Solicitation 12256-493

Cordova Road Seawall Replacement

Bid Designation: Public

City of Fort Lauderdale

5

Bid 12256-493
Cordova Road Seawall Replacement

Bid Number	12256-493
Bid Title	Cordova Road Seawall Replacement
Bid Start Date	Apr 8, 2019 5:22:21 PM EDT
Bid End Date	Jun 3, 2019 2:00:00 PM EDT
Question & Answer End Date	May 22, 2019 5:00:00 PM EDT
Bid Contact	Penelope Burger Procurement Administrator Finance pburger@fortlauderdale.gov
Contract Duration	**One Time Purchase**
Contract Renewal	Not Applicable
Prices Good for	**120 days**
Pre-Bid Conference	**Apr 18, 2019 11:00:00 AM EDT** **Attendance is optional** **Location: City Hall, 100 N. Andrews Avenue, 5th Floor Conference Room, Fort Lauderdale, Florida 33301**

Bid Comments

The City of Fort Lauderdale, Florida (City) is seeking bids from qualified bidders, hereinafter referred to as the Contractor, to provide construction services for the City of Fort Lauderdale, in accordance with the terms, conditions, and specifications contained in this Invitation To Bid (ITB).

Sealed bids will be received electronically until 2:00 P.M., local time, on **May 10, 2019,** and opened immediately thereafter in the 5th Floor Conference Room, City Hall, 100 North Andrews Avenue, Fort Lauderdale, Florida, 33301, for **BID NO.,12256-493, PROJECT NO. 12337 Cordova Road Seawall Replacement.**

This project consists of Drawing File No. 4-141.55; 42 sheets.

This Project is located on Cordova Road between SE 12 St., and SE 7th St., Fort Lauderdale, FL 33316. The work includes furnishing and installation of all tools, equipment, materials, supplies, manufactured articles, transportation and services, including fuel, power, water, and essential communications, for the performance of all labor, work, and/or other operations as required for the installation of approximate 2166 LF of seawall, stormwater drainage systems, and all work as shown in the Contract Documents. The work includes all associated general, civil, structural, electrical work, and all appurtenant work, complete, tested and ready for operation, all in conformance with the Contract Documents.

NOTE: **Payment on this contract will be made by Visa or MasterCard.**

Licensing Requirements: Possession of a General Contractor License or Certified Marine Specialty Contractor License is required for this Project.

Pre-Bid Meeting: - A pre-bid meeting will be held on April 18, 2019, at 11:00 a.m., local time, at The City of Fort Lauderdale, City Hall, 100 N. Andrews Avenue, 5th Floor Conference Room, Fort Lauderdale, Florida 33301. While attendance is not mandatory, it is strongly suggested that all Contractors attend the pre-proposal conference. It will be the sole responsibility of the bidder to inspect the City's location(s) and become familiar with the scope of the City's requirements and systems prior to submitting a proposal. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a proposal will be considered evidence that the proposer has familiarized himself with the nature and extent of the work, equipment, materials, and labor required.

Bidding blanks may be obtained **free of charge** at BIDSYNC.COM. Drawing Plans are on file in the Public Works Department,

City of Fort Lauderdale, at 100 North Andrews Avenue, 4th floor, (Monday thru Friday 8:00 am to 4:30 pm) at a **NON-REFUNDABLE** **cost of $50.00 (including sales tax per set)**. Only cash or cashier's check made payable to the City of Fort Lauderdale are accepted.

It will be the sole responsibility of the bidder to ensure that his bid is submitted prior to the bid opening date and time listed. **PAPER BID SUBMITTALS WILL NOT BE ACCEPTED. BIDS MUST BE SUBMITTED ELECTRONICALLY VIA BIDSYNC.COM**

Bid Security: A certified check, cashier's check, bank officer's check or bid bond for **FIVE** percent **(5%)** of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

Bid Bonds:
Bidders can submit bid bonds for projects four different ways:
1) BidSync allows bidders to submit bid bonds electronically directly through their system using **Surety 2000**. For more information on this feature and to access it, contact BIDSYNC customer care department.
2) Bidders may **upload** their original executed bid bond on BIDSYNC to accompany their bids with the electronic proposal, and deliver the original, signed and sealed hard copy within five (5) business days after bid opening, with the company name, bid number and title clearly indicated.
3) Bidders can **hand deliver** their bid bond in a sealed envelope to the Finance Department, Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.
4) Bidders can **mail** their bid bond to the Finance Department, Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.56) BidSync allows bidders to submit bid bonds electronically directly through their system using **Surety 2000**. For more information on this feature and to access it, contact BIDSYNC customer care department.

Certified Checks, Cashier's Checks and Bank Drafts
These **cannot** be submitted via BIDSYNC, nor are their images allowed to be uploaded and submitted with your electronic bid. These forms of securities, as well as hard copy bid bonds, must be received on or before the Invitation to Bid (ITB) opening date and time, at the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope.

It is the bidder's sole responsibility to ensure that his bid bond or other bid security is received by the Procurement Services Division before time of bid opening. Failure to adhere to this requirement may be grounds to consider the bid as non-responsive.

The City of Fort Lauderdale reserves the right to waive any informality in any or all bids and to reject any or all bids.

For information concerning technical specifications, please utilize the question/answer feature provided by BIDSYNC at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures, will only be transmitted by written addendum. (See addendum section of BIDSYNC Site). **Contractors please note:** No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation.

Information on bid results and projects currently out to bid can be obtained on the City's website – http://www.fortlauderdale.gov/departments/finance/procurement-services. For general inquiries, please call (954) 828-5933.

Added on May 8, 2019:
Addendum No. 1

1. CHANGE: Question and Answer End Date changed from April 29, 2019 to **May 15, 2019**.
2. CHANGE: End Date changed from May 10, 2019 to **May 29, 2019**.

Added on May 15, 2019:
See Addendum No. 2 for Details.
Added on May 20, 2019:
Addendum No. 3
CHANGE: Special Conditions, page SC-3. *Item Number 09, Bid Allowance*, Bidsync page 35.
Permit fee allowance ~~165,000~~ 25,000
Material testing allowance ~~100,000~~ 50,000
ADD Utility fee allowance 200,000
TOTAL: $ 275,000

Addendum # 1

New Documents	**Addendum_1.pdf**		
Previous End Date	May 10, 2019 2:00:00 PM EDT	New End Date	**May 29, 2019 2:00:00 PM EDT**
Previous Q & A End Date	Apr 29, 2019 5:00:00 PM EDT	New Q & A End Date	**May 15, 2019 5:00:00 PM EDT**

Addendum # 2

New Documents	**P12337.ADDENDUM 2.pdf**		
Previous End Date	**May 29, 2019 2:00:00 PM** EDT	New End Date	**Jun 3, 2019 2:00:00 PM** EDT
Previous Q & A End Date	**May 15, 2019 5:00:00 PM** EDT	New Q & A End Date	**May 22, 2019 5:00:00 PM** EDT

New Lot: 20

Previous Bid Allowance Amount	$265,000.00	New Bid Allowance Amount	$200,000.00

Changes were made to the following items:

Preparation of Existing Catch Basins
Inline Check Valves (Tidal Valves)
Pollution Retardant Baffles
Cantilevered Steel Sheet Pile Seawall
Existing Tree Protection and Disposition
Miscellaneous Site Restoration
Monitoring and migation of Settlement, Vibration and Noise

Addendum # 3

New Documents	**Addendum_3.pdf**

Item Response Form

Item	**12256-493--01-01 -** 1: Mobilization and Demobilization
Lot Description	1
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price for this item shall be full compensation for mobilization and demobilization activities. This includes but is not

limited to scheduling, project coordination, temporary facilities, preparatory work and operations necessary for the movement of personnel and setting up of all equipment, instruments, and incidentals to the project site, finish grading, site cleanup, and all other activities necessary to prepare and complete the contract work. The payment for mobilization and demobilization shall not exceed 3% of the contract price. Partial payments for mobilization and demobilization shall be made in accordance with Specification Section 010125.

Item **12256-493--02-01 -** 2: Maintenance of Traffic

Lot Description 2

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description

The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for maintenance of traffic in accordance City of Fort Lauderdale Engineering Department. This item includes but is not limited to, preparing maintenance of traffic plans (MOTs) to appropriate agencies for approval, providing personnel as required to direct traffic (flaggers, crossing guards, local police, etc.), providing signs, cones, lights, signs and barricades, installing temporary fencing and walkways as required to maintain pedestrian traffic, installing temporary steel plates for vehicular traffic and all other work incidental to the maintenance of traffic as required by City of Fort Lauderdale Engineering Department and the Contract Documents

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Item **12256-493--03-01 -** 3: Record Drawings/ Geodatabase Data

Lot Description 3

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description

The lump sum price for this item shall be full compensation for the cost of preparing and submitting City approved electronic record drawings and geodatabase data as outlined in the Contract Documents. This item includes, but is not limited to, preparing record drawings in AutoCAD Civil 3D format (2017 version); providing elevations and GPS coordinates for the regraded Right-Of-Way, asphalt (if changed), new storm drains, stormwater structures, outfalls, replaced seawalls, tie-ins to existing storm drains, deflections, and conflict separations; and other data as may be required in the Contract Documents. Initiation for payment of this bid item will not occur until all items in the list of submittals are approved and accepted by the City. Final payment for this item will not be made until final record drawings (signed and sealed by a Florida registered surveyor) have been received and accepted by the City. Payments for Record Drawings/GPS Data will be made in accordance with Specification Section 01025.

Item **12256-493--04-01 -** 4: Audio-**Visual Preconstruction Record**

Lot Description 4

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price for this item shall be full compensation for the cost of preparing an audio-visual preconstruction record of the project area as outlined in the Contract Documents. This item includes, but is not limited to, preparing audio and visual preconstruction record documentation; providing construction progress photos and video documentation via a professional electrographer; and other data as may be required in the Contract Documents. Initiation for payment of this bid item will not occur until all items in the list of submittals are approved and accepted by the City. Final payment for this item will not be made until final recordings have been reviewed and accepted by the City. Payments for Audio-Visual Preconstruction Record will be made in accordance with Specification Section 01300.

Item	**12256-493--05-01 -** 5: Construction Flyer Distribution & Project Signs
Lot Description	5
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price for this item shall be full compensation for the cost of preparing and distributing up to 500 construction flyers and (2) City Project construction signs as outlined in the Contract Documents. This item includes, but is not limited to, preparing construction flyers and signs. Final payment for this item will not be made until all flyers have been distributed and signs installed at the project area. Payments for Construction Flyer Distribution and Project Signs will be made in accordance with Specification Section 01500.

Item	**12256-493--06-01 -** 6: Prevention, Control, and Abatement of Erosion and Water Pollution
Lot Description	6
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the installation, maintenance, and removal of the temporary erosion and sediment control measures for the project, water pollution control measures, floating turbidity barriers, and stormwater pollution prevention measures

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Item	**12256-493--07-01 -** 7: Preparation of Existing Catch Basins
Lot Description	7
Quantity	**8 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 8

Description
The unit price for this item shall be full compensation, on a per structure basis, for all labor, equipment, material, and work required for the preparation of existing catch basins proposed for connection to new 15-inch outfall pipes. This item includes, but is not limited to, dewatering catch basins, removal and disposal of barnacles and debris from catch basins where outfall pipe connections shall be installed, removal and re-installation of existing baffle pollution baffles as required, coring of existing catch basins for connection to proposed 15-inch outfall pipes, and all associated site restoration activities
Added on May 15, 2019:
The unit price for this item shall be full compensation, on a per structure basis, for all labor, equipment, material, and work required for the preparation of existing catch basins proposed for connection to new 15-inch outfall pipes. This item includes, but is not limited to, dewatering catch basins, removal and disposal of barnacles and debris from catch basins where outfall pipe connections shall be installed, removal and re-installation of existing pollution retardant baffles as required, coring of existing catch basins for connection to proposed 15-inch outfall pipes, and all associated site restoration activities

Addendum # 2

Item	**12256-493--08-01 -** 8: Stormwater Structures
Lot Description	8
Quantity	**7 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 7

Description
The unit price for this item shall be full compensation, on a per structure basis, as shown in the bid form, for all labor, equipment, material, and work required for installation of the 4 x 4 stormwater catch basin structure installed in accordance with the Contract Documents and as described herein. This item includes, but is not limited to, locating, verifying and protecting existing utilities, surveying for layout for installation, excavating, pavement cutting and removal, dewatering (along with all required materials, equipment and labor for satisfactory disposal), temporary sheeting, shoring, inlet protections, removing unsuitable material below the structure, disposing of unsuitable material, graded stone bedding below structure, concrete structure and grating, concrete apron, leveling bricks as needed, non-shrink cementitious grout, riser sections, joint materials, backfill, compaction, and full depth pavement reconstruction along with all other appurtenant and miscellaneous items and work required for a complete installation

Item	**12256-493--09-01 -** 9: Inline Check Valves (Tidal Valves)
Lot Description	9
Quantity	**13 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 13

Description
The unit price for this item shall be full compensation for all labor, equipment, material, and work required for the installation of the 15-inch WASTOP inline check valves (tidal valves) or approved equal as required by the Contract Documents. Payment for furnishing and installing tidal valves will be made at the unit price, per each, named in the Schedule of Values and includes but is not limited to all labor, tools, equipment, and material required to furnish, transport, store and install each WASTOP inline check valve as described herein. This item includes, but is not limited to, locating, verifying and protecting existing utilities, surveying for layout for installation, and labor for satisfactory installing the inline check valve in the proposed catch basin as shown in the Drawings and as required for a complete and operable system.
Added on May 15, 2019:
The unit price for this item shall be full compensation for all labor, equipment, material, and work required for the installation of the 15-inch WASTOP inline check valves (tidal valves) or approved equal as required by the Contract Documents. Payment for furnishing and

installing tidal valves will be made at the unit price, per each, named in the Schedule of Values and includes but is not limited to all labor, tools, equipment, and material required to furnish, transport, store and install each WASTOP inline check valve, or approved equal as described herein and per Section 15177. This item includes, but is not limited to, locating, verifying and protecting existing utilities, surveying for layout for installation, and labor for satisfactory installing the inline check valve in the proposed catch basin as shown in the Drawings and as required for a complete and operable system.

Addendum # 2

Item	**12256-493--10-01 -** 10: 15 inch RCP Storm Drain
Lot Description	10
Quantity	**230 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 230

Description
The unit price for this item shall be full compensation on a per linear foot basis for all labor, tools, equipment, and material required to furnish, transport, store and install the 15-inch reinforced concrete pipe storm drain shown on the Contract Documents and described herein. This item includes, but is not limited to, locating, verifying and protecting existing utilities, site preparation, installing temporary sheeting and shoring as required, connecting pipe to existing or proposed catch basins with appropriate accessories and materials, installing piping, removing and disposal of unsuitable material within and below the pipe trench, backfilling, testing, full depth pavement reconstruction, surface restoration, pipe flushing, post-construction testing, and surveying as required for a complete and operable installation. This item also includes demolition and removal of existing outfall pipes as shown on the Contract Drawings. Measurement for payment shall be the linear feet of pipe actually installed as determined by measurement along the horizontal centerline of the pipe in place in accordance with the Contract Documents.

Item	**12256-493--11-01 -** 11: Pollution Retardant Baffles
Lot Description	11
Quantity	**13 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 13

Description
The unit price for this item shall be full compensation, on a unit basis, for all labor, material, equipment, and work required for furnishing and installing pollution retardant baffles. This item includes, but is not limited to, compensation for all hardware, caulking, gaskets, grout, brick, concrete, or any other items required to install the baffles in accordance with the Contract Documents. Payment shall be made for each pollution retardant baffle installed by authorization of the Engineer. Any damage to any drainage structure shall be repaired at the Contractors expense. Pollution Retardant Baffles shall be installed in all drainage structures as shown on the drawings and described herein. This item does not include payment for re-installation of existing pollution retardant baffles as described in Item 8.
Added on May 15, 2019:
The unit price for this item shall be full compensation, on a unit basis, for all labor, material, equipment, and work required for furnishing and installing pollution retardant baffles. This item includes, but is not limited to, compensation for all hardware, caulking, gaskets, grout, brick, concrete, or any other items required to install the baffles in accordance with the Contract Documents. Payment shall be made for each pollution retardant baffle installed by authorization of the Engineer. Any damage to any drainage structure shall be repaired at the Contractors expense. Pollution Retardant Baffles shall be installed in all drainage structures as shown on the drawings and described herein. This item does not include payment for re-installation of existing pollution retardant baffles as described in Item 7.

Addendum # 2

Item	**12256-493--12-01 -** 12: Cantilevered Steel Sheet Pile Seawall
Lot Description	12
Quantity	**2203 linear foot**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 2203

Description
The unit price for this item is the payment, on a linear foot basis, for all materials, labor, equipment, and work necessary and required for the complete installation of a cantilevered steel sheet pile wall with concrete cap. This item includes, but is not limited to, installation of cantilevered steel sheet pile wall, installation of jet filters, and termination details at existing bridge. This item also includes all required demolition, removal and disposal of existing sea wall and/or portions of existing sea wall deemed necessary by Contractor to install proposed wall.
Added on May 15, 2019:
The unit price for this item is the payment, on a linear foot basis, for all materials, labor, equipment, and work necessary and required for the complete installation of a cantilevered steel sheet pile wall with concrete cap. This item includes, but is not limited to, installation of cantilevered steel sheet pile wall, pile splicing where required, installation of jet filters, and termination details at existing bridges. This item also includes all required temporary bracing, shoring, demolition, removal and disposal of existing sea wall and/or portions of existing sea wall deemed necessary by Contractor to install proposed wall.

Addendum # 2

Item	**12256-493--13-01 -** 13: FDOT #57 Stone for Seawalls
Lot Description	13
Quantity	**402 cubic yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 402

Description
The unit price for this item is the payment, on a cubic yard basis, for all labor, equipment, material and work required for furnishing and installing FDOT #57 stone as required for a complete installation of the proposed sea wall. This item includes the furnishing and placement of FDOT #57 stone in void spaces between the existing and proposed sea walls as shown in the Contract Documents. This item excludes all FDOT #57 stone used for any other purpose.

Item	**12256-493--14-01 -** 14: Outfall Pipe Penetrations
Lot Description	14
Quantity	**13 each**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301

Qty 13

Description
The unit price for this item is the payment, on a unit basis, for all labor, equipment, material, and work necessary and required for constructing 15-inch outfall drain pipe penetrations through the proposed seawall. This item includes, but is not limited to, excavation, removal of existing wall as required, penetrating through proposed wall, installing concrete face, installing manatee grates, backfilling, grading, site restoration and all other appurtenances as shown in the Contract Documents associated with the pipe penetration.

Item	**12256-493--15-01 -** 15: Diving Inspection
Lot Description	15
Quantity	**20 hourly rate**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 20

Description
The unit price for this item is the payment, on an hourly basis, for all Work necessary and required for furnishing all labor, material, for a fully equipped diver with boat or barge to perform diving inspection at several locations as directed by the Engineer. Mobilization to and demobilization from the job site are not included. Inspection time shall start after diving equipment is operational landside and diver enters the water as agreed by the City/Engineer. Inspection time shall end as soon as the diver exits the water as agreed by the City/Engineer. A full report shall be provided to the Engineer within 10 days of inspection.

Item	**12256-493--16-01 -** 16-**1: Demolition and Removal of Dock Structures**
Lot Description	**16-**1
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1415 SE 11th Court.

Item	**12256-493--17-01 -** 16-**2: Demolition and Removal of Dock Structures**
Lot Description	**16-**2
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301

Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1411 SW 11th Street.

Item	**12256-493--18-01 -** 16-**3: Demolition and Removal of Dock Structures**
Lot Description	**16-**3
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1109 Cordova Road.

Item	**12256-493--19-01 -** 16-**4: Demolition and Removal of Dock Structures**
Lot Description	**16-**4
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1101 Cordova Road.

Item	**12256-493--20-01 -** 16-**5: Demolition and Removal of Dock Structures**
Lot Description	**16-**5
Quantity	**1 lump sum**
Unit Price	

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1029 Cordova Road.

Item **12256-493--21-01 -** 16-**6: Demolition and Removal of Dock Structures**

Lot Description **16-**6

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1025 Cordova Road.

Item **12256-493--22-01 -** 16-**7: Demolition and Removal of Dock Structures**

Lot Description **16-**7

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1028 SE 13th Terrace.

Item **12256-493--23-01 -** 16-**8: Demolition and Removal of Dock Structures**

Lot Description **16-**8

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1013 Cordova Road.

Item **12256-493--24-01 -** 16-**9: Demolition and Removal of Dock Structures**

Lot Description **16-**9

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1009 Cordova Road.

Item **12256-493--25-01 -** 16-**10: Demolition and Removal of Dock Structures**

Lot Description **16-**10

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1005 Cordova Road.

Item	**12256-493--26-01 -** 16-**11: Demolition and Removal of Dock Structures**
Lot Description	**16-**11
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1320 Ponce De Leon Drive.

Item	**12256-493--27-01 -** 16-**12: Demolition and Removal of Dock Structures**
Lot Description	**16-**12
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1326 Ponce De Leon Drive.

Item	**12256-493--28-01 -** 16-**13: Demolition and Removal of Dock Structures**
Lot Description	**16-**13
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the

residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 919 Cordova Road.

Item	**12256-493--29-01 -** 16-**14: Demolition and Removal of Dock Structures**
Lot Description	**16-**14
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 915 Cordova Road.

Item	**12256-493--30-01 -** 16-**15: Demolition and Removal of Dock Structures**
Lot Description	**16-**15
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 909 Cordova Road.

Item	**12256-493--31-01 -** 16-**16: Demolition and Removal of Dock Structures**
Lot Description	**16-**16
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301

Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 901 Cordova Road.

Item	**12256-493--32-01 -** 16-**17: Demolition and Removal of Dock Structures**
Lot Description	**16-**17
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 817 Cordova Road.

Item	**12256-493--33-01 -** 16-**18: Demolition and Removal of Dock Structures**
Lot Description	**16-**18
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 811 Cordova Road.

Item	**12256-493--34-01 -** 16-**19: Demolition and Removal of Dock Structures**
Lot Description	**16-**19
Quantity	**1 lump sum**
Unit Price	

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 805 Cordova Road.

Item **12256-493--35-01 -** 16-**20: Demolition and Removal of Dock Structures**

Lot Description **16-**20

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 801 Cordova Road.

Item **12256-493--36-01 -** 16-**21: Demolition and Removal of Dock Structures**

Lot Description **16-**21

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**
See ITB Specifications
See ITB Specifications
Fort Lauderdale FL 33301
Qty 1

Description
The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 721 Cordova Road.

Item **12256-493--37-01 -** 16-**22: Demolition and Removal of Dock Structures**

Lot Description **16-**22

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications

See ITB Specifications

Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 715 Cordova Road.

Item **12256-493--38-01 -** 16-**23: Demolition and Removal of Dock Structures**

Lot Description **16-**23

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications

See ITB Specifications

Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 711 Cordova Road.

Item **12256-493--39-01 -** 16-**24: Demolition and Removal of Dock Structures**

Lot Description **16-**24

Quantity **1 lump sum**

Unit Price

Delivery Location **City of Fort Lauderdale**

See ITB Specifications

See ITB Specifications

Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 705 Cordova Road.

Item	**12256-493--40-01 -** 16-**25: Demolition and Removal of Dock Structures**
Lot Description	**16-**25
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 701 Cordova Road.

Item	**12256-493--41-01 -** 16-**26: Demolition and Removal of Dock Structures**
Lot Description	**16-**26
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 621 Cordova Road.

Item	**12256-493--42-01 -** 16-**27: Demolition and Removal of Dock Structures**
Lot Description	**16-**27
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the

residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1516 Ponce De Leon Drive.

Item	**12256-493--43-01 -** 16-**28: Demolition and Removal of Dock Structures**
Lot Description	**16-**28
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price shall be full compensation for all labor, equipment, material, and work required for the complete removal and disposal of existing docks and miscellaneous structures at each location. The address provided in the bid item below refers to the residential property directly adjoining the right-of-way where these docks and structures are located. This item includes, but is not limited to, decks, boat lifts, swim ladders, accessories, utility stations with electrical and water lines, benches, storage, security cameras, architectural items, electrical items, and all other items. Existing concrete or timber piles shall be demolished and removed or cut a minimum of 12 inches below grade surface and removed. The Contractor shall be responsible for conducting a pre-bid site investigation for each structure to determine the full extent of demolition required. This item is for 1550 Ponce De Leon Drive.

Item	**12256-493--44-01 -** 17: Pavement Restoration
Lot Description	17
Quantity	**6900 square yard**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 6900

Description

The unit price for this item is the payment, on a square yard basis, for all labor, equipment, material, and work necessary for pavement restoration along Cordova Road in accordance with the Contract Documents. This item includes, but is not limited to, milling of existing pavement at a thickness of 1-inch, removing and disposing of the existing asphalt, installing SP-9.5 asphalt concrete overlay at a thickness of 1-inch to provide a uniform surface within the limits of pavement restoration, applying a tack coat, restoration of speed bumps, adjusting rim elevations of existing manholes, catch basins, and valve boxes, providing temporary pavement markings, and saw cutting of all pavement. This item also includes permanent thermoplastic pavement markings, raised retro-reflective pavement markers, pavement markings for speed bumps, and all other miscellaneous and appurtenant work

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Item	**12256-493--45-01 -** 18: Existing Tree Protection and Disposition
Lot Description	18
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price for this item shall be full compensation for all labor, equipment, material and work necessary for the protection of existing trees and landscaping to remain in place; demolition, removal, and disposal of existing trees to be removed; and removal and relocation of existing trees to locations defined by the City/Engineer, all in accordance with the Tree Location Plans shown on the Contract Drawings. This item includes, but is not limited to, preparing submittals required by the City of Fort Lauderdale and procuring all permits related to tree removal and/or relocation as required by all regulatory agencies with jurisdiction over this area. All fees paid to regulatory agencies shall be paid for under Item 7 Permits, Licenses, and Fees Dedicated Allowance

Added on May 15, 2019:

The lump sum price for this item shall be full compensation for all labor, equipment, material and work necessary for the protection of existing trees and landscaping to remain in place; demolition, removal, and disposal of existing trees, and landscaping to be removed; and removal and relocation of existing trees to locations defined by the City/Engineer, replacement of trees and any landscape and hardscape impacted in any way by the removal and/or relocation of trees · all in accordance with the Tree Location Plans shown on the Contract Drawings. This item includes, but is not limited to, preparing submittals required by the City of Fort Lauderdale and procuring all permits related to tree removal and/or relocation as required by all regulatory agencies with jurisdiction over this area.

Addendum # 2

Item	**12256-493--46-01 - 19: Miscellaneous Site Restoration**
Lot Description	19
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications Fort Lauderdale FL 33301 **Qty** 1

Description

The lump sum price for this item shall be full compensation for all labor, equipment, material, and work necessary for the restoration of the right of way along Cordova Road not included in other bid items. This item includes, but is not limited to, restoring swales, grading, sodding, landscaping, irrigation, sidewalks, edging and hedges, and all other work incidental to the restoration of the right of way as required by the Contract Documents. This item also includes all Work not defined in other Bid Items

Added on May 15, 2019:

The lump sum price for this item shall be full compensation for all labor, equipment, material, and work necessary for the restoration of the right of way along Cordova Road not included in other bid items. This item includes, but is not limited to, restoring swales, grading, sodding, landscaping, hardscaping, irrigation, sidewalks, edging and hedges, and all other work incidental to the restoration of the right of way, as required by the Contract Documents. This item also includes all Work not defined in other Bid Items.

Addendum # 2

Item	**12256-493--47-01 -** 20 : Monitoring and migation of Settlement, Vibration and Noise
Lot Description	**Monitoring and Mitigation of Settlement, Vibration and Noise:** **The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the pre-construction and post-construction condition inspections, preparation of mitigation plans, establishment and monitoring of benchmarks and implementation of mitigation plans where required per the Contract Documents.**
Quantity	**1 lump sum**
Unit Price	
Delivery Location	**City of Fort Lauderdale** See ITB Specifications See ITB Specifications

Fort Lauderdale FL 33301

Qty 1

Description

The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the pre-construction and post-construction condition inspections, preparation of mitigation plans, establishment and monitoring of benchmarks and implementation of mitigation plans where required per the Contract Documents.

Addendum # 2

Previous Title		New Title	**Monitoring and migation of Settlement,** Vibration and Noise
Added Item			

6

CITY OF FORT LAUDERDALE
CONTRACT AND SPECIFICATIONS PACKAGE

BID NO. 12256-493

PROJECT NO. 12337

CORDOVA ROAD SEAWALL REPLACEMENT

Juan Carlos Samuel, E.I
Project Manager II

Penelope Burger
Procurement Administrator
Telephone: (954) 828-5189
E-mail: pburger@fortlauderdale.gov

TABLE OF CONTENTS

Description **Pages**

INSTRUCTIONS TO BIDDERS (continued)

DIVISION 2 - SITE CONSTRUCTION

DIVISION 3 - CONCRETE

DIVISION 4 – MASONRY (NOT USED)

DIVISION 5 - METALS

DIVISION 6 – WOOD AND PLASTICS

TABLE OF CONTENTS (continued)

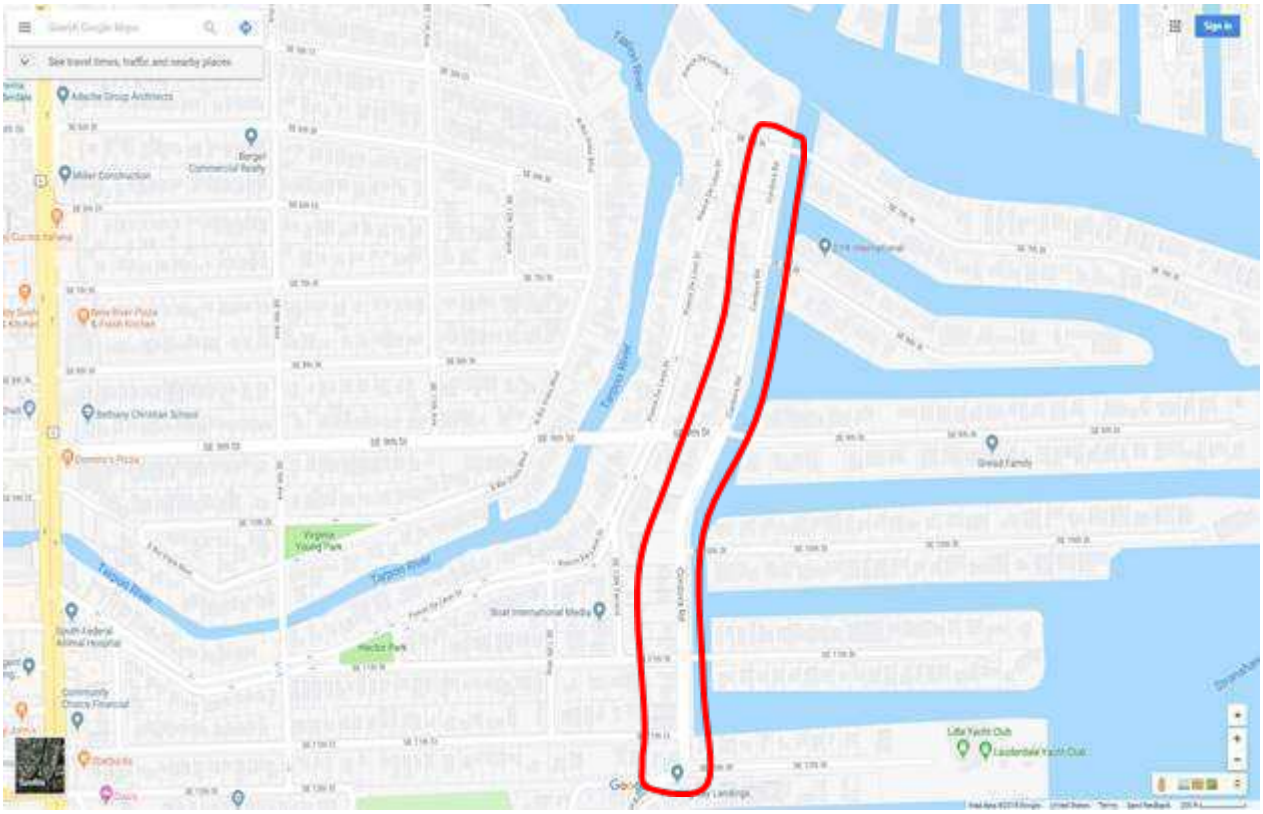
Note: The following documents are available electronically for completion and documents must be returned with your bid along with your bid security, proof of insurance, and proof of required licenses/certification.

INVITATION TO BID

Sealed bids will be received electronically until 2:00 P.M., local time, on **May 10, 2019,** and opened immediately thereafter in the 5th Floor Conference Room, City Hall, 100 North Andrews Avenue, Fort Lauderdale, Florida, 33301, for **BID NO.,12256-493, PROJECT NO. 12337, Cordova Road Seawall Replacement.**

This project consists of Drawing File No. 4-141.55; 42 sheets.

This Project is located at Cordova Road between SE 12 St., and SE 7th St., Fort Lauderdale, FL 33316. The work includes furnishing and installation of all tools, equipment, materials, supplies, manufactured articles, transportation and services, including fuel, power, water, and essential communications, for the performance of all labor, work, and/or other operations as required for the installation of approximately 2166 LF of seawall, stormwater drainage systems, and all work as shown in the Contract Documents. The work includes all associated general, civil, structural, electrical work, and all appurtenant work, complete, tested and ready for operation, all in conformance with the Contract Documents.



NOTE: Payment on this contract will be made by Visa or MasterCard.

Licensing Requirements: Possession of a General Contractor License or Certified Marine Specialty Contractor License is required for this Project.

Pre-Bid Meeting: - A pre-bid meeting will be held on April 18, 2019, at 11:00 a.m., local time, at The City of Fort Lauderdale, City Hall, 100 N. Andrews Avenue, 5th Floor Conference Room, Fort Lauderdale, Florida 33301.

INSTRUCTIONS TO BIDDERS (Continued)

While attendance is not mandatory, it is strongly suggested that all Contractors attend the pre-bid conference. It will be the sole responsibility of the bidder to inspect the City's location(s) and become familiar with the scope of the City's requirements and systems prior to submitting a bid. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the bidder has familiarized himself with the nature and extent of the work, equipment, materials, and labor required.

Bidding blanks may be obtained **free of charge** at BIDSYNC.COM. Drawing Plans are on file in the Public Works Department, City of Fort Lauderdale, at 100 North Andrews Avenue, 4th floor, (Monday thru Friday 8:00 am to 4:30 pm) at a **NON-REFUNDABLE cost of $50.00 (including sales tax per set)**. Only cash or cashier's check made payable to the City of Fort Lauderdale are accepted.

It will be the sole responsibility of the bidder to ensure that his bid is submitted prior to the bid opening date and time listed. **PAPER BID SUBMITTALS WILL NOT BE ACCEPTED. BIDS MUST BE SUBMITTED ELECTRONICALLY VIA BIDSYNC.COM**

Bid Security: A certified check, cashier's check, bank officer's check or bid bond for **FIVE** percent **(5%)** of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

Bid Bonds:

Bidders can submit bid bonds for projects four different ways:

1) BidSync allows bidders to submit bid bonds electronically directly through their system using **Surety 2000**. For more information on this feature and to access it, contact BIDSYNC customer care department.

2) Bidders may **upload** their original executed bid bond on BIDSYNC to accompany their bids with the electronic proposal, and deliver the original, signed and sealed hard copy within five (5) business days after bid opening, with the company name, bid number and title clearly indicated.

3) Bidders can **hand deliver** their bid bond in a sealed envelope to the Finance Department, Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

4) Bidders can **mail** their bid bond to the Finance Department, Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, before time of bid opening, with the company name, bid number and title clearly indicated on the envelope.

Certified Checks, Cashier's Checks and Bank Drafts

These **cannot** be submitted via BIDSYNC, nor are their images allowed to be uploaded and submitted with your electronic bid. These forms of securities, as well as hard copy bid bonds, must be received on or before the Invitation to Bid (ITB) opening date and time, at the Finance Department/Procurement Services Division, 100 North Andrews Avenue, Room 619, Fort Lauderdale, FL 33301-1016, with the bid number and title clearly indicated on the envelope.

It is the bidder's sole responsibility to ensure that his bid bond or other bid security is received by the Procurement Services Division before time of bid opening. Failure to adhere to this requirement may be grounds to consider the bid as non-responsive.

The City of Fort Lauderdale reserves the right to waive any informality in any or all bids and to reject any or all bids.

For information concerning technical specifications, please utilize the question/answer feature provided by BIDSYNC at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures, will only be transmitted by written addendum. (See addendum section of BIDSYNC Site). **Contractors please note:** No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation.

Information on bid results and projects currently out to bid can be obtained on the City's website – http://www.fortlauderdale.gov/departments/finance/procurement-services. For general inquiries, please call (954) 828-5933.

INSTRUCTIONS TO BIDDERS

The following instructions are given for the purpose of guiding bidders in properly preparing their bids or proposals. These directions have equal force and weight with the specifications and strict compliance is required with all of these provisions.

QUALIFICATIONS OF BIDDERS – No proposal will be accepted from, nor will any contract be awarded to, any person who is in arrears to the CITY OF FORT LAUDERDALE, upon any debt or contract, or who has defaulted, as surety or otherwise, upon any obligation to the City, or who is deemed irresponsible or unreliable by the City Commission of Fort Lauderdale.

PERSONAL INVESTIGATION - Bidders shall satisfy themselves by personal investigation, and by such other means as they may think necessary or desirable, as to the conditions affecting the proposed work and the cost. No information derived from maps, plans, specifications, or from the Engineer, City Manager, or their assistants shall relieve the Contractor from any risk or from fulfilling all terms of the contract.

INCONSISTENCIES – Any seeming inconsistency between different provisions of the plans, specifications, proposal or contract, or any point requiring explanation must be inquired into by the bidder, in writing, at least ten (10) days prior to the time set for opening proposals. After proposals are opened, the bidders shall abide by the decision of the Engineer as to such interpretation.

ADDENDA AND INTERPRETATIONS - No interpretations of the meaning of the plans, specifications or other contract documents will be made orally to any bidder. Prospective bidders must request such interpretation in writing as instructed in the bid package. To be considered, such request must be received by the Questions and Answers deadline as indicated in BIDSYNC.COM. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. **It is the bidder's responsibility to verify if addendums have been issued in BIDSYNC.COM.** Failure of any bidder to receive any such addenda or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become a part of the contract document. **Bidder** shall verify **in BIDSYNC.COM** that he has all addenda before submitting a bid.

LEGAL CONDITIONS - Bidders are notified to familiarize themselves with the provisions of the laws of the State of Florida relating to hours of labor on municipal work, and with the provisions of the laws of the State of Florida and the Charter and the ordinances of the City of Fort Lauderdale.

PUBLIC ENTITY CRIMES - A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, for CATEGORY TWO for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

FORMS OF PROPOSALS - Each proposal and its accompanying statements must be made on the blanks provided. THE FORMS MUST BE SUBMITTED ELECTRONICALLY, IN GOOD ORDER WITH ALL BLANKS COMPLETED, and must show the name of the bidder and a statement as to its contents.

INSTRUCTIONS TO BIDDERS (continued)

FORMS OF PROPOSALS (CONTINUED) - The proposal must be signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the proposal. No proposal will be accepted, for any reason whatsoever, which is not submitted to the City as stated above, within the specified time.

INSURANCE - Contractor shall provide and shall require all of its sub-contractors to provide, pay for, and maintain in force at all times during the term of the Agreement, such insurance, including Property Insurance (Builder's Risk), Commercial General Liability Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Employer's Liability Insurance, and Umbrella/Excess Liability, as stated below. Such policy or policies shall be issued by companies authorized to do business in the State of Florida and having agents upon whom service of process may be made in the State of Florida.

BID BOND - A certified check, cashier's check or bank officer's check, for the sum set forth in the advertisement, made payable to the City of Fort Lauderdale, Florida, or bid bond in such amount, shall accompany each proposal as evidence of the good faith and responsibility of the bidder. The check or bond shall be retained by the City as liquidated damages should the bidder refuse to or fail to enter into a contract for the execution of the work embraced in this proposal, in the event the proposal of the bidder is accepted. Retention of such amount shall not be construed as a penalty or forfeiture.

The above bond or check shall be a guarantee that the bidder will, if necessary, promptly execute a satisfactory contract and furnish good and sufficient bonds. As soon as a satisfactory contract has been executed and the bonds furnished and accepted, the check or bond accompanying the proposal of the successful bidder will be returned to him. The certified or other checks or bid bonds of the unsuccessful bidders will be returned to them upon the acceptance of the bid of the successful bidder. If the successful bidder shall not enter into, execute, and deliver such a contract and furnish the required bonds within ten (10) days after receiving notice to do so, the certified or other check or bid bond shall immediately become the property of the City of Fort Lauderdale as liquidated damages. Retention of such amount shall not be construed as a penalty or forfeiture.

FILLING IN BIDS - All prices must be electronically submitted in the proposal pages, and all proposals must fully cover all items for which proposals are asked and no other. Bidders are required to state the names and places of residence of all persons interested, and if no other person is interested, the bidder shall distinctly state such fact and shall state that the proposal is, in all respects, fair and without collusion or fraud. Where more than one person is interested, it is required that all persons interested or their legal representative make all verification and subscribe to the proposal.

PRICES QUOTED: Deduct any discount offered and quote firm net unit prices. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern. All prices quoted shall be F.O.B. destination, freight prepaid (Bidder pays and bears freight charges, Bidder owns goods in transit and files any claims), unless otherwise stated in Special Conditions. Each item must be bid separately. No attempt shall be made to tie any item or items contained in the ITB with any other business with the City.

BIDS FIRM FOR ACCEPTANCE: Bidder warrants, by virtue of bidding, that his bid and the prices quoted in his bid will be firm for acceptance by the City for a period of one hundred and twenty (120) days from the date of bid opening unless otherwise stated in the ITB. The City shall award contract within this time period or shall request to the recommended awarded vendor an extension to hold pricing, until products/services have been awarded.

ADDITIONAL ITEMS OR SERVICES: The City may require additional items or services of a similar nature, but not specifically listed in the contract. The Contractor agrees to provide such items or

INSTRUCTIONS TO BIDDERS (continued)

services, and shall provide the City prices on such additional items or services. If the price(s) offered are not acceptable to the City, and the situation cannot be resolved to the satisfaction of the City, the City reserves the right to procure those items or services from other vendors, or to cancel the contract upon giving the Contractor thirty (30) days written notice.

DELETION OR MODIFICATION OF SERVICES: The City reserves the right to delete any portion of the Contract at any time without cause, and if such right is exercised by the City, the total fee shall be reduced in the same ratio as the estimated cost of the work deleted bears to the estimated cost of the work originally planned. If work has already been accomplished on the portion of the Contract to be deleted, the Contractor shall be paid for the deleted portion on the basis of the estimated percentage of completion of such portion.

If the Contractor and the City agree on modifications or revisions to the task elements, after the City has approved work to begin on a particular task or project, and a budget has been established for that task or project, the Contractor will submit a revised budget to the City for approval prior to proceeding with the work.

CAUSES FOR REJECTION - No proposal will be canvassed, considered or accepted which, in the opinion of the City Commission, is informal or unbalanced, or contains inadequate or unreasonable prices for any items; each item must carry its own proportion of the cost as nearly as is practicable. Any alteration, erasure, interlineation, or failure to specify bids for all items called for in the schedule shall render the proposal informal.

REJECTION OF BIDS - The City reserves the right to reject any bid if the evidence submitted by the bidder, or if the investigation of such bidder, fails to satisfy the City that such bidder is properly qualified to carry out the obligations and to complete the work contemplated. Any or all proposals will be rejected, if there is reason to believe that collusion exists among bidders. A proposal will be considered irregular and may be rejected, if it shows serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all proposals and to waive such technical errors as may be deemed best for the interests of the City.

BID PROTEST PROCEDURE - Any Bidder who is not recommended for award of a contract and who alleges a failure by the city to follow the city's procurement ordinance or any applicable law, may follow the protest procedure as found in the city's procurement ordinance within five (5) days after a notice of intent to award is posted on the city's web site at the following link: http://www.fortlauderdale.gov/departments/finance/procurement-services/notices-of-intent-to-award.
The complete protest ordinance may be found on the city's web site at the following link: https://library.municode.com/fl/fort_lauderdale/codes/code_of_ordinances?nodeId=COOR_CH2AD_ARTVFI_DIV2PR_S2-182DIREPR

WITHDRAWALS - Any bidder may, without prejudice to himself, withdraw his proposal at any time prior to the expiration of the time during which proposals may be submitted. Such request for withdrawal must be in writing and signed in the same manner and by the same person who signed the proposal. After expiration of the period for receiving proposals, no proposal can be withdrawn, modified, or explained.

CONTRACT - The bidder to whom award is made shall execute a written contract to do the work and maintain the same in good repair until final acceptance by the proper authorities, and shall furnish

good and sufficient bonds as specified within ten (10) days after receiving such contract for execution. If the bidder to whom the first award is made fails to enter into a contract as provided, the award may be annulled and the contract let to the next lowest bidder who is reliable, responsible, and responsive in the opinion of the City Commission, and that bidder shall fulfill every stipulation and obligation as if such bidder were the original party to whom award was made.

The contract shall provide that the Contractor agrees to correct any defective or faulty work or material, which may appear within one (1) year after completion of the work and receipt of final payment.

ENFORCEMENT OF SPECIFICATIONS - Copies of the specifications will be placed in the hands of all the assistants to the Engineer and Inspectors employed on the work, who shall enforce each and every requirement of the contract. Such assistants shall have no authority to vary from such requirements.

COPIES OF DRAWING PLANS - Copies of the drawing plans are on file in the Public Works Department, City Hall, 4th Floor, 100 N. Andrews Avenue, Fort Lauderdale, Florida 33301.

SURETY BOND – The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2018), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

The successful bidder shall furnish a performance and payment bond in compliance with Section 255.05, Florida Statutes, written by a Corporate Surety company, holding a Certificate of Authority from the Secretary of the Treasury of the United States as acceptable sureties on federal bonds, in an amount equal to the total amount payable by the terms of the contract, executed and issued by a Resident Agent licensed by and having an office in the State of Florida, representing such Corporate Surety, conditioned for the due and faithful performance of the work, and providing in addition to all other conditions, that if the Contractor, or his or its subcontractors, fail to duly pay for any labor, materials, or other supplies used or consumed by such Contractor, or his or its subcontractor or subcontractors, in performance of the work contracted to be done, the Surety will pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the rate of fifteen percent (15%) per annum, and that they shall indemnify and save harmless the City of Fort Lauderdale to the extent of any and all payments in connection with carrying out of the contract, which the City may be required to make under the law.

The Contractor is required at all times to have a valid surety bond in force covering the work being performed. A failure to have such bond in force at any time shall constitute a default on the part of the Contractor. A bond written by a surety, which becomes disqualified to do business in the State of Florida, shall automatically constitute a failure on the part of the Contractor to meet the above requirements.

Such bond shall continue in effect for one (1) year after completion and acceptance of the work with liability equal to at least twenty-five percent (25%) of contract price, or an additional bond shall be conditioned that the Contractor will correct any defective or faulty work or material which appear within one (1) year after completion of the contract, upon notification by the City, except in contracts which are concerned solely with demolition work, in which cases twenty-five percent (25%) liability will not be applicable.

AUDIT OF CONTRACTOR'S RECORDS - Upon execution of the Contract, the City reserves the right to conduct any necessary audit of the Contractor's records. Such an audit, or audits, may be conducted by the City or its representatives at any time prior to final payment, or thereafter, for a period up to three (3) years. The City may also require submittal of the records from either the Contractor, the Subcontractor, or both. For the purpose of this Section, records shall include all books of account, supporting documents and papers deemed necessary by the City to assure compliance with the contract provisions.

Failure of the Contractor or Subcontractor to comply with these requirements may result in disqualification or suspension from bidding for future contracts or disapproval as a Subcontractor at the option of the City.

The Contractor shall assure that each of its Subcontractors will provide access to its records pertaining to the project upon request by the City.

PERIODIC ESTIMATE FOR PARTIAL PAYMENT - After the Contractor has submitted a periodic estimate for partial payment, approved and certified by the Public Works Department, the City shall make payment in the manner provided in the Contract Documents and in accordance with Florida's Prompt Payment Act, Section 218, Florida Statutes.

RESERVATION FOR AWARD AND REJECTION OF BIDS - The City reserves the right to accept or reject any or all bids, part of bids, and to waive minor irregularities or variations to specifications contained in bids, and minor irregularities in the bidding process. The City also reserves the right to award the contract on a split order basis, lump sum basis, individual item basis, or such combination as shall best serve the interest of the City. The City reserves the right to make an award to the responsive and responsible bidder whose product or service meets the terms, conditions, and specifications of the ITB and whose bid is considered to best serve the City's interest. In determining the responsiveness of the offer and the responsibility of the Bidder, the following shall be considered when applicable: the ability, capacity and skill of the Bidder to perform as required; whether the Bidder can perform promptly, or within the time specified, without delay or interference; the character, integrity, reputation, judgment, experience and efficiency of the Bidder; the quality of past performance by the Bidder; the previous and existing compliance by the Bidder with related laws and ordinances; the sufficiency of the Bidder's financial resources; the availability, quality and adaptability of the Bidder's supplies or services to the required use; the ability of the Bidder to provide future maintenance, service or parts; the number and scope of conditions attached to the bid.

EARLY PROJECT COMPLETION INCENTIVE
The City reserves the right to negotiate incentives for early deliverables with the awarded vendor. The City is under no obligation to offer any such incentive.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION AND BUSINESS - It is the desire of the City of Fort Lauderdale to increase the participation of minority (MBE) and women-owned (WBE) businesses in its contracting and procurement programs. While the City does not have any preference or set aside programs in place, it is committed **to a policy of equitable participation for these firms.** The City of Fort Lauderdale wants to increase the participation of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBE) in its procurement activities. If your firm qualifies in accordance with the below definitions please indicate in the space provided in this ITB.

Minority Business Enterprise (MBE) "A Minority Business" is a business enterprise that is owned or controlled by one or more socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

The term “Minority Business Enterprise” means a business at least fifty-one percent (51%) of which is owned by minority group members or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by minority group members. For the purpose of the preceding sentence, minority group members are citizens of the United States who include, but are not limited to: Blacks, Hispanics, Asian Americans, and Native Americans.

Women Business Enterprise (WBE) a “Women Owned or Controlled Business” is a business enterprise at least fifty-one percent (51%) of which is owned by females or, in the case of a publicly owned business, at least fifty-one percent (51%) of the stock of which is owned by females.

Small Business Enterprise (SBE) “Small Business” means a corporation, partnership, sole proprietorship, or other legal entity formed for the purpose of making a profit, which is independently owned and operated, has either fewer than 100 employees or less than $1,000,000 in annual gross receipts.

BLACK includes persons having origins in any of the Black racial groups of Africa.

WHITE includes persons whose origins are Anglo-Saxon and Europeans and persons of Indo-European decent including Pakistani and East Indian.

HISPANIC includes persons of Mexican, Puerto Rican, Cuban, Central and South American, or other Spanish culture or origin, regardless of race.

NATIVE AMERICAN includes persons whose origins are American Indians, Eskimos, Aleuts, or Native Hawaiians.

ASIAN AMERICAN includes persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.

DEBARRED OR SUSPENDED BIDDERS OR PROPOSERS - The bidder or proposer certifies, by submission of a response to this solicitation, that neither it nor its principals and subcontractors are presently debarred or suspended by any Federal department or agency.

LOBBYING ACTIVITIES - **ALL CONTRACTORS PLEASE NOTE:** Any contractor submitting a response to this solicitation must comply, if applicable, with City of Fort Lauderdale Ordinance No. C-00-27 & Resolution No. 07-101, Lobbying Activities. Copies of Ordinance No., C-00-27, and Resolution No. 07-101, may be obtained from the City Clerk’s Office on the 7th Floor of City Hall, 100 N. Andrews Avenue, Fort Lauderdale, Florida. The ordinance may also be viewed on the City's website at http://www.fortlauderdale.gov/clerk/LobbyistDocs/lobbyist_ordinance.pdf .

PROJECT 12256-493

SPECIAL CONDITIONS

01. PURPOSE

The City of Fort Lauderdale, Florida (City) is seeking bids from qualified bidders, hereinafter referred to as the Contractor, to provide construction services in accordance with the terms, conditions, and specifications contained in this Invitation To Bid (ITB).

02. TRANSACTION FEES

The City of Fort Lauderdale uses BidSync (www.bidsync.com) to distribute and receive bids and proposals. There is no charge to vendors/contractors to register and participate in the solicitation process, nor will any fees be charged to the awarded contractor.

03. SUBMISSION OF BIDS

It is the sole responsibility of the Contractor to ensure that their bid is submitted electronically through BidSync at www.bidsync.com and that any bid security not submitted via BidSync reaches the City of Fort Lauderdale, Procurement Services Division, 6th floor, Room 619, 100 N. Andrews Avenue, Fort Lauderdale, FL 33301, in a sealed envelope marked on the outside with the ITB solicitation number and Contractor's name, no later than the time and date specified in this solicitation. **PAPER BID SUBMITALS WILL NOT BE ACCEPTED. PLEASE SUBMIT YOUR BID RESPONSE ELECTRONICALLY.**

04. INFORMATION OR CLARIFICATION

For information concerning procedures for responding to this solicitation, contact Penelope Burger, **Procurement Administrator**, at (954) 828-5189 or email at pburger@fortlauderdale.gov. Such contact shall be for clarification purposes only.

For information concerning technical specifications please utilize the question/answer feature provided by BidSync at www.bidsync.com. Questions of a material nature must be received prior to the cut-off date specified in the solicitation. Material changes, if any, to the scope of services or bidding procedures will only be transmitted by written addendum. (See addendum section of BidSync Site). **Contractors please note**: No part of your bid can be submitted via FAX. No variation in price or conditions shall be permitted based upon a claim of ignorance. Submission of a bid will be considered evidence that the Contractor has familiarized himself with the nature and extent of the work, and the equipment, materials, and labor required. The entire bid response must be submitted in accordance with all specifications contained in this solicitation. The questions and answers submitted in BidSync shall become part of any contract that is created from this ITB.

05. CONTRACT TIME

5.1 The Contractor recognizes that TIME IS OF THE ESSENCE. The Work shall commence within 30 calendar days (20 working days), of the date of the Notice to Proceed.

5.2 The Work shall be Substantially Completed within 365 calendar days (261 working days), after the date when the Contract Time commences to run as provided in the Notice to Proceed.

5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 395 calendar days (283 working days), after the date when the Contract Time commences to run as provided in the Notice to Proceed.

The City of Fort Lauderdale reserves the right to waive any informality in any bid and to reject any or all bids. The City of Fort Lauderdale reserves the right to reduce or delete any of the bid items.

At time of award of contract, the City reserves the right to set a maximum dollar limit that may be expended on this project. Contract quantities of any or all items may be increased, reduced, or eliminated to adjust the contract amount to coincide with the amount of work necessary or to bring the contract value to within the established limit. All quantities are estimated and the City reserves the right to increase, reduce, or eliminate the contract quantities in any amount.

The undersigned bidder affirms that he has or will obtain all equipment necessary to complete the work described, that he has or will obtain all required permits and licenses from the appropriate agencies, and that his firm is authorized to do business in the State of Florida.

06. BID SECURITY

A certified check, cashier's check, bank officer's check or bid bond for **FIVE** percent **(5%)** of the bid amount, made payable to the City of Fort Lauderdale, Florida, shall accompany each proposal.

07. REQUIRED LICENSES/CERTIFICATIONS

Contractor must possess the following licenses/certifications to be considered for award.

Florida General Contractor License or a Florida Certified Marine Specialty Contractor License.

Note: Contractor must have proper licensing and be able to provide evidence of same, if requested, at time of award.

08. SPECIFIC EXPERIENCE REQUIRED

The following expertise is required to be considered for this contract. Specific references attesting to this expertise must be submitted with bid.

The contractor shall have at least ten (10) years previous construction experience in the demolition of existing seawalls, and in the construction of new seawalls, in the State of Florida within the last ten (10) years. Bidder shall submit proof of construction experience for a minimum of three (3) projects of similar scope and scale (or larger) and shall, for each project listed, identify location; dates of construction; project name and overall scope; scope of work that was self-performed by Contractor; and client's name, address, telephone number and e-mail address.

NOTE: REFERENCES SHALL NOT INCLUDE ONLY CITY OF FORT LAUDERDALE EMPLOYEES OR WORK PERFORMED FOR THE CITY. THE CITY IS ALSO INTERESTED IN WORK EXPERIENCE AND REFERENCES FROM ENTITIES OTHER THAN THE CITY OF FORT LAUDERDALE.

By signing this bid solicitation, contractor is affirming that this expertise will be provided for this contract at no additional charge.

09. BID ALLOWANCE

Allowance for permits: Payments will be made to the contractor based on the actual cost of permits upon submission of paid permit receipts. The City shall not pay for other costs related to obtaining or securing permits.

The amount indicated is intended to be sufficient to cover the entire project. If the City Permit fees exceed the allowance indicated, the City will reimburse the contractor the actual amount of City Permit Fees required for project completion.

Allowance	$
Permit fee allowance	165,000
Material testing allowance	100,000
TOTAL	$265,000

Note: The City will add this allowance to your bid.

10. INSURANCE REQUIREMENTS *(See Article 10, Bonds and Insurance, of the Contract for details)*

Insurance

10.1 As a condition precedent to the effectiveness of this Agreement, during the term of this Agreement and during any renewal or extension term of this Agreement, the Contractor, at the Contractor's sole expense, shall provide insurance of such types and with such terms and limits as noted below. Providing proof of and maintaining adequate insurance coverage are material obligations of the Contractor. The Contractor shall provide the City a certificate of insurance evidencing such coverage. The Contractor's insurance coverage shall be primary insurance for all applicable policies. The limits of coverage under each policy maintained by the Contractor shall not be interpreted as limiting the Contractor's liability and obligations under this Agreement. All insurance policies shall be from insurers authorized to write insurance policies in the State of Florida and that possess an A.M. Best rating of A-, VII or better. All insurance policies are subject to approval by the City's Risk Manager.

The coverages, limits, and endorsements required herein protect the interests of the City, and these coverages, limits, and endorsements may not be relied upon by the Contractor for assessing the extent or determining appropriate types and limits of coverage to protect the Contractor against any loss exposure, whether as a result of this Agreement or otherwise. The requirements contained herein, as well as the City's review or acknowledgement, are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under this Agreement.

The following insurance policies and coverages are required:

10.1.1 Commercial General Liability

Coverage must be afforded under a Commercial General Liability policy with limits not less than:

- $1,000,000 each occurrence and $2,000,000 aggregate for Bodily Injury, Property Damage, and Personal and Advertising Injury
- $1,000,000 each occurrence and $2,000,000 aggregate for Products and Completed Operations

Policy must include coverage for Contractual Liability and Independent Contractors.

The City and the City's officers, employees, and volunteers are to be covered as additional insureds with a CG 20 26 04 13 Additional Insured – Designated Person or Organization Endorsement or similar endorsement providing equal or broader Additional Insured Coverage with respect to liability arising out of activities performed by or on behalf of the Contractor. The coverage shall contain no special limitation on the scope of protection afforded to the City or the City's officers, employees, and volunteers.

10.1.2 Business Automobile Liability

Coverage must be afforded for all Owned, Hired, Scheduled, and Non-Owned vehicles for Bodily Injury and Property Damage in an amount not less than $1,000,000 combined single limit each accident.

If the Contractor does not own vehicles, the Contractor shall maintain coverage for Hired and Non-Owned Auto Liability, which may be satisfied by way of endorsement to the Commercial General Liability policy or separate Business Auto Liability policy.

10.1.3 Workers' Compensation and Employer's Liability

Coverage must be afforded per Chapter 440, Florida Statutes. Any person or entity performing work for or on behalf of the City must provide Workers' Compensation insurance. Exceptions and exemptions will be allowed by the City's Risk Manager, if they are in accordance with Florida Statute.

The Contractor waives, and the Contractor shall ensure that the Contractor's insurance carrier waives, all subrogation rights against the City and the City's officers, employees, and volunteers for all losses or damages. The City requires the policy to be endorsed with WC 00 03 13 Waiver of our Right to Recover from Others or equivalent.

The Contractor must be in compliance with all applicable State and federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act and the Jones Act, if applicable.

Insurance Certificate Requirements

a. The Contractor shall provide the City with valid Certificates of Insurance (binders are unacceptable) no later than thirty (30) days prior to the start of work contemplated in this Agreement.
b. The Contractor shall provide to the City a Certificate of Insurance having a thirty (30) day notice of cancellation; ten (10) days' notice if cancellation is for nonpayment of premium.
c. In the event that the insurer is unable to accommodate the cancellation notice requirement, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested, and addressed to the certificate holder.
d. In the event the Agreement term goes beyond the expiration date of the insurance policy, the Contractor shall provide the City with an updated Certificate of Insurance no later than ten (10) days prior to the expiration of the insurance currently in effect. The City reserves the right to suspend the Agreement until this requirement is met.
e. The Certificate of Insurance shall indicate whether coverage is provided under a claims-made or occurrence form. If any coverage is provided on a claims-made form, the Certificate of Insurance must show a retroactive date, which shall be the effective date of the initial contract or prior.
f. The City shall be named as an Additional Insured on the General liability policy, with the exception of Workers' Compensation.
g. The City shall be granted a Waiver of Subrogation on the Contractor's Workers' Compensation insurance policy.
h. The title of the Agreement, Bid/Contract number, event dates, or other identifying reference must be listed on the Certificate of Insurance.

The Certificate Holder should read as follows:
City of Fort Lauderdale
100 N. Andrews Avenue
Fort Lauderdale, FL 33301

The Contractor has the sole responsibility for the payment of all insurance premiums and shall be fully and solely responsible for any costs or expenses as a result of a coverage deductible, co-insurance penalty, or self-insured retention; including any loss not covered because of the operation of such deductible, co-insurance penalty, self-insured retention, or coverage exclusion or limitation. Any costs for adding the City as an Additional Insured shall be at the Contractor's expense.

If the Contractor's primary insurance policy/policies do not meet the minimum requirements, as set forth in this Agreement, the Contractor may provide evidence of an Umbrella/Excess insurance policy to comply with this requirement.

The Contractor's insurance coverage shall be primary insurance as applied to the City and the City's officers, employees, and volunteers. Any insurance or self-insurance maintained by the City covering the City, the City's officers, employees, or volunteers shall be non-contributory.

Any exclusion or provision in the insurance maintained by the Contractor that excludes coverage for work contemplated in this Agreement shall be unacceptable and shall be considered breach of contract.

All required insurance policies must be maintained until the contract work has been accepted by the City, or until this Agreement is terminated, whichever is later. Any lapse in coverage shall be considered breach of contract. In addition, Contractor must provide to the City confirmation of coverage renewal via an updated certificate should any policies expire prior to the expiration of this Agreement. The City reserves the right to review, at any time, coverage forms and limits of Contractor's insurance policies.

The Contractor shall provide notice of any and all claims, accidents, and any other occurrences associated with this Agreement shall be provided to the Contractor's insurance company or companies and the City's Risk Management office as soon as practical.

It is the Contractor's responsibility to ensure that any and all of the Contractor's independent contractors and subcontractors comply with these insurance requirements. All coverages for independent contractors and subcontractors shall be subject to all of the applicable requirements stated herein. Any and all deficiencies are the responsibility of the Contractor.

10.1.4 REQUIRED COVERAGES

10.1.4.1 <u>Crane and Rigging Liability</u>
Coverage must be afforded for any crane operations under the Commercial General or Business Automobile Liability policy as necessary, in line with the limits of the associated policy.

10.1.4.2 <u>Contractors Pollution Liability Coverage</u>
For sudden and gradual occurrences and in an amount not less than $1,000,000 per claim arising out of this Agreement, including but not limited to, all hazardous materials identified under the Agreement.

10.1.4.3 <u>Watercraft Liability</u>
Coverage must be afforded in an amount not less than $1,000,000 per occurrence and must cover the utilization of watercraft, including Bodily Injury and Property Damage arising out of ownership, maintenance, or use of any watercraft, including owned, non-owned, and hired.

Coverage may be provided in the form of an endorsement to the Commercial General Liability policy, or in the form of a separate policy covering Watercraft Liability or Protection and Indemnity for Bodily Injury and Property Damage.

10.1.4.4 <u>Umbrella Liability</u>

Each Occurrence	$2,000,000
Aggregate	$2,000,000

NOTE: CITY PROJECT NUMBER AND NAME MUST APPEAR ON EACH CERTIFICATE, AND THE CITY OF FORTLAUDERDALE MUST BE NAMED ON THE CERTIFICATE AS AN "ADDITIONAL INSURED" ON ALL LIABILITY POLICIES, WITH THE EXCEPTION OF WORKERS' COMPENSATION.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.

11. PERFORMANCE AND PAYMENT BOND: 100%
Number of awards anticipated: __1___

12. CITY PROJECT MANAGER
The Project Manager is hereby designated by the City as Juan Carlos Samuel, E.I., whose address is 101 NE, 3rd Ave, #1410, Fort Lauderdale, FL 33301, telephone number: (954) 828-6323, and email address is jsamuel@fortlauderdale.gov. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

13. LIQUIDATED DAMAGES *(See Article 16, Liquidated Damages, of the Contract for details)*

Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **Five Hundred Dollars ($500.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. (See Article 16, Liquidated Damages Clause, of the Contract)

14. PAYMENT (*See Article 7, Payment, of the Contract for other details*)

The City shall make payment to the Contractor through utilization of the City's P-Card Program. The City has implemented a Purchasing Card (P-Card) Program utilizing both VISA and MASTERCARD networks. Purchases from this contract will be made utilizing the City's Purchasing Card. Contractor will receive payment from the purchasing card in the same manner as other credit card purchases. Accordingly, bidders must presently have the ability to accept these credit cards or take whatever steps necessary to implement the ability before the start of the contract term, or contract award by the City. The City reserves the right to revise this program as necessary. All costs associated with the Contractor's participation in this purchasing program shall be borne by the Contractor. The City reserves the right to revise this program as necessary.

15. WORK SCHEDULE (including overtime hours):

Regular work hours: **7:00 am to 4:30 pm, Monday through Friday.**
City Inspector Hours: **8:00 am to 4:30 pm, Monday through Friday.**

Any inspection requested by the contractor outside those hours will be considered overtime to be paid by the Contractor.

16. INSPECTION OVERTIME COST: $ 219/hr.

CITY OF FORT LAUDERDALE
CONSTRUCTION AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 20__, by and between the City of Fort Lauderdale, a Florida municipal corporation (City) and _____, (Contractor), (parties);

WHEREAS, the City desires to retain a contractor for the Project as expressed in its Invitation to Bid No., _____, Project Number, _____, which was opened on _____; and,

WHEREAS, the Contractor has expressed its willingness and capability to perform the necessary work to accomplish the Project.

NOW, THEREFORE, the City and the Contractor, in consideration of the mutual covenants and conditions contained herein and for other good and valuable consideration, the receipt and sufficiency is hereby acknowledged, agree as follows:

ARTICLE 1 – DEFINITIONS

Whenever used in this Agreement or in other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural forms:

1.1 Agreement – This written Agreement between the City and the Contractor covering the work to be performed including other Contract Documents that are attached to or incorporated in the Agreement.

1.2 Application for Payment – The form accepted by the City which is to be used by the Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents

1.3 Approve – The word approve is defined to mean review of the material, equipment or methods for general compliance with design concepts and with the information given in the Contract Documents. It does not imply a responsibility on the part of the City to verify in every detail conformance with plans and specifications.

1.4 Bid – The offer or Bid of the Contractor submitted on the prescribed form setting forth the total prices for the Work to be performed.

1.5 Bid Documents –This Agreement, advertisement for Invitation to Bids, the Instructions to Bidders, the Bid Form (with supplemental affidavits and agreements), the Contract Forms, General Conditions, the Supplementary Conditions, the Specifications, and the Plans, which documents all become an integral part of the Contract Documents.

1.6 Certificate of Substantial Completion - Certificate provided by the City certifying that all Work, excluding the punch list items, has been completed, inspected, and accepted by the City.

1.7 Change Order - A change order is defined as a written order to a contractor approved by the City, authorizing a revision of an underlying agreement between the City and a contractor that is directly related to the original scope of work or an adjustment in the original contract price or the contract time directly related to the original scope of work, issued on or after the effective date of the contract.

1.8 City – The City of Fort Lauderdale, Florida, including but not limited to its employees, agents, officials, representatives, contractors, subcontractors, volunteers, successors and assigns, with whom the Contractor has entered into the Agreement and for whom the Work is to be provided.

1.9 Contract Documents – The Contract Documents shall consist of this Agreement, Exhibits to this Agreement, Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance, Notice of Award and Notice to Proceed, General Conditions as amended by the Special Conditions, Technical Specifications, Plans/Drawings, Addenda, Bid Form and supplement Affidavits and Agreements, all applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement, Invitation to Bid, Instructions to Bidders and Bid Bond, Contractor's response to the City's Invitation to Bid, Schedule of Completion, Schedule of Values, all amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement, as well as any additional documents that are required to be submitted under the Agreement.

Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

1.10 Contract Price – The monies payable to the Contractor by the City under the Contract Documents and in accordance with the line item unit prices listed in the Bid.

1.11 Contract Time – The number of calendar days stated in the Agreement for the completion of the Work. The dates on which the work shall be started and shall be completed as stated in the Notice to Proceed.

1.12 Contractor – The person, firm, company, or corporation with whom the City has entered into the Agreement, including but not limited to its employees, agents, representatives, contractors, subcontractors, their subcontractors and their other successors and assigns.

1.13 Day – A calendar day of twenty-four (24) hours ending at midnight.

1.14 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, test or approval referred to in the Contract Documents, or has been damaged prior to the Project Manager's recommendation of final payment.

1.15 Effective Date of the Agreement – The effective date of the agreement shall be the date the City Commission approves the work. The contractor shall provide all required payment and performance bonds and insurances to the City within ten (10) Calendar days following the City Commission approval. Upon verification of all bonds and insurances, the City will issue a notice to proceed (NTP) to the Contractor. Contract time will commence on the date when the Notice to Proceed is issued. The Contractor shall commence the work immediately upon receipt of the Notice to Proceed. Failure of the contractor to proceed with the work will constitute non-performance of the Contractor and would be ground for termination of the contract per ARTICLE 17 of the Agreement.

1.16 Final Completion Date – The date the Work is completed, including completion of the final punch list, and delivered along with those items specified in the Contract Documents and is accepted by the City.

1.17 Hazardous Materials (HAZMAT) - Any solid, liquid, or gaseous material that is toxic, flammable, radioactive, corrosive, chemically reactive, or unstable upon prolonged storage in quantities that could pose a threat to life, property, or the environment defined in Section 101(14) of Comprehensive Environmental Response, Compensation and Liability Act of 1980 and in 40 CFR 300.6. Also defined by 49 CFR 171.8 as a substance or material designated by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce and which has been so designated.

1.18 Hazardous Substance - As defined by Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act; any substance designated pursuant to Section 311(b) (2) (A) of the Clean Water Act; any element, compound, mixture, solution or substance designated pursuant to Section 102 identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act {but not including any waste listed under Section 307[a] of the Clean Water Act}; any hazardous air pollutant listed under Section 112 of the Clean Air Act; and any imminently hazardous chemical substance or mixture pursuant to Section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in the first sentence of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

1.19 Hazardous Waste - Those solid wastes designated by OSHA in accordance with 40 CFR 261 due to the properties of ignitability, corrosivity, reactivity, or toxicity. Any material that is subject to the Hazardous Waste Manifest requirements of the EPA specified in 40 CFR Part 262.

1.20 Holidays - Those designated non-work days as established by the City Commission of the City of Fort Lauderdale.

1.21 Inspection – The term “inspection” and the act of inspecting as used in this Agreement is defined to mean the examination of construction to ensure that it conforms to the design concept expressed in the plans and specifications. This term shall not be construed to mean supervision, superintending and/or overseeing.

1.22 Notice of Award - The written notice by City to the Contractor stating that upon compliance by the Contractor with the conditions precedent enumerated therein, within the time specified that the City will sign and deliver this Agreement.

1.23 Notice to Proceed – A written notice given by the City to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contract Time will end.

1.24 Plans - The drawings which show the character and scope of the work to be performed and which have been prepared or approved by the City and are referred to in the Contract Documents.

1.25 Premises (otherwise known as Site or Work Site) – means the land, buildings, facilities, etc. upon which the Work is to be performed.

1.26 Project – The total construction of the Work to be provided as defined in the Contract Documents.

1.27 Project Manager - The employee of the City, or other designated individual who is herein referred to as the Project Manager, will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the contract Documents in connection with completion of the Work in accordance with this Agreement. The Project Manager, or designee, shall be the authorized agent for the City unless otherwise specified.

1.28 Punch List - The City's list of Work yet to be done or be corrected by the Contractor, before the Final Completion date can be determined by the City.

1.29 Record Documents - A complete set of all specifications, drawings, addenda, modifications, shop drawings, submittals and samples annotated to show all changes made during the construction process.

1.30 Record Drawings or "As-Builts" - A set of drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor. These documents will be signed and sealed by the Engineer of Record or a Professional Land Surveyor licensed in the State of Florida.

1.31 Substantially Completed Date – A date when the Contractor has requested in writing, stating that the Work is substantially completed and is ready for an inspection and issuance of a final punch list for the Project.

1.32 Work – The entire completed delivered product or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating material and equipment into the product, all as required by the Contract Documents.

ARTICLE 2 – SCOPE OF WORK

2.1 The Contractor shall complete all work as specified or indicated in the Contract Documents. The Project for which the Work under the Contract Documents may be the whole or only part is generally described as follows:

CORDOVA ROAD SEAWALL REPLACEMENT
ITB # 12256-493
PROJECT # 12337

2.2 All Work for the Project shall be constructed in accordance with the Drawings and Specifications. The Work generally involves:

Project is located at Cordova Road between SE 12th Street and SE 7th Street, Fort Lauderdale, FL 33316 . The work Includes furnishing and installation of all tools, equipment, materials, supplies, manufactured articles, transportation and services, including fuel, power, water, and essential communications, for the performance of all labor, work, and/or other operations as required for the installation of approximate 2500 LF of seawall demolition and construction, drainage infrastructure installation (catch basins, piping, check valves), pavement restoration, landscaping restoration and all work as shown in the Contract Documents. The work includes all associated general, civil, structural, electrical work, and all appurtenant work, complete, tested and ready for operation, all in conformance with the Contract Documents.

2.3 Within ten (10) days of the execution of this Agreement, the Contractor shall submit a Construction Schedule, Schedule of Values and a listing of those subcontractors that will be utilized by the Contractor. The general sequence of the work shall be submitted by the Contractor and approved by the City before any work commences. The City reserves the right to issue construction directives necessary to facilitate the Work or to minimize any conflict with operations.

ARTICLE 3 – PROJECT MANAGER

3.1 The Project Manager is hereby designated by the City as Juan Carlos Samuel, E.I., whose address is 101 N.E. 3rd Avenue, #1410, Fort Lauderdale, FL 33301, telephone number: (954) 828-6323, and email address is jsamuel@fortlauderdale.gov. The Project Manager will assume all duties and responsibilities and will have the rights and authorities assigned to the Project Manager in the Contract Documents in connection with completion of the Work in accordance with this Agreement.

ARTICLE 4 – CONTRACT DOCUMENTS

The Contract Documents which comprise the entire Agreement between the City and Contractor are attached to this Agreement, are made a part hereof and consist of the following:

4.1 This Agreement.

4.2 The Contract Documents may only be altered, amended, or repealed in accordance with the specific provisions of the terms of this Agreement.

4.3 Exhibits to this Agreement: File No. 4-141.55; 42 sheets

4.4 Public Construction Bond, Performance Bond, Payment Bond and Certificates of Insurance.

4.5 Notice of Award and Notice to Proceed.

4.6 General Conditions as amended by the Special Conditions.

4.7 Technical Specifications.

4.8 Plans/Drawings.

4.9 Addenda number _____ through _____, inclusive.

4.10 Bid Form and supplement Affidavits and Agreements.

4.11 All applicable provisions of State and Federal Law.

4.12 Invitation to Bid No., 12256-493, Instructions to Bidders, and Bid Bond.

4.13 Contractor's response to the City's Invitation to Bid No., _____, dated _____.

4.14 Schedule of Completion and Schedule of Values.

4.15 All amendments, modifications and supplements, change orders and work directive changes issued on or after the Effective Date of the Agreement.

4.16 Any additional documents that are required to be submitted under the Agreement.

4.17 Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Agreement. A copy of all permits shall be given to the City for inclusion in the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

In the event of any conflict between the documents or any ambiguity or missing specification or instruction, the following priority is established:

a. Specific direction from the City Manager (or designee).

b. Approved change orders, addenda or amendments.

c. Specifications (quality) and Drawings (location and quantity).

d. Supplemental conditions or special terms.

e. General Terms and Conditions.

f. This Agreement dated _____ and any attachments.

g. Invitation to Bid No., _____, and the specifications prepared by the City.

h. Contractor's response to the City's Invitation to Bid No., _____, dated _____.

i. Schedule of Values.

j. Schedule of Completion.

If during the performance of the Work, Contractor finds a conflict, error or discrepancy in the Contract Documents, Contractor shall so report to the Project Manager, in writing, at once and before proceeding with the Work affected shall obtain a written interpretation or clarification from the City.

It is the intent of the specifications and plans to describe a complete Project to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the specifications or plans as being required to produce the intended result shall be supplied whether or not it is specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials, or equipment, such works shall be interpreted in accordance with such meaning. Reference to standard specifications, manuals or codes of any technical society, organization or associations, or to the code of any governmental authority whether such reference be specific or implied, shall mean the latest standard specification, manual or code in effect as of the Effective Date of this Agreement, 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 change the duties and responsibilities of the City, the Contractor, or any of their agents or employees from those set forth in the Contract Documents.

ARTICLE 5 – CONTRACT TIME

5.1 The Contractor recognizes that **TIME IS OF THE ESSENCE**. The Work shall commence within 30 calendar days (20 working days), of the date of the Notice to Proceed.

5.2 The Work shall be Substantially Completed within 365 calendar days (261 working days) after the date when the Contract Time commences to run as provided in the Notice to Proceed.

5.3 The Work shall be finally completed on the Final Completion Date and ready for final payment in accordance with this Agreement within 395 calendar days (283 working days), after the date when the Contract Time commences to run as provided in the Notice to Proceed.

ARTICLE 6 – CONTRACT PRICE

6.1 City shall pay Contractor for performance of the Work in accordance with Article 7, subject to additions and deletions by Change Order, as provided for in this Agreement.

6.2 The parties expressly agree that the Contract Price, which shall not exceed the amount of $_____, constitutes the total maximum compensation payable to Contractor for performing the Work, plus any Work done pursuant to a Change Order. The Contract Price is in accordance with the line item unit prices listed in the Bid. Line items are based on a unit price cost multiplied by a defined quantity. Any

additional duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change to the Contract Price.

6.3 The Contract Price constitutes the compensation payable to Contractor for performing the Work plus any Work done pursuant to a Change Order. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract price.

ARTICLE 7 – PAYMENT

7.1 Contractor shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by City as provided in the General Conditions.

7.2 Progress Payments. City shall make progress payments on account of the Contract Price on the basis of Contractor's monthly Applications for Payment, which shall be submitted by the Contractor between the first (1st) and the tenth (10th) day after the end of each calendar month for which payment is requested. All progress payments will be made on the basis of the progress of the Work completed.

7.3 Prior to Final Completion, progress payments will be made in an amount equal to ninety percent (90%) of the value of Work completed less in each case the aggregate of payments previously made.

7.4 Final Payment. Upon final completion of the Work in accordance with the General Conditions, as may be supplemented, the City shall pay Contractor an amount sufficient to increase total payments to one-hundred percent (100%) of the Contract Price. However, not less than ten percent (10%) of the Contract Price shall be retained until Record Drawings (as-builts), specifications, addenda, modifications and shop drawings, including all manufacturers' instructional and parts manuals are delivered to and accepted by the City.

7.5 City may withhold, in whole or in part, payment to such extent as may be necessary to protect itself from loss on account of:

7.5.1 Defective work not remedied.
7.5.2 Claims filed or reasonable evidence indicating probable filing of claims by other parties against Contractor or City because of Contractor's performance.
7.5.3 Failure of Contractor to make payments properly to Subcontractors or for material or labor.
7.5.4 Damage to another contractor not remedied.
7.5.5 Liquidated damages and costs incurred by Consultant for extended construction administration, if applicable.
7.5.6 Failure of Contractor to provide any and all documents required by the Contract Documents.

When the above grounds are removed or resolved satisfactory to the Project Manager, payment shall be made in whole or in part.

7.6 The City shall make payment to the Contractor in accordance with the Florida Prompt Payment Act, Section 218.70, Florida Statutes.

7.7 The City shall make payment to the Contractor through utilization of the City's P-Card Program. The City has implemented a Purchasing Card (P-Card) Program utilizing both VISA and MASTERCARD networks. Purchases from this contract will be made utilizing the City's Purchasing Card. Contractor will receive payment from the purchasing card in the same manner as other credit card purchases. Accordingly, bidders must presently have the ability to accept these credit cards or take whatever steps necessary to implement the ability before the start of the contract term, or contract award by the City. The City reserves the right to revise this program as necessary. All costs associated with the Contractor's participation in this purchasing program shall be borne by the Contractor. The City reserves the right to revise this program as necessary.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

In order to induce the City to enter into this Agreement, Contractor makes the following representations upon which the City has relied:

8.1 Contractor is qualified in the field of public construction and in particular to perform the Work and services set forth in this Agreement.

8.2 Contractor has visited the Work Site, has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor's experts, has determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted within the Contract Time as defined in this Agreement. Furthermore, Contractor warrants and confirms that he is totally familiar with, understands and obligates Contractor to comply with all federal, state and local laws, ordinances, rules, regulations and all market conditions that affect or may affect the cost and price of materials and labor needed to fulfill all provisions of this Agreement or that in any manner may affect cost, progress or performance of the Work.

8.3 The Contractor has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Project, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

8.4 The Contractor has also studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Works, and finds and has further determined that no conditions exist that would in any manner affect the Proposed Price and that the project can be completed for the Proposed Price submitted.

8.5 Contractor has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraphs 8.2, 8.3 and 8.4 above as he deems necessary for the performance of the Work at the Contract Prices, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor for such purposes.

8.6 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.7 Contractor has given City written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution by City is acceptable to the Contractor.

8.8 Labor

8.8.1 The Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.

8.8.2 The Contractor shall, at all times, have a competent superintendent, capable of reading and thoroughly understanding the drawings and specifications, as the Contractor's agent on the Work, who shall, as the Contractor's agent, supervise, direct and otherwise conduct the Work.

8.8.3 The Contractor shall designate the superintendent on the job to the City, in writing, immediately after receipt of the Notice to Proceed. The Contractor understands and agrees that the superintendent's physical presence on the job site is indispensable to the successful completion of the Work. If the superintendent is frequently absent from the job site, the Project Manager may deliver written notice to the Contractor to stop work or terminate the Contract in accordance with Article 17.

8.8.4 The Contractor shall assign personnel to the job site that have successfully completed training programs related to trench safety, confined space and maintenance of traffic. A certified "competent person" shall be assigned to the job site. Personnel certified by the International Municipal Signal Associations with Florida Department of Transportation qualifications are required relative to maintenance of traffic. Failure to pursue the Work with the properly certified supervisory staff may result in notice to stop work or terminate the Contract in accordance with Article 17.

8.9 Materials:

8.9.1 The Contractor shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of Work.

8.9.2 All material and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. Suppliers shall be selected and paid by the Contractor; the City reserves the right to approve all suppliers and materials.

8.10 Work Hours: 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 Supplementary Conditions, all work at the site shall be performed during regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the Project Manager's written consent at least seventy-two (72) hours in advance of starting such work. If the Project Manager permits overtime work, the Contractor shall pay for the additional charges to the City with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made to the Contractor for overtime work. It shall be noted that the City's Inspector work hours are from 8:00 a.m. to 4:30 p.m. and any Work requiring inspection oversight being performed outside of this timeframe shall be paid for by the Contractor as Inspector overtime. The cost to the Contractor to reimburse the City for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the Contractor at the actual rate accrued.

8.11 Patent Fee and Royalties: The 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, or any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. The Contractor hereby expressly binds himself or itself to indemnify and save harmless the City from all such claims and fees and from any and all suits and action of every name and description that may be brought against City on account of any such claims, fees, royalties, or costs for any such invention or patent, and from any and all suits or actions that may be brought against said City for the infringement of any and all patents or patent rights claimed by any person, firm corporation or other entity.

8.12 Permits: The Contractor shall obtain and pay for all permits and licenses. There shall be no allowance for Contractor markup, overhead or profit for permits and licenses. The Contractor shall pay all government charges which are applicable at the time of opening of proposals. It shall be the responsibility of the Contractor to secure and pay for all necessary licenses and permits of a temporary nature necessary for the prosecution of Work.

8.13 Law and Regulations: The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the Contractor observes that the specifications or plans are at variance therewith, the Contractor shall give the Project Manager prompt written notice thereof, and any necessary changes shall be adjusted by any appropriate modifications. If the Contractor performs any work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, and without such notice to the Project Manager, the Contractor shall bear all costs arising therefrom; however, it shall not be the Contractor's primary responsibility to make certain that the specifications and plans are in accordance with such laws, ordinances, rules and regulations.

8.14 Taxes: The Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by him in accordance with the laws of the City of Fort Lauderdale, County of Broward, State of Florida.

8.15 Contractor Use of Premises: The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by law, ordinances, permits and/or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

The Contractor shall not enter upon private property for any purpose without first securing the permission of the property owner in writing and furnishing the Project Manager with a copy of said permission. This requirement will be strictly enforced, particularly with regard to such vacant properties as may be utilized for storage or staging by the Contractor.

The Contractor shall conduct his work in such a manner as to avoid damage to adjacent private or public property. Any damage to existing structures of work of any kind, including permanent reference markers or property corner markers, or the interruption of a utility service, shall be repaired or restored promptly at no expense to the City or property owner.

The Contractor will preserve and protect all existing vegetation such as trees, shrubs and grass on or adjacent to the site which do not reasonably interfere with the construction, as determined by the Project Manager. The Contractor will be responsible for repairing or replacing any trees, shrubs, lawns and landscaping that may be damaged due to careless operation of equipment, stockpiling of materials, tracking of grass by equipment or other construction activity. The Contractor will be liable for, or will be required to replace or restore at no expense to the City all vegetation not protected or preserved as required herein that may be destroyed or damaged.

During the progress of the work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish and debris resulting from the Work. At the completion of the Work, the 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 the City. The Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents at no cost to the City.

8.16 Project Coordination: The Contractor shall provide for the complete coordination of the construction effort. This shall include, but not necessarily be limited to, coordination of the following:

8.16.1 Flow of material and equipment from suppliers.
8.16.2 The interrelated work with affected utility companies.
8.16.3 The interrelated work with the City where tie-ins to existing facilities are required.
8.16.4 The effort of independent testing agencies.
8.16.5 Notice to affected property owners as may be directed by the Project Manager.

8.17 Project Record Documents and Final As-Builts (Record Drawings): Contractor shall be responsible for maintaining up-to-date redline as-built drawings, on site, at all times during construction. All as-built information shall be surveyed and verified by a professional land surveyor registered in the State of Florida. Contractor shall provide the City with a minimum of three (3) sets of signed and sealed record drawings (Final As-Builts) and a CD of the electronic drawings files created in AutoCad 2014 or later. All costs associated with survey work required for construction layout and as-built preparation shall be the responsibility of the Contractor.

8.18 Safety and Protection:

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

8.18.1.1 All employees working on the project and other persons who may be affected thereby.

8.18.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site.

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

8.18.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders 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. The Contractor shall notify owners of adjacent property and utilities when execution of the Work may affect them at least seventy-two (72) hours in advance (unless otherwise required). All damage, injury or loss to any property caused, directly or indirectly, in whole or in part by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and accepted by the City.

8.19 Emergencies: In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Project Manager prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby.

8.20 Risk of Loss: The risk of loss, injury or destruction shall be on the Contractor until acceptance of the Work by the City. Title to the Work shall pass to the City upon acceptance of the Work by the City.

8.21 Environmental: The Contractor has fully inspected the Premises and agrees, except as to the presence of any asbestos, to accept the Premises in an "as is" physical condition, without representation or warranty by the City of any kind, including, without limitation, any and all existing environmental claims or obligations that may arise from the presence of any "contamination" on, in or about the Premises. Further, Contractor and all entitles claiming by, through or under the Contractor, releases and discharges the City, from any claim, demand, or cause of action arising out of or relating to the Contractor's use, handling, storage, release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of any hazardous substances including asbestos on, under, from or about the Premises. The Contractor shall have no liability for any pre-existing claims or "contamination" on the Premises.

The Contractor shall not use, handle, store, discharge, treat, remove, transport, or dispose of Hazardous Substances including asbestos at, in, upon, under, to or from the Premises until receipt of instructions from the City. At such time, a City approved Change Order, which shall not include any profit, shall authorize the Contractor to perform such services.

The Contractor shall immediately deliver to the Project Manager complete copies of all notices, demands, or other communications received by the Contractor from any governmental or quasi-governmental authority or any insurance company or board of fire underwriters or like or similar entities regarding in any way alleged violations or potential violations of any Environmental Law or otherwise asserting the existence or potential existence of any condition or activity on the Premises which is or could be dangerous to life, limb, property, or the environment.

For other and additional consideration, the Contractor hereby agrees, at its sole cost and expense, to indemnify and protect, defend, and hold harmless the City and its respective employees, agents, officials, officers, representatives, contractors and subcontractors, successors, and assigns (hereafter the "City") from and against any and all claims, demands, losses, damages, costs, expenses, including but not limited to mitigation, restoration, and natural restoration expenses, liabilities, assessments, fines, penalties charges, administrative and judicial proceedings and orders, judgments, causes of action, in law or in equity, remedial action requirements and/or enforcement actions of any kind (including, without limitation, attorneys' fees and costs) directly or indirectly arising out of or attributable to, in whole or in part, the Contractor's use, handling, storage, release, threatened release, discharge, treatment, removal, transport, decontamination, cleanup, disposal and/or presence of a Hazardous Substance (excluding asbestos) on, under, from, to or about the Premises or any other activity carried on or undertaken on or off the Premises by the Contractor or its employees, agents or subcontractors, in connection with the use, handling, storage, release, threatened release, discharge, treatment, mitigation, natural resource restoration, removal, transport, decontamination, cleanup, disposal and/or presence or any Hazardous Substance including asbestos located, transported, or present on, undue, from, to, or about the Premises. This indemnity is intended to be operable under 42 U.S.C. sections 9607, as amended, and any successor section.

The scope of the indemnity obligations includes, but is not limited to: (a) all consequential damages; (b) the cost of any required or necessary repair, cleanup, or detoxification of the applicable real estate and the preparation and implementation of any closure, remedial or other required plan, including without limitation; (i) the costs of

removal or remedial action incurred by the United States government or the State of Florida or response costs incurred by any other person, or damages from injury to destruction of, or loss of, natural resources, including the cost of assessing such injury, destruction, or loss, incurred pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended; (ii) the clean-up costs, fines, damages, or penalties incurred pursuant to any applicable provisions of Florida law; and (iii) the cost and expenses of abatement, correction or cleanup, fines, damages, response costs, or penalties which arise from the provisions of any other statute, law, regulation, code ordinance, or legal requirement state or federal; and (c) liability for personal injury or property damage arising under any statutory or common law tort theory, including damages assessed for the maintenance of a public private nuisance, response costs, or for the carrying on of an abnormally dangerous activity.

8.22 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any other reason or allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

8.23 No Liens: If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements or claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items furnished in connection with the Work or any Change Order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within twenty (20) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining such. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments.

8.24 Weather Emergencies: Upon issuance of a Hurricane Watch by the National Weather Service, the Contractor shall submit to the City a plan to secure the work area in the

event a Hurricane Warning is issued. The plan shall detail how the Contractor will secure the Premises, equipment and materials in a manner as to prevent damage to the Work and prevent materials and equipment from becoming a hazard to persons and property on and around the Premises. The plan shall include a time schedule required to accomplish the hurricane preparations and a list of emergency contacts that will be available and in the City before, during and immediately after the storm. Upon issuance of a Hurricane Warning by the National Weather Service, if the Contractor has not already done so, the Contractor shall implement its hurricane preparedness plan. Cost of development and implementation of the hurricane preparedness plan shall be considered as incidental to construction. Cost of any clean up and rework required after the storm will be considered normal construction risk within Florida and shall not entitle the Contractor to any additional compensation. Contractor shall be entitled to request an extension in time for completion of the Work, in accordance with the provisions of Article 15 of this Agreement, equal to the time he is shut down for implementation of the preparedness plan, the duration of the storm and a reasonable period to restore the Premises.

8.25 Force Majeure: No Party shall hold the other responsible for damages or for delays in performance caused by force majeure, acts of God, or other acts or circumstances beyond the control of the other party or that could not have been reasonably foreseen and prevented. For this purposes, such acts or circumstances shall include, but not be limited to weather conditions affecting performance, floods, epidemics, war, riots, strikes, lockouts, or other industrial disturbances, or protest demonstrations. Should such acts or circumstances occur, the parties shall use their best efforts to overcome the difficulties arising therefrom and to resume the Work as soon as reasonably possible with the normal pursuit of the Work.

Inclement weather, continuous rain for less than three (3) days or the acts or omissions of subcontractors, third-party contractors, materialmen, suppliers, or their subcontractors, shall not be considered acts of force majeure.

No Party shall be liable for its failure to carry out its obligations under the Agreement during a period when such Party is rendered unable by force majeure to carry out its obligation, but the obligation of the Party or Parties relying on such force majeure shall be suspended only during the continuance of the inability and for no longer period than the unexpected or uncontrollable event.

The Contractor further agrees and stipulates, that its right to excuse its failure to perform by reason of force majeure shall be conditioned upon giving written notice of its assertion that a Force Majeure delay has commenced within 96 hours after such an occurrence. The CONTRACTOR shall use its reasonable efforts to minimize such delays. The CONTRACTOR shall promptly provide an estimate of the anticipated additional time required to complete the Project.

8.26 Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assisted Contracts: The recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR part 26 and as

approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 *et eq.*).

Additionally, the contractor assures that they, the sub recipient or the subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. (This additional language must be included in each subcontract the prime contractor signs with a subcontractor.)

ARTICLE 9 – CITY'S RESPONSIBILITIES

9.1 The City shall furnish the data required of the City under the Contract Documents promptly and shall make payments to the Contractor promptly after they are due as provided in Article 7.

9.2 The City's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in the Contract Documents.

9.3 <u>Technical Clarifications and Interpretations:</u>

9.3.1 The City shall issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents as it may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Should the Contractor fail to request interpretation of questionable items in the Contract Documents, the City shall not entertain any excuse for failure to execute the Work in a satisfactory manner.

9.3.2 The City shall interpret and decide matters concerning performance under the requirements of the Contract Documents, and shall make decisions on all claims, disputes or other matters in question. Written notice of each claim, dispute or other matter will be delivered by claimant to the other Party but in no event later than five (5) days after the occurrence of event, and written supporting date will be submitted to the other Party within five (5) days after such occurrence. All written decisions of the City on any claim or dispute will be final and binding.

9.4 The Contractor shall perform all Work to the reasonable satisfaction of the City in accordance with the Contract Documents. In cases of disagreement or ambiguity, the City shall decide all questions, difficulties, and disputes of whatever nature, which may arise under or by reason of this Agreement or the quality, amount and value of the Work, and the City's decisions on all claims, questions and determination are final.

ARTICLE 10 – BONDS AND INSURANCE

10.1 Public Construction and Other Bonds: The Contractor shall furnish Public Construction or Performance and Payment Bonds ("Bond"), each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all the Contractor's obligations under the Contract Documents. These Bonds shall remain in effect until at least one (1) year after the date of final payment, except as otherwise provided by law. All Bonds shall be furnished and provided by the surety and shall be in substantially the same form as prescribed by the Contract Documents and be executed by such sureties as (i) are licensed to conduct business in the State of Florida, and (ii) are named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department and (iii) otherwise meet the requirements set forth herein that apply to sureties. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

10.1.1 Performance Bond: A Corporate Surety Bond legally issued, meeting the approval of, and running to the City in an amount not less than the Contract Price of such improvements, conditioned that the Contractor shall maintain and make all repairs to the improvements constructed by the Contractor at their own expense and free of charge to the City, for the period of one (1) year after the date of acceptance of the Work within such period by reason of any imperfection of the material used or by reason of any defective workmanship, or any improper, imperfect or defective preparation of the base upon which any such improvement shall be laid.

The Contractor shall execute and record in the public records of Broward County, Florida, a payment and performance bond in an amount at least equal to the Contract Price with a surety insurer authorized to do business in the State of Florida as surety, ("Bond"), in accordance with Section 255.05, Florida Statutes (2014), as may be amended or revised, as security for the faithful performance and payment of all of the Contractor's obligations under the Contract Documents.

10.2 Disqualification of Surety: If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Florida or it ceases to meet the requirements of clauses (i) and (ii) of Paragraph 10.1, the Contractor shall within five (5) days thereafter substitute another Bond and Surety, both of which shall be acceptable to the City.

10.3 Insurance

10.3.1 As a condition precedent to the effectiveness of this Agreement, during the term of this Agreement and during any renewal or extension term of this Agreement, the Contractor, at the Contractor's sole expense, shall provide insurance of such types and with such terms and limits as noted below. Providing proof of and maintaining adequate insurance coverage are material obligations of the Contractor. The Contractor shall provide the City a certificate of insurance evidencing such coverage. The Contractor's insurance coverage shall be primary insurance for all applicable policies. The limits of coverage under each

policy maintained by the Contractor shall not be interpreted as limiting the Contractor's liability and obligations under this Agreement. All insurance policies shall be from insurers authorized to write insurance policies in the State of Florida and that possess an A.M. Best rating of A-, VII or better. All insurance policies are subject to approval by the City's Risk Manager.

The coverages, limits, and endorsements required herein protect the interests of the City, and these coverages, limits, and endorsements may not be relied upon by the Contractor for assessing the extent or determining appropriate types and limits of coverage to protect the Contractor against any loss exposure, whether as a result of this Agreement or otherwise. The requirements contained herein, as well as the City's review or acknowledgement, are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under this Agreement.

The following insurance policies and coverages are required:

10.3.2 Commercial General Liability

Coverage must be afforded under a Commercial General Liability policy with limits not less than:

- $1,000,000 each occurrence and $2,000,000 aggregate for Bodily Injury, Property Damage, and Personal and Advertising Injury
- $1,000,000 each occurrence and $2,000,000 aggregate for Products and Completed Operations

Policy must include coverage for Contractual Liability and Independent Contractors.

The City and the City's officers, employees, and volunteers are to be covered as additional insureds with a CG 20 26 04 13 Additional Insured – Designated Person or Organization Endorsement or similar endorsement providing equal or broader Additional Insured Coverage with respect to liability arising out of activities performed by or on behalf of the Contractor. The coverage shall contain no special limitation on the scope of protection afforded to the City or the City's officers, employees, and volunteers.

10.3.3 Business Automobile Liability

Coverage must be afforded for all Owned, Hired, Scheduled, and Non-Owned vehicles for Bodily Injury and Property Damage in an amount not less than $1,000,000 combined single limit each accident.

If the Contractor does not own vehicles, the Contractor shall maintain coverage for Hired and Non-Owned Auto Liability, which may be satisfied by way of endorsement to the Commercial General Liability policy or separate Business Auto Liability policy.

10.3.4 Workers' Compensation and Employer's Liability

Coverage must be afforded per Chapter 440, Florida Statutes. Any person or entity performing work for or on behalf of the City must provide Workers' Compensation insurance. Exceptions and exemptions will be allowed by the City's Risk Manager, if they are in accordance with Florida Statute.

The Contractor waives, and the Contractor shall ensure that the Contractor's insurance carrier waives, all subrogation rights against the City and the City's

officers, employees, and volunteers for all losses or damages. The City requires the policy to be endorsed with WC 00 03 13 Waiver of our Right to Recover from Others or equivalent.

The Contractor must be in compliance with all applicable State and federal workers' compensation laws, including the U.S. Longshore Harbor Workers' Act and the Jones Act, if applicable.

Insurance Certificate Requirements

a. The Contractor shall provide the City with valid Certificates of Insurance (binders are unacceptable) no later than thirty (30) days prior to the start of work contemplated in this Agreement.
b. The Contractor shall provide to the City a Certificate of Insurance having a thirty (30) day notice of cancellation; ten (10) days' notice if cancellation is for nonpayment of premium.
c. In the event that the insurer is unable to accommodate the cancellation notice requirement, it shall be the responsibility of the Contractor to provide the proper notice. Such notification will be in writing by registered mail, return receipt requested, and addressed to the certificate holder.
d. In the event the Agreement term goes beyond the expiration date of the insurance policy, the Contractor shall provide the City with an updated Certificate of Insurance no later than ten (10) days prior to the expiration of the insurance currently in effect. The City reserves the right to suspend the Agreement until this requirement is met.
e. The Certificate of Insurance shall indicate whether coverage is provided under a claims-made or occurrence form. If any coverage is provided on a claims-made form, the Certificate of Insurance must show a retroactive date, which shall be the effective date of the initial contract or prior.
f. The City shall be named as an Additional Insured on the General liability policy, with the exception of Workers' Compensation.
g. The City shall be granted a Waiver of Subrogation on the Contractor's Workers' Compensation insurance policy.
h. The title of the Agreement, Bid/Contract number, event dates, or other identifying reference must be listed on the Certificate of Insurance.

The Certificate Holder should read as follows:
City of Fort Lauderdale
100 N. Andrews Avenue
Fort Lauderdale, FL 33301

The Contractor has the sole responsibility for the payment of all insurance premiums and shall be fully and solely responsible for any costs or expenses as a result of a coverage deductible, co-insurance penalty, or self-insured retention; including any loss not covered because of the operation of such deductible, co-insurance penalty, self-insured retention, or coverage exclusion or limitation. Any costs for adding the City as an Additional Insured shall be at the Contractor's expense.

If the Contractor's primary insurance policy/policies do not meet the minimum requirements, as set forth in this Agreement, the Contractor may provide evidence of an Umbrella/Excess insurance policy to comply with this requirement.

The Contractor's insurance coverage shall be primary insurance as applied to the City and the City's officers, employees, and volunteers. Any insurance or self-insurance maintained by the City covering the City, the City's officers, employees, or volunteers shall be non-contributory.

Any exclusion or provision in the insurance maintained by the Contractor that excludes coverage for work contemplated in this Agreement shall be unacceptable and shall be considered breach of contract.

All required insurance policies must be maintained until the contract work has been accepted by the City, or until this Agreement is terminated, whichever is later. Any lapse in coverage shall be considered breach of contract. In addition, Contractor must provide to the City confirmation of coverage renewal via an updated certificate should any policies expire prior to the expiration of this Agreement. The City reserves the right to review, at any time, coverage forms and limits of Contractor's insurance policies.

The Contractor shall provide notice of any and all claims, accidents, and any other occurrences associated with this Agreement shall be provided to the Contractor's insurance company or companies and the City's Risk Management office as soon as practical.

It is the Contractor's responsibility to ensure that any and all of the Contractor's independent contractors and subcontractors comply with these insurance requirements. All coverages for independent contractors and subcontractors shall be subject to all of the applicable requirements stated herein. Any and all deficiencies are the responsibility of the Contractor.

10.3.5 REQUIRED COVERAGES

10.3.5.1 Crane and Rigging Liability
Coverage must be afforded for any crane operations under the Commercial General or Business Automobile Liability policy as necessary, in line with the limits of the associated policy.

10.3.5.2 Contractors Pollution Liability Coverage
For sudden and gradual occurrences and in an amount not less than $1,000,000 per claim arising out of this Agreement, including but not limited to, all hazardous materials identified under the Agreement.

10.3.5.3 Watercraft Liability
Coverage must be afforded in an amount not less than $1,000,000 per occurrence and must cover the utilization of watercraft, including Bodily Injury and Property Damage arising out of ownership, maintenance, or use of any watercraft, including owned, non-owned, and hired.

Coverage may be provided in the form of an endorsement to the Commercial General Liability policy, or in the form of a separate policy covering Watercraft Liability or Protection and Indemnity for Bodily Injury and Property Damage.

10.3.5.4 Umbrella Liability

Each Occurrence	$2,000,000
Aggregate	$2,000,000

NOTE: CITY PROJECT NUMBER AND NAME MUST APPEAR ON EACH CERTIFICATE, AND THE CITY OF FORTLAUDERDALE MUST BE NAMED ON THE CERTIFICATE AS AN "ADDITIONAL INSURED" ON ALL LIABILITY POLICIES, WITH THE EXCEPTION OF WORKERS' COMPENSATION.

A Sample Insurance Certificate shall be included with the proposal to demonstrate the firm's ability to comply with insurance requirements. Provide a previous certificate or other evidence listing the insurance companies' names for all required coverage, and the dollar amounts of the coverage.

ARTICLE 11- WARRANTY AND GUARANTEE, TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

11.1 Warranty: The Contractor warrants and guarantees to the 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 the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this Article.

11.1.1 Warranty of Title: The Contractor warrants to the City that it possesses good, clear and marketable title to all equipment and materials provided and that there are no pending liens, claims or encumbrances against the equipment and materials.

11.1.2 Warranty of Specifications: The Contractor warrants that all equipment, materials and workmanship furnished, whether furnished by the Contractor, its subcontractors or suppliers, will comply with the specifications, drawings and other descriptions supplied or adopted and that all services will be performed in a workmanlike manner.

11.1.3 Warranty of Merchantability: The Contractor warrants that any and all equipment to be supplied pursuant to this Agreement is merchantable, free from defects, whether patent or latent in material or workmanship, and fit for the ordinary purposes for which it is intended.

11.2 Tests and Inspections: Contractor shall retain the services of an independent, certified, testing lab to perform all testing as required by the specifications, Contract drawings, and any applicable permitting agency. Contractor shall provide evidence of certification to the City before the work and testing is done. Testing results shall be submitted to the Engineer for review and approval at the time the results are provided to the Contractor. The Contractor shall give the Project Manager and City Inspector a minimum of twenty-four (24) hours' advanced notice of readiness of the Work for all required inspections, tests, or approvals and shall notify all applicable permitting agencies in a timely manner based on requirements set forth in the permit documents.

11.2.1 Neither observations by the Project Manager nor inspections, tests or approvals by others shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

11.3 Uncovering Work: If any work that is to be inspected, tested or approved is covered without approval or consent of the Project Manager, it must, if requested by the Project Manager, be uncovered for observation and/or testing. Such uncovering and replacement shall be at the Contractor's sole expense unless the Contractor has given the Project Manager timely notice of the Contractor's intention to cover such Work and the Project Manager has not acted with reasonable promptness in response to such notice.

11.3.1 If the Project Manager considers it necessary or advisable that Work covered in accordance with Paragraph 11.2.1, 11.2.2 and 11.2.3 be observed by the City or inspected or tested by others, the Contractor at the City's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Project Manager 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, the Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, and an appropriate deductive Change Order shall be issued. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection testing and reconstruction if he makes a claim therefore as provided in Articles 14 and 15.

11.4 City May Stop the Work: If the Work is defective, or the Contractor fails to supply sufficient skilled supervisory personnel or workmen or suitable materials or equipment or the work area is deemed unsafe, the City may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the City to stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other party. The City will not award any increase in Contract Price or Contract Time if the Work is stopped due to the circumstances described herein.

11.5 Correction or Removal of Defective Work Before Final Payment: If required by the Project Manager, the Contractor shall promptly, without cost to the City and as Specified by the Project Manager, either correct any defective Work, whether or not fabricated, installed or completed, or if the Work has been rejected by the City remove it from the site and replace it with non-defective Work.

11.6 One Year Correction Period After Final Payment: If within one (1) year after the date of final acceptance, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective Work, or, if it has been rejected by the City, remove it from the site and replace it with non-defective Work.

If The 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, the City may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs for such removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

11.7 Acceptance of Defective Work, Deductions: If, instead of requiring correction or removal and replacement of defective Work, the City, at the city's sole option, prefers to accept it, the City may do so. In such a case, if acceptance occurs prior to the Project Manager's recommendation of final payments, a Change Order shall be issued incorporating the necessary revisions in the Contracts Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after such recommendation, an appropriate amount shall be paid by the Contractor to the City.

11.8 City May Correct Defective Work: If the Contractor fails within a reasonable time after written notice of the Project Manager to proceed to correct defective Work or to remove and replace rejected Work as required by the Project Manager in accordance with Paragraph 11.5, or if the Contractor fails to perform the Work in accordance with the Contract Documents, the City may, after seven (7) days written notice to the Contractor, correct and remedy any such deficiency. In exercising its rights under this paragraph, the City shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the City may exclude the Contractor from all or part of the site, take possession of all or part of the Work, suspend the Contractor's services related thereto and take possession of the Contractor's tools, construction equipment and materials stored at the site or elsewhere. The Contractor shall allow the City's representative agents and employees such access to the site as may be necessary to enable the City to exercise its rights under this paragraph. All direct and indirect costs of the City in exercising such rights shall be charged against the Contractor in an amount verified by the Project Manager, and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents and a reduction in the Contract Price. Such direct and indirect costs shall include, in particular but without limitation, compensation for additional professional services required and costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the Contractor's defective Work. The 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 the City of the City's right hereunder.

ARTICLE 12 – INDEMNIFICATION

12.1 Disclaimer of Liability: The City shall not at any time, be liable for injury or damage occurring to any person or property from any cause, whatsoever, arising out of Contractor's construction and fulfillment of this agreement.

12.2 Indemnification: For other, additional good valuable consideration, the receipt and sufficiency of which is hereby acknowledged:

12.2.1 Contractor shall, at its sole cost and expense, indemnify and hold harmless the City, its representatives, employees and elected and appointed officials from or on account of all claims, damages, losses, liabilities and expenses, direct, indirect or consequential including but not limited to fees and charges of engineers, architects, attorneys, consultants and other professionals and court costs arising out of or in consequence of the performance of this Agreement at all trial and appellate levels. Indemnification shall specifically include but not be limited to claims, damages, losses, liabilities and expenses arising out of or from (a) the negligent or defective design of the project and Work of this Agreement; (b) any act, omission or default of the Contractor, its Subcontractors, agents, servants or employees; (c) any and all bodily injuries, sickness, disease or death; (d) injury to or destruction of tangible property, including any resulting loss of use; (e) other such damages, liabilities, or losses received or sustained by any person or persons during or on account of any operations connected with the construction of this Project including the warranty period; (f) the use of any improper materials; (g) any construction defect including both patent and latent defects; (h) failure to timely complete the work; (i) the violation of any federal, state, county or city laws, ordinances or regulations by Contractor, its subcontractors, agents, servants, independent contractors or employees; (j) the breach or alleged breach by Contractor of any term of the Agreement, including the breach or alleged breach of any warranty or guarantee.

12.2.2 Contractor agrees to indemnify, defend, save and hold harmless the City, its officers, agents and employees, from all damages, liabilities, losses, claims, fines and fees, and from any and all suits and actions of every name and description that may be brought against City, its officers, agents and employees, on account of any claims, fees, royalties, or costs for any invention or patent and/or for the infringement of any and all copyrights or patent rights claimed by any person, firm, or corporation.

12.2.3 Contractor shall pay all claims, losses, liens, settlements or judgments of any nature in connection with the foregoing indemnifications including, but not limited to, reasonable attorney's fees and costs for trails and appeals.

12.2.4 If any Subcontractor, supplier, laborer, or materialmen of Contractor or any other person directly or indirectly acting for or through Contractor files or attempts to file a mechanic's or construction lien against the real property on which the work is performed or any part or against any personal property or improvements thereon or make a claim against any monies due or to become due from the City to Contractor or from Contractor to a Subcontractor, for or on account of any work, labor, services, material, equipment, or other items

furnished in connection with the Work or any change order, Contractor agrees to satisfy, remove, or discharge such lien or claim at its own expense by bond, payment, or otherwise within five (5) days of the filing or from receipt of written notice from the City.

Additionally, until such time as such lien or claim is satisfied, removed or discharged by Contractor, all monies due to Contractor, or that become due to Contractor before the lien or claim is satisfied, removed or otherwise discharged, shall be held by City as security for the satisfaction, removal and discharge of such lien and any expense that may be incurred while obtaining the discharge. If Contractor shall fail to do so, City shall have the right, in addition to all other rights and remedies provided by this Agreement or by law, to satisfy, remove, or discharge such lien or claim by whatever means City chooses at the entire and sole cost and expense of Contractor which costs and expenses shall, without limitation, include attorney's fees, litigation costs, fees and expenses and all court costs and assessments, and which shall be deducted from any amount owing to Contractor. In the event the amount due Contractor is less than the amount required to satisfy Contractor's obligation under this, or any other article, paragraph or section of this Agreement, the Contractor shall be liable for the deficiency due the City.

12.2.5 The Contractor and the City agree that Section 725.06(2), Florida Statutes controls the extent and limits of the indemnification and hold harmless provisions of this Agreement, if any, and that the parties waive any defects in the wording of this Article that runs afoul of said statutory section.

ARTICLE 13 – CHANGES IN THE WORK

13.1 Without invalidating this Agreement, the City may, at any time or from time to time order additions, deletions or revisions in the Work through the issuance of Change Orders. Upon receipt of a Change Order, the Contractor shall proceed with the Work involved. All Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 14 or Article 15 on the basis of a claim made by either Party.

13.2 The Project Manager may authorize minor changes in the work not involving an adjustment in the Contract Price or the Contract Time, which are consistent with the overall intent of the Contract Documents. Such changes must be in writing and signed by the City and the Contractor.

13.3 If notice of any change affecting the general scope of the Work or change in the Contract Price is required by the provisions of any Bond to be given to the Surety, it will be the Contractor's responsibility to so notify the Surety, and the amount of each applicable Bond shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the City.

ARTICLE 14 – CHANGE OF CONTRACT PRICE

Change of Contract Price, approved by City, shall be computed as follows:

14.1 Cost of the Work: The term "Cost of the Work" means the sum of all direct costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by the City, these costs shall be in amounts no higher than those prevailing in the City and shall include only the following items and shall not include any of the costs itemized in Paragraph 14.3:

14.1.1 Payroll costs for employees in the direct employ of the Contractor in the performance of the Work under schedules of job classifications agreed upon by the City and the 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 and cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, worker's compensation, health and retirement benefits, bonuses, sick leave, vacation and applicable holiday pay.

14.1.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage, and required suppliers and field services. All cash discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the City, and the Contractor shall make provisions so that they may be obtained.

14.1.3 Supplemental costs including the following:

14.1.3.1 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.

14.1.3.2 Rentals of all construction equipment and machinery and the parts whether rented from the Contractor or others in accordance with rental agreements approved by the City, and the costs of transporting, loading, unloading, installation, dismantling and removal. The rental of any such equipment, machinery or parts shall cease when the use is no longer necessary for the Work.

14.1.3.3 Sales, consumer, use or similar taxes related to the Work and for which the Contractor is liable, imposed by laws and regulations.

14.1.3.4 Royalty payments and fees for permits and licenses.

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

14.1.3.6 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.

14.1.3.7 Cost of premiums for additional bonds and insurance required because of changes in the Work.

14.2 The Contract Price may only be increased by a Change Order when Work is modified in accordance with Article 13 and approved by the City in writing. Any claim for an increase in the Contract Price resulting from a Change Order shall be based on written notice delivered to the Project Manager within ten (10) days of the occurrence of the Change Order giving rise to the claim. Notice of the amount of the claim with supporting data shall be included in the Change Order and delivered within twenty (20) days of such occurrence unless Project Manager allows an additional period of time to ascertain accurate cost data. Any change in the Contract Price resulting from any such claim shall be incorporated in the Change Order. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT PRICE SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.**

14.3 Not Included in the Cost of the Work: The term "cost of the Work" shall not include any of the following:

14.3.1 Payroll costs and other compensation of the Contractor's officers executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditor, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed by the Contractor whether at the site or in the Contractor's principal or branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 14.1.1, all of which are to be considered administrative costs covered by the Contractor's fee.

14.3.2 Expenses of the Contractor's principal and branch offices other than the Contractor's office at the site.

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

14.3.4 Cost of premiums for all bonds and for all insurance whether or not the Contractor is required by the Contract Documents to purchase and maintain the same.

14.3.5 Costs due to the negligence of the 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.

14.3.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 14.1

14.4 Basis of Compensation: The Contractor's compensation, allowed to the Contractor for overhead and profit, shall be determined as follows:

14.4.1 A mutually acceptable negotiated fee:

14.4.1.1 For costs incurred under Paragraphs 14.1.1 and 14.1.2, the Contractor's fee shall not exceed five percent (5%).

14.4.1.2 No fee shall be payable on the basis of costs itemized under Paragraphs 14.1.3.1, 14.1.3.2, 14.1.3.3, 14.1.3.4, 14.1.3.5, 14.1.3.6, 14.1.3.7, 14.3.1, 14.3.2, 14.3.3, 14.3.4, 14.3.5 and 14.3.6.

14.4.1.3 The amount of credit to be allowed by the Contractor to the City for any such change which results in a net decrease plus a deduction in the Contractor's fee by an amount equal to five percent (5%) for the net decrease.

14.4.1.4 When both additions and credits are involved in any one change the combined overhead and profit shall be figured on the basis of net increase if any, however, not to exceed five percent (5%) of the agreed compensation. Profit will not be paid on any Work not performed.

14.5 Cost Breakdown Required: Whenever the cost of any Work is to be determined pursuant to this Article, the Contractor will submit in form acceptable to the City an itemized cost breakdown together with supporting documentation. Whenever a change in the Work is to be based upon mutual acceptance of a lump sum, whether the amount is an addition, credit, or no-charge-in-cost, the Contractor shall submit an estimate substantiated by a complete itemized breakdown:

14.5.1 The breakdown shall list quantities and unit prices for materials, labor, equipment and other items of cost.

14.5.2 Whenever a change involves the Contractor and one (1) or more subcontractors and the change is an increase in the agreed compensation, the overhead and profit percentage for the Contractor and each subcontractor shall be itemized separately.

14.6 Time for the City to Approve Extra Work: Any Extra Work in an amount up to and not exceeding a cumulative amount of $25,000 for a specific project can be approved by the City Manager and shall require a written Change Order proposal to be submitted to the Public Works Director for submittal and approval by the City Manager. Extra Work exceeding the cumulative amount of $25,000 for a specific project must be approved by the City Commission and a written Change Order proposal must be submitted to the Public Works Director for submittal and approval by the City Manager and City Commission. No financial or time claim for delay to the project resulting from the Change Order approval process outlined above under Section 14.6 will be allowed.

ARTICLE 15 – CHANGE OF THE CONTRACT TIME

15.1 The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Project Manager within five (5) days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

15.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made there for as provided in Paragraph 15.1. Such delays shall include but not be limited to, acts or neglect by the City, or to fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

15.3 All time limits stated in the Contract Documents are of the essence. The provisions of this Article 15 shall not exclude recovery for damages for delay by the Contractor.

15.4 Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the CONTRACTOR (non-affiliated Contractors) shall not give rise to a claim by the CONTRACTOR for damages for increases in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T and Florida East Coast Railway, LLC.

15.5 Rights of Various Interests: Whenever work being done by City's forces or by other contractors is contiguous to or within the limits of work covered by this Contract, the respective rights of the various interests involved shall be established by the Project Manager to secure the completion of the various portions of the work in general harmony.

ARTICLE 16 – LIQUIDATED DAMAGES

16.1 Upon failure of the Contractor to complete the Work within the time specified for completion, the Contractor shall pay to the City the sum of **Five Hundred Dollars ($500.00)** for each and every calendar day that the completion of the Work is delayed beyond the time specified in this Agreement for completion, as fixed and agreed liquidated damages and not as a penalty, so long as the delay is caused by the Contractor. Should an act of God or the acts or omissions of the City, its agents or representatives, in derogation to the terms of this Agreement cause the delay, the Contractor shall not be responsible for the delay nor liquidated damages. Liquidated damages are fixed and agreed upon between the Parties, recognizing the impossibility of precisely ascertaining the amount of damages that will be sustained by the City as a consequence of such delay and both parties desiring to obviate any question of dispute concerning the amount of damages and the cost and effect of the failure of the Contractor to complete the Work on time. Liquidated damages shall apply separately to each portion of the Work for which a time of completion is given. The City shall have the right to deduct from or retain any compensation which may be due or which may become due and payable to the Contractor the amount of liquidated damages, and if the amount retained by the City is insufficient to pay in full such liquidated damages, the Contractor shall pay all

liquidated damages in full. The Contractor shall be responsible for reimbursing the City, in addition to liquidated damages or other damages for delay, for all costs of engineering, architectural fees, and inspection and other costs incurred in administering the construction of the Project beyond the completion date specified or beyond an approved extension of time granted to the Contractor whichever is later. Delays caused by or resulting from entities, contractors or subcontractors who are not affiliated with the Contractor shall not give rise to a claim by Contractor for damages for increase in material and/or labor costs. Such entities, contractors and subcontractors include, but are not limited to, the City's contractors and subcontractors, Florida Power and Light Company, AT&T, and Florida East Coast Railway, LLC.

16.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 17 – SUSPENSION OF WORK AND TERMINATION

17.1 City May Suspend Work: The City may, at any time and without cause, suspend the Work or any portion of the Work for a period of not more than ninety (90) days by notice in writing to the Contractor which shall fix the date on which Work shall be resumed. The Contractor shall resume the Work on the date fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if the Contractor makes a claim as provided in Articles 14 and 15.

17.2 City's Right to Terminate Contract: The City may terminate this Agreement upon fifteen (15) calendar days' written notice upon the occurrence of any one or more of the following events:

17.2.1 If the Contractor commences a voluntary case or a petition is filed against the Contractor, under any chapter of the Bankruptcy Code, or if the 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.

17.2.2 If the Contractor makes a general assignment for the benefit of creditors.

17.2.3 If a trustee, receiver, custodian or agent of the Contractor is appointed under applicable law or under Contract, whose appointment or authority to take charge of property of the 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 the Contractor's creditors.

17.2.4 If Contractor fails to begin the Work within fifteen (15) calendar days after the Project Initiation Date, or fails to perform the Work with sufficient workers and equipment or with sufficient materials to ensure the prompt completion of the Work, or shall perform the Work unsuitably, or cause it to be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work pursuant to the accepted schedule or if Contractor shall fail to perform any material term set forth in the Contract Documents, or from any other cause whatsoever shall not carry on the Work in an acceptable manner, Project Manager may give notice in writing to Contractor and its Surety of such delay, neglect or default, specifying the same.

17.2.5 If the Contractor repeatedly fails to make prompt payments to subcontractors or for labor, material or equipment.

17.2.6 If the Contractor repeatedly disregards proper safety procedures.

17.2.7 If the Contractor disregards any local, state or federal laws or regulations.

17.2.8 If the Contactor otherwise violates any provisions of this Agreement.

17.3 If Contractor, within a period of ten (10) calendar days after such notice, shall not proceed in accordance therewith, the City may exclude the Contractor from the Work site and take the prosecution of the Work out of the hands of the Contractor, and take possession of the Work and all of the Contractor's tools, appliances, construction equipment and machinery at the site and use them without liability to the City for trespass or conversion, incorporate in the Work all materials and equipment stored at the site or for which the City has paid the Contractor but which are stored elsewhere, and finish the Work as the City may deem expedient. In this instance, the Contractor shall not be entitled to receive any further compensation until the Work is finished.

17.3.1 If after notice of termination of Contractor's right to proceed, it is determined for any reason that Contractor was not in default, the rights and obligations of City and Contractor shall be the same as if the notice of termination had been issued pursuant to the Termination for Convenience clause as set forth in Section 17.5 below.

17.3.2 Upon receipt of Notice of Termination pursuant to Sections 17.2 or 17.5, Contractor shall promptly discontinue all affected work unless the Notice of Termination directs otherwise and deliver or otherwise make available to City all data, drawings, specifications, reports, estimates, summaries and such other information as may have been required by the Contract Documents whether completed or in process.

17.4 If the Contractor commits a default due to its insolvency or bankruptcy, the following shall apply:

17.4.1 Should this Agreement be entered into and fully executed by the parties, funds released and the Contractor (Debtor) files for bankruptcy, the following shall occur:

17.4.1.1 In the event the Contactor files a voluntary petition under 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303, the Contractor shall acknowledge the extent, validity, and priority of the lien recorded in favor of the City. The Contractor further agrees that in the event of this default, the City shall, at its option, be entitled to seek relief from the automatic stay pursuant to 11 U.S.C. 362. The City shall be entitled to relief from the automatic stay pursuant to 11 U.S.C. 362(d) (1) or (d) (2), and the Contactor agrees to waive the notice provisions in effect pursuant to 11 U.S.C. 362 and any applicable Local Rules of the United States Bankruptcy Court. The Contactor acknowledges that such waiver is done knowingly and voluntarily.

17.4.1.2 Alternatively, in the event the City does not seek stay relief, or if stay relief is denied, the City shall be entitled to monthly adequate protection payments within the meaning of 11 U.S.C. 361. The monthly adequate protection payments shall each be in an amount determined in accordance with the Note and Mortgage executed by the Contractor in favor of the City.

17.4.1.3 In the event the Contractor files for bankruptcy under Chapter 13 of Title 11, United States Code in additional to the foregoing provisions, the Contractor agrees to cure any amounts in arrears over a period not to exceed twenty-four (24) months from the date of the confirmation order, and such payments shall be made in addition to the regular monthly payments required by the Note and mortgage. Additionally, the Contractor shall agree that the City is over secured and, therefore, entitled to interest and attorney's fees pursuant to 11 U.S.C. 506(b). Such fees shall be allowed and payable as an administrative expense. Further, in the event the Contractor has less than five (5) years of payments remaining on the Note, the Contractor agrees that the treatment afforded to the claim of the City under any confirmed plan of reorganization shall provide that the remaining payments shall be satisfied in accordance with the Note, and that the remaining payments or claim shall not be extended or amortized over a longer period than the time remaining under the Note.

17.4.2 Should this Agreement be entered into and fully executed by the parties, and the funds have not been forwarded to Contractor, the following shall occur:

17.4.2.1 In the event the Contractor files a voluntary petition pursuant to 11 U.S.C. 301 or 302, or an order for relief is entered under 11 U.S.C. 303., the Contractor acknowledges that the commencement of a bankruptcy proceeding constitutes an event of default under the terms of this Agreement. Further, the Contractor acknowledges that this Agreement constitutes an executory contract within the meaning of 11 U.S.C. 365. The Contractor acknowledges that this Agreement is not capable of being assumed pursuant to 11 U.S.C. 365(c)(2), unless the

City expressly consents in writing to the assumption. In the event the City consents to the assumption, the Contractor agrees to file a motion to assume this Agreement within ten (10) days after receipt of written consent from the City, regardless of whether the bankruptcy proceeding is pending under Chapter 7, 11, or 13 of Title 11 of the United States Code. The Contractor further acknowledges that this Agreement is not capable of being assigned pursuant to 11 U.S.C. 365(b)(1).

17.5 Termination for Convenience: This Contract may be terminated for convenience in writing by City upon thirty (30) days written notice to Contractor (delivered by certified mail, return receipt requested) of intent to terminate and the date on which such termination becomes effective. In such case, Contractor shall be paid for all work executed and expenses incurred prior to termination in addition to termination settlement costs reasonably incurred by Contractor relating to commitments which had become firm prior to the termination. Payment shall include reasonable profit for work/services satisfactorily performed. No payment shall be made for profit for work/services which have not been performed.

17.6 Where the Contractor's service have been so terminated by the City, the termination shall not affect any rights of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due the Contractor by the City will not release the Contractor from liability.

17.7 The Contractor has no right, authority or ability to terminate the Work except for the wrongful withholding of any payments due the Contractor from the City.

ARTICLE 18 – DISPUTE RESOLUTION

18.1 Resolution of Disputes: Questions, claims, difficulties and disputes of whatever nature which may arise relative to the technical interpretation of the Contract Documents and fulfillment of this Agreement as to the character, quality, amount and value of any work done and materials furnished, or proposed to be done or furnished under or, by reason of, the Contract Documents which cannot be resolved by mutual agreement of Contract Administrator and Contractor shall be submitted to the Consultant for resolution. When either party has determined that a disputed question, claim, difficulty or dispute is at an impasse, that party shall notify the other party in writing and submit the question, claim, difficulty or dispute to the Consultant for resolution. The parties may agree to a proposed resolution at any time without the involvement and determination of the Consultant.

18.1.1 Consultant shall notify Contract Administrator and Contractor in writing of Consultant's decision within twenty-one (21) calendar days from the date of the submission of the question, claim, difficulty or dispute, unless Consultant requires time to gather information or allow the parties to provide additional information.

18.1.2 In the event the determination of a dispute by the Consultant under this Article is unacceptable to any of the parties hereto, the party objecting to the determination must notify the other party and the City Manager, in writing within ten (10) days after receipt of the determination. The notice must state

the basis of the objection and the proposed resolution. Final resolution of such dispute shall be made by the City Manager. The City Manager's decision shall be final and binding on the parties.

18.1.3 All non-technical administrative disputes (such as billing and payment) shall be determined by Contract Administrator.

18.1.4 During the pendency of any dispute and after a determination thereof, Contractor, Consultant, and Contract Administrator shall act in good faith to mitigate any potential damages including utilization of construction schedule changes and alternate means of construction. During the pendency of any dispute arising under this Agreement, other than termination herein, Contractor shall carry on the Work and adhere to the progress schedule. The Work shall not be delayed or postponed pending resolution of any disputes or disagreements.

18.1.5 For any disputes which remain unsolved, within sixty (60) calendar days after Final Completion of the Work, the parties shall participate in mediation to address all unresolved disputes. A mediator shall be mutually agreed upon by the parties. Should any objection not be resolved in mediation, the parties retain all their legal rights and remedies under applicable law. If a party objecting to a determination, fails to comply in strict accordance with the requirements of this Article, said party specifically waives all of its rights provided hereunder, including its rights and remedies under applicable law.

ARTICLE 19 – NOTICES

19.1 All notices required by any of the Contract Documents shall be in writing and shall be deemed delivered upon mailing by certified mail, return receipt requested to the following:

To the City:

City Manager
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

with copy to the:

Project Manager and City Attorney
City of Fort Lauderdale
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

To the Contractor:

_____
_____
_____
_____

ARTICLE 20 – LIMITATION OF LIABILITY

20.1 The City desires to enter into this Agreement only if in so doing the City can place a limit on the City's liability for any cause of action arising out of this Agreement, so that the City's liability for any breach never exceeds the sum of $1,000. For other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Contractor expresses its willingness to enter into this Agreement with the knowledge that the Contractor's recovery from the City to any action or claim arising from the Agreement is limited to a maximum amount of $1,000, which amount shall be reduced by the amount actually paid by the City to the Contractor pursuant to this Agreement, for any action or claim arising out of this Agreement. Nothing contained in this paragraph or elsewhere in this Agreement is in any way intended either to be a waiver of the limitation placed upon the City's liability as set forth in Section 768.28, Florida Statutes, or to extend the City's liability beyond the limits established in said Section 768.28; and no claim or award against the City shall include attorney's fees, investigative costs, expert fees, suit costs or pre-judgment interest.

20.2 No Extended Damages: For other and additional good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Contractor covenants and agrees that in the event of any delay of construction or for any reason, allegation or claim, and notwithstanding the reason of the delay, reason, claim or allegation or who caused them or the construction delay or whether they were caused by the City, that there will be no entitlement to Contractor to or for any direct or indirect financial damages or losses for extended corporate overhead impact, extended project overhead impacts, project support services, mobilization or demobilization or by whatever other label or legal concept or theory and types of names or labels or basis such claims may have, or any business damages or losses of whatever type or nature, and Contractor hereby waives any right to make any such claim or claims. This provision will have application and effect when construction delays are anticipated and agreed upon by both the City and the Contractor.

ARTICLE 21 – GOVERNING LAW

21.1 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. Venue for any claim, objection or dispute arising out of this Agreement shall be in Broward County, Florida. **By entering into this Contract, Contractor and City hereby expressly waive any rights either party may have to a trial by jury or any civil litigation related to, or arising out of the Project. Contractor shall specifically bind all subcontractors to the provisions of this Contract.**

ARTICLE 22 – MISCELLANEOUS

22.1 The duties and obligations imposed by this Agreement and the rights and remedies available to the parties and, in particular but without limitation, the warranties, guaranties and obligations imposed upon the Contractor and all of the rights and remedies available to the City, 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, and the provisions of this Paragraph will survive final payment and termination or completion of this Agreement.

22.2 The Contractor shall not assign or transfer this Agreement or its rights, title or interests. The obligations undertaken by the Contractor pursuant to this Agreement shall not be delegated or assigned to any other person or firm. Violation of the terms of this Paragraph shall constitute a material breach of Agreement by the Contractor and the City any, at its discretion, cancel this Agreement and all rights, title and interest of the Contractor which shall immediately cease and terminate.

22.3 The Contractor and its employees, volunteers and agents shall be and remain an independent contractors and not agents or employees of the City with respect to all of the acts and services performed by and under the terms of this Agreement. This Agreement shall not in any way be constructed to create a partnership, association or any other kind of joint undertaking or venture between the Parties.

22.4 The City reserves the right to audit the records of the Contractor relating in any way to the Work to be performed pursuant to this Agreement at any time during the performance and term of this Agreement and for a period of three (3) years after completion and acceptance by the City. If required by the City, the Contractor agrees to submit to an audit by an independent certified public accountant selected by the City. The Contractor shall allow the City to inspect, examine and review the records of the Contractor at any and all times during normal business hours during the term of this Agreement.

22.5 The remedies expressly provided in this Agreement to the City shall not be deemed to be exclusive but shall be cumulative and in addition to all other remedies in favor of the City now or later existing at law or in equity.

22.6 Should any part, term or provisions of this Agreement be decided by the courts to be invalid, illegal or in conflict with any state or federal law, the validity of the remaining portion or provision shall not be affected.

22.7 <u>Prohibition Against Contracting With Scrutinized Companies</u>: Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), with regard to the "Cuba Amendment," the Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2018), that it is not engaged in a boycott of Israel, and that it does not have business operations in Cuba or Syria, as provided in section 287.135, Florida Statutes (2018), as may be amended or revised. The City may terminate this Agreement at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2018), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section

215.4725, Florida Statutes (2018), or is engaged in a boycott of Israel or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2018), as may be amended or revised.

22.8 Public Entity Crimes: In accordance with the Public Crimes Act, Section 287.133, Florida Statutes, a person or affiliate who is a contractor, consultant or other provider, who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to the City, may not submit a bid on a contract with the City for the construction or repair of a public building or public work, may not submit bids on leases of real property to the City, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with the City, and may not transact any business with the City in excess of the threshold amount provided in Section 287.017, Florida Statutes, for category two purchases for a period of thirty-six (36) months from the date of being placed on the convicted vendor list. Violation of this section by Contractor shall result in cancellation of the City purchase and may result in Contractor debarment.

22.9 Attorney Fees: If CITY or CONSULTANT incurs any expense in enforcing the terms of this Agreement through litigation, the prevailing party in that litigation shall be reimbursed for all such costs and expenses, including but not limited to court costs, and reasonable attorney fees incurred during litigation.

22.10 Public Records

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 PRRCONTRACT@FORTLAUDERDALE.GOV, 954-828-5002, CITY CLERK'S OFFICE, 100 N. ANDREWS AVENUE, FORT LAUDERDALE, FLORIDA 33301.

Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2018), as may be amended or revised, or as otherwise provided by law.

3. 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 this contract if the Contractor does not transfer the records to the City.

4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Contractor or keep and maintain public records required by the

City to perform the service. If the Contractor transfers all public records to the City upon completion of this 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 public records upon completion of this 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's custodian of public records, in a format that is compatible with the information technology systems of the City.

Cordova Road Seawall Replacement
(Contractor)
Project #12337

CITY

IN WITNESS OF THE FOREGOING**,** the parties have set their hands and seals the day and year first above written.

CITY OF FORT LAUDERDALE, a municipal corporation of the State of Florida

By: _____
CHRISTOPHER J. LAGERBLOOM, ICMA-IC
City Manager

(CORPORATE SEAL)

ATTEST:

By: _____
JEFFREY A. MODARELLI
City Clerk

Approved as to Legal Form:

By: _____
RHONDA MONTOYA HASAN
Assistant City Attorney

CONTRACTOR

WITNESSES:

CONTRACTOR.,
a Florida corporation.

_____ By_____

_____ _____ _____
Print Name PRINT NAME Title

_____ ATTEST:

_____ BY: _____
Print Name

_____ _____
PRINT NAME Secretary

(CORPORATE SEAL)

STATE OF FLORIDA:
COUNTY OF BROWARD:

The foregoing instrument was acknowledged before me this _____ day of _____, 2019, by _____ (Name), as _____ (Title) of _____ (CONTRACTOR), a Florida corporation, on behalf of the Corporation.

SEAL

_____
Notary Public, State of Florida

_____
Name of Notary Typed, Printed or Stamped

☐ Personally Known or ☐ Produced Identification:

Type of Identification Produced: _____

GENERAL CONDITIONS

Unless otherwise modified in the projects special conditions, the following General Conditions shall be part of the Contract:

GC - 01 - DEFINITIONS - The following words and expressions, or pronouns used in their stead, shall wherever they appear in the Contract and the Contract Documents, be construed as follows:

"Addendum" or "Addenda" - shall mean the additional Contract provisions issued in writing, by the Engineer, prior to the receipt of bids.

"Bid" – shall mean the offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

"Bidder" – shall mean any person, firm, company, corporation or entity submitting a Bid for the Work.

"Bonds" –shall mean Bid, performance and payment bonds and other instruments of security, furnished by Contractor and his surety in accordance with the Contract Documents.

“City” – shall mean the City of Fort Lauderdale, Florida, a Florida municipal corporation. In the event the City exercises its regulatory authority as a government body, the exercise of such regulatory authority and the enforcement of any rules, regulations, codes, laws and ordinances shall be deemed to have occurred pursuant to City’s authority as a governmental body and shall not be attributable in any manner to the City as a party to this Contract. For the purpose of this Contract, “City” without modification shall mean the City Commission, and/or City Manager or his/her designee(s) as applicable.

“Construction Manager” - shall mean the Public Works Director or his/her designee.

“Construction Project Manager” - shall mean the Public Works Director or his/her designee.

"Consultant" – shall mean a person, firm, company, corporation or other entity employed by the City to perform the professional services for the project.

“Contract Work” - shall mean everything expressed or implied to be required to be furnished and furnished by the Contractor by any one or more of the parts of the Contract Documents referred to in the Contract hereof except Extra Work as hereinafter defined, it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Public Works Director shall determine which shall prevail.

“Design Documents” – shall mean the construction plans and specifications included as part of a Bid/Proposal Solicitation prepared either by the City or by the Consultant under a separate Agreement with the City.

“Engineer” - shall mean the Public Works Director or his/her designee.

"Extra Work" - shall mean work other than that required by the Contract.

"Inspector" – shall mean an authorized representative of the City assigned to make necessary inspections of materials furnished by Contractor and of the Work performed by Contractor.

"Notice" - shall mean written notice sent by certified United States Mail, return receipt requested, or sent by commercial express carrier with acknowledgement of delivery, or via fax or email, or by

hand delivery with a request for a written receipt of acknowledgment of delivery and shall be served upon the Contractor either personally or to its place of business listed in the Bid.

“Owner” - shall mean the City of Fort Lauderdale.

“Project Manager” - shall mean the Public Works Director or his/her designee.

"Public Works Director" –shall mean the Public Works Director of the City of Fort Lauderdale, Florida or his/her designee(s).

"Site" - shall mean the area upon or in which the Contractor's operations are carried out and such other areas adjacent thereto as may be designated as such by the Public Works Director.

"Subcontractor" - shall mean any person, firm, company, corporation or other entity, other than employees of the Contractor, who or which contracts with the contractor, to furnish, or actually furnishes labor and materials, or labor and equipment, or labor, materials and equipment at the site.

"Surety" - shall mean any corporation or entity that executes, as Surety, the Contractor's performance and payment bond securing the performance of this Contract.

GC - 02 - SITE INVESTIGATION AND REPRESENTATION - The Contractor acknowledges that it has satisfied itself as to the nature and location of the Work under the Contract Documents, the general and local conditions of the Site, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, and roads, the conformation and conditions at the ground based on City provided reports, the type of equipment and facilities needed preliminary to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under the Contract Documents.

The Contractor acknowledges that it has conducted extensive tests, examinations and investigations and represents and warrants a thorough familiarization with the nature and extent of the Contract Documents, the Work, locality, soil conditions, moisture conditions and all year-round local weather and climate conditions (past and present), and, in reliance on such tests, examination and investigations conducted by Contractor and the Contractor’s experts, has determined that no conditions exist that would in any manner affect the Bid Price and that the project can be completed for the Bid Price submitted.

The Contractor, on its own, has made or caused to be made examinations, investigations, tests and studies of reports and related data in addition to those referred above, as Contractor deemed necessary to perform the Work at the Bid price set by the Contractor, within the contract time and in accordance with the other terms and conditions of the Contract Documents and the Bid made by the Contractor; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by Contractor to assure that the Work can be done at the Bid price set by the Contractor.

The Contractor further acknowledges that it has satisfied itself based on any geotechnical reports the City may provide and inspection of the project Site as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the City or included in the

Contract Documents and finds and has further determined that no conditions exist that would in any manner affect the Bid price and that the project can be completed for the Bid price submitted..

Any failure by the Contractor to acquaint itself with all the provided information and information obtained by visiting the project Site will not relieve Contractor from responsibility for properly estimating the difficulty or cost thereof under the Contract Documents. In the event that the actual subsurface conditions vary from the actual City provided reports, the Contractor shall notify the City and the Contract amount may be adjusted depending on the conditions, at the approval of the City.

GC - 03 - SUBSTITUTIONS - If the Contractor desires to use materials and/or products of manufacturer's names different from those specified in the Contract Documents, the Bidder requesting the substitution shall make written application as described herein. The burden of proving the equality of the proposed substitution rests on the Bidder making the request. To be acceptable, the proposed substitution shall meet or exceed all expressed requirements of the Contract Documents and shall be submitted upon the Contractor's letterhead, in addition to the "Contractor's Request for Substitution" form provided by the Public Works Director. The following requirements shall be met in order for the substitution to be considered:

1. Requests for substitution shall reach the Public Works Director no less than ten (10) Working Days prior to the date set for opening of Bids; and

2. Requests for substitution shall be accompanied by such technical data, as the party making the request desires to submit. The Public Works Director will consider reports from reputable independent testing laboratories, verified experience records from previous users and other written information valid in the circumstances; and

3. Requests for substitution shall completely and clearly indicate in what respects the materials and/or products differ from those indicated in the Contract Documents; and

4. Requests for substitution shall be accompanied by the manufacturer's printed recommendations clearly describing the installation, use and care, as applicable, of the proposed substitutions; and

5. Requests for substitution shall be accompanied by a complete schedule of changes in the Contract Documents, if any, which must be made to permit the use of the proposed substitution; and

If a proposed substitution is approved by the Public Works Director, an Addendum will be issued to prospective bidders not less than three (3) working days prior to the date set for opening of Bids. Unless substitutions are received and approved as described above, the successful Bidder shall be responsible for furnishing materials and products in strict accordance with the Contract Documents.

GC - 04 - CONTROL OF THE WORK - The Public Works Director shall have full control and direction of the Work in all respects. The Public Works Director and/or his authorized designee(s) shall, at all times, have the right to inspect the Work and materials. The Contractor shall furnish all reasonable facilities for obtaining such information, as the Public Works Director may desire respecting the quality of the Work and materials and the manner of conducting the Work. Should the Contractor be directed or permitted to perform night Work, or to vary the period which work is ordinarily carried on in the daytime, he shall give ample notice to the Public Works Director so that proper and adequate inspection may be provided. Such Work shall be done only under such regulations as are furnished in writing by the Public Works Director, and no extra compensation shall be allowed to the Contractor therefore. In the event of night work, the Contractor shall furnish such light, satisfactory to the Public Works Director, as will insure proper inspection. Nothing herein

contained shall relieve the Contractor from compliance with any and all City ordinances relating to noise or Work during prohibited hours.

The Contractor shall keep the Public Works Director informed, a reasonable time in advance, as to his need for grades and lines in order that the same may be furnished and all necessary measurements made for records and for payment with the minimum of inconvenience to the Public Works Director or of delay to the Contractor. The Contractor shall submit to the Public Works Director or Inspector on the job a written request outlining the streets, etc., for which the Contractor desires lines and grades. It is the intention not to delay the Work for the giving of lines and grades, but when necessary, work operations shall be suspended for such reasonable time as the Public Works Director may require for this purpose. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC - 05 - SUBCONTRACTOR - The Contractor shall not sublet, in whole or any part of the Work without the written consent and approval of the Public Works Director. Within ten (10) days after official notification of starting date, the Contractor must submit in writing, to the Public Works Director, a list of all Subcontractors. No Work shall be done by any Subcontractor until such Subcontractor has been officially approved by the Public Works Director. A subcontractor not appearing on the original list will not be approved without written request submitted to the Public Works Director and approved by the Public Works Director. In all cases, the Contractor shall give his personal attention to the Work of the Subcontractors and the Subcontractor is liable to be discharged by the Contractor, at the direction of the Public Works Director, for neglect of duty, incompetence or misconduct.

Acceptance of any Subcontractor, other person, or organization by the Public Works Director shall not constitute a waiver of any right of Public Works Director to reject defective Work or Work not in conformance with the Contract Documents.

Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between City and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of City to pay or to see to the payment of any moneys due to any Subcontractor or other person, or organization, except as may otherwise be required by law.

GC – 06 - **QUANTITIES** - It is mutually agreed that the proposal shows the approximate amounts only along with the Plans and the general location. It is also mutually agreed that no change will be made involving any departure from the general scheme of the Work and that no such change involving a material change in cost, either to the City or Contractor, shall be made, except upon written permission of the City. However, the Public Works Director shall have the right to make minor alternations in the line, grade, plan, form or materials of the Work herein contemplated any time before the completion of the same. That if such alterations shall diminish the quantity of the Work to be done, such alterations shall not constitute a claim for damages or anticipated profits. That if such alterations increase the amount of the Work to be done, such increase shall be paid for according to the quantity actually performed and at the unit price or prices stipulated therefore in the Contract.

The City shall, in all cases of dispute, determine the amount or quantity of the several kinds of Work which are to be paid for under this Contract, and shall decide all questions relative to the execution of the same, and such estimates and decisions shall be final and binding.

Any Work not herein specified, which might be fairly implied as included in the Contract, of which the City shall judge, shall be done by the Contractor without extra charge. However, such cost increases shall be authorized either by the City Manager and/or designee, or the City Commission based upon the purchasing threshold amounts provided for in Chapter 2 of the City of Fort Lauderdale's Code of Ordinances.

GC–07 - NO ORAL CHANGES - Except to the extent expressly set forth in the Contract, no change in or modification, termination or discharge of the Contract in any form whatsoever, shall be valid or enforceable unless it is in writing and signed by the parties charged, therewith or their duly authorized representative.

GC - 08 - PERMITS AND PROTECTION OF PUBLIC – Permits on file with the City and or those permits to be obtained shall be considered directive in nature and will be considered a part of this Contract. A copy of all permits shall be given to the City and become part of the Contract Documents. Terms of permits shall be met prior to acceptance of the Work and release of the final payment.

The Contractor shall be required to observe all the ordinances in relation to obtaining permits for occupying, excavating, or in any way obstructing the streets and alleys. He shall erect and maintain barricades and sufficient safeguards around all excavations, embankments or obstructions; he shall place sufficient warning lights at or near the Work; keep the same burning from sunset to sunrise, employ watchmen, and strictly obey all laws and ordinances controlling or limiting those engaged in similar work.

Where there are telephones, light or power poles, water mains, conduits, pipes or drains or other construction, either public or private, in or on the streets or alleys, the Work shall be so conducted that no interruption or delay will be caused in the operation or use of the same. Proper written notice shall be given, and all the facilities, afforded the owners of such construction encountered or likely to be encountered, as will enable them to preserve the same from injury.

The Contractor shall not be permitted to interfere with public travel and convenience by grading or tearing up streets indiscriminately, but the Work of constructing the various items in this contract shall proceed in an orderly, systematic and progressive manner.

Contractor shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall he subject any part of the Work to stresses or pressures that will endanger it.

Where lifting operations involving the use of specialized cranes are required as part of construction, Contractor must make undertake the following investigation and submit the results and documentation to the Engineer prior to commencing any lifting operations: marking a very specific area in the field for the placement of the crane; a drawing showing the limitations of the job operation (i.e. not over adjacent properties or pedestrian and high vehicular traffic areas);underground utility exploration in the vicinity of the crane location, which may include ground penetrating radar to identify voids or old pipe or other subsurface features that could lead to sudden failure; assessment of the underlying soil and roadway materials and a worst case analysis based on entire load being distributed on just one or two outriggers; provision of properly sized pads under the outriggers; loading charts from manufacturer showing allowable configurations/loads; and inspection to make sure crane operation is in accordance with the permit conditions.

GC - 09 - DISEASE REGULATIONS - The Contractor shall enforce all sanitary regulations and take all precautions against infectious diseases as the Public Works Director may deem necessary. Should any infectious or contagious diseases occur among his employees, he shall arrange for the immediate removal of the employee from the Site and isolation of all persons connected with the Work.

GC - 10 - CONTRACTOR TO CHECK PLANS, SPECIFICATIONS, AND DATA - The Contractor shall verify all dimensions, quantities, and details shown on the plans, supplementary drawings, schedules, or other data received from the Public Works Director, and shall notify the Public Works Director of all errors, omissions, conflicts and discrepancies found therein within three (3) working days of discovery. Failure to discover or correct errors, conflictions, or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction, or improper operation resulting there from nor from rectifying such condition at his own expense.

GC - 11 - SUPPLEMENTARY DRAWINGS - When, in the opinion of the Public Works Director, 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 Public Works Director and copies will be given to the Contractor.

The supplementary drawings shall be binding upon the Contractor with the same force as the original Plans. Where such supplementary drawings require either less or more than the estimated quantities of work, credit to the City or compensations therefore to the Contractor shall be subject to the terms of the Contract.

GC - 12 - MATERIALS AND WORKMANSHIP - All material and workmanship shall, in every respect, be in conformity with approved modern practice and with prevailing standards of performance and quality. In the event of dispute the Public Works Director's decision shall be final. Wherever the Plans, specifications, Contract Documents, or the directions of the Public Works Director are unclear as to what is permissible and/or fail to note the quality of any Work, that interpretation will be made by the Public Works Director, which is in accordance with approved modern practice, to meet the particular requirements of the Contract.

In all cases, new materials shall be used, unless this provision is waived by notice from the City in writing.

GC - 13 - SAFEGUARDING MARKS - The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing same if disturbed, or bear the entire expense of rectifying Work improperly installed due to not maintaining or protecting or for removing without authorization, such established points, stakes and marks. The Contractor shall safeguard all existing and known property corners, monuments and marks not related to the Work and, if required, shall bear the cost of having them re-established by a licensed surveyor if disturbed or destroyed during the course of construction.

GC - 14 - EXISTING UTILITY SERVICE - All existing utility service shall be maintained with a minimum of interruption at the expense of the Contractor.

GC - 15 - JOB DESCRIPTION SIGNS – Contractor, at Contractor's expense, shall furnish, erect, and maintain suitable weatherproof signs on jobs over $100,000 containing the following information:

1. City Seal (in colors)

2. Project or Improvement Number
3. Job Description
4. Estimated Cost
5. Completion Date

Minimum size of sign shall be four feet high, eight feet wide and shall be suitably anchored. The entire sign shall be painted and present a pleasing appearance. Exact location of signs will be determined in the field. Two (2) signs will be required, one at each end of the job. All costs of this work shall be included in other parts of the work.

GC - 16 - FLORIDA EAST COAST RIGHT-OF-WAY - Whenever a City contractor is constructing within the Florida East Coast Railway Company's Right-of-Way, it will be mandatory that the contractor carry separate bodily injury and property damage insurance in the amounts as stated below. This insurance shall be taken out and maintained during the life of the Contract.

Bodily injury insurance in an amount not less than $500,000.00 for injuries, including wrongful death to any one person, and subject to the same limit for each person, in an amount not less than $1,000,000.00 on account of any one occurrence, and

Property damage insurance in an amount not less than $500,000.00 for damages on account of any one occurrence and in an amount not less than $1,000,000.00 for damages on account of all occurrences.

GC - 17 - ACCIDENTS - The Contractor shall provide such equipment and facilities as are necessary and/or required, in the case of accidents, for first aide services to be provided to a person who may be injured during the project duration. The Contractor shall also comply with the OSHA requirements as defined in the United States Labor Code 29 CFR 1926.50.

In addition, the Contractor must report immediately to the Public Works Director every accident to persons or damage to property, and shall furnish in writing full information, including testimony of witnesses regarding any and all accidents.

GC - 18 - SAFETY PRECAUTIONS - Contractor must adhere to the applicable environmental protection guidelines for the duration of a project. If hazardous waste materials are used, detected or generated at any time, the Project Manager must be immediately notified of each and every occurrence. The Contractor shall comply with all codes, ordinances, rules, orders and other legal requirements of public authorities (including OSHA, EPA, DERM, the City, Broward County, State of Florida, and Florida Building Code), which bear on the performance of the Work.

The Contractor shall take the responsibility to ensure that all Work is performed using adequate safeguards, including but not limited to: proper safe rigging, safety nets, fencing, scaffolding, barricades, chain link fencing, railings, barricades, steel plates, safety lights, and ladders that are necessary for the protection of its employees, as well as the public and City employees. All riggings and scaffolding shall be constructed with good sound materials, of adequate dimensions for their intended use, and substantially braced, tied or secured to ensure absolute safety for those required to use it, as well as those in the vicinity. All riggings, scaffolding, platforms, equipment guards, trenching, shoring, ladders and similar actions or equipment shall be OSHA approved, as applicable, and in accordance with all Federal, State and local regulations.

GC - 19 - DUST PREVENTION - The Contractor shall, by means of a water spray, or temporary asphalt pavement, take all necessary precautions to prevent or abate a dust nuisance arising from dry weather or Work in an incomplete stage. All costs of this Work shall be included in cost of other parts of the Work.

Should the Contractor fail to abate a dust nuisance by the above methods, and then he will be required to immediately construct temporary patches per City standards.

GC - 20 - PLACING BARRICADES AND WARNING LIGHTS - The Contractor shall furnish and place, at his own expense, all barricades, warning lights, automatic blinker lights and such devices necessary to properly protect the work and vehicular and pedestrian traffic. Should the Contractor fail to erect or maintain such barricades, warning lights, etc., the Public Works Director may, after 24 hours' notice to the Contractor, proceed to have such barricades and warning lights placed and maintained by City or other forces and all costs incurred thereof charged to the Contractor and may be retained by the City from any monies due, or to become due, to the Contractor.

GC - 21 - TRAFFIC CONTROL - The Contractor shall coordinate all Work and obtain, through the City's Transportation and Mobility Department, Broward County, Florida Department of Transportation, as applicable, any permits required to detour traffic or close any street before starting to work in the road. The following section: Part VI Traffic Controls for Street and Highway Construction and Maintenance Operations, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, U.S. Department of Transportation Federal Highway Administration, 2009, or current edition, shall be used as a guide for requirement and placement of traffic control devices, signs and barricades. The Public Works Director shall determine requirements for the above. The above publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. In the event that a Maintenance of Traffic (MOT) Plan is required, the Plan shall be prepared by an A.A.S.T.A. certified technician.

All traffic control devices, flashing lights, signs and barricades shall be maintained in working condition at all times.

GC - 22 - COORDINATION - The Contractor shall notify all utilities, transportation department, etc., in writing, with a copy to the Public Works Director before construction is started and shall coordinate his Work with them. The Contractor shall cooperate with the owners of any underground or overhead utility lines in their removal, construction and rearrangement operations in order that services rendered by these parties will not be unnecessarily interrupted.

The Contractor shall arrange his Work and dispose of his materials so as to not interfere with the operation of other Contractors engaged upon adjacent work and to join his Work to that of others in a proper manner and to perform his Work in the proper sequence in relation to that of other Contractors all as may be directed by the Public Works Director.

Each Contractor shall be responsible for any damage done by him or his agents to the work performed by another Contractor.

The Contractor shall contact the Broward County Transportation Department and the Florida Department of Transportation, as applicable, to verify and obtain location of any and all traffic conduits, loops, and street light underground services.

GC - 23 - WATER - Bulk water used for construction, flushing pipelines, and testing shall be obtained from fire hydrants. Contractor shall make payment for hydrant meter at Treasury Billing Office, 1st Floor, City Hall, 100 N. Andrews Avenue. With the paid receipt, contractor can pick up hydrant meter at the utility location office. No connection shall be made to a fire hydrant without a meter connected.

GC - 24 - PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES - Subject to *Odebrecht Construction, Inc., v. Prasad*, 876 F.Supp.2d 1305 (S.D. Fla. 2012), *affirmed*, *Odebrecht Construction, Inc., v. Secretary, Florida Department of Transportation*, 715 F.3d 1268 (11th Cir. 2013), with regard to the "Cuba Amendment," the Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2018), that it is not engaged in a boycott of Israel, and that it does not have business operations in Cuba or Syria, as provided in section 287.135, Florida Statutes (2018), as may be amended or revised. The City may terminate this Agreement at the City's option if the Contractor is found to have submitted a false certification as provided under subsection (5) of section 287.135, Florida Statutes (2018), as may be amended or revised, or been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List or the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes (2018), or is engaged in a boycott of Israel or has been engaged in business operations in Cuba or Syria, as defined in Section 287.135, Florida Statutes (2018), as may be amended or revised.

GC - 25 - LOCATION OF UNDERGROUND FACILITIES - If the Proposer, for the purpose of responding to this solicitation, requests the location of underground facilities through the Sunshine State One-Call of Florida, Inc. notification system or through any person or entity providing a facility locating service, and underground facilities are marked with paint, stakes or other markings within the City pursuant to such a request, then the Proposer shall be deemed non-responsive to this solicitation in accordance with Section 2-184(5) of the City of Fort Lauderdale Code of Ordinances.

GC - 26 – USE OF FLORIDA LUMBER TIMBER AND OTHER FOREST PRODUCTS - In accordance with Florida Statute 255.20 (3), The City specifies that lumber, timber, and other forest products used for this project shall be produced and manufactured in the state of Florida if such products are available and their price, fitness, and quality are equal. This requirement does not apply to plywood specified for monolithic concrete forms, if the structural or service requirements for timber for a particular job cannot be supplied by native species, or if the construction is financed in whole or in part from federal funds with the requirement that there be no restrictions as to species or place of manufacture.

The Bidder affirms by submitting a bid response to this solicitation that they will comply with section 255.20 (3) Florida Statutes.

GC – 27 – PUBLIC RECORDS/TRADE SECRETS/COPYRIGHT: The Proposer's response to the Solicitation is a public record pursuant to Florida law, which is subject to disclosure by the City under the State of Florida Public Records Law, Florida Statutes Chapter 119.07 ("Public Records Law"). The City shall permit public access to all documents, papers, letters or other material submitted in connection with this Solicitation and the Contract to be executed for this Solicitation, subject to the provisions of Chapter 119.07 of the Florida Statutes.

Any language contained in the Proposer's response to the Solicitation purporting to require confidentiality of any portion of the Proposer's response to the Solicitation, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Proposer submits any documents or other information to the City which the Proposer

claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Proposer shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Proposer must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Proposer's response to the Solicitation constitutes a Trade Secret. The City's determination of whether an exemption applies shall be final, and the proposer agrees to defend, indemnify, and hold harmless the City and the City's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the City's treatment of records as public records. Proposals purporting to be subject to copyright protection in full or in part will be rejected.

EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE SOLICITATION AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE SOLICITATION OR ANY PART THEREOF AS COPYRIGHTED.

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:

Telephone Number: **(954) 828-5002**

Mailing Address: **City Clerk's Office**
100 N. Andrews Avenue
Fort Lauderdale, FL 33301

E-mail: **prrcontract@fortlauderdale.gov**

Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service.

2. Upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes (2018), as may be amended or revised, or as otherwise provided by law.

3. 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 this contract if the Contractor does not transfer the records to the City.

4. Upon completion of the Contract, transfer, at no cost, to the City all public records in possession of the Contractor or keep and maintain public records required by the City to perform the service. If the Contractor transfers all public records to the City upon completion of this 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 public records upon completion of this 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's custodian of public records, in a format that is compatible with the information technology systems of the City.

CITB Construction Bid Certification

Rev. 6/17/2016 GC-10

DIVISION 1

GENERAL REQUIREMENTS

PROJECT NO. 12337

SECTION 01001

GENERAL REQUIREMENTS

PART 1 - GENERAL REQUIREMENTS

1.01 THE REQUIREMENT

A. A brief description of the work is stated in the Invitation to Bid. To determine the full scope of the project or any particular part of the project, coordinate the applicable information in these Contract Documents and review the available project drawings.

B. Project Environmental Goals: Contractor shall distribute copies of the Environmental Goals to each subcontractor and the Engineer. The overall goal is to construct functional systems incorporating the principles of sustainability. Specifically:

1. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.

2. Use the minimum amount of energy, water, and materials feasible to meet the design intent. Select energy and water efficient equipment and strategies.

3. Use environmentally preferable products and decrease toxicity level of materials used.

4. Use renewable energy and material resources.

5. Optimize operational performance (through commissioning efforts) in order to ensure energy efficient equipment operates as intended.

6. Consider the durability, maintainability, and flexibility of building systems.

7. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.

8. Reduce construction waste through reuse, recycling, and supplier takeback.

C. The work under this Contract shall be performed by the Contractor as required by the City. Work will be authorized in the form of a Notice to Proceed (NTP) issued to the Contractor. The Contractor shall complete all work in the Contract within the number of calendar days stipulated in the Contract unless an extension in the time of completion is granted by the Engineer, as stated in the Instructions to Bidders. Upon completion of the work and compliance with applicable provisions in the Contract Documents, the Contractor will receive final payment for all work done.

D. Existing Work: In addition to requirements to protect existing vegetation, structures, equipment, utilities or other improvements, remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which will

remain. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the City. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

E. The following additional information, though not all-inclusive, is given to assist contractors in their evaluation of the work required to meet the project objectives.

F. The Contractor shall become familiar with the existing operating conditions of the City's stormwater system and pumping stations and take such into consideration in planning and scheduling work. No extra claims shall be made for work required to achieve conditions beyond those obtainable under normal operation of the existing transmission, collection and pumping facilities necessary to accomplish the work.

1.02 DOT SPECIFICATIONS

A. Portions of The Florida Department of Transportation Standard Specifications for Road and Bridge Construction and their Roadway and Traffic Design Standards, hereinafter referred to as the DOT Standard Specifications, are referred to herein and amended, in part, and the same are hereby made a part of this Contract to the extent of such references and shall be as binding upon the Contract as though reproduced herein. Such reference shall mean the current edition, including all supplements. In case of a conflict in the requirements of the DOT Specifications and the requirements stated herein, the requirements herein shall prevail.

B. Contractor will be required to submit MOTs for work in the county and state highways and City streets. Contractor shall coordinate with MOTs for nearby or highway work and obtain approval for all traffic control as required by the permits contained elsewhere in this section.

PART 2 - SEQUENCE OF OPERATIONS

2.01 SCHEDULING

A. General: Prepare and submit schedule in accordance with the provisions of Section 01310 - Progress Schedules.

B. Plan the work and carry it out with minimum interference to the operation of the existing facilities. Do not make connections between existing work and new work until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.

C. No work shall be started until the Contractor has received approved shop drawings, established material/delivery dates for all equipment, and received approval of the construction schedule from the Engineer. The Contractor shall have sufficient manpower, equipment, and material to complete the project.

D. No work shall commence without express consent of the Engineer.

E. If a privately-owned staging area is required, no work shall commence until approval of the facility is obtained from City Planning and Zoning in accordance with Section 47-19.2 of the Unified Land Development Regulations. Submit a copy of the approval and agreement to the City.

2.02 MOBILIZATION AND DEMOBILIZATION

A. Contractor shall be responsible for mobilization and demobilization of labor, materials and equipment. Payment for mobilization and demobilization shall be included in the lump sum price indicated in the Proposal for the project.

2.03 COORDINATION

A. Contractor shall cooperate in the coordination of separate activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall project work.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the Engineer.

2.04 MAINTENANCE AND SHUTDOWN OF EXISTING OPERATIONS OR UTILITIES

A. Continuous operation of the City's service functions is of critical importance. The Contractor's work shall not result in the interruption of sewage, water, or solid waste service to any customers.

B. The Contractor shall be fully responsible for all precautionary measures together with all remediation, cleanup, disinfection, regulatory agency fines and all other labor, materials, and costs associated with any contamination of the potable water supply caused directly or indirectly by the activities of the Contractor in the performance of the work.

C. Notwithstanding other indemnification requirements of the Contract Documents, the Contractor shall also indemnify, defend, and hold harmless the City and the Engineer from any and all legal action which may arise from contamination of the potable water supply caused directly or indirectly by the Contractor in the performance of the work.

D. Minimizing conflicts with the ongoing area-wide commercial activities is of critical importance. The Contractor's work shall minimize in the interruption of operations at any facility or business.

E. Connections to existing services or utilities, or other work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and coordinated with the City or Engineer in writing. The Contractor shall schedule short-term and extended shutdowns in advance and shall present all desired shutdowns in the 30 and 60-day schedules at the construction progress meetings.

F. Seven (7) business days advanced notice shall be given in order that the City or Engineer may witness any required shutdowns, tie-ins, and startups. Temporary shutdowns of City services must be approved by the City. All tie-in and bypass operations shall be the responsibility of the Contractor and are considered incidental to the cost of construction and shall be provided at no additional cost to the City.

G. If in the judgment of the City or Engineer, a requested shutdown is not required for the Contractor to perform the work, the Contractor shall utilize approved alternative methods to accomplish the work.

H. Where required in the Construction Sequence, the Contractor shall proceed with the work continuously, (24 hours/day, 7 days/week) start to finish, until the work is completed and normal operation is restored.

I. All materials and equipment (including emergency equipment) necessary to expedite tie-ins shall be on hand prior to the shutdown of existing services or utilities.

J. If the Contractor completes all required work before a specified shutdown period has ended, the City may immediately place the existing system back into service.

K. All shutdowns shall be scheduled for low flow period during the daily diurnal water demand and shall generally be limited to four (4) hours or less depending on water demand, system pressure, weather forecast and amount of potable water stored onsite. The schedule and duration of short-term shutdowns shall be at the discretion of the City.

2.05 OPERATION OF EXISTING SYSTEM PROHIBITED

A. At no time is the Contractor to close off any utility lines or open valves or take any other action which would affect the operation of existing systems. The City's operations crew will operate all valves. Provide at least seven business day notice to City prior to any required operation of existing system.

PART 3 - SITE CONDITIONS

3.01 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges satisfaction as to the general nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

B. Failure by the Contractor to become acquainted with the physical conditions and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the Contractor can perform the work in a good and workmanlike manner and to the satisfaction of the City. The City assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the City.

D. The Contractor shall be responsible for all restoration of disturbed areas encountered as pre-existing site conditions whether or not specifically shown or denoted on the Contract Documents. It is the Contractor's responsibility to fully familiarize itself with the project site and restoration requirements of the Measurement and Payment Section and to adequately reflect compensation for these items in its initial base bid. Failure by the Contractor to become acquainted with the physical conditions and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

E. Exercise reasonable care to verify locations of existing subsurface structures and underground facilities.

F. Thoroughly check immediate and adjacent areas subject to excavation by visual examination (and by electronic metal and pipe detection equipment, as necessary) for indications of subsurface structures and underground facilities.

G. Make exploratory excavations where existing underground facilities or structures may potentially conflict with proposed underground facilities or structures. Conduct exploratory excavations in presence of Engineer and sufficiently ahead of construction to avoid possible delays to Contractor's Work.

3.02 INFORMATION ON SITE CONDITIONS

A. General: Information obtained by the City or Engineer regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the City upon request. Such information is offered as supplementary information only. Neither the Engineer nor the City assumes any responsibility for the completeness or interpretation of such supplementary information.

B. Where appropriate, subsurface boring logs are provided for supplemental informational purposes only. Contractor shall interpret this data at his own RISK.

3.03 UTILITIES

A. The Contractor shall be responsible for determining and/or confirming, at his cost, the locations of all utilities within the project area, and shall be responsible for contacting each utility for location and notification prior to commencing work.

B. The Contractor shall contact Sunshine State One Call at 811 or visit www.callsunshine.com at least two (2) full business days (10 business days for water

crossings) prior to any excavation and make arrangements for locating all utilities in the project area.

C. Contact the City of Fort Lauderdale Public Services Department at 954 828-8000 for water and sewer utility locations.

D. If damage occurs, or if conflicts or emergencies arise during Work, contact the appropriate utility.

E. Utility Cutovers and Interruptions: Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and City holidays. Conform to procedures required in the paragraph "Work outside Regular Hours." Ensure that new utility lines

are complete, except for the connection, before interrupting existing service. Interruption to water, sanitary sewer, storm sewer, telephone service, electric

F. Service, air conditioning, heating, fire alarm, compressed air, and CATV or other communications shall be considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours."

3.04 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the Contractor's operations could cause damage or inconvenience to utilities, telephone, television, power, water, or sewer systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor with the owner of the utility affected.

B. Notