOR SHALL CONTACT EACH PROPERTY OWNER ALONG THE ROUTE OF NEW PIPING AND LOCATE ANY EXISTING IRRIGATION/SPRINKLER SYSTEMS. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR/REPLACEMENT OF ANY DAMAGED IRRIGATION/SPRINKLER SYSTEMS ON PRIVATE PROPERTY OR CITY R.O.W'S DUE TO WORK BEING PERFORMED BY CONTRACTOR AND/OR SUB-CONTRACTORS.

26. THE CONTRACTOR SHALL SUBMIT A SHORING PLAN FOR EXCAVATIONS ADJACENT TO BUILDINGS, ADJACENT TO RIGHT-OF-WAY, OR ANY OTHER EXCAVATIONS DEEPER THAN 7 FEET. THE SHORING PLAN SHALL INCLUDE SHORING SYSTEM DESIGN CALCULATIONS AND DETAILS SIGNED AND SEALED BY A FLORIDA REGISTERED PROFESSIONAL ENGINEER.

27. ALL PROTECTED TREES SHALL BE PROTECTED FROM INJURY DURING ANY LAND CLEARING OR CONSTRUCTION. PRIOR TO ANY LAND CLEARING OR CONSTRUCTION OPERATIONS, TEMPORARY BARRIERS SHALL BE INSTALLED AROUND ALL TREES AND OTHER UNDERSCORE VEGETATION TO BE PRESERVED AND SHALL REMAIN UNTIL THE COMPLETION OF WORK. THE TEMPORARY BARRIER SHALL BE AT LEAST THREE FEET HIGH, SHALL BE PLACED AT LEAST SIX (6) FEET AWAY FROM THE BASE OF ANY TREE, SHALL INCLUDE AT LEAST FIFTY (50) PERCENT OF THE AREA UNDER THE DRIP LINE OF ANY PROTECTED TREE OR TREES. THE BARRIER SHALL CONSIST OF EITHER A WOOD FENCE WITH 2X4 POSTS PLACED A MAXIMUM OF EIGHT (8) FEET APART WITH A 2X4 MINIMUM TOP RAIL, OR A TEMPORARY WIRE MESH FENCE OR OTHER SIMILAR BARRIER WHICH WILL LIMIT ACCESS TO THE AREA, AND SHALL COMPLY WITH THE GUIDELINES IN THE TREE PROTECTION GUIDE FOR BUILDERS AND DEVELOPERS BY THE FLORIDA DIVISION OF FORESTRY, NO MATERIALS, TRAILERS, EQUIPMENT OR CHEMICALS SHALL BE STORED, OPERATED, DUMPED, BURIED OR BURNED WITHIN PROTECTED AREAS. NO ATTACHMENT WIRES (OTHER THAN PROTECTIVE GUY WIRES), SIGNS, OR PERMITS SHALL BE ATTACHED TO PROTECTED TREE.

28. TREE BARRICADE APPROVAL: OBTAIN CITY APPROVAL OF TREE BARRICADES BEFORE BEGINNING CLEARING OPERATIONS OR ANY CONSTRUCTION.

29. CONSTRUCTION ACTIVITIES DISTURBING AN AREA OF ONE (1) ACRE OR GREATER SHALL REQUIRE AN NPDES PERMIT. CONTRACTOR SHALL SUBMIT AN NOI TO FDEP PRIOR TO CONSTRUCTION

MICHAEL R. KLINK LICENSE No. 71840 STATE OF FLORIDA PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

GENERAL NOTES

CITY OF JACKSONVILLE BEACH, FL

DESIGN MRK	DRAWN BRH		
JOB #	19-1023	ISSUE DATE	JANUARY 2025
		ISSUE	PERMIT

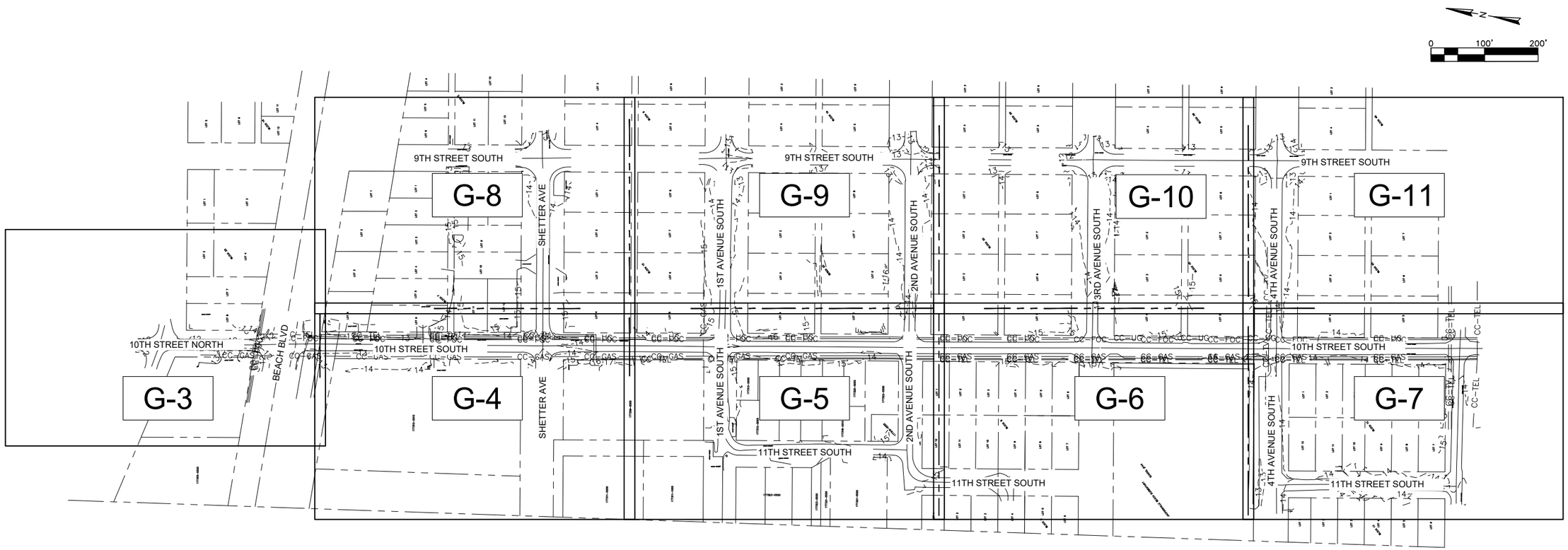
FOUR WATERS ENGINEERING
324 5TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-411-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
G-1

Approved
2025-H-2[illegible]845
Jason Quinto
8/20/2025

A MAP SHOWING A TOPOGRAPHIC SURVEY SURVEY OF

1st AVENUE NORTH, 1st AVENUE SOUTH, 2nd AVENUE, 3rd AVENUE, 4th AVENUE, 5tH AVENUE,
BEACH BOULEVARD, SHETTER AVENUE, 9th STREET, 10th STREET, 11th STREET
CITY OF JACKSONVILLE BEACH, DUVAL COUNTY, FLORIDA



LINE LEGEND
LINE TYPES BELOW ARE AS DEPICTED ON CROWN CASTLE FIBER DRAWING: HORSESHOE 4 SEGEMENT 4 – S268436

CROWN CASTLE FIBER
9250 W FLAGLER ST.
MIAMI, FL 33174

CC–FOC	FIBER OPTIC
CC–GAS	GAS
CC–TEL	TELECOM
CC–TV	CABLE TV
CC–UG	EXISTING ELECTRIC
CC–UGE	ELECTRIC

NOTES:
1.) THIS IS NOT A BOUNDARY SURVEY.

2.) BEARINGS AND COORDINATES SHOWN HEREIN REFER TO THE FLORIDA STATE PLANE COORDINATE SYSTEM FOR THE FLORIDA EAST ZONE (901), NORTH AMERICAN DATUM OF 1983 (NAD 83) AND WERE DERIVED FROM GPS OBSERVATIONS UTILIZING OPUS RS–SOLUTIONS AS PROVIDED BY THE NATIONAL GEODETIC SURVEY (NGS) AND ARE EXPRESSED IN U.S. SURVEY FEET.

3.) ELEVATIONS SHOWN HEREIN REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE BASED ON NATIONAL GEODETIC SURVEY (NGS) BENCHMARK DESIGNATED Y 323, (PID BC0500), BEING BENCH MARK DISK SET IN TOP OF CONCRETE MONUMENT STAMPED "Y 323 1970" AND ARE EXPRESSED IN U.S. SURVEY FEET.

4.) RIGHT–OF–WAY LINES SHOWN HEREIN WERE DETERMINED BY PRODUCING A "BEST FIT" LINE UTILIZING FOUND MONUMENTATION ALONG THE PROPERTY LINES FRONTING EACH ROAD. NO ATTEMPT WAS MADE BY THIS SURVEYOR TO DETERMINE THE ACTUAL RIGHT–OF–WAY LINES

5.) INFORMATION SUCH AS PIPE SIZE, DIRECTION, INVERTS, MATERIAL, AND CONNECTIVITY OF THE SANITARY AND STORM SYSTEM IS AS BEST ASCERTAINED DUE TO AGE, CONDITION, AND ACCESSABILITY

6.) THIS IS A SURFACE SURVEY ONLY. UNDERGROUND IMPROVEMENTS SUCH AS FOOTERS AND UTILITIES, IF ANY, WERE NOT LOCATED BY THIS SURVEY, EXCEPT AS SHOWN.

7.) INFORMATION SHOWN HEREON REPRESENTS CONDITIONS AS THEY EXISTED ON THE SURVEY DATE SHOWN AND CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS AT THAT TIME.

DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
LB# 2648
8001 Belfort Parkway, Suite 200, Jacksonville, Florida 32256

PREVIOUSLY:

GEOMATICS CORP.
SURVEYING–MAPPING–GPS
2804 N. FIFTH STREET, UNIT 101
ST. AUGUSTINE, FL 32084
PHONE (904) 824-3088 FAX (904) 824-5753
4809–1 ROSSELLE STREET
JACKSONVILLE, FL 32254
PHONE (904) 384-0071
LICENSED BUSINESS
FLORIDA #6979 GEORGIA #928
SOUTH CAROLINA #3367 ALABAMA #794
NORTH CAROLINA COA #3752

PROJECT No: D–19–3050	
SURVEY DATE: Dec. 11, 2019	
CAD FILE: 19–3050–2.dwg	
CHECKED BY: T. Durden	
DRAWN BY: A. Wallen / RDF	
FIELD WORK: A. Land	
FB: 13–08, Pgs. 21–54	

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

EXISTING CONDITIONS - KEY MAP

CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN		
MRK	BRH	19-1023	PERMIT
		JOB #	ISSUE
		JANUARY 2025	DATE
			ISSUE

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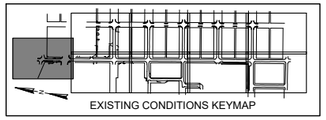
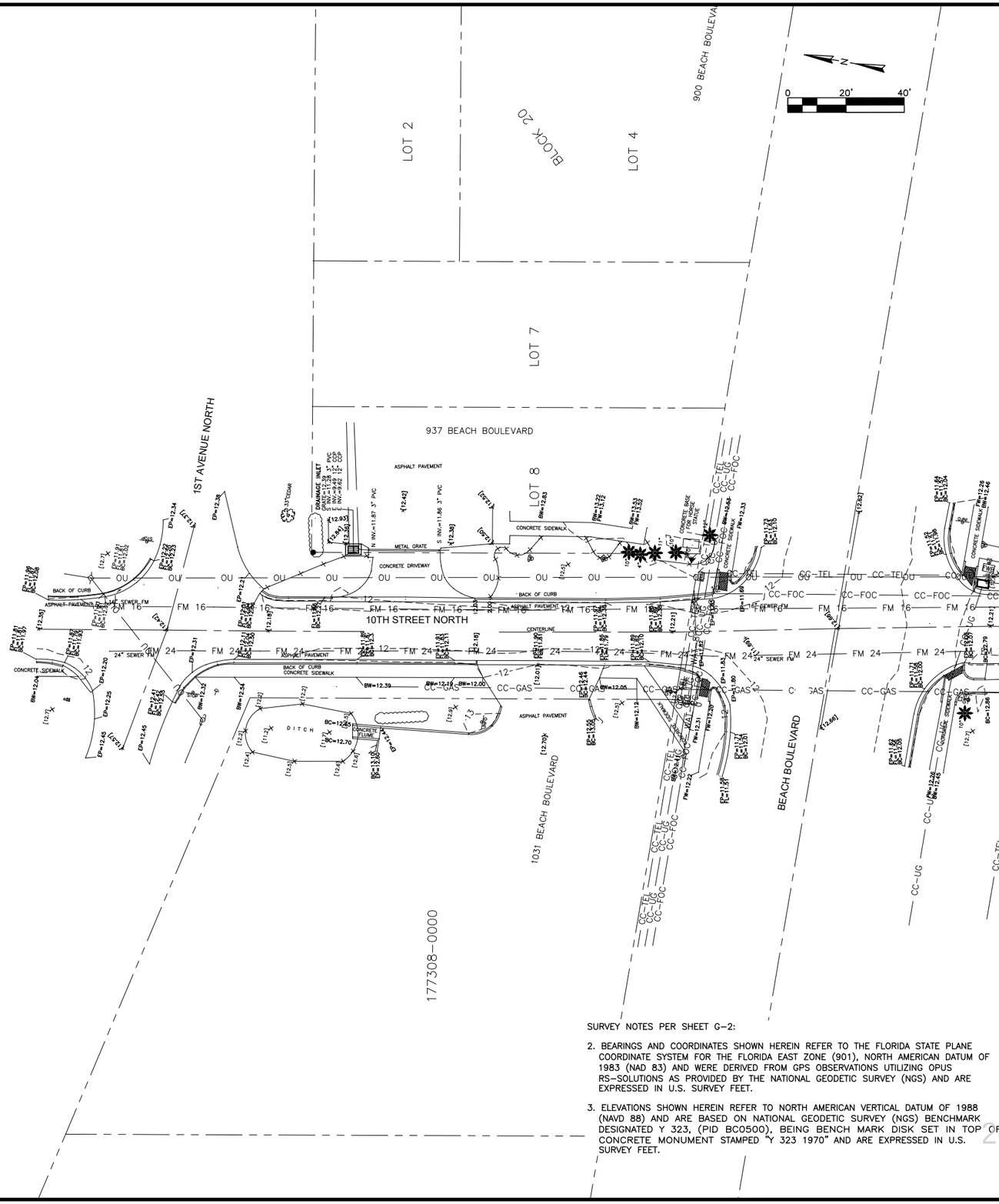
904-412-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
G-2 - KEY

Approved
Mason Quinto
1/28/2025

LAST EDITED BY: BRIAN HAMIL
CAD FILE: R:\19-1023 COJB 10TH ST\X\CDS\EXISTING CONDITIONS.DWG
PLOT DATE AND TIME: 1/28/2025 3:30:20 PM





SURVEY NOTES PER SHEET G-2:

2. BEARINGS AND COORDINATES SHOWN HEREIN REFER TO THE FLORIDA STATE PLANE COORDINATE SYSTEM FOR THE FLORIDA EAST ZONE (901), NORTH AMERICAN DATUM OF 1983 (NAD 83) AND WERE DERIVED FROM GPS OBSERVATIONS UTILIZING OPUS RS-SOLUTIONS AS PROVIDED BY THE NATIONAL GEODETIC SURVEY (NGS) AND ARE EXPRESSED IN U.S. SURVEY FEET.

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MATCHLINE; G-4

10TH STREET SOUTH INFRASTRUCTURE IMPROVEMENTS - PHASE II

EXISTING CONDITIONS

CITY OF JACKSONVILLE BEACH, FL.

DESIGN	DRAWN
MRK	BRH
JOB #	19-1023
ISSUE DATE	JANUARY 2025
ISSUE	PERMIT

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Approved 2025-H-2[illegible]645 Jason Gabbard 8/20/2025

LAST EDITED BY: BRIAN HAMIL

CAD FILE: R:\19-1023 COJB 10TH ST\X\CDS\EXISTING CONDITIONS.DWG

PLOT DATE AND TIME: 1/28/2025 3:30:29 PM

MATCHLINE: G-8

MATCHLINE: G-3

MATCHLINE: G-5

10TH STREET SOUTH

992 BEACH BOULEVARD

1036 BEACH BOULEVARD

1100 SHETTER AVENUE

SHETTER AVENUE

53 10th STREET

57 10th STREET

LOT 4

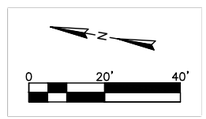
LOT 6

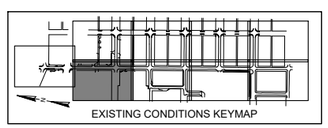
LOT 11

177310-0010

177309-0000

177311-0000




EXISTING CONDITIONS KEYMAP

SURVEY NOTES PER SHEET G-2:

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MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

EXISTING CONDITIONS

CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN		
MRK	BRH		
JOB #	19-1023		
ISSUE DATE	JANUARY 2025		
ISSUE	PERMIT		

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DRAWING NUMBER
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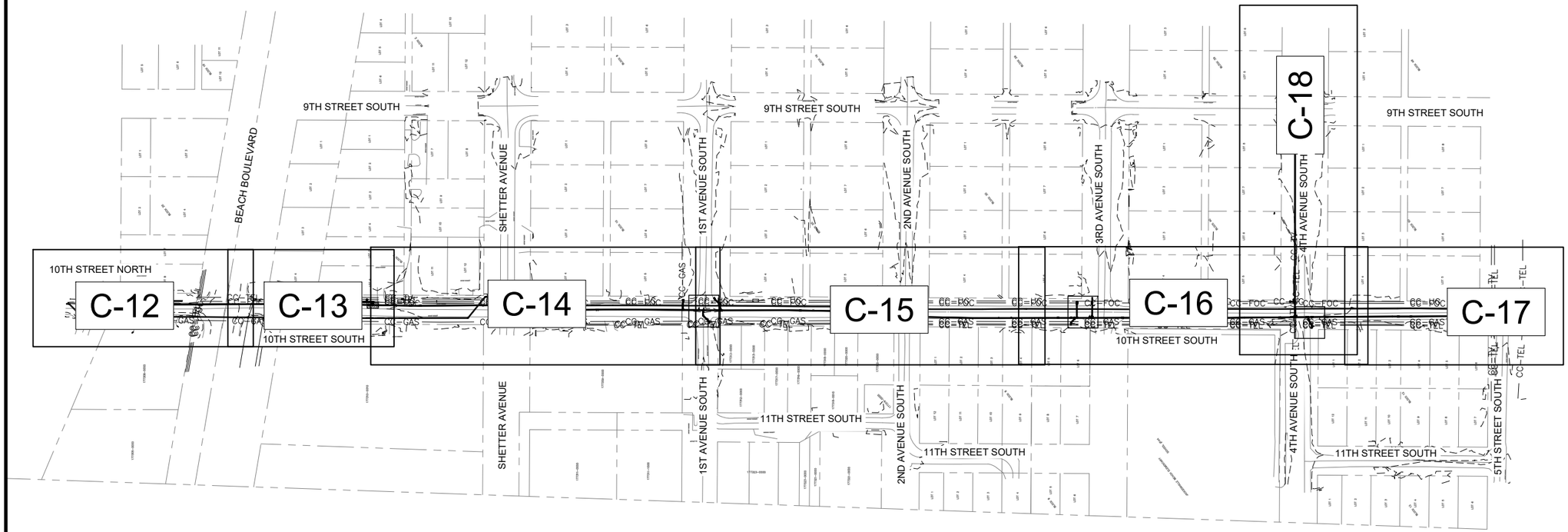
Approved
2025-H-2[illegible]845
Jason Gilbert
8/20/2025



SURVEY NOTES PER SHEET G-2:

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

WATERMAIN REPLACEMENT - KEY MAP

CITY OF JACKSONVILLE BEACH, FL

DESIGN MRK	DRAWN BRH		
	JOB #	19-1023	
	ISSUE DATE	JANUARY 2025	
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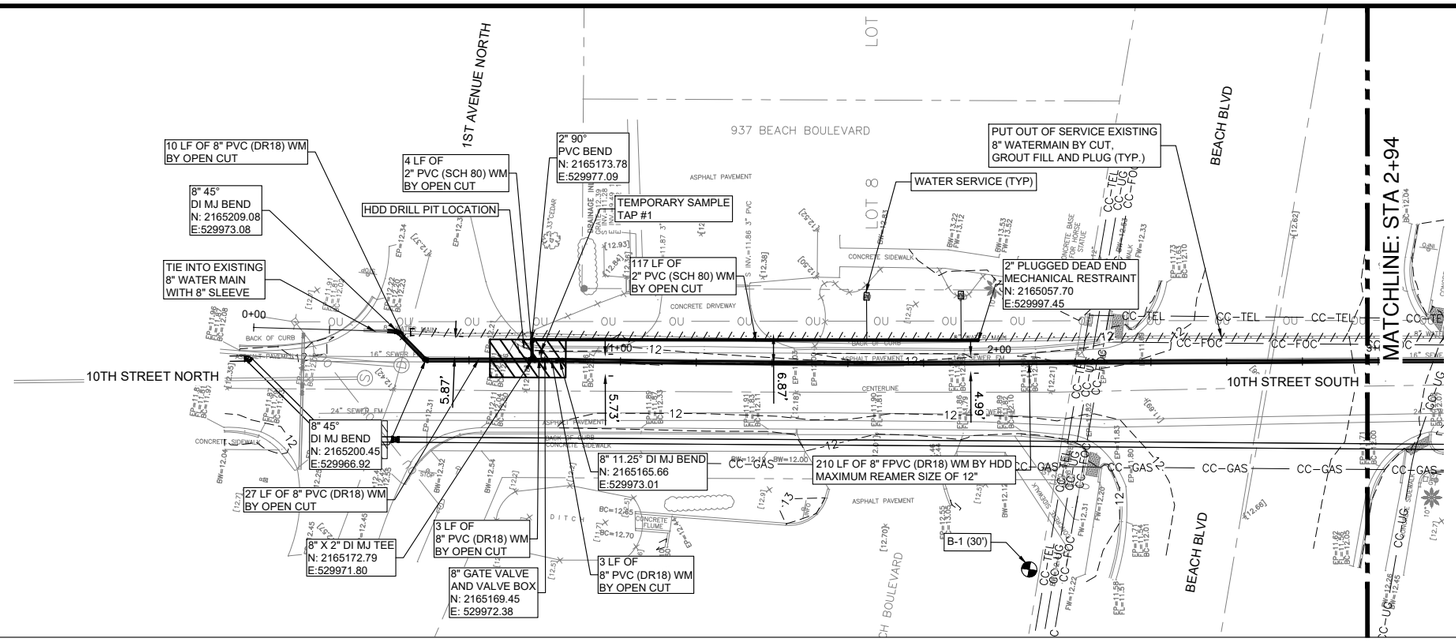
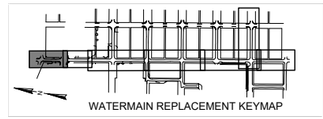
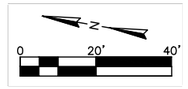
C-11

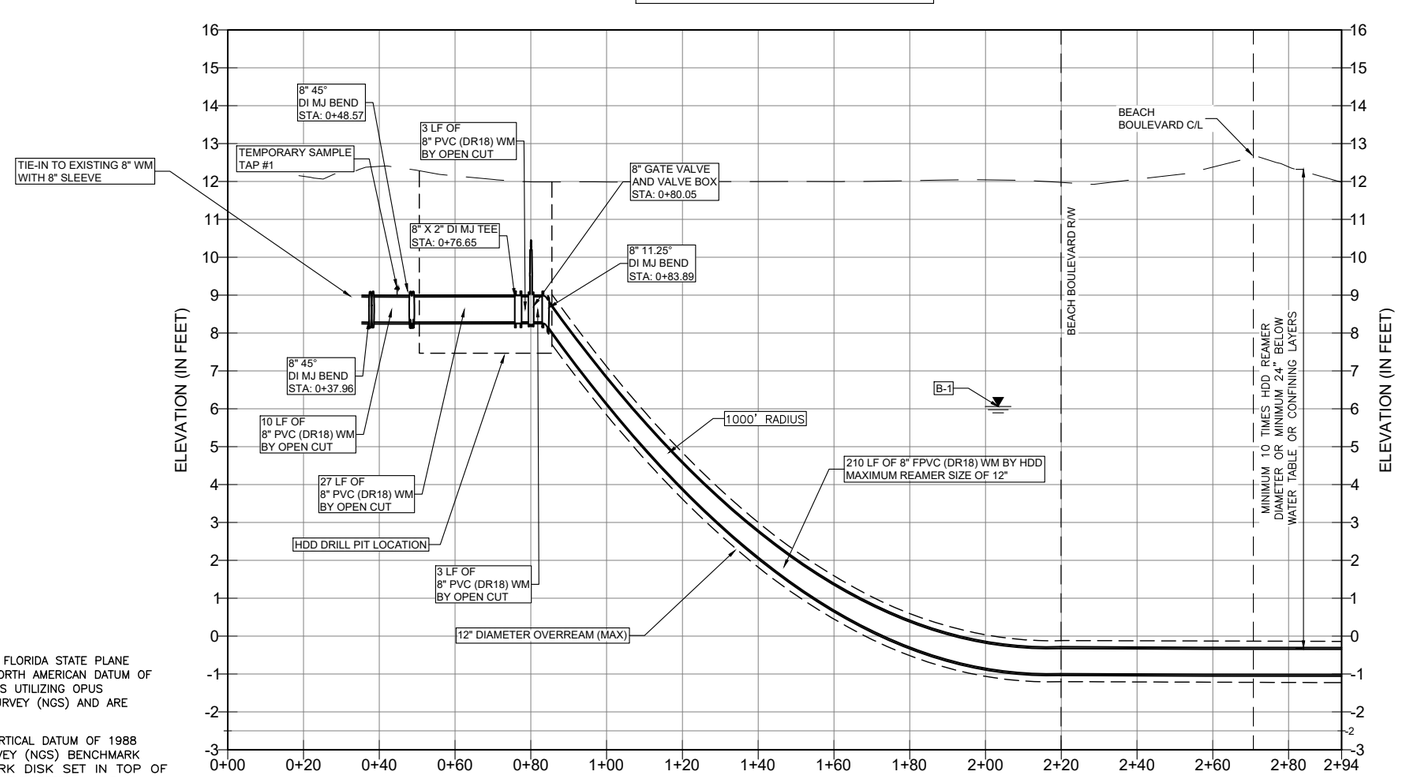
Approved
025-H-2[illegible]645
Jason Ostanello
8/20/2025

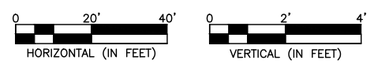






PROPOSED WATERMAIN PROFILE FROM STA: 0+00.00 TO STA: 2+94.00





SURVEY NOTES PER SHEET G-2:

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

WATERMAIN REPLACEMENT - HDD

CITY OF JACKSONVILLE BEACH, FL

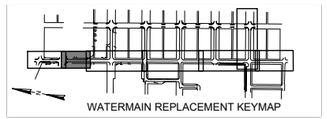
DESIGN	DRAWN
MRK	BRH

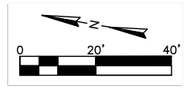
JOB #	ISSUE DATE	ISSUE
19-1023	JANUARY 2025	PERMIT

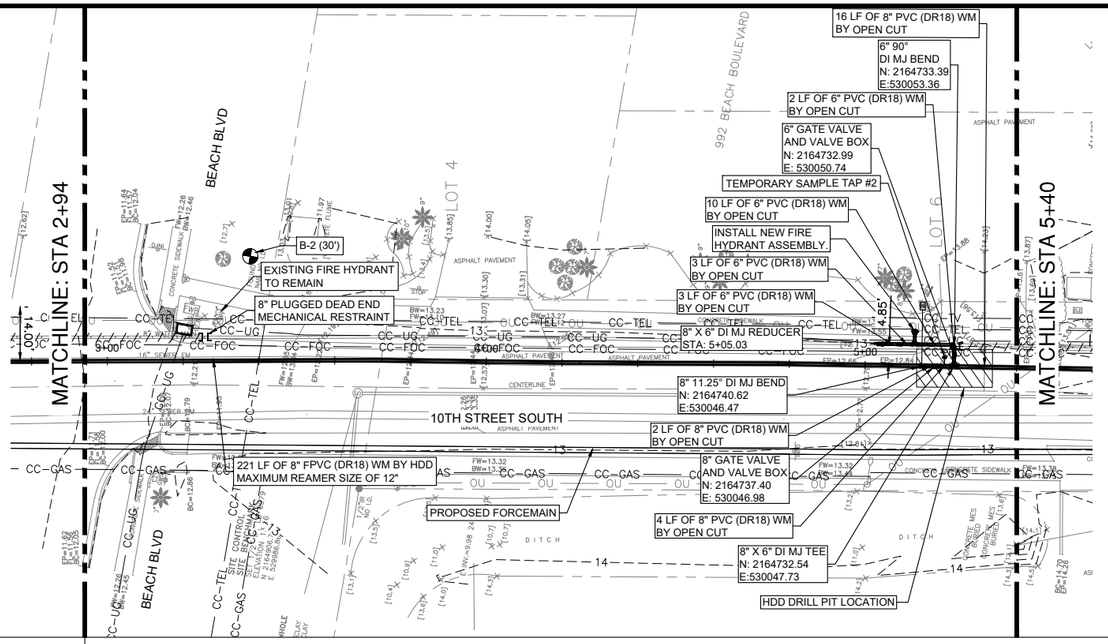
FOUR WATERS ENGINEERING
324 6TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
C-12

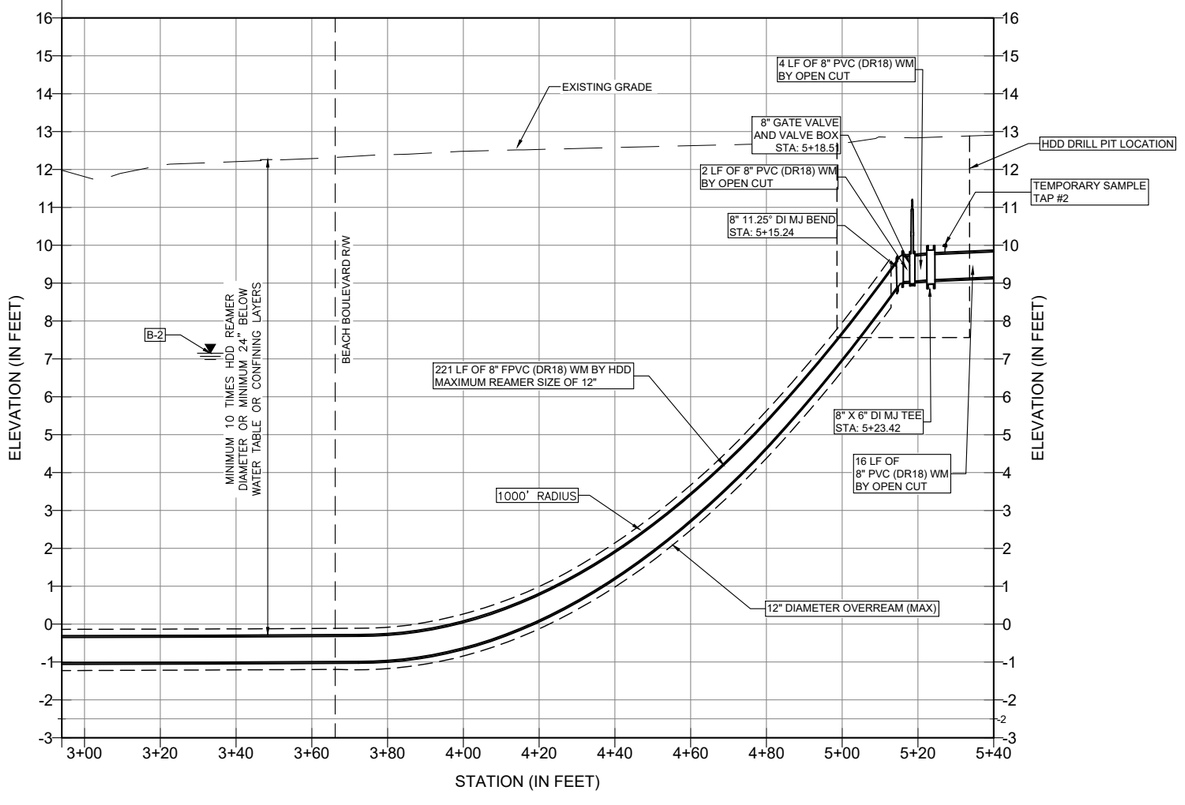
Approved
2025-H-2[illegible]845
Jason Gutierrez
8/20/2025

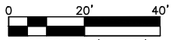


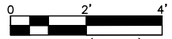




PROPOSED WATERMAIN PROFILE
FROM STA: 2+94.00 TO STA: 5+40.00







SURVEY NOTES PER SHEET G–2:

2. BEARINGS AND COORDINATES SHOWN HEREIN REFER TO THE FLORIDA STATE PLANE COORDINATE SYSTEM FOR THE FLORIDA EAST ZONE (901), NORTH AMERICAN DATUM OF 1983 (NAD 83) AND WERE DERIVED FROM GPS OBSERVATIONS UTILIZING OPUS RS–SOLUTIONS AS PROVIDED BY THE NATIONAL GEODETIC SURVEY (NGS) AND ARE EXPRESSED IN U.S. SURVEY FEET.

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MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

WATERMAIN REPLACEMENT - HDD

CITY OF JACKSONVILLE BEACH, FL

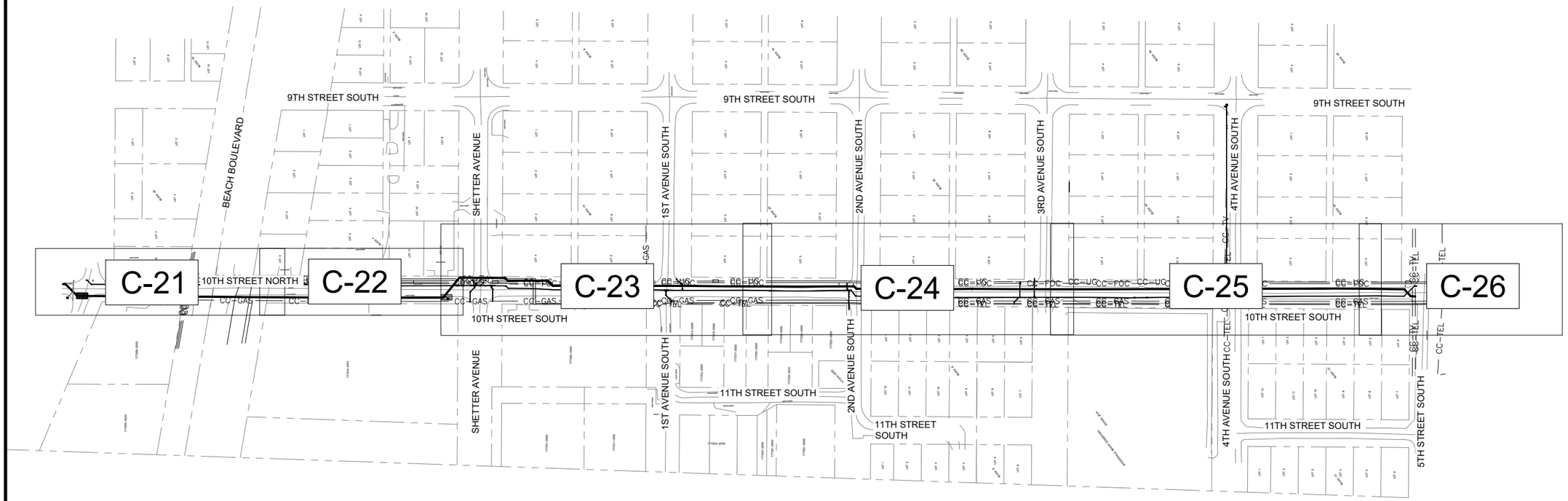
DESIGN	DRAWN
MRK	BRH

JOB #	ISSUE DATE	ISSUE
19-1023	JANUARY 2025	PERMIT

FOUR WATERS ENGINEERING
324 6TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
C-13

Approved
2025-H-2[illegible]845
Jason Ostanello
8/20/2025



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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

FORCEMAIN REPLACEMENT- KEY MAP

CITY OF JACKSONVILLE BEACH, FL

DESIGN MRK	DRAWN BRH	19-1023	
JOB #		ISSUE DATE	JANUARY 2025
ISSUE		PERMIT	

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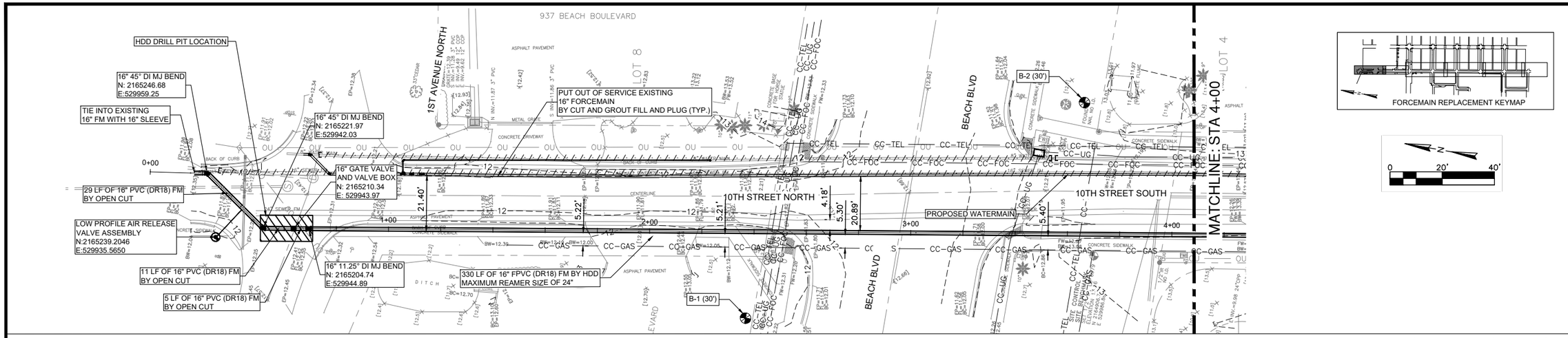
324 6th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
C-21 - KEY

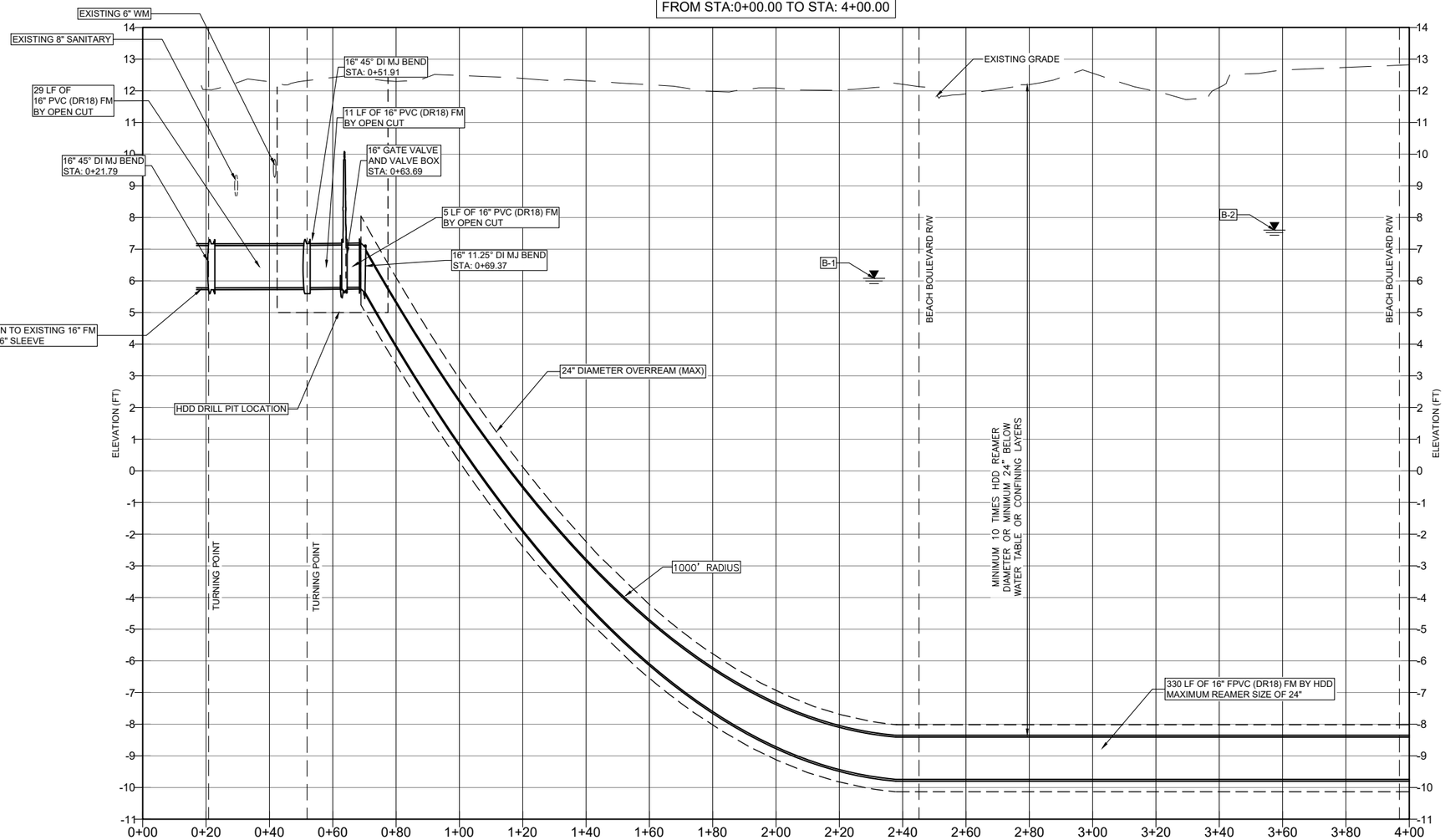
Approved
2025-H-2[illegible]845
Jason Gilletto
8/29/2025



0 20' 40'
HORIZONTAL (IN FEET)

0 2' 4'
VERTICAL (IN FEET)

PROPOSED FORCEMAIN PROFILE FROM STA:0+00.00 TO STA: 4+00.00



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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

FORCEMAIN REPLACEMENT- HDD

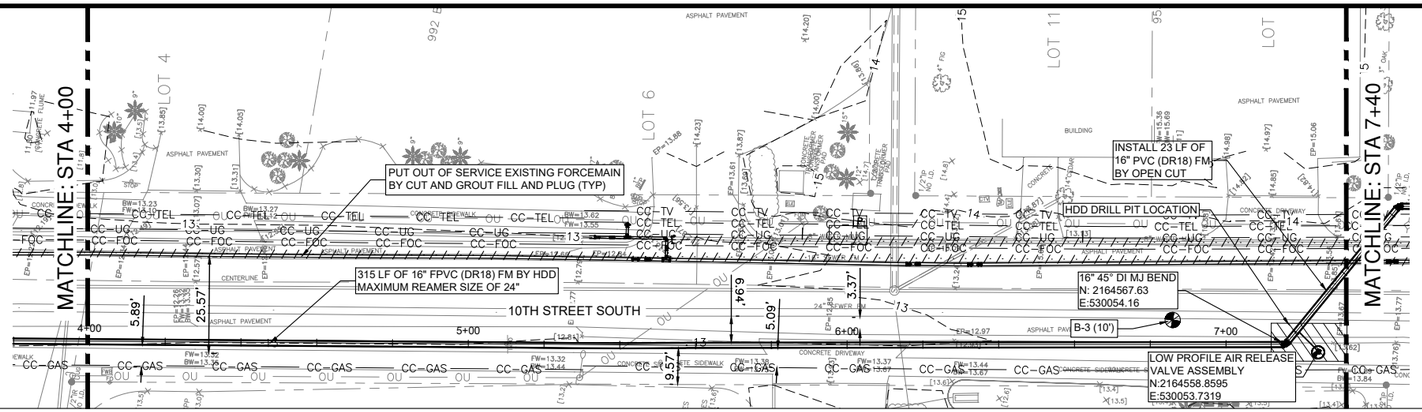
CITY OF JACKSONVILLE BEACH, FL

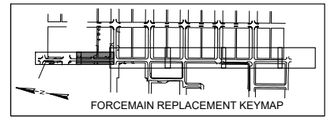
DESIGN	DRAWN
MRK	BRH
JOB #	19-1023
ISSUE DATE	JANUARY 2025
ISSUE	PERMIT

FOUR WATERS ENGINEERING
324 6TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
C-22

Approved
DocuSigned by:
Jason Gilbreath
8/20/2025





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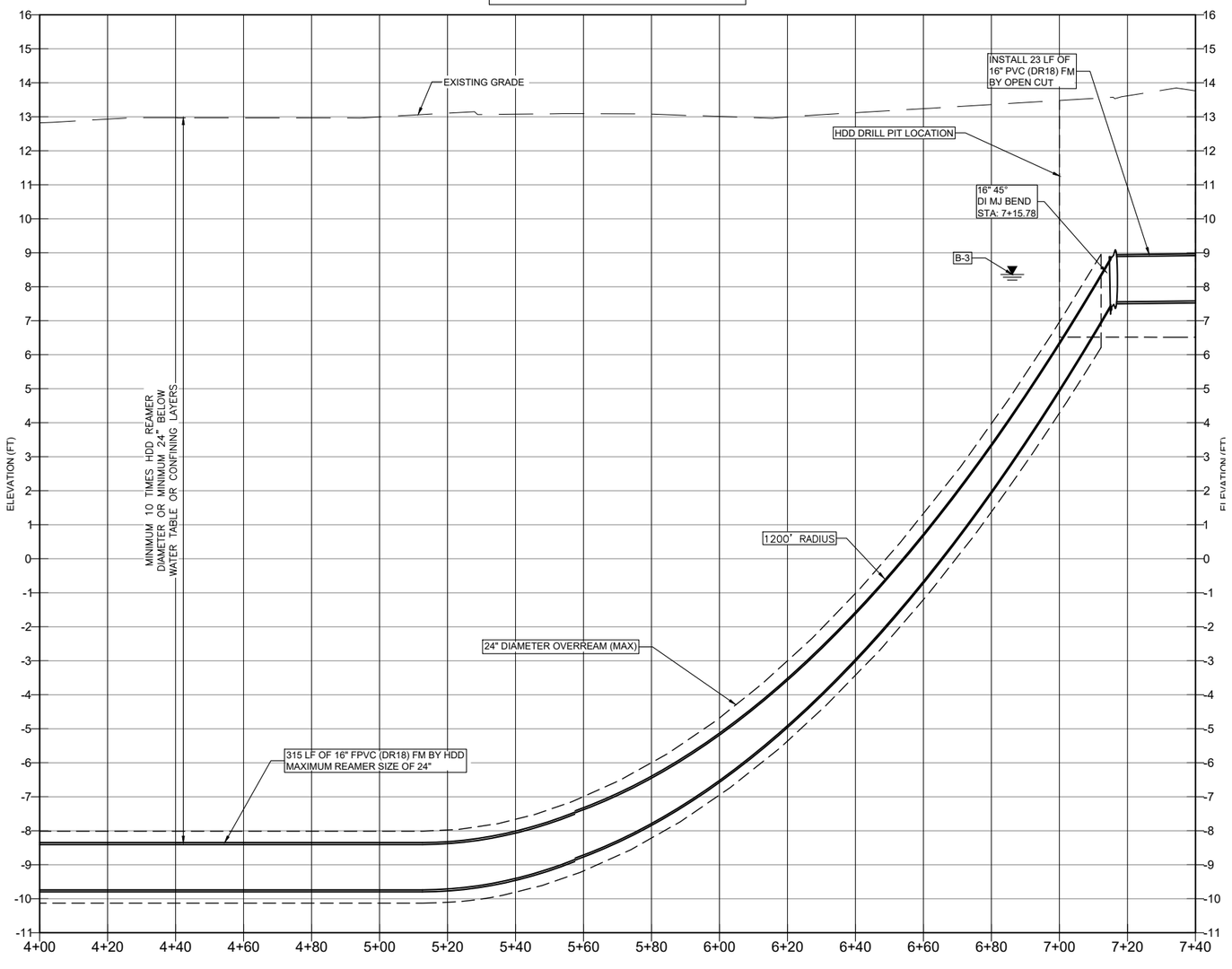
PROPOSED FORCEMAIN PROFILE FROM STA:4+00.00 TO STA: 7+40.00



0 20' 40'
HORIZONTAL (IN FEET)

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VERTICAL (IN FEET)

SURVEY NOTES PER SHEET G-2:

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MICHAEL R. KLINK LICENSE No. 71840 STATE OF FLORIDA PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

FORCEMAIN REPLACEMENT- HDD

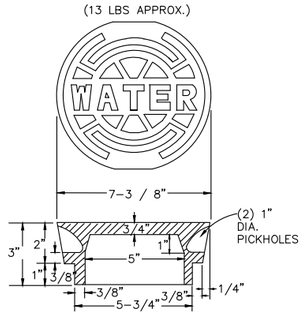
CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN
MRK	BRH
JOB #	19-1023
ISSUE DATE	JANUARY 2025
ISSUE	PERMIT

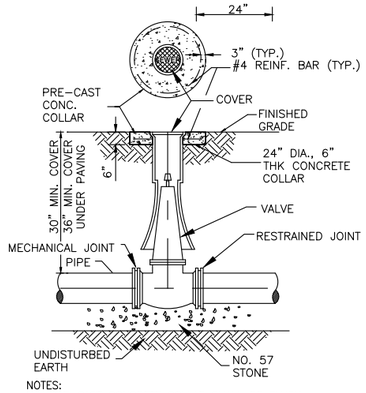
FOUR WATERS ENGINEERING
324 4TH AVE N JACKSONVILLE BEACH, FLORIDA 32250
904-411-2400 C.O.A.# 31101 WWW.4WENG.COM

Approved
2025-H-2[illegible]845
Jason Gillette
8/20/2025

DRAWING NUMBER
C-23

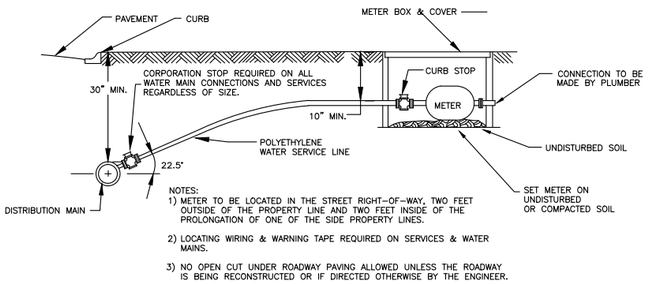


WATER SYSTEM VALVE BOX COVER
N.T.S.



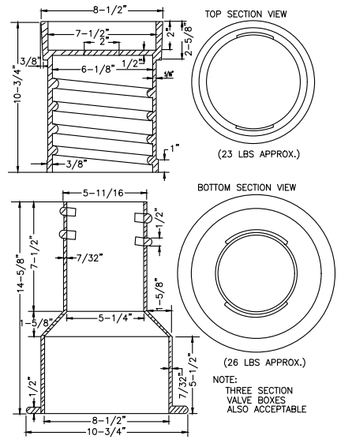
NOTES:
1. PRE-CAST CONCRETE COLLAR SHALL BE FLUSH WITH GRADE, AND SHALL BE INCLUDED AS PART OF THE COST OF EACH WATER VALVE.

VALVE BOX DETAIL
NOT TO SCALE



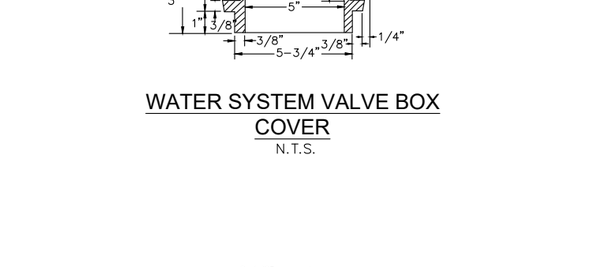
NOTES:
1) METER TO BE LOCATED IN THE STREET RIGHT-OF-WAY, TWO FEET OUTSIDE OF THE PROPERTY LINE AND TWO FEET INSIDE OF THE PROLONGATION OF ONE OF THE SIDE PROPERTY LINES.
2) LOCATING WIRING & WARNING TAPE REQUIRED ON SERVICES & WATER MAINS.
3) NO OPEN CUT UNDER ROADWAY PAVING ALLOWED UNLESS THE ROADWAY IS BEING RECONSTRUCTED OR IF DIRECTED OTHERWISE BY THE ENGINEER.

SERVICE METER INSTALLATION
NOT TO SCALE



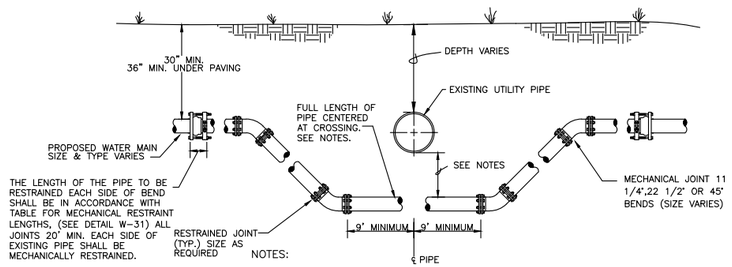
NOTE: THREE SECTION VALVE BOXES ALSO ACCEPTABLE

WATER SYSTEM VALVE BOX
N.T.S.



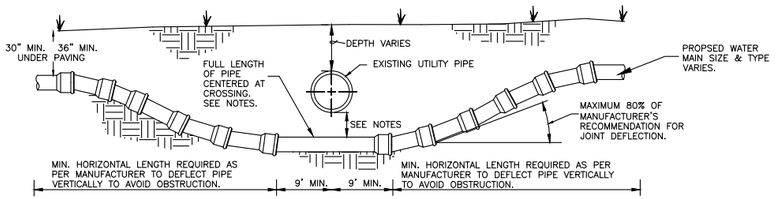
ALL FITTINGS USED IN THIS TRANSITION ARE TO BE D.I. MJ RESTRAINED.

CULVERT TRANSITION - DETAIL 1
N.T.S.



NOTES:
1. IF EXISTING UTILITY PIPE IS A WATER MAIN 6-INCHES OF SEPARATION IS REQUIRED.
2. IF EXISTING UTILITY PIPE IS A FORCE MAIN, SANITARY SEWER, RECLAIMED WATER MAIN OR STORM SEWER, 18 INCHES OF SEPARATION IS REQUIRED. IF THIS IS IMPRACTICAL AND EXISTING UTILITY MAIN IS C900, C905 OR D.I. PIPE, SEPARATION CAN BE REDUCED TO 6-INCHES. A FULL LENGTH OF PIPE SHALL BE CENTERED UNDER EXISTING UTILITY MAIN TO PROVIDE MAXIMUM JOINT SPACING FOR ALL CROSSINGS.
3. LOCATING WIRING REQUIRED. SEE SHT. 7.

ADJ. UNDER EXIST. UTILITIES
N.T.S.



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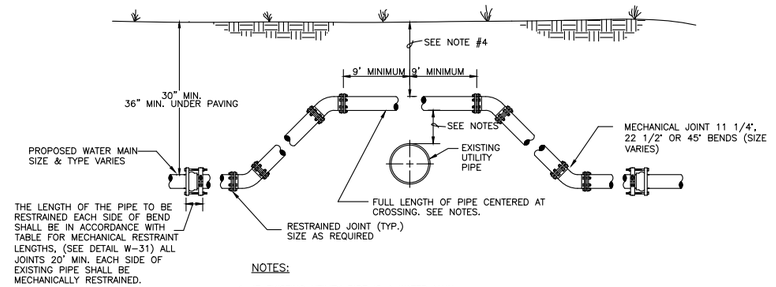
ADJ. UNDER EXIST. UTILITIES (PIPE DEFLECTION)
N.T.S.



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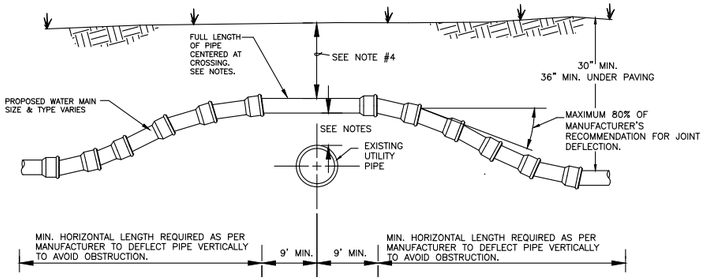
3. LOCATING WIRING REQUIRED. SEE SHT. 7.
4. DEPTH OF BURY TO BE 36" MINIMUM IN PAVED AREAS MEASURED FROM FINISHED GRADE. DEPTH OF BURY TO BE 30" MINIMUM IN UNPAVED AREAS.

ADJ. OVER EXIST. UTILITIES
N.T.S.



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ADJ. OVER EXIST. UTILITIES (PIPE DEFLECTION)
N.T.S.

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS

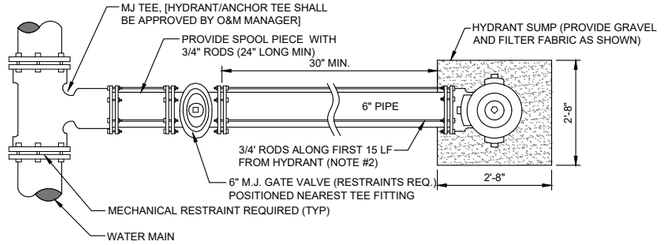
CITY OF JACKSONVILLE BEACH, FL.

DESIGN	DRAWN
MRK	BRH
JOB #	ISSUE DATE
19-1023	JANUARY 2025
ISSUE	PERMIT

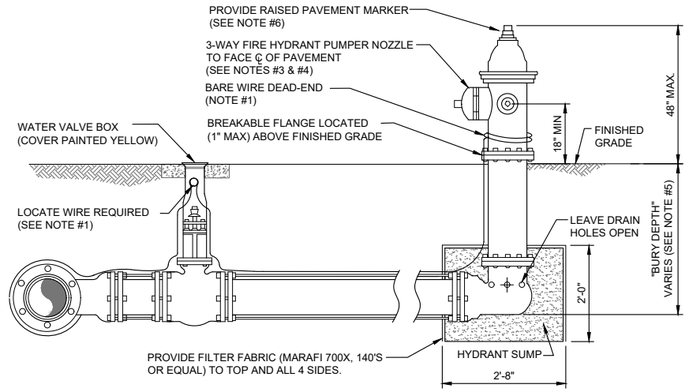
FOUR WATERS ENGINEERING
1324 6th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

Approved
2025-H-2[illegible]845
Jason Gilbert
8/20/2025

DRAWING NUMBER
D-1



PLAN



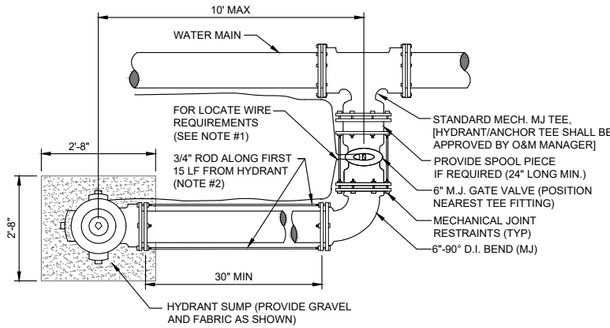
SECTION

NOTES:

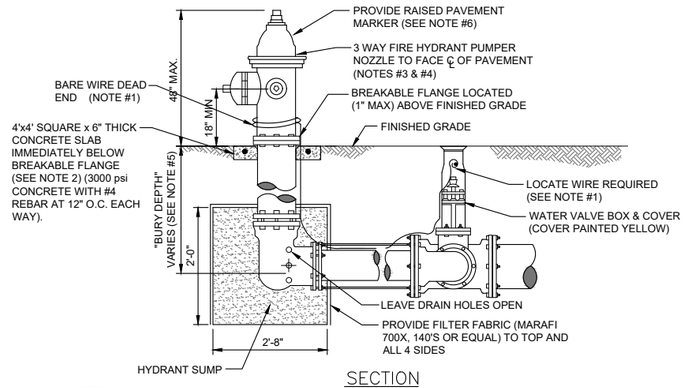
1. LOCATE WIRE SHALL BE ROUTED FROM THE VALVE TO THE HYDRANT AS SHOWN ABOVE LEAVING ENOUGH SLACK TO REACH 4' ABOVE FINAL GRADE. THE END OF THE WIRE SHALL BE SECURED TO THE PIPE MAIN. SEE SECTION 350, LOCATE WIRE INSTALLATION PARAGRAPH.
2. FIRE HYDRANTS SHALL BE INSTALLED BETWEEN BACK OF CURB AND FACE OF SIDEWALK AND NOT WITHIN SWALE/DITCH AREAS. THE DISTANCE RANGE FROM EDGE OF ADJACENT PAVEMENT, BACK OF CURB AND FACE OF SIDEWALK SHALL BE IN COMPLIANCE WITH LOCAL COUNTY FIRE DEPARTMENT RULES AND AS APPROVED BY THE CITY OF JACKSONVILLE BEACH AND APPLICABLE PERMITTING AGENCIES. DISTANCE SHALL BE MEASURED TO THE CLOSEST PART OF THE FIRE HYDRANT (I.E. THE PUMPER NOZZLE). THE MAXIMUM DISTANCE (BACK OF CURB) SHALL BE IN COMPLIANCE WITH LOCAL COUNTY FIRE DEPARTMENT RULES AND AS APPROVED BY THE CITY OF JACKSONVILLE BEACH. IF PIPING BETWEEN TEE AND HYDRANT IS LONGER THAN 80 LF, AN ADDITIONAL 6" GATE VALVE IS REQUIRED AT THE HYDRANT LOCATION (PROVIDE 30" SEPARATION). ALL PIPING, VALVES AND FITTINGS ALONG THE HYDRANT BRANCH MAIN WHICH IS WITHIN 15 LF OF THE HYDRANT SHALL BE RESTRAINED UTILIZING ONLY TWO 3/4" DIA (THREADED ENDS) STEEL RODS AND EYE BOLTS (NO JOINT RESTRAINT DEVICES REQUIRED). A SPLIT SERRATED RING WITH RESTRAINT EARS (EBAA 15 PF06 or EQUAL) MAYBE USED IN THIS ASSEMBLY. ALL OTHER JOINTS ALONG THE HYDRANT BRANCH MAIN OUTSIDE OF THE FIRST 15 LF SHALL INCLUDE JOINT RESTRAINTS.
3. NO WATER MAIN BRANCHES OR SERVICE TAPS SHALL BE ALLOWED ALONG THE HYDRANT BRANCH MAIN, UNLESS APPROVED BY THE CITY OF JACKSONVILLE BEACH.
4. OPERATION OF THE FIRE HYDRANT SHALL BE EITHER FULL OPEN POSITION OR TOTALLY CLOSED POSITION. THE HYDRANT SHALL NOT BE UTILIZED TO THROTTLE OUTLET FLOW.
5. PRIOR TO PROJECT FINAL INSPECTION, THE HYDRANT AND ALL ABOVE GROUND PIPING SHALL BE RE-OILED, GREASED AND REPAINTED (RUS- KIL ENAMEL-INTERNATIONAL YELLOW OR EQUAL). PRIVATELY OWNED AND MAINTAINED FIRE HYDRANTS SHALL BE PAINTED RED.
6. FIRE HYDRANTS SHALL BE ORDERED WITH PROPER "BURY DEPTH" TO MEET ACTUAL FIELD CONDITIONS. THIS IS ESPECIALLY IMPORTANT FOR BRANCH LINES WHICH TEE-OFF A 12" OR LARGER WATER MAIN. UNLESS APPROVED OTHERWISE BY THE CITY OF JACKSONVILLE BEACH, THE INSTALLATION OF (45°) BENDS IS NOT ACCEPTABLE WHEN UTILIZED TO CORRECT AN IMPROPERLY FURNISHED HYDRANT. THE USE OF HYDRANT EXTENSIONS SHOULD BE MINIMIZED.
7. BLUE REFLECTIVE MARKERS SHALL BE INSTALLED IN SUCH A MANNER THAT THE REFLECTIVE FACE OF THE MARKER IS PERPENDICULAR TO A LINE PARALLEL TO THE ROADWAY CENTERLINE. THE BLUE REFLECTIVE MARKERS SHALL BE PLACED IN THE CENTER OF THE TRAVEL LANE, DIRECTLY ACROSS FROM AND ADJACENT TO EACH FIRE HYDRANT.

FIRE HYDRANT INSTALLATION USING MECHANICAL JOINT TEE

NOT TO SCALE



PLAN



SECTION

NOTES:

1. LOCATE WIRE SHALL BE ROUTED FROM THE VALVE TO THE HYDRANT AS SHOWN ABOVE LEAVING ENOUGH SLACK TO REACH 4' ABOVE FINAL GRADE. THE END OF THE WIRE SHALL BE SECURED TO THE PIPE MAIN. SEE SECTION 350, LOCATE WIRE INSTALLATION PARAGRAPH.
2. FIRE HYDRANTS SHALL BE INSTALLED BETWEEN BACK OF CURB AND FACE OF SIDEWALK. ALL HYDRANTS SHALL BE LOCATED NO LESS THAN THREE (3) FEET FROM THE EDGE OF PAVEMENT OR BACK OF CURB OF THE ADJACENT ROADWAY AND NO LESS THAN THREE (3) FEET FROM ANY PHYSICAL FEATURE WHICH MAY OBSTRUCT ACCESS OR VIEW OF ANY HYDRANT UNLESS OTHERWISE APPROVED BY THE THE CITY OF JACKSONVILLE BEACH. THE MAXIMUM DISTANCE (BACK OF CURB) SHALL BE IN COMPLIANCE WITH LOCAL COUNTY FIRE DEPARTMENT RULES AND AS APPROVED BY THE CITY OF JACKSONVILLE BEACH. IF PIPING BETWEEN TEE AND HYDRANT IS LONGER THAN 80 LF, AN ADDITIONAL 6" GATE VALVE IS REQUIRED AT THE HYDRANT LOCATION (PROVIDE 30" SEPARATION). ALL PIPING, VALVES AND FITTINGS ALONG THE HYDRANT BRANCH MAIN WHICH IS WITHIN 15 LF OF THE HYDRANT SHALL BE RESTRAINED UTILIZING ONLY TWO 3/4" DIA (THREADED ENDS) STEEL RODS AND EYE BOLTS (NO JOINT RESTRAINT DEVICES REQUIRED). A SPLIT SERRATED RING WITH RESTRAINT EARS (EBAA 15 PF06 or EQUAL) MAYBE USED IN THIS ASSEMBLY. ALL OTHER JOINTS ALONG THE HYDRANT BRANCH MAIN OUTSIDE OF THE FIRST 15 LF SHALL INCLUDE JOINT RESTRAINTS.
3. NO WATER MAIN BRANCHES OR SERVICE TAPS SHALL BE ALLOWED ALONG THE HYDRANT BRANCH MAIN, UNLESS APPROVED BY THE CITY OF JACKSONVILLE BEACH.
4. OPERATION OF THE FIRE HYDRANT SHALL BE EITHER FULL OPEN POSITION OR TOTALLY CLOSED POSITION. THE HYDRANT SHALL NOT BE UTILIZED TO THROTTLE OUTLET FLOW.
5. PRIOR TO PROJECT FINAL INSPECTION, THE HYDRANT AND ALL ABOVE GROUND PIPING SHALL BE RE-OILED, GREASED AND REPAINTED (RUS- KIL ENAMEL-INTERNATIONAL YELLOW OR EQUAL). PRIVATELY OWNED AND MAINTAINED FIRE HYDRANTS SHALL BE PAINTED RED.
6. FIRE HYDRANTS SHALL BE ORDERED WITH PROPER "BURY DEPTH" TO MEET ACTUAL FIELD CONDITIONS. THIS IS ESPECIALLY IMPORTANT FOR BRANCH LINES WHICH TEE-OFF A 12" OR LARGER WATER MAIN. UNLESS APPROVED OTHERWISE BY THE CITY OF JACKSONVILLE BEACH, THE INSTALLATION OF (45°) BENDS IS NOT ACCEPTABLE WHEN UTILIZED TO CORRECT AN IMPROPERLY FURNISHED HYDRANT. THE USE OF HYDRANT EXTENSIONS SHOULD BE MINIMIZED.
7. BLUE REFLECTIVE MARKERS SHALL BE INSTALLED IN SUCH A MANNER THAT THE REFLECTIVE FACE OF THE MARKER IS PERPENDICULAR TO A LINE PARALLEL TO THE ROADWAY CENTERLINE. THE BLUE REFLECTIVE MARKERS SHALL BE PLACED IN THE CENTER OF THE TRAVEL LANE, DIRECTLY ACROSS FROM AND ADJACENT TO EACH FIRE HYDRANT.

FIRE HYDRANT INSTALLATION LIMITED SPACE

NOT TO SCALE

MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS

CITY OF JACKSONVILLE BEACH, FL.

DESIGN	DRAWN		
MRK	BRH		
JOB #	19-1023		
ISSUE DATE	JANUARY 2025		
ISSUE	PERMIT		

FOUR WATERS ENGINEERING
324 4th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

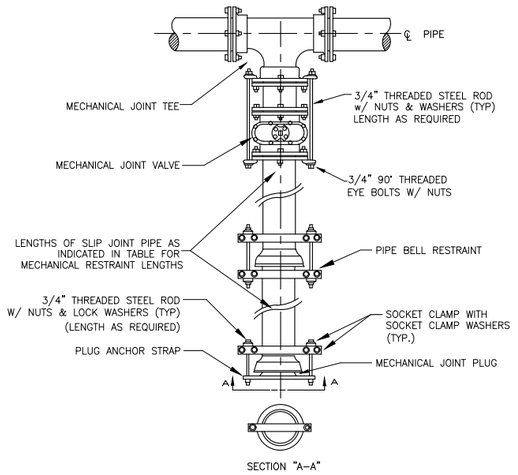
DRAWING NUMBER
D-2

Approved
2025-H-2[illegible]845
Jason Gilbreth
8/20/2025

MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)									
NOMINAL PIPE SIZE (INCHES)	11 1/4° Horizontal Elbow	22 1/2° Horizontal Elbow	45° Horizontal Elbow	90° Horizontal Elbow	Horizontal Tees	Horizontal Plugs and Valves	45° Vertical Offset Upper length/low per length	22½° Vertical Offset Upper length/lower length	Reducer (to 1 size smaller) Length on Larger Size Side
4	2	4	8	20	20 –run 1 –branch	50	20/3	8 / 1	n/a
6	2	5	10	28	20 –run 1 –branch	70	28/4	11 / 2	28
8	3	6	14	36	20 –run 1 –branch	90	36/5	14 / 3	30
10	4	8	18	40	20 –run 1 –branch	110	45/6	17 / 3	29
12	4	9	20	50	20 –run 1 –branch	120	52/8	20 / 4	50
14	5	10	23	56	20 –run 10 – branch	140	60/9	23 / 4	30
16	6	11	26	60	20 –run 26 – branch	160	67/10	26 / 5	30
18	6	12	29	69	20 –run 41 – branch	180	74/12	29 / 5	29
20	7	13	32	75	20 –run 55 – branch	195	80/13	36 / 6	29
24	7	15	33	76	20 –run 58 – branch	200	81/14	37 / 7	55
30	9	18	36	88	20 –run 77 – branch	235	97/16	44 / 8	77
36	10	20	40	100	20 –run 115 – branch	270	110/20	51 / 10	77

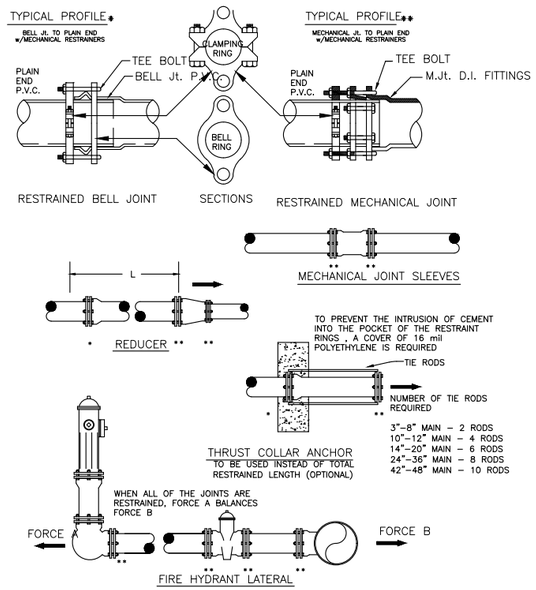
NOTES
1. TABLE ASSUMPTIONS: PVC PIPE, SAFETY FACTOR = 1.5, TEST PRESSURE = 150PSI
   SOIL = GM OR SM, 3 FT. BURY DEPTH TO TOP OF PIPE, TRENCH TYPE 3,
   BRANCH ON TEE IS ONE SIZE SMALLER THAN RUN OF TEE SIZE AND 20 FEET OF PIPE
   IS INSTALLED PAST THE TEE ON THE RUN SIDE (SMALLER BRANCH SIZES MUST BE CALCULATED BY THE
   ENGINEER). VERTICAL OFFSETS ARE 3 FEET DEEP ON TOP AND 8 FEET DEEP ON BOTTOM. REDUCERS ARE
   CALCULATED FOR ONE SIZE REDUCTION. OTHER CONDITIONS WILL REQUIRE ADDITIONAL CALCULATIONS.
2. ALL FITTINGS MUST BE RESTRAINED. ONE OF THE FOLLOWING METHODS MAY BE USED:
   A. MECHANICAL RESTRAINTS AT FITTING AND AT ADJACENT JOINTS TO A LENGTH AS SPECIFIED IN CHART.
   B. TIE RODS AT FITTING AND THROUGH JOINTS TO A LENGTH AS SPECIFIED IN CHART IF APPROVED BY
   CITY OF JACKSONVILLE BEACH
3. PAYMENT FOR RESTRAINTS AT FITTING SHALL BE INCLUDED WITH THE FITTING PAYMENT. PAYMENT FOR
   RESTRAINT AT DISTANCE "L" FROM FITTING SHALL BE AS IF 20 FT. JOINTS WERE INSTALLED.
4. VALVE RESTRAINTS SHALL BE RESTRAINED THE SAME DISTANCE AS HORIZONTAL PLUGS.

MECHANICAL RESTRAINT TABLE
NOT TO SCALE

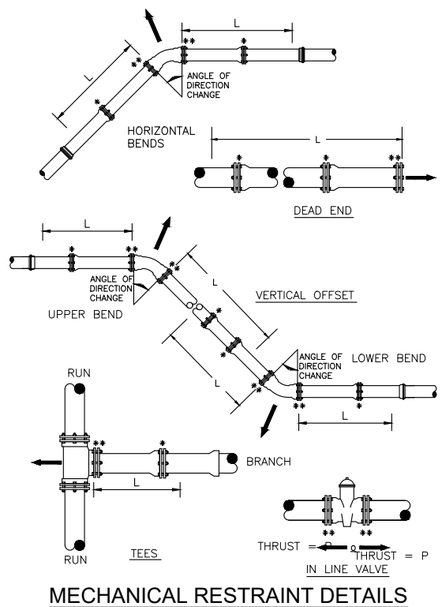


NOTES:
1. IN A STRAIGHT RUN DEAD END INSTALLATION THE VALVE SHALL BE RESTRAINED TO THE NEXT UPSTREAM PIPE JOINTS AS OUTLINED IN TABLE FOR MECHANICAL RESTRAINT LENGTHS
2. LOCATING WIRING REQUIRED.
3. ALL PIPE & FITTINGS SHOWN VARY IN SIZE
4. CONCRETE COLLARS WITH TIE–RODS MAY BE USED INSTEAD OF LENGTH OUTLINED IN TABLE FOR MECHANICAL RESTRAINT LENGTHS. SEE THIS SHEET

PLUGGED DEAD END
NOT TO SCALE



MECHANICAL RESTRAINT DETAILS
NOT TO SCALE



MECHANICAL RESTRAINT DETAILS
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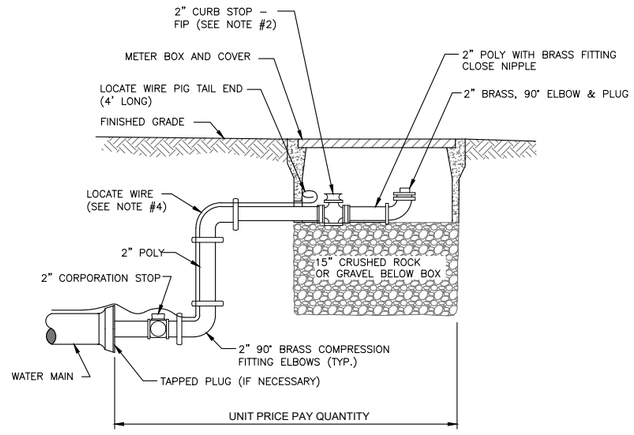
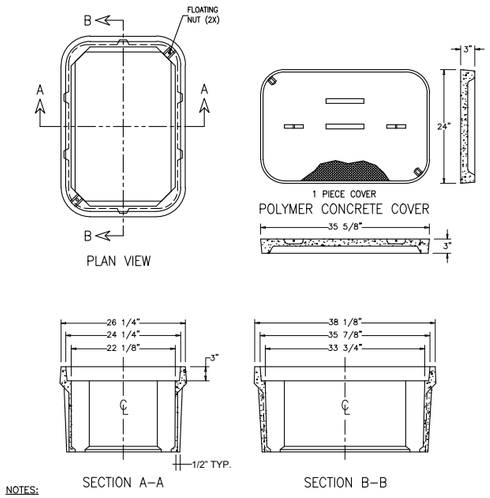


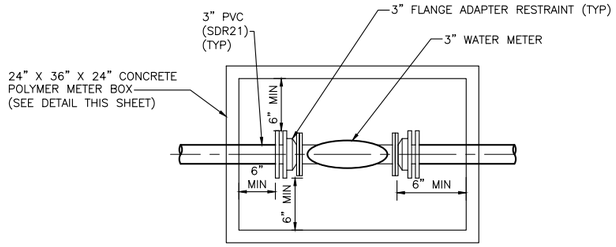
NOTES:
1. PIPE SHALL BE POLYETHYLENE. FITTINGS SHALL BE BRASS.
2. THE 2" CURB STOP SHALL BE ALL BRONZE. FITTINGS SHALL BE BRASS.
3. ANY RECLAIMED WATER VALVE SHALL HAVE RECLAIMED EMBLEM.
4. LOCATE WIRE FOR 10' OR GREATER IN LENGTH.
5. CANNOT BE PLACED UNDER CONCRETE OR PAVEMENT.
6. PLACE 2 FEET PAST LAST WATER MAIN SERVICE CONNECTION.

FLUSHING VALVE BELOW GRADE
NOT TO SCALE



NOTES:
1. THE DIMENSIONS SHOWN ARE FOR A STANDARD 24" WIDE BY 36" LONG BY 24" DEEP BOX. ALL DIMENSIONS ARE SHOWN IN INCHES.
2. GRADE TO SLOPE AWAY FROM METER BOX.
3. DO NOT INSTALL METER BOX IN AREA SUBJECTED TO FLOODING.
4. LOCATING WIRING REQUIRED.
5. A 4" THICK CONCRETE BOTTOM SHALL BE CONSTRUCTED DURING THE BOX INSTALLATION.

24" x 36" x 24" CO-POLYMER WATER METER BOX
NOT TO SCALE



NOTES:
1. THE CITY OF JACKSONVILLE BEACH WILL PROVIDE THE 3" WATER METER.
2. FOR COPOLYMER WATER METER BOX DETAIL, SEE DETAIL THIS SHEET.
3. MAXIMUM COVER OF LARGE WATER METERS SHALL BE 36" (FROM TOP OF PIPE TO GRADE).
4. LOCATING WIRING REQUIRED FROM WATER MAIN TO METER BOX.

WATER METER BOX DETAIL
AS SHOWN

MICHAEL R. KLINK LICENSE No. 71840 STATE OF FLORIDA PROFESSIONAL ENGINEER

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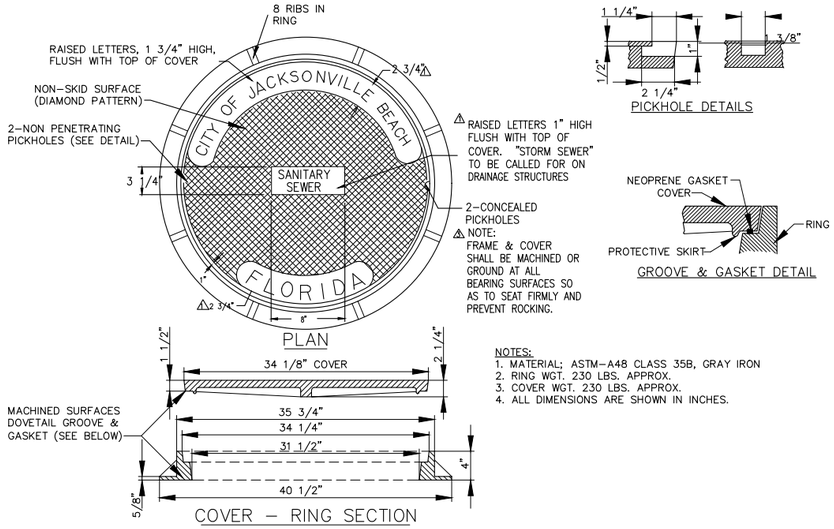


△ RAISED LETTERS 1" HIGH FLUSH WITH TOP OF COVER. "STORM SEWER" TO BE CALLED FOR ON DRAINAGE STRUCTURES

△ 2-CONCEALED PICKHOLES

△ NOTE: FRAME & COVER SHALL BE MACHINED OR GROUND AT ALL BEARING SURFACES SO AS TO SEAT FIRMLY AND PREVENT ROCKING.

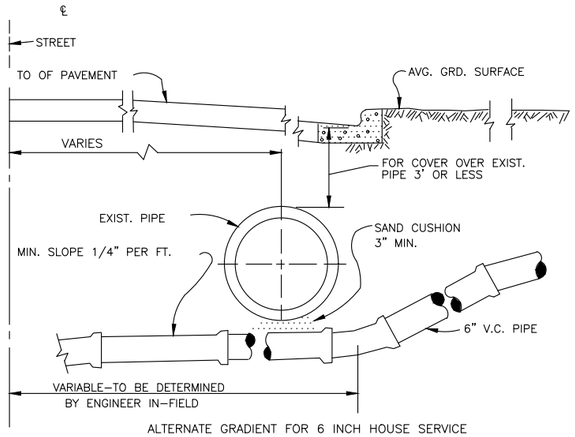
PICKHOLE DETAILS

GROOVE & GASKET DETAIL

NOTES:
1. MATERIAL; ASTM-A48 CLASS 35B, GRAY IRON
2. RING WGT. 230 LBS. APPROX.
3. COVER WGT. 230 LBS. APPROX.
4. ALL DIMENSIONS ARE SHOWN IN INCHES.

SEWER MANHOLE COVER AND FRAME

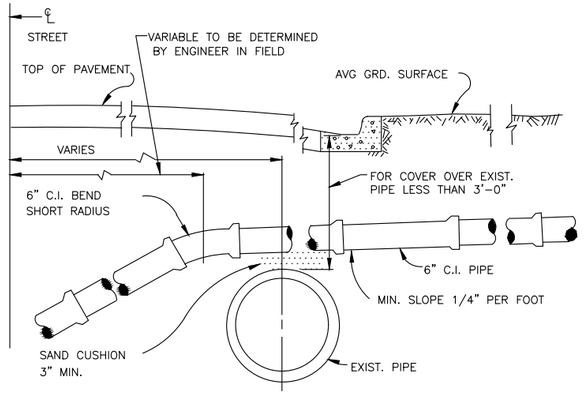
N.T.S.



ALTERNATE GRADIENT FOR 6 INCH HOUSE SERVICE SEWERS AT CONFLICTS WITH EXISTING STORM SEWERS & OTHER EXISTING CONDUITS.

6 INCH HOUSE CONN.

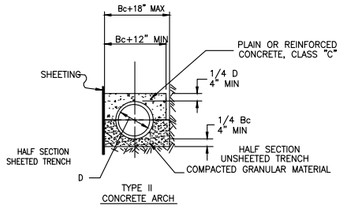
N.T.S.

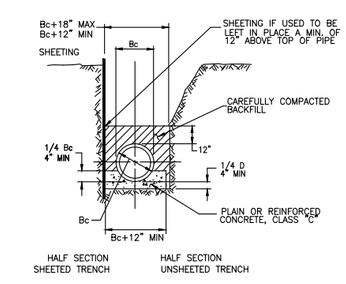


ALTERNATE GRADIENT FOR 6 INCH HOUSE SERVICE SEWERS AT CONFLICTS WITH EXISTING STORM SEWERS & OTHER EXISTING CONDUITS

6 INCH C.I. HOUSE CONN.

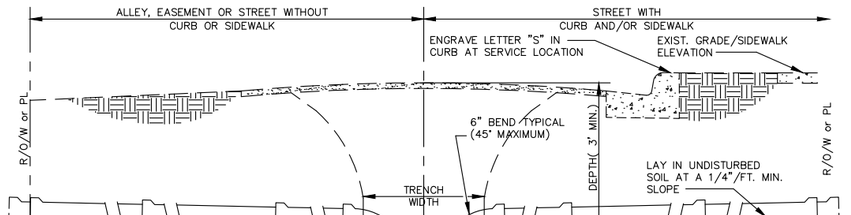
N.T.S.





BEDDING - CLASS A

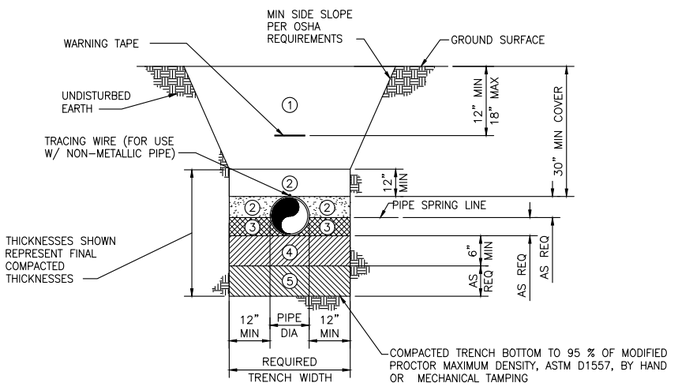
N.T.S.



SEWER SERVICE LATERAL SECTION

N.T.S.

NOTES:
1. ALL NEW SEWER SERVICE LATERALS SHALL HAVE A 4" X 4" X 3' LONG PRESSURE TREATED WOOD POST INSTALLED BETWEEN THE END OF THE LATERAL AND THE PROPERTY LINE. THE POST SHALL BE PAINTED "RED" AND EXTEND 12" ABOVE THE FINISHED GRADE. THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE INDIVIDUAL ITEMS.



FINAL BACKFILL – CLEAN, WELL GRADED MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS. FINAL BACKFILL SHALL BE INSTALLED IN LIFTS NOT EXCEEDING 6 INCHES, LOOSE MEASUREMENT, AND SHALL BE COMPACTED TO AT LEAST 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY, ASTM D-1557. (98% DENSITY UNDER ROADWAYS AND STRUCTURES).

INITIAL BACKFILL – CLEAN, WELL GRADED MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS. BACKFILL SHALL BE INSTALLED IN LIFTS NOT EXCEEDING 6 INCHES, LOOSE MEASUREMENT, AND SHALL BE COMPACTED TO AT LEAST 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY, ASTM D-1557. (98% DENSITY UNDER ROADWAYS AND STRUCTURES) BACKFILL SHALL EXTEND TO THE TOP OF THE PIPE AFTER COMPACTION. ALL LIFTS SHALL BE COMPACTED BY HAND TAMPING OR AN APPROVED METHOD OF MECHANICAL TAMPING.

HAUNCHING – CLEAN, WELL GRADED MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS. HAUNCHING SHALL BE INSTALLED IN COMPLETELY DEWATERED TRENCHES IN LIFTS NOT EXCEEDING 4 INCHES, LOOSE MEASUREMENT, AND SHALL BE COMPACTED TO AT LEAST 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY, ASTM D-1557, (98% DENSITY UNDER ROADWAYS AND STRUCTURES) BY HAND TAMPING. HAUNCHING SHALL BE BROUGHT UP EQUALLY ON BOTH SIDES OF THE PIPE.

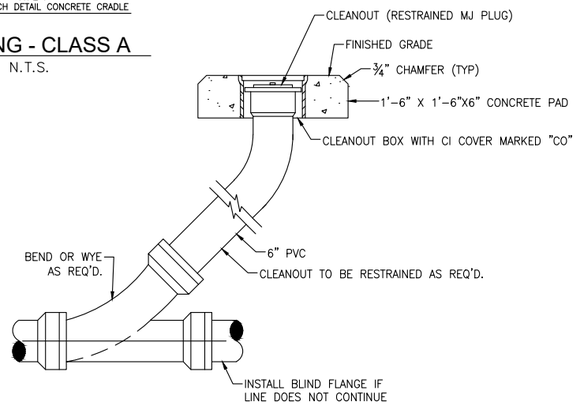
4 BEDDING – CLEAN, CLASS B TYPE 1, WELL GRADED MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATIONS. BEDDING SHALL BE INSTALLED IN COMPLETELY DEWATERED TRENCHES IN LIFTS NOT EXCEEDING 6 INCHES, LOOSE MEASUREMENT, AND SHALL BE COMPACTED TO AT LEAST 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY, ASTM D-1557, (98% DENSITY UNDER ROADWAYS AND STRUCTURES) BY HAND OR MECHANICAL TAMPING. PROPERLY SHAPED BELL HOLES SHALL BE EXCAVATED IN THE COMPACTED BEDDING TO PERMIT ASSEMBLY OF THE PIPE.

NOTE: NATIVE, UNDISTURBED MATERIAL IN COMPLETELY DEWATERED TRENCHES MEETING THE COMPACTION AND MATERIAL REQUIREMENTS FOR COMPACTED BEDDING MATERIAL NEED NOT BE REPLACED OR REWORKED, EXCEPT FOR SHAPING OF BELL HOLES, AND WHERE REFILL IS REQUIRED.

5 REFILL – REQUIRED WHERE TRENCH HAS BEEN OVER-EXCAVATED. REFILL SHALL BE INSTALLED IN COMPLETELY DEWATERED TRENCHES IN LIFTS NOT EXCEEDING 6 INCHES AND COMPACTED TO 95% OF ASTM D1557 MAX DRY DENSITY, (98% DENSITY UNDER ROADWAYS AND STRUCTURES) BY HAND OR MECHANICAL TAMPING.

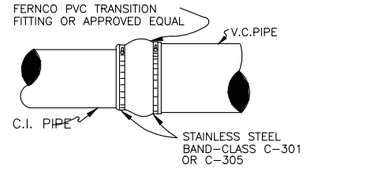
TYPICAL PIPE TRENCH DETAIL

NOT TO SCALE



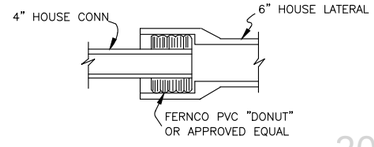
SEWER CLEANOUT DETAIL

N.T.S.



TYPICAL C.I. TO V.C. COUPLING ADAPTER

N.T.S.



TYPICAL 6" TO 4" HOUSE CONN.

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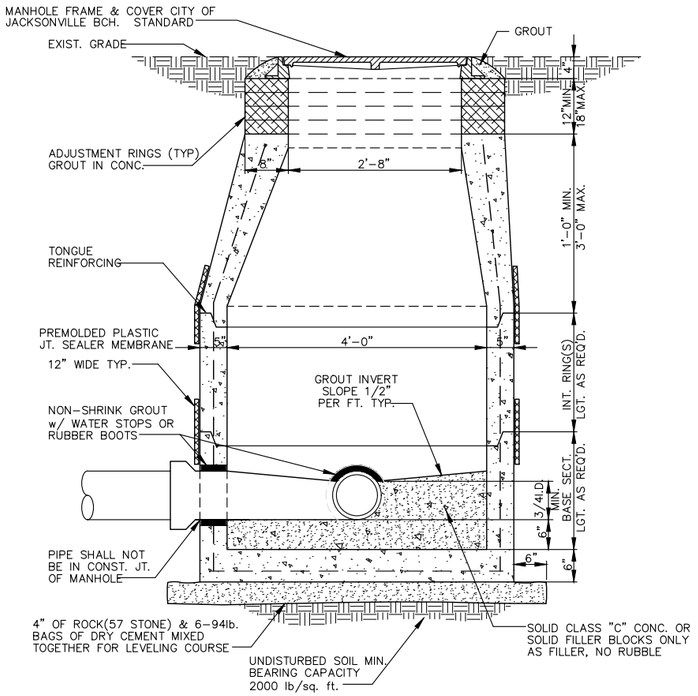
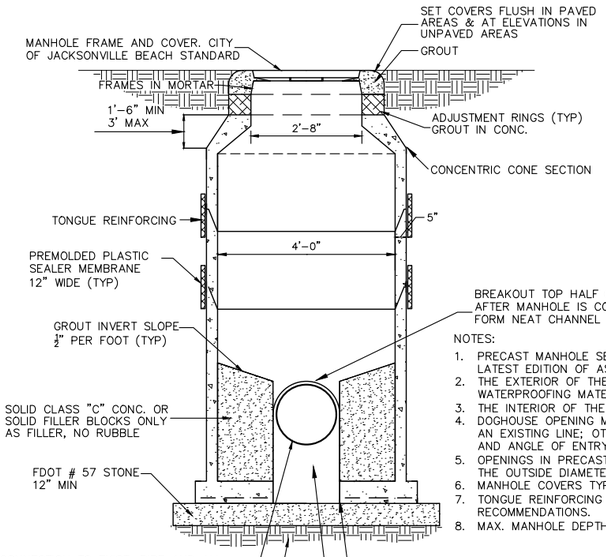


NOTES:
1. PRECAST MANHOLE SECTIONS TO BE MANUFACTURED IN ACCORDANCE WITH LATEST EDITION OF ASTM C47B WITH 4000 LB. CONCRETE, TYPE II CEMENT.
2. THE EXTERIOR OF THE MANHOLE SHALL BE GIVEN TWO COATS OF BITUMINOUS WATERPROOFING MATERIAL. DO NOT COAT JOINT OR PIPE OPENING SURFACES.
3. THE INTERIOR OF THE MANHOLE SHALL BE COATED WITH "SPECTRASHIELD".

SANITARY SEWER TYPE "A" MANHOLE

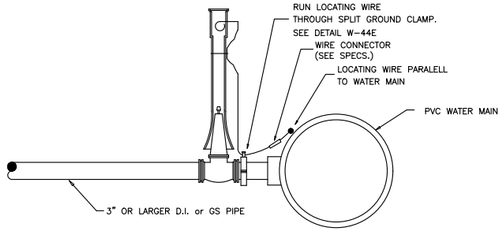
N.T.S.



NOTES:
1. PRECAST MANHOLE SECTIONS TO BE MANUFACTURED IN ACCORDANCE WITH LATEST EDITION OF ASTM C47B WITH 4000 LB. CONCRETE, TYPE II CEMENT.
2. THE EXTERIOR OF THE MANHOLE SHALL BE GIVEN TWO COATS OF BITUMINOUS WATERPROOFING MATERIAL. DO NOT COAT JOINT OR PIPE OPENING SURFACES.
3. THE INTERIOR OF THE MANHOLE SHALL BE COATED WITH "SPECTRASHIELD".
4. DOGHOUSE OPENING MAY ONLY BE USED WHEN PLACING A NEW MANHOLE OVER AN EXISTING LINE; OTHERWISE, THE OPENING MUST BE CAST. SIZE, LOCATION AND ANGLE OF ENTRY SHOULD BE AS REQUIRED BY THE PLANS.
5. OPENINGS IN PRECAST UNITS ARE TO BE 4" MINIMUM TO 8" MAX. LARGER THAN THE OUTSIDE DIAMETER OF THE PROPOSED PIPE.
6. MANHOLE COVERS TYPICAL FOR ALL FRAME TYPES.
7. TONGUE REINFORCING MUST BE USED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
8. MAX. MANHOLE DEPTH SHALL BE 15' TO LOWEST PIPE INVERT.

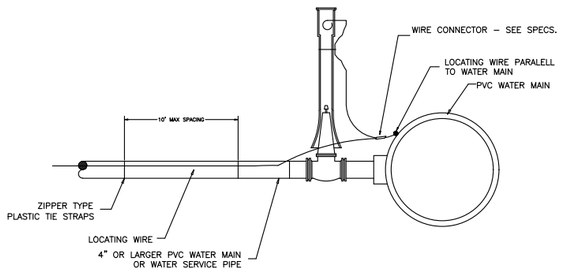
SADDLE MANHOLE

N.T.S.



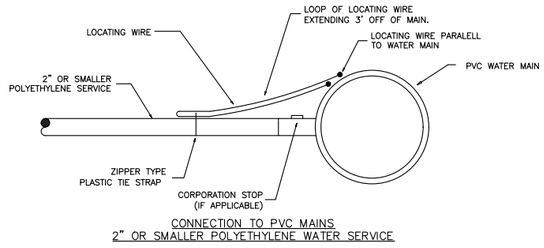
CONNECTION TO PVC MAINS

w/3" OR LARGER D.I. OR GS WATER SERVICE OR WATER MAIN



CONNECTION TO PVC MAINS

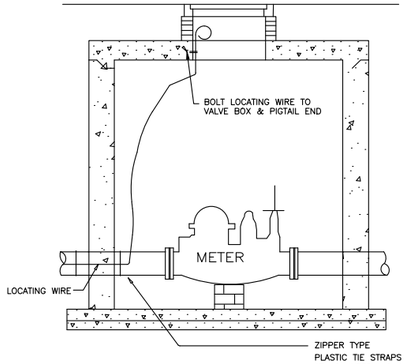
4" OR LARGER PVC WATER MAIN OR WATER SERVICE PIPE



CONNECTION TO PVC MAINS
2" OR SMALLER POLYETHYLENE WATER SERVICE

LOCATING WIRE DETAIL "A"

N.T.S.

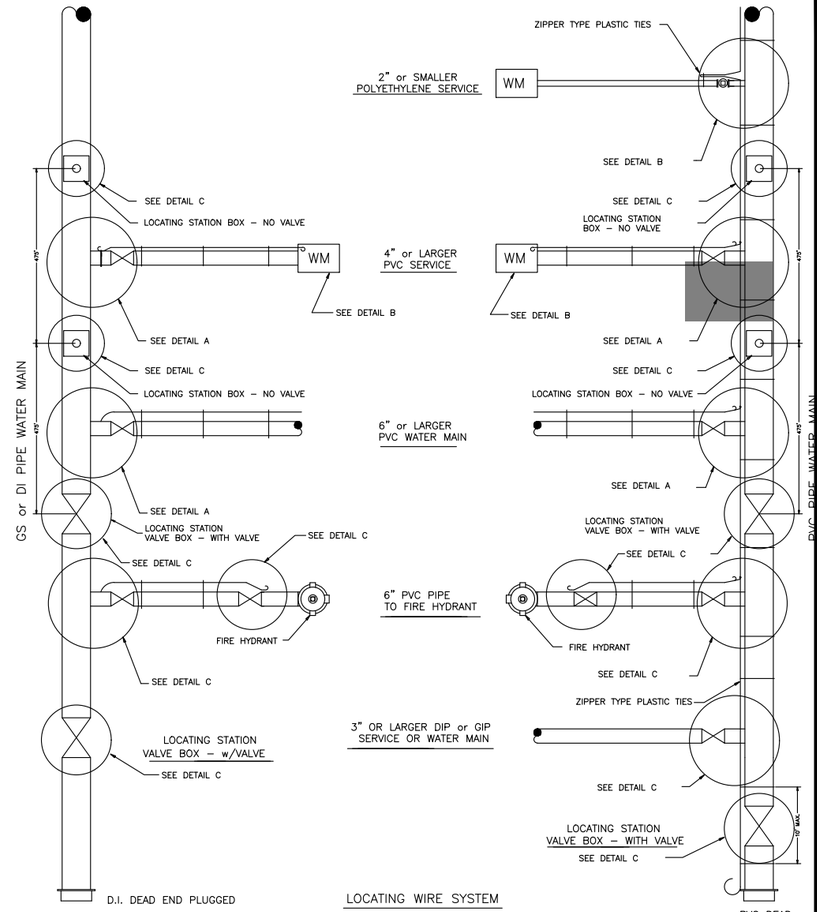


PRECAST METER BOX & COVER (3" OR LARGER)

CONNECTION AT METERS BOXES w/ PVC WATER SERVICE

LOCATING WIRE DETAIL "B"

N.T.S.

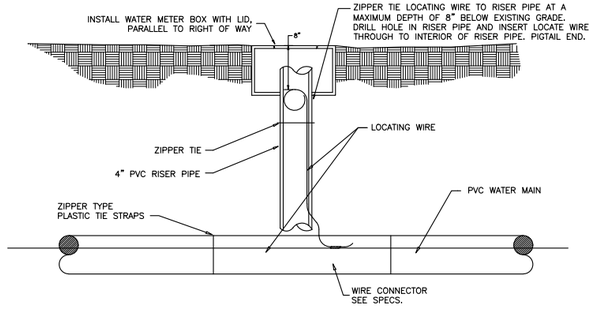


LOCATING WIRE SYSTEM

1. LOCATING WIRE TO BE INSTALLED IN EITHER THE ONE OR ELEVEN O'CLOCK POSITION ON PIPE.
2. SECURE LOCATING WIRE TO WATER MAIN BY USE OF ZIPPER TYPE PLASTIC TIE STRAPS SPACED AT A MAXIMUM DISTANCE OF TEN FEET (10') AND AT EACH SIDE OF BELL JOINT OR FITTING.
3. THE ENTIRE LOCATING SYSTEM SYSTEM SHALL BE SUBJECTED TO TESTING TO DETERMINE ITS RELIABILITY. WHERE INSTALLED UNDER PAVEMENT AREAS , TESTING SHALL BE DONE PRIOR TO THE PLACEMENT OF PAVEMENT.
4. LOCATING WIRE SHALL TERMINATE WITHIN A VALVE BOX WITH A VALVE OR A METER BOX IF NO VALVE AT 475' INTERVALS. SEE DETAILS.
5. LOCATING WIRE SHALL BE 10 GAUGE, SINGLE STRAND, UF RATED (DIRECT BURIAL), COPPER WIRE.

LOCATING WIRE

N.T.S.



IN LINE LOCATING STATION - PVC PIPE METER BOX

LOCATING WIRE DETAIL "C"

N.T.S.

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS

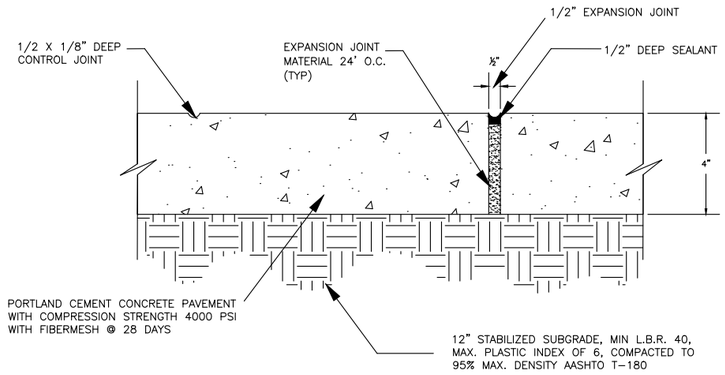
CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN
MRK	BRH
JOB #	ISSUE DATE
19-1023	JANUARY 2025
ISSUE	PERMIT

FOUR WATERS ENGINEERING
324 6TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-413-2400 C.O.A.# 31101 WWW.4WENG.COM

Approved
2025-H-28[illegible]645
Jason Gutierrez
8/20/2025

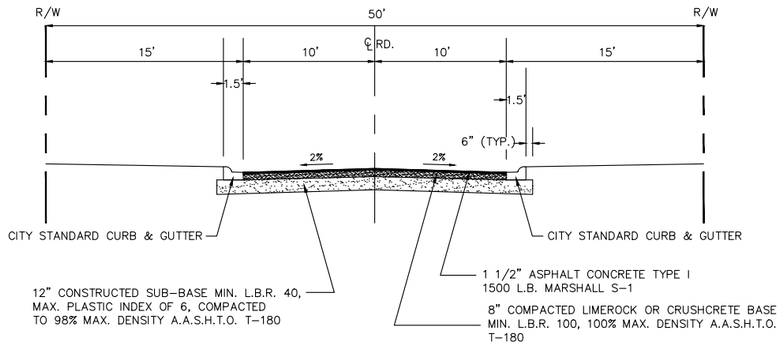
DRAWING NUMBER
D-5



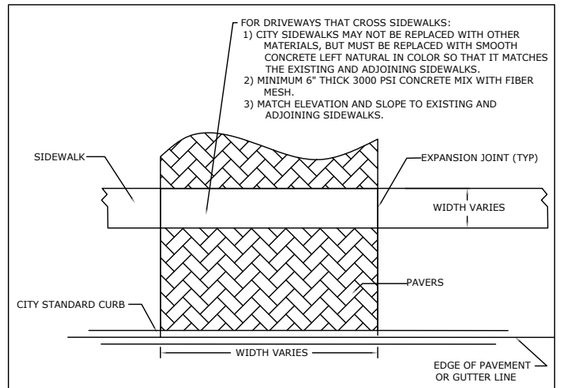
NOTE: IF CONTROL JOINTS ARE SAWED, SAWING SHALL BE ACCOMPLISHED WITHIN 12 HRS. OF CONCRETE POUR: 5'-0" O.C. (TYP)

STANDARD SIDEWALK DETAIL

N.T.S.



TYPICAL SECTION (CITY STANDARD CURB)



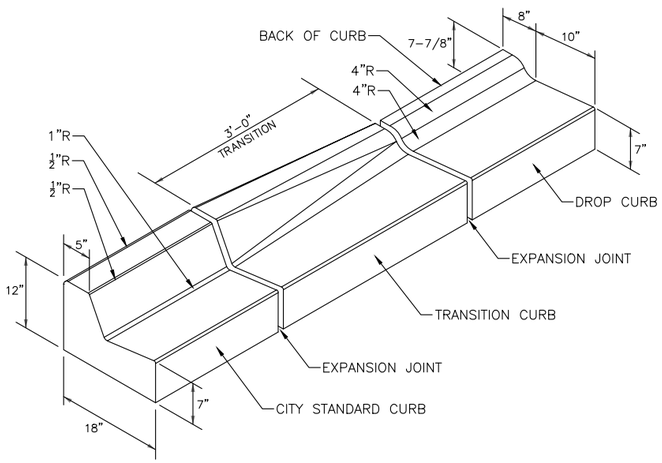
STANDARD PAVER DRIVEWAY CONSTRUCTION

N.T.S.

USE THIS SPEC IF PROPERTY ALREADY HAS A CURB.

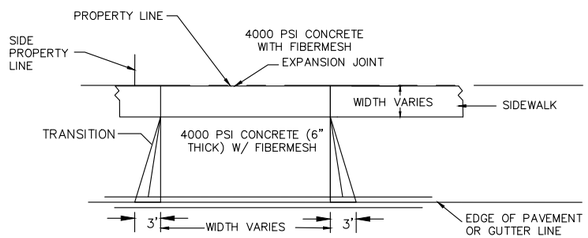
CITY OF JACKSONVILLE BEACH, FLORIDA

PAVER DRIVEWAY CONSTRUCTION STANDARD



TRANSITION CURB DETAIL

NOT TO SCALE



CITY OF JACKSONVILLE BEACH, FLORIDA 6" CONCRETE DRIVEWAY STANDARD DETAIL

NOT TO SCALE

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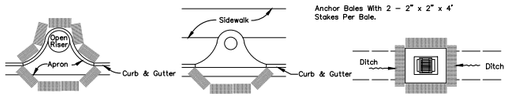
DRAWING NUMBER D-6

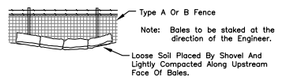
Approved
2025-H-2[illegible]845
Jason Quinto
8/20/2025

EROSION AND SEDIMENT CONTROL NOTES

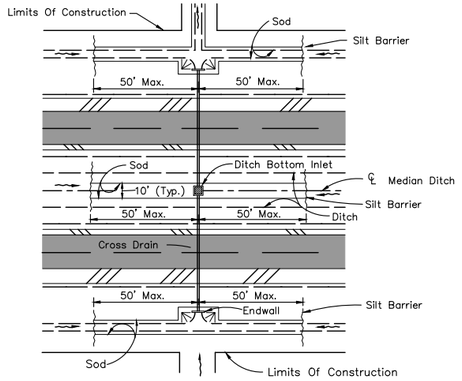
1. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING SILT FROM SITE IF NOT REUSABLE ON-SITE AND ASSURING PLAN ALIGNMENT AND GRADE IN ALL DITCHES AND SWALES AT COMPLETION OF CONSTRUCTION.
2. THE SITE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES AFTER COMPLETION OF CONSTRUCTION AND ONLY WHEN AREAS HAVE BEEN STABILIZED.
3. ADDITIONAL PROTECTION – ON-SITE PROTECTION IN ADDITION TO THE ABOVE MUST BE PROVIDED THAT WILL NOT PERMIT SILT TO LEAVE THE PROJECT CONFINES DUE TO UNSEEN CONDITIONS OR ACCIDENTS.
4. CONTRACTOR SHALL INSURE THAT ALL DRAINAGE STRUCTURES, PIPES, ETC. ARE CLEANED OUT AND WORKING PROPERLY AT TIME OF ACCEPTANCE.
5. WIRE MESH SHALL BE LAID OVER THE DROP INLET SO THAT THE WIRE EXTENDS A MINIMUM OF 1 FOOT BEYOND EACH SIDE OF THE INLET STRUCTURE. HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH 1/2-INCH OPENINGS SHALL BE USED. IF MORE THAN ONE STRIP OF MESH IS NECESSARY, THE STRIPS SHALL BE OVERLAPPED.
6. FDOT NO. 1 COARSE AGGREGATE SHALL BE PLACED OVER THE WIRE MESH AS INDICATED IN D-903. THE DEPTH OF STONE SHALL BE AT LEAST 12 INCHES OVER THE ENTIRE INLET OPENING. THE STONE SHALL EXTEND BEYOND THE INLET OPENING AT LEAST 18 INCHES ON ALL SIDES.
7. IF THE STONE FILTER BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PERFORMS ITS FUNCTION, THE STONES MUST BE PULLED AWAY FROM THE INLET, CLEANED AND REPLACED.
8. BALES SHALL BE EITHER WIRE-BOUND OR STRING-TIED WITH THE BINDINGS ORIENTED AROUND THE SIDES RATHER THAN OVER AND UNDER THE BALES.
9. BALES SHALL BE PLACED LENGTHWISE IN A SINGLE ROW SURROUNDING THE INLET, WITH THE ENDS OF ADJACENT BALES PRESSED TOGETHER.
10. THE FILTER BARRIER SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED TO A MINIMUM DEPTH OF 8 INCHES. AFTER THE BALES ARE STAKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AND COMPACTED AGAINST THE FILTER BARRIER.
11. EACH BALE SHALL BE SECURELY ANCHORED AND HELD IN PLACE BY AT LEAST TWO STAKES OR REBARS DRIVEN THROUGH THE BALE.
12. LOOSE STRAW SHOULD BE WEDGED BETWEEN BALES TO PREVENT WATER FROM ENTERING BETWEEN BALES.
13. STRAW BALE BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
14. CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED BALES, END RUNS AND UNDERCUTTING BENEATH BALES.
15. NECESSARY REPAIRS TO BARRIERS OR REPLACEMENT OF BALES SHALL BE ACCOMPLISHED PROMPTLY.
16. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SYNTHETIC BALE BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.
17. SILT FENCES AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
18. SHOULD THE FABRIC ON A SILT FENCE OR FILTER BARRIER DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
19. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER.
20. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEEDED.
21. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
22. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
23. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING THE BEST EROSION AND SEDIMENT CONTROL PRACTICES AS OUTLINED IN THE PLANS, SPECIFICATIONS AND ST. JOHNS RIVER WATER MANAGEMENT DISTRICT SPECIFICATIONS AND CRITERIA.
24. FOR ADDITIONAL INFORMATION ON SEDIMENT AND EROSION CONTROL REFER TO "THE FLORIDA DEVELOPMENT MANUAL – A GUIDE TO SOUND LAND AND WATER MANAGEMENT" FROM THE STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (F.D.E.R.) CHAPTER 6.
25. EROSION AND SEDIMENT CONTROL BARRIERS SHALL BE PLACED ADJACENT TO ALL WETLAND AREAS WHERE THERE IS POTENTIAL FOR DOWNSTREAM WATER QUALITY DEGRADATION. SEE DETAIL SHEET FOR TYPICAL CONSTRUCTION.
26. ALL DISTURBED AREAS SHALL BE GRASSED, FERTILIZED, MULCHED AND MAINTAINED UNTIL A PERMANENT VEGETATIVE COVER IS ESTABLISHED.
27. SOD SHALL BE PLACED IN AREAS WHICH MAY REQUIRE IMMEDIATE EROSION PROTECTION TO ENSURE WATER QUALITY STANDARDS ARE MAINTAINED.
28. ANY DISCHARGE FROM DEWATERING ACTIVITY SHALL BE FILTERED AND CONVEYED TO THE OUTFALL IN A MANNER WHICH PREVENTS EROSION AND TRANSPORTATION OF SUSPENDED SOLIDS TO THE RECEIVING OUTFALL.
29. DEWATERING PUMPS SHALL NOT EXCEED THE CAPACITY OF THAT WHICH REQUIRES A CONSUMPTIVE USE PERMIT FROM THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT.
30. ALL DISTURBED AREAS TO BE STABILIZED THROUGH COMPACTION, SILT SCREENS, SYNTHETIC BALES, AND GRASSING. ALL FILL SLOPES 3:1 OR STEEPER TO RECEIVE STAKED SOLID SOD.
31. ALL DEWATERING, EROSION, AND SEDIMENT CONTROL TO REMAIN IN PLACE AFTER COMPLETION OF CONSTRUCTION AND REMOVED ONLY WHEN AREAS HAVE STABILIZED.
32. THIS PLAN INDICATES THE MINIMUM EROSION AND SEDIMENT MEASURES REQUIRED FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL APPLICABLE RULES, REGULATIONS AND WATER QUALITY GUIDELINES AND MAY NEED TO INSTALL ADDITIONAL CONTROLS.
33. THE CONTRACTOR SHALL BE REQUIRED TO RESPOND TO ALL WATER MANAGEMENT DISTRICT INQUIRIES, RELATIVE TO COMPLIANCE OF SJRWMD FOR EROSION AND SEDIMENTATION CONTROL. THE COST OF THIS COMPLIANCE SHALL BE PART OF THE CONTRACT.



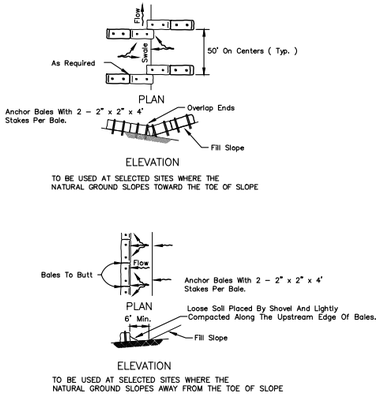
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



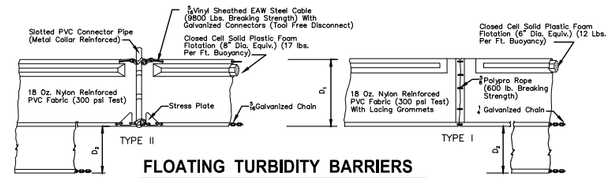
BALES BACKED BY FENCE



DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

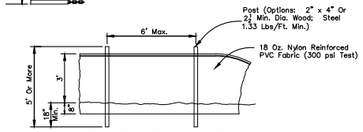


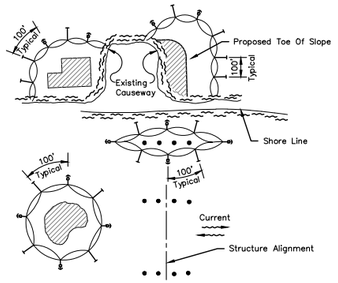
BARRIERS FOR FILL SLOPES



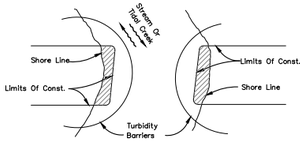
FLOATING TURBIDITY BARRIERS

NOTICE:
COMPONENTS OF TYPES I & TYPE II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.





NOTES:
1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of anchors dependent on current velocities.
3. Deployment of barrier around pile locations may vary to accommodate construction operations.
4. Navigation may require segmenting barrier during construction operations.
5. For additional information see Section 104 of the FDOT Standard Specifications.

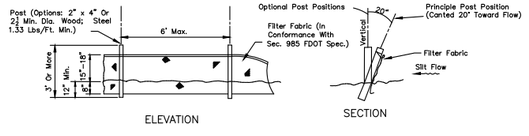


Note:
Turbidity barriers for flowing streams and tidal creeks may be either floating, or staked types or any combinations of types that will suit site conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractors option unless otherwise specified in the plans, however payment will be under the contract lump sum price established in the bid proposal for Erosion & Sediment Control Posts in staked turbidity barriers to be installed in vertical position unless otherwise directed by the Engineer.

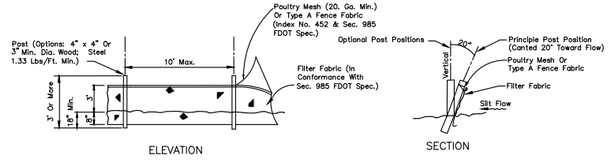
TURBIDITY BARRIER APPLICATIONS

SYNTHETIC BALE LOCATION

(D-901)
N.T.S.

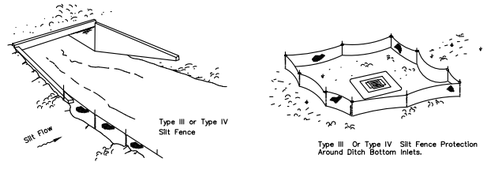


TYPE III SILT FENCE

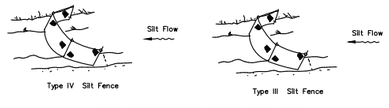


Note: Silt Fence to be paid for under the contract lump sum price for Erosion and Sediment Control.

TYPE IV SILT FENCE



Do not deploy in a manner that silt fences will act as a dam across permanent flowing watercourses. Silt fences are to be used at upland locations and turbidity barriers used at permanent bodies of water.

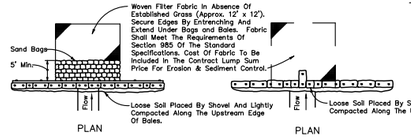


Note: Spacing for Type III & TYPE IV Fence to be in accordance with Chart 1, Sheet 1 of 3, FDOT Index No. 102 and ditch installations at drainage structures Sheet 2 of 3, FDOT Index No. 102.

SILT FENCE APPLICATIONS

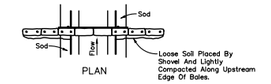
SYNTHETIC BALE BARRIERS TYPE I & II

(D-912)
N.T.S.



Application and Spacing: The use of Types I & II bale barriers should be limited to the conditions outlined in Chart 1, Sheet 1 of 3, Index No. 102

BARRIER FOR UNPAVED DITCHES



BARRIER FOR PAVED DITCH

NOTE:
WHERE FDOT SPECS AND INDEX ARE REFERENCED, PLEASE REFER TO FDOT ROADWAY & TRAFFIC DESIGN STANDARDS, AND FDOT STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION.

SILT FENCE TYPE III & IV

(D-908)
N.T.S.

TURBIDITY BARRIERS

(D-907)
N.T.S.

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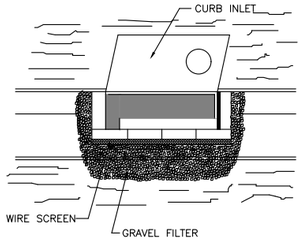
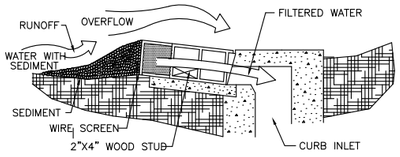
8/20/2025



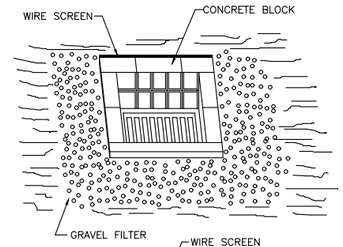


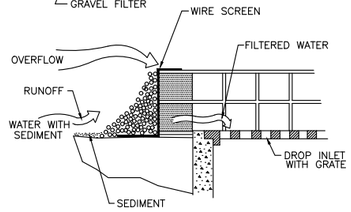
SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.

BLOCK & GRAVEL CURB INLET SEDIMENT FILTER

(D-902)
N.T.S.





SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

BLOCK & GRAVEL DROP INLET SEDIMENT FILTER

(D-904)
N.T.S.

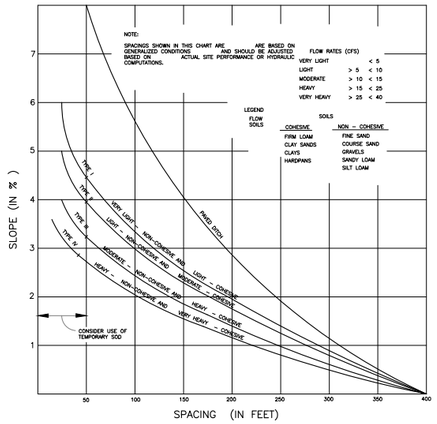
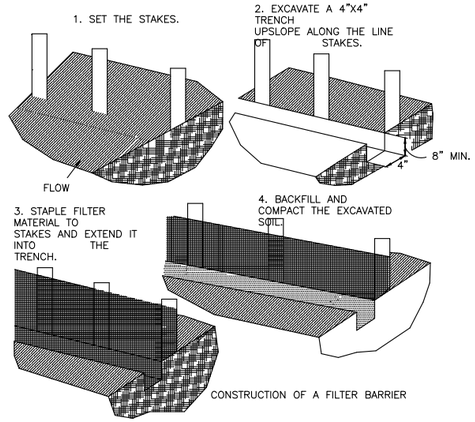


CHART I

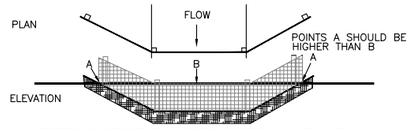
RECOMMENDED SPACING FOR TYPE I AND TYPE II SYNTHETIC BALE BARRIERS, AND TYPE III AND TYPE IV SILT FENCES AND PAVED DITCH SYNTHETIC BALE BARRIERS

SPACING RECOMMENDATION FOR SILT FENCES & SYNTHETIC BALES

(D-906)
N.T.S.



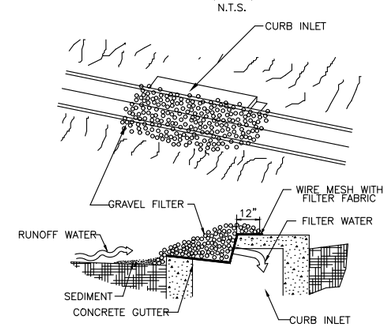
CONSTRUCTION OF A FILTER BARRIER



PROPER PLACEMENT OF A FILTER BARRIER IN A DRAINAGE WAY

FILTER BARRIER CONSTRUCTION DETAIL

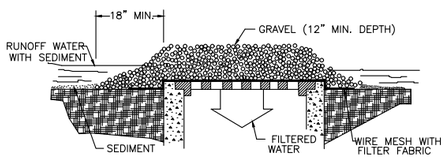
(D-910)
N.T.S.



GRAVEL CURB INLET SEDIMENT FILTER

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.



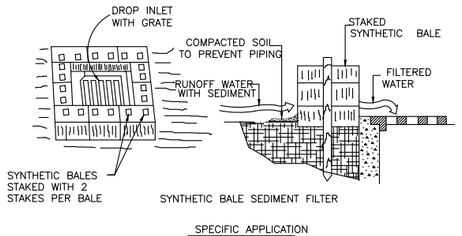
GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY CONCEN- TRATED FLOWS ARE EXPECTED, BUT NOT WHERE PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

GRAVEL INLET SEDIMENT TRAP

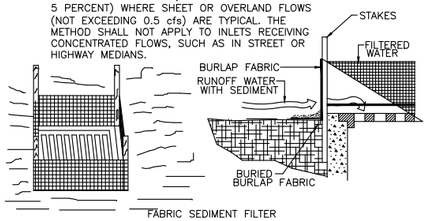
(D-903)
N.T.S.



SYNTHETIC BALE SEDIMENT FILTER

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPES NO GREATER THAN 5 PERCENT) WHERE SHEET OR OVERLAND FLOWS (NOT EXCEEDING 0.5 cfs) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.



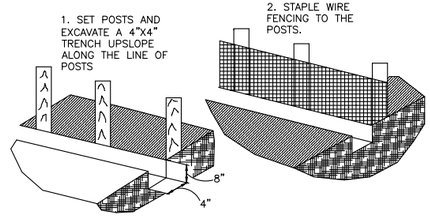
FABRIC SEDIMENT FILTER

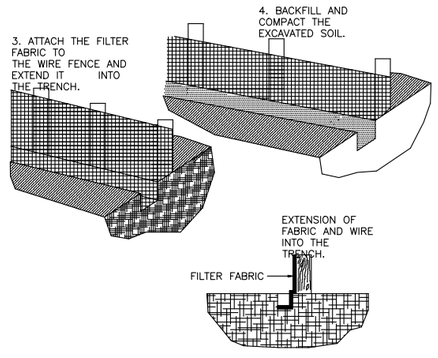
SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPES NO GREATER THAN 5 PERCENT) WHERE SHEET OR OVERLAND FLOWS (NOT EXCEEDING 0.5 cfs) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS. SUCH AS IN STREET OR HIGHWAY MEDIANS.

DROP INLET SEDIMENT TRAP

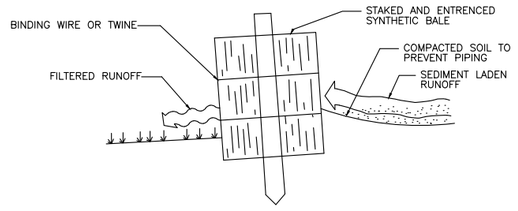
(D-905)
N.T.S.





CONSTRUCTION DETAILS FOR SILT FENCES

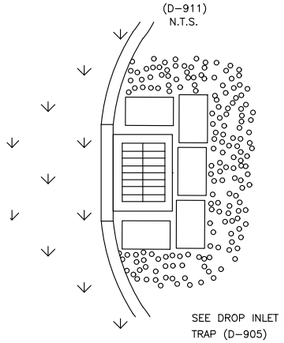
(D-909)
N.T.S.



CROSS-SECTION OF A PROPERLY INSTALLED STRAW BALE

STAKED SYNTHETIC BALE

(D-911)
N.T.S.



SEE DROP INLET SEDIMENT TRAP (D-905)

ERECT SEDIMENT BARRIERS AT CATCH BASINS

(TYPICAL)
N.T.S.

MICHAEL R. KLINK LICENSE No. 71840 STATE OF FLORIDA PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS

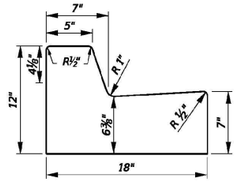
CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN	
MRK	BRH	
JOB #	19-1023	
ISSUE DATE	JANUARY 2025	
ISSUE	PERMIT	

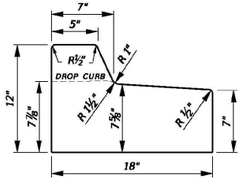
FOUR WATERS ENGINEERING
324 6TH AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-414-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
D-8

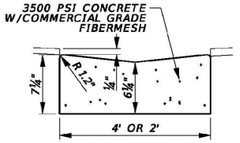
Approved
2025-H-2[illegible]845
Jason Gilbert
8/20/2025



CITY STANDARD



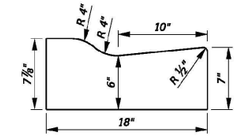
MEDIAN CURB



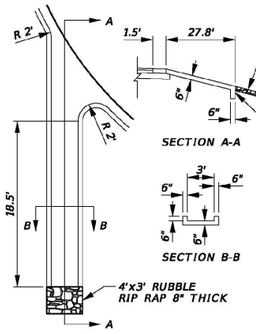
VALLEY GUTTER DETAIL

TABLE 1 HORIZONTAL WALL REINFORCING SCHEDULE				
WALL DEPTH	SCHEDULE	AREA (in.²/ft.)	MAX. SPACING	
			BARS	WWR
0' - 5'	A12	0.20	12"	8"
5' - 9'	A6	0.20	6"	5"
9' - 12'	A4	0.20	4"	3"
9' - 15'	B5.5	0.24	5½"	5"

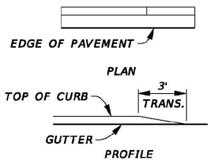
NOTES:
1. PLAN VIEW: GRATE, CONCRETE DITCH PAVEMENT, AND SOD NOT SHOWN ON STRUCTURE DETAIL.
2. PRECAST SHOWN, CAST-IN-PLACE (C-I-P) SIMILAR.
3. CONSTRUCTION JOINTS PERMITTED BETWEEN THESE LIMITS. SEE INDEX 425-001 FOR MINIMUM DIMENSIONS.



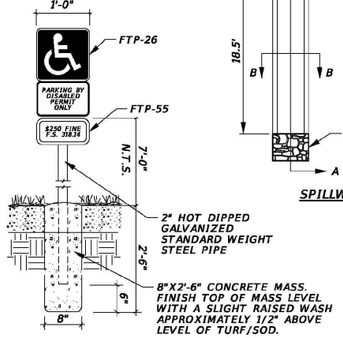
DROP CURB



SPILLWAY DETAIL

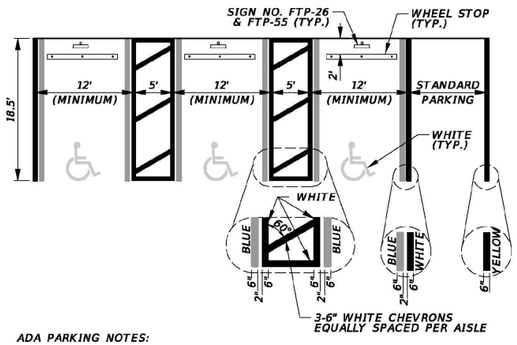


CURB TRANSITION



SIGN NOTES:

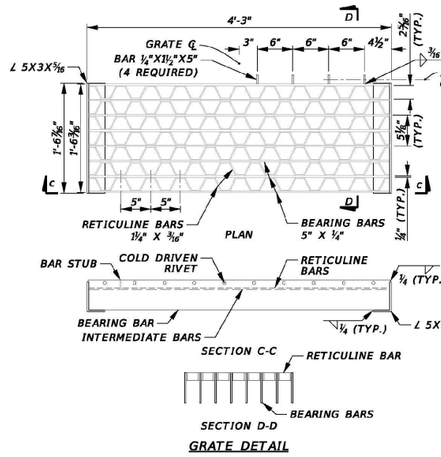
1. METAL POST TO BE H.D. GALVANIZED. ALL BOLTS, NUTS, WASHERS, AND SCREWS SHALL BE 316 S.S.
2. CONCRETE FOR FOOTING SHALL BE OF PORTLAND CEMENT AND HAVE A MIN. COMPRESSIVE STRENGTH OF 3000 P.S.I.
3. SIGNS WILL BE FABRICATED BY USING A REFLECTING COATING IN THE SYMBOL, MESSAGE AND BORDERS APPLIED TO A SHEET ALUMIN. BACKING (.080") IN THICKNESS.
4. TOP PORTION OF FTP-25 SHALL HAVE A REFLECTIVE BLUE BACKGROUND WITH WHITE REFLECTIVE SYMBOL AND BORDER.
5. BOTTOM PORTION OF FTP-25 SHALL HAVE A REFLECTIVE WHITE BACKGROUND WITH BLACK OPAQUE LEGEND AND BORDER.



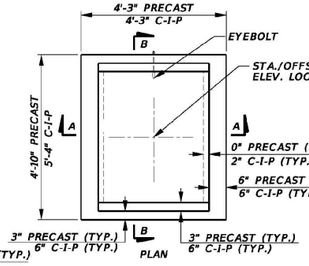
ADA PARKING NOTES:

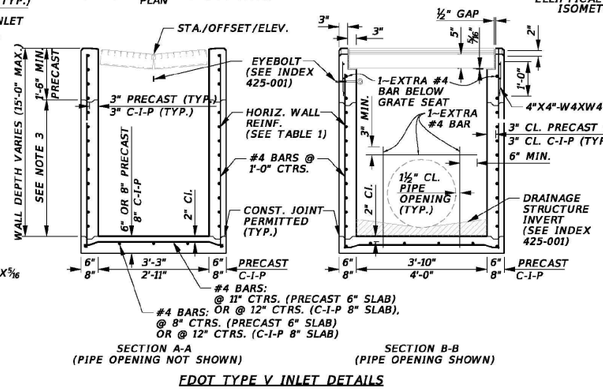
1. ALL HANDICAPPED PARKING SPACES MUST BE SIGNED AND MARKED PER STANDARDS ESTABLISHED BY THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG).
2. PARKING SPACES AND ACCESS ISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 1:50 (2%) IN ALL DIRECTIONS.
3. ADA PARKING SPACES SHALL BE DESIGNATED AS RESERVED BY A PAINTED SYMBOL OF ACCESSIBILITY AND A SIGN SHOWING THE ACCESSIBLE SYMBOL.
4. ADA SIGNS ARE TO BE LOCATED DIRECTLY IN FRONT OF AN ACCESSIBLE PARKING SPACE AND MOUNTED, EITHER ON A POLE OR A WALL, A MINIMUM OF SEVEN (7) FEET ABOVE THE PARKING SURFACE'S GRADE.
5. SIDEWALK RAMPS FRONTING AN ADA ACCESS ISLE SHALL HAVE DETECTABLE WARNINGS COMPLYING WITH ADAAG 4.29.2.

HANDICAP PARKING DETAILS

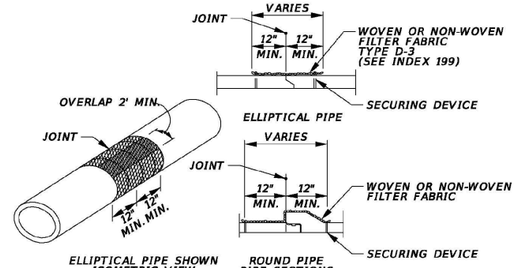


GRATE DETAIL





FDOT TYPE V INLET DETAILS

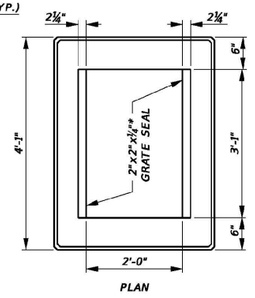


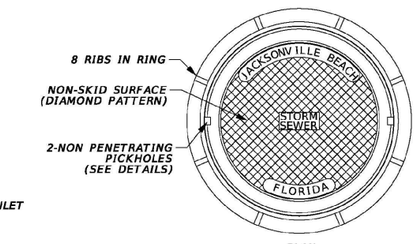
ELLIPTICAL PIPE SHOWN ISOMETRIC VIEW

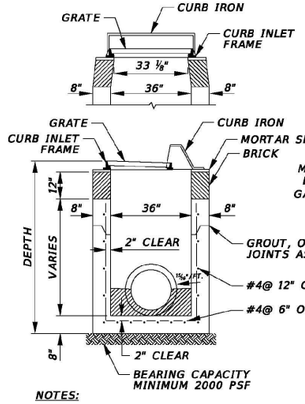
ROUND PIPE PIPE SECTIONS

NOTE:
COST OF FILTER FABRIC JACKET TO BE INCLUDED IN COST OF PIPE CULVERTS. FOR ALL PIPE TYPES - CONCRETE PIPE SHOWN.

FILTER FABRIC JACKET

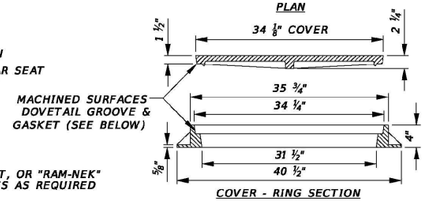






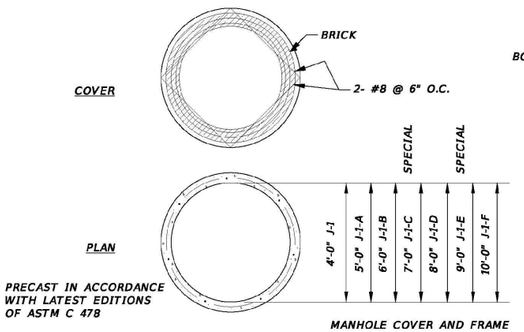
NOTES:
1. CONC. DESIGN STRENGTH 4,000 PSI.
2. PIPES SHALL BE FLUSH WITH INSIDE WALL.
3. PIPE MUST NOT BE IN CONST. JOINT.

STORM SEWER CURB INLET



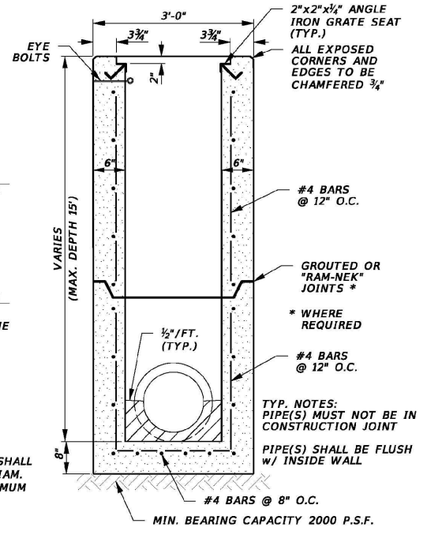
NOTES:
1. MATERIAL; ASTM-A48 CLASS 35B, GRAY IRON.
2. RING WGT. 230 LBS. APPROX.
3. COVER WGT. 230 LBS. APPROX.
4. ALL DIMENSIONS ARE SHOWN IN INCHES.

STORM SEWER MANHOLE COVER and FRAME



NOTE:
FOR ADDITIONAL STRUCTURAL DETAILS REFER TO PLATE D-110.

TYPE "J-1" MANHOLE



NOTES:
1. SLOT OPENINGS SHALL NOT BE IN WALLS WITH GRATE SEAL.
2. CONCRETE DESIGN STRENGTH - 4000 P.S.I.
3. PIPES MUST NOT BE IN CONSTRUCTION JOINTS.
4. PIPES SHALL BE FLUSH WITH INSIDE WALL.

TYPE 'C' INLET

MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS

CITY OF JACKSONVILLE BEACH, FL.

DESIGN	DRAWN	JOB #	ISSUE DATE	
MRK	BRH	19-1023	JANUARY 2025	PERMIT

FOUR WATERS ENGINEERING
324 6th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
D-9

Approved
2025-H-28[illegible]845
Jason Gummo
8/20/2025

LEGEND

ASPHALT

LIMEROCK

FINE SAND; SLIGHTLY SILTY FINE SAND (A-3)

CLAYEY SAND (A-2-6)

SILTY FINE SAND (A-2-4)

(A-3) AASHTO SOIL CLASSIFICATION SYSTEM

GROUNDWATER LEVEL AT TIME OF DRILLING

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FT UNLESS OTHERWISE NOTED, NUMBERS TO THE LEFT OF BORING INDICATE N-VALUES.

W -200 NATURAL MOISTURE CONTENT (%) FINES PASSING NO.200 SIEVE (%)

B.T. SPT BORING TERMINATED

GRANULAR MATERIALS

RELATIVE DENSITY	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT)
VERY LOOSE	LESS THAN 3
LOOSE	3-8
MEDIUM DENSE	8-24
DENSE	24-40
VERY DENSE	GREATER THAN 40

SILTS AND CLAYS

CONSISTENCY	AUTOMATIC HAMMER SPT N-VALUE (BLOWS/FT)
VERY SOFT	LESS THAN 1
SOFT	1-3
FIRM	3-6
STIFF	6-12
VERY STIFF	12-24
HARD	GREATER THAN 24

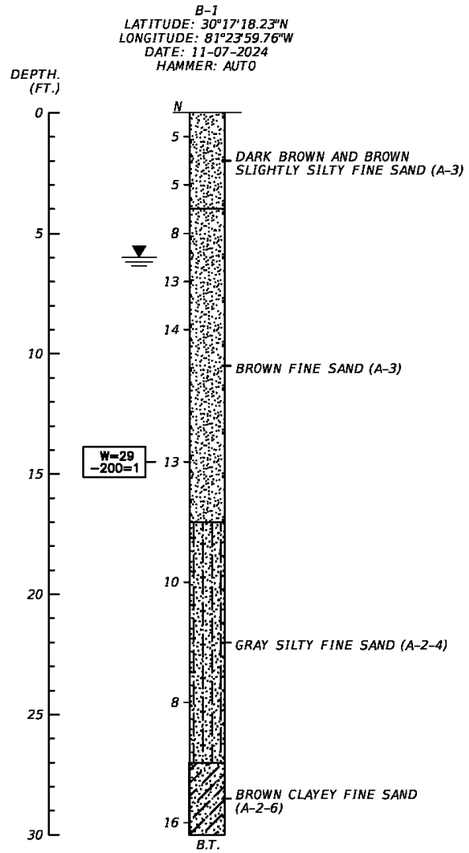
STANDARD PENETRATION TEST DATA

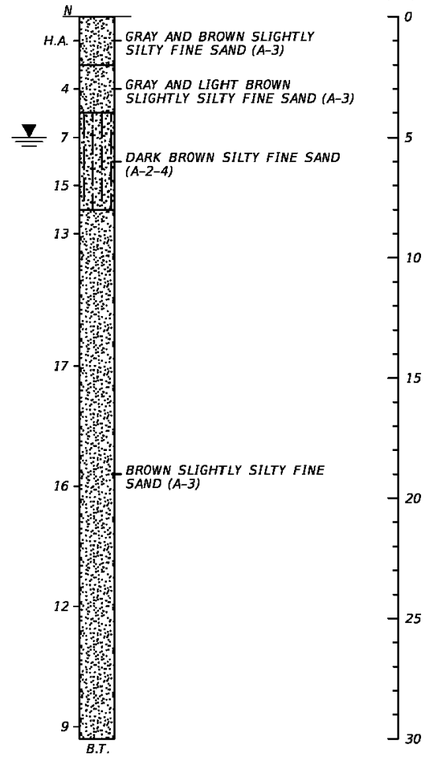
SPOON INSIDE DIA.	1.5 INCHES
SPOON OUTSIDE DIA.	2.0 INCHES
ASTM STANDARD DROP HAMMER, AUTO	
AVG. HAMMER DROP	30.0 INCHES
HAMMER WEIGHT	140.0 LBS

NOTES:

1) DRILL AND PENETRATION TESTING WAS PERFORMED IN ACCORDANCE WITH ASTM D-1586.

2) LAYER BOUNDARIES ARE APPROXIMATE AND MAY VARY BETWEEN OR AWAY FROM BORING LOCATIONS.





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2394 ST. JOHNS BLUFF ROAD, S. SUITE 200
JACKSONVILLE, FLORIDA 32246

GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIAL TESTING
CONSTRUCTION ENGINEERING INSPECTION

REPORT OF SPT BORINGS
JACKSONVILLE BEACH 10TH ST. SOUTH DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

MICHAEL R. KLINK LICENSE No. 71840 STATE OF FLORIDA PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS - SOIL BORINGS

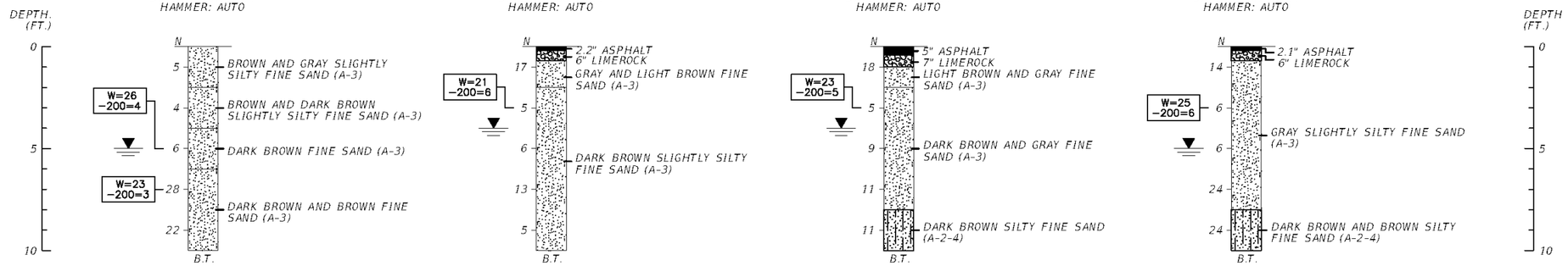
CITY OF JACKSONVILLE BEACH, FL

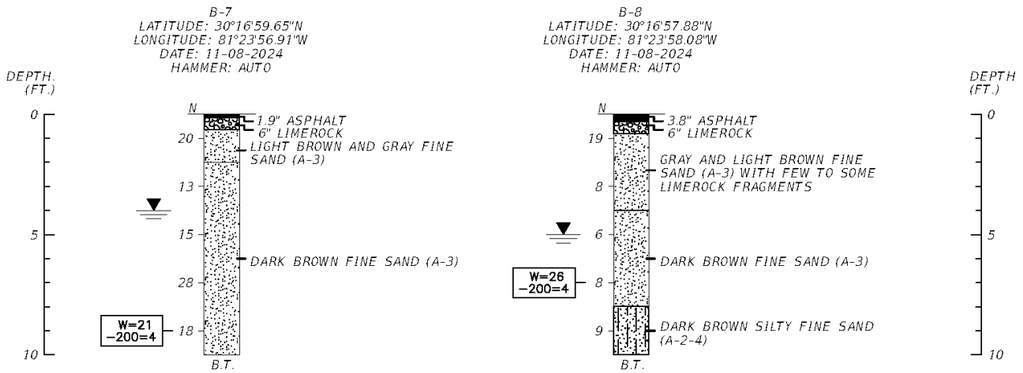
DESIGN	DRAWN	JOB #	ISSUE DATE	ISSUE
MRK	BRH	19-1023	JANUARY 2025	PERMIT

FOUR WATERS ENGINEERING
324 6th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 31101 WWW.4WENG.COM

DRAWING NUMBER
D-10

Approved
2025-H-2800-1845
Jason Gillette
8/20/2025





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2394 ST. JOHNS BLUFF ROAD, S. SUITE 200
JACKSONVILLE, FLORIDA 32246

GEOTECHNICAL ENGINEERING
CONSTRUCTION MATERIAL TESTING
CONSTRUCTION ENGINEERING INSPECTION

REPORT OF SPT BORINGS
JACKSONVILLE BEACH 10TH ST. SOUTH DRAINAGE IMPROVEMENTS
JACKSONVILLE BEACH, FLORIDA

MICHAEL R. KLINK
LICENSE
No. 71840
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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10TH STREET SOUTH
INFRASTRUCTURE IMPROVEMENTS - PHASE II

CONSTRUCTION DETAILS - SOIL BORINGS

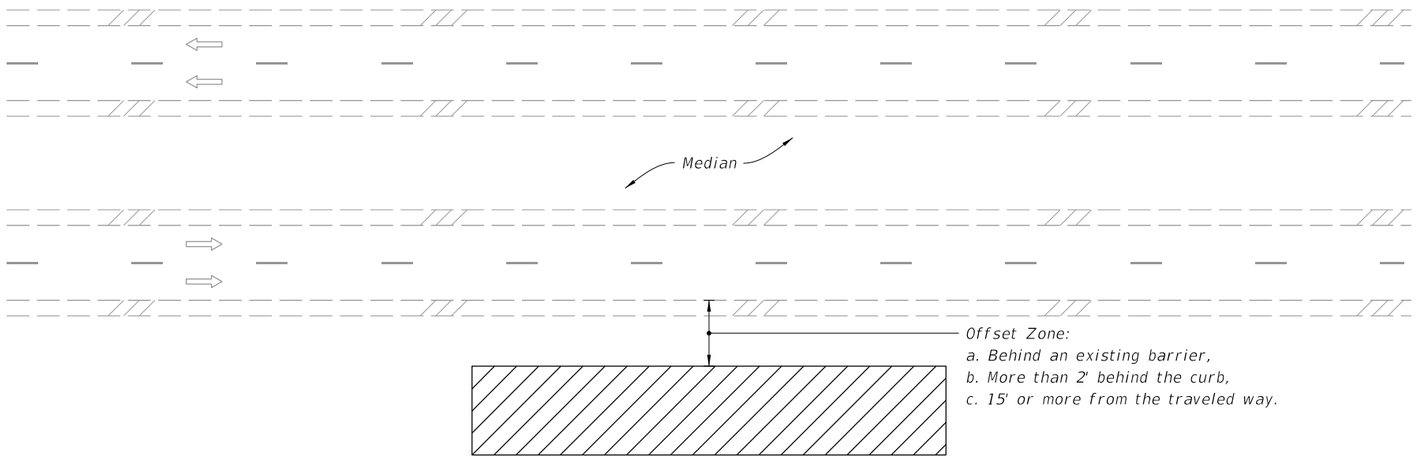
CITY OF JACKSONVILLE BEACH, FL

DESIGN	DRAWN		
MRK	BRH	19-1023	PERMIT
JOB #		ISSUE DATE	ISSUE
		JANUARY 2025	

FOUR WATERS ENGINEERING
324 4th AVE N. JACKSONVILLE BEACH, FLORIDA 32250
904-241-2400 C.O.A.# 51101 WWW.4WENG.COM

DRAWING NUMBER
D-11

Approved
2025-H-2[illegible]845
Jason Gillette
8/20/2025



MULTILANE ROADWAY SHOWN, TWO-LANE ROADWAY SIMILAR

NOTES:

1. This Index applies to Two-Lane, Two-Way and Multilane Roadways, including Medians of divided roadways, with work beyond the shoulder.

2. Use Index 102-602 when the work operation (excluding establishing and terminating the work area) requires that two or more work vehicles cross the Offset Zone in any one hour period.

3. Use Index 102-660 when Work Area encroaches a Sidewalk.

SYMBOLS:

Work Area

Lane Identification and Direction of Traffic

10/6/2022 1:23:55 PM

LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/20			FY 2023-24 STANDARD PLANS	TWO-LANE AND MULTILANE ROADWAY, WORK BEYOND THE SHOULDER	102-601	1 of 1

Approved
2025-H-294-00345
Jason Outlano
8/20/2025

NOTE:

1. This Index applies to Two-Lane, Two-Way and Multilane Roadways, including Medians of divided roadways, with work on the shoulder.

2. L = Taper Length
   X = Work Zone Sign Spacing
   B = Buffer Length
   See Index 102-600 for "L", "X", "B", and channelizing device spacing values.

3. Where work activities are between 2' and 15' from the edge of traveled way, the Engineer may omit signs and channelizing devices for work operations 60 minutes or less.

4. When four or more work vehicles enter the through traffic lanes in a one hour period (excluding establishing and terminating the work area), use a flagger or lane closure to accommodate work vehicle ingress and egress.

5. For work less than 2' from the traveled way and work zone speed is greater than 45 MPH, use a lane closure.

6. The "Speeding Fines Doubled When Workers Present" signs (M0T-13-06) and "End Road Work" Signs (G20-2) along with the associated work zone sign spacing distances may be omitted when the work operation is in place for 24 hours or less.

7. Temporary pavement markings may be omitted when the work operation is in place for 3 days or less.

8. Omit "Shoulder Closed" signs (W21-5a) along with associated work zone sign spacing distances for work on the median.

9. When there is no paved shoulder, the "Worker" sign (W21-1) may be used instead of the "Shoulder Closed" sign (W21-5a).

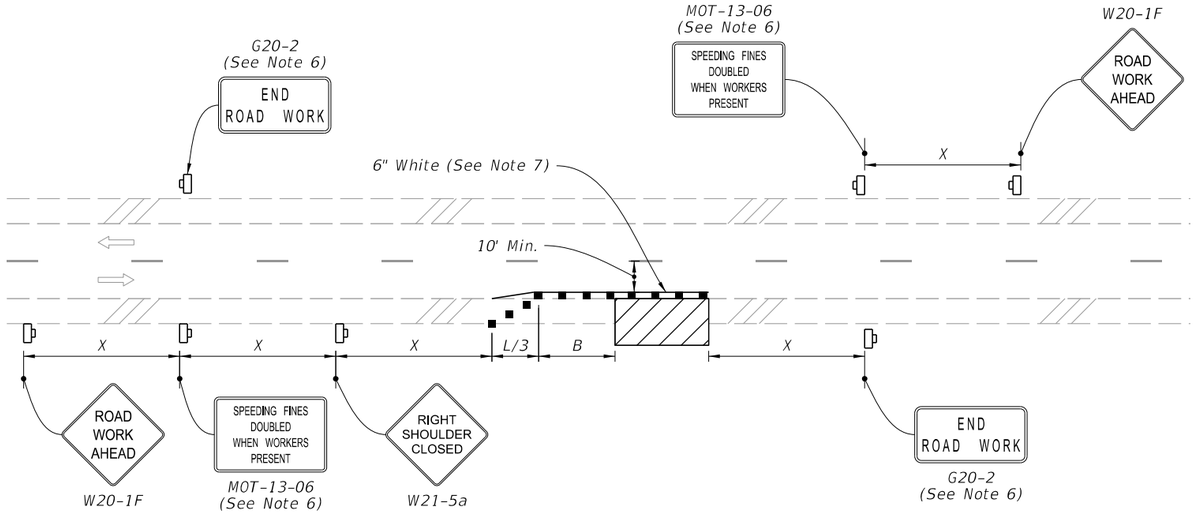
SYMBOLS:

Work Area

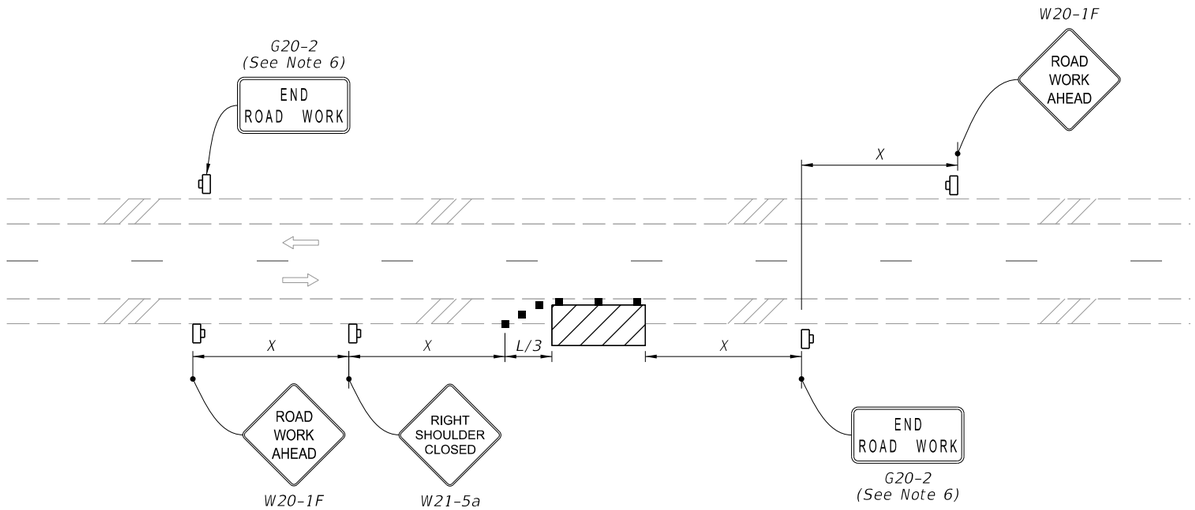
Channelizing Device (See Index 102-600)

Work Zone Sign

Lane Identification and Direction of Traffic



TWO-LANE ROADWAY
SHOULDER WORK LESS THAN 2' FROM THE TRAVELED WAY WITH WORK ZONE SPEED OF 45 MPH OR LESS

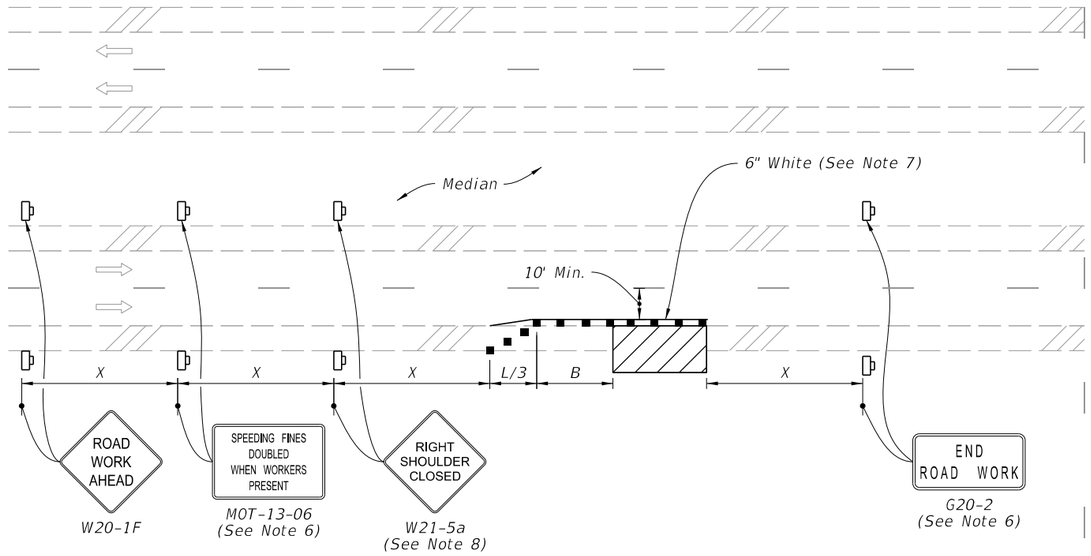


TWO-LANE ROADWAY
SHOULDER WORK BETWEEN 2' AND 15' FROM THE TRAVELED WAY

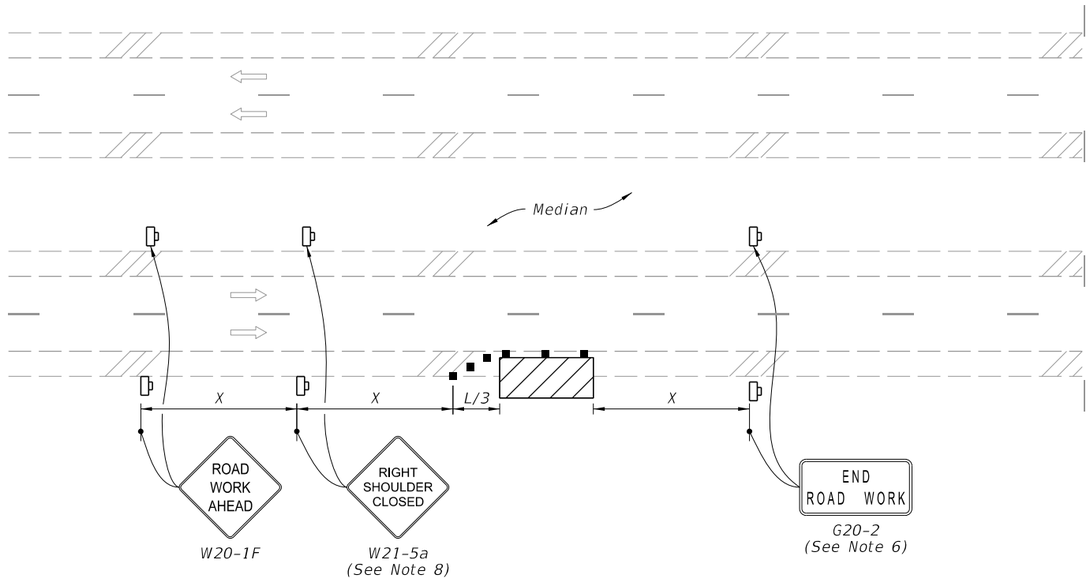
Approved
2025-H-294-00345
Jason Quijano
8/20/2025

2/2/2023 10:33:35 AM

LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/21			FY 2023-24 STANDARD PLANS	TWO-LANE AND MULTILANE, WORK ON SHOULDER	102-602	1 of 2



MULTILANE ROADWAY
SHOULDER WORK LESS THAN 2' FROM THE TRAVELED WAY
WITH WORK ZONE SPEED OF 45 MPH OR LESS



MULTILANE ROADWAY
SHOULDER WORK BETWEEN 2' AND 15' FROM THE TRAVELED WAY

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Lane Identification and Direction of Traffic

10:33:38 AM

2/2/2023

Approved
2025-H-294-00345
Jason Orijano
8/20/2025

LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/20			FY 2023-24 STANDARD PLANS	TWO-LANE AND MULTILANE, WORK ON SHOULDER	102-602	2 of 2

NOTES:

1. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.

2. Place pedestrian LCDs across the full width of the closed sidewalk.

3. For post mounted signs located near or adjacent to a sidewalk, maintain a minimum 7' clearance from the bottom of the sign panel to the surface of the sidewalk.

4. "Sidewalk Closed" signs (R9-XX) may be mounted on pedestrian LCDs in accordance with the manufacturer's instructions.

5. Omit the Advance Closure LCD if it blocks access to other pedestrian facilities (e,g,, transit stops, residences, or business entrances).

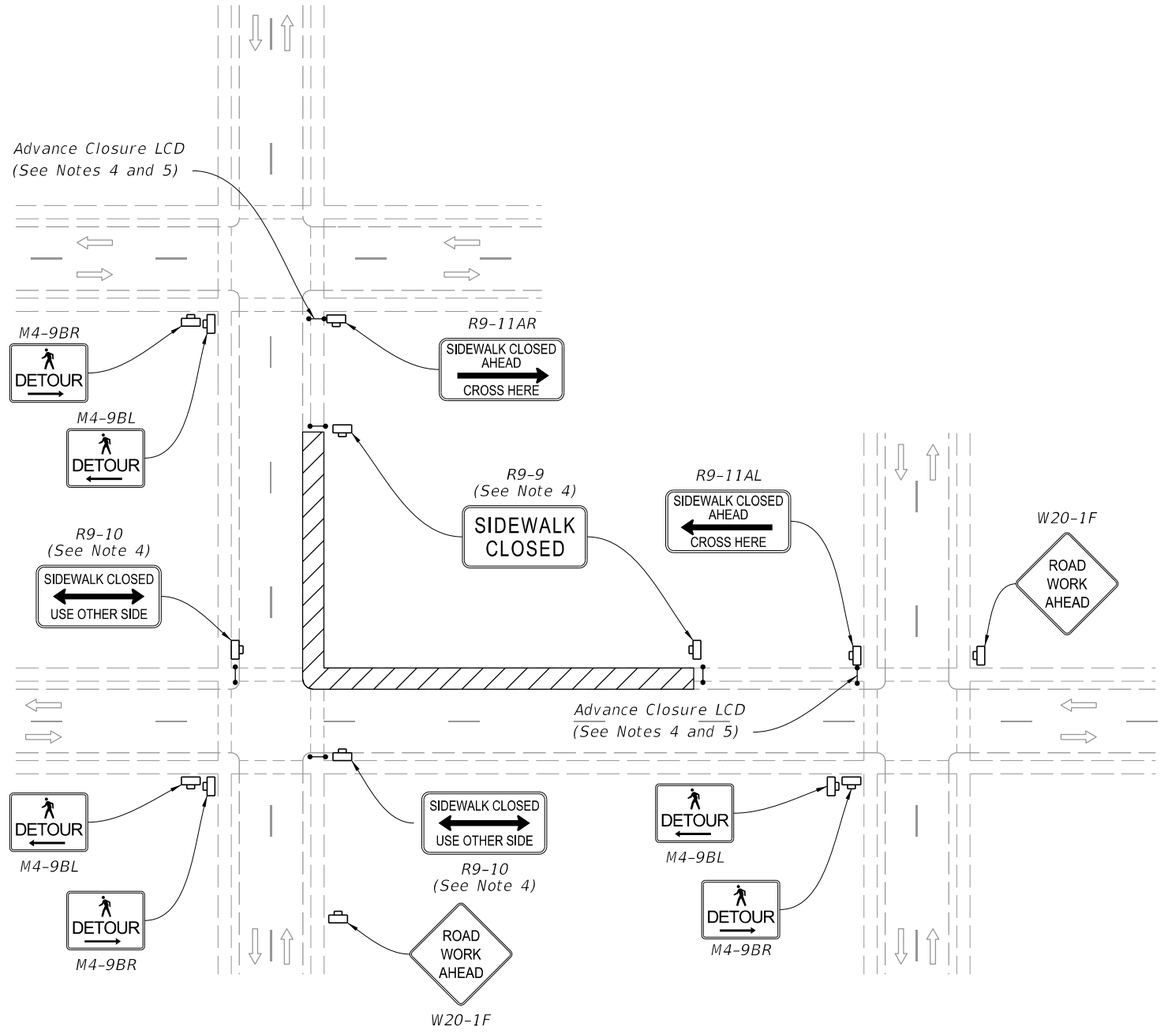
SYMBOLS:

Work Area

Work Zone Sign

Pedestrian Longitudinal Channelizing Device (LCD)

Lane Identification and Direction of Traffic



PEDESTRIAN DETOUR

1:28:35 PM

10/6/2022

Approved
2025-H-294-00345
Jason Quijano
8/20/2025

LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2023-24 STANDARD PLANS	SIDEWALK CLOSURE	INDEX	SHEET
11/01/20						102-660	1 of 2

NOTES:

1. L = Taper Length
   B = Buffer Length
   X = Work Zone Sign Distance
   See Index 102-600 for "L", "B", "X", channelizing device spacing values.

2. Provide a 5' wide temporary pedestrian way with a maximum cross-slope of 0.02, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary pedestrian ways less than 5' in width at intervals not to exceed 200'.

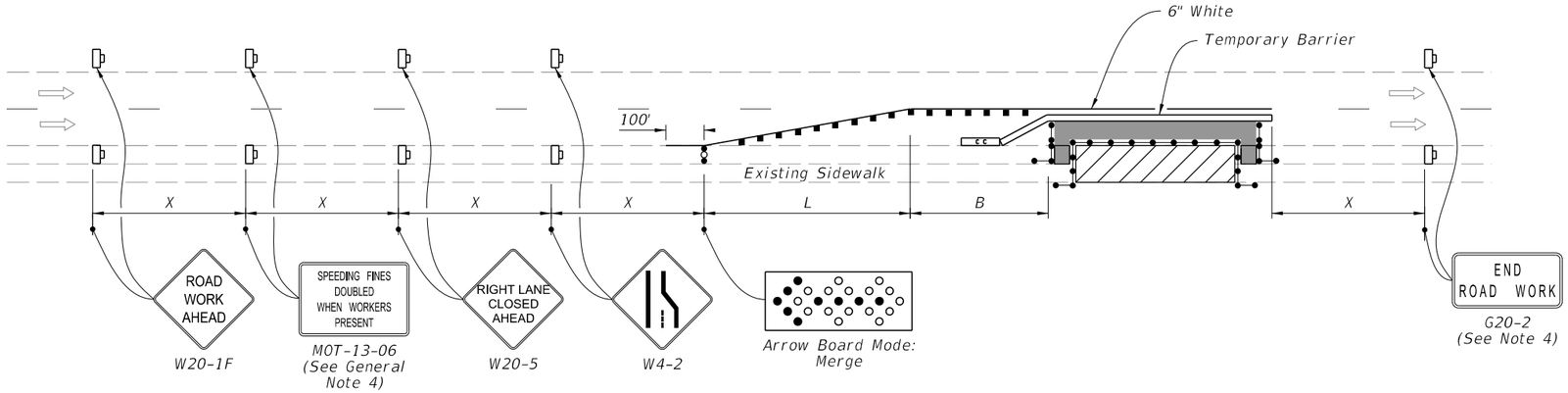
3. When temporary pedestrian ways require curb ramps, meet the requirements of Index 522-002. Detectable warnings are not required for curb ramps diverting pedestrian traffic into a closed lane.

4. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2), along with associated work zone sign distances, may be omitted when the work operation will be in place for 24 hours or less.

5. Pedestrian Diversion Option 2 may only be used when called for in the Plans or as approved by an Engineer.

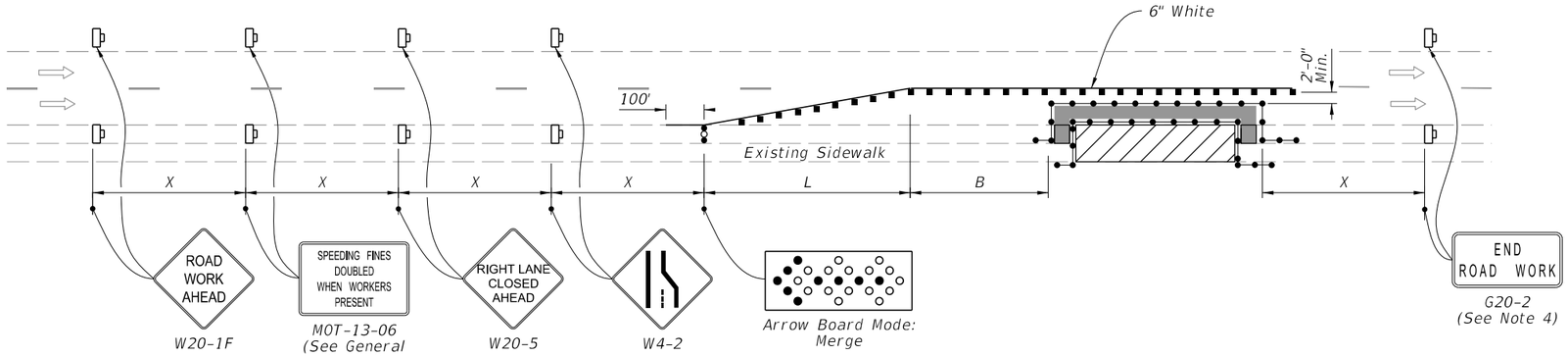
SYMBOLS:

- Work Area
- Temporary Pedestrian Way
- Channelizing Device (See Index 102-600)
- Pedestrian Longitudinal Channelizing Device (LCD)
- Work Zone Sign
- Arrow Board
- Crash Cushion
- Lane Identification and Direction of Traffic



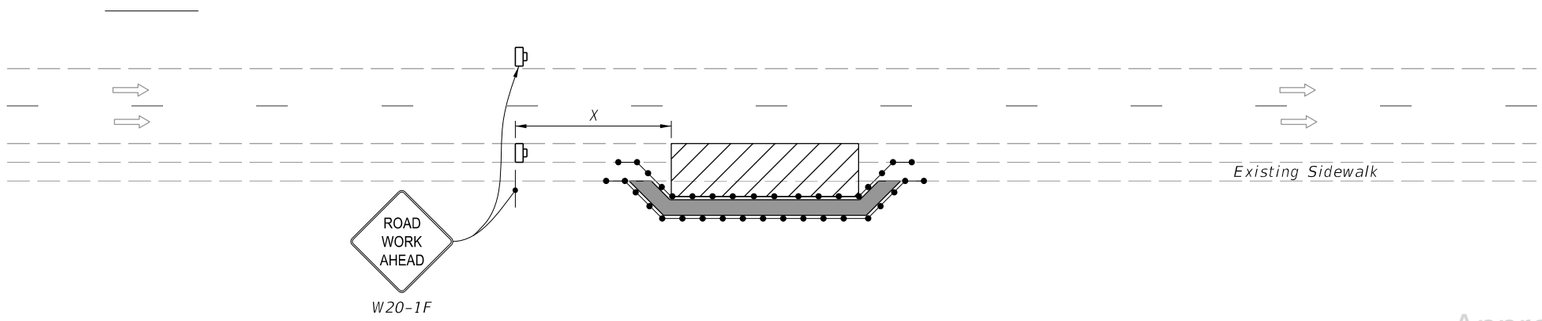
PEDESTRIAN DIVERSION - OPTION 1

(Temporary Barrier Shown, Low Profile Barrier Similar)



PEDESTRIAN DIVERSION - OPTION 2

(Work Zone Speed 35 mph or Less)



PEDESTRIAN SPECIAL DETOUR

Approved
2025-H-294-00345
Jason Oujiano
8/20/2025

2/21/2023 10:19:10 AM

LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2023-24 STANDARD PLANS	SIDEWALK CLOSURE	INDEX	SHEET
11/01/21					102-660	2 of 2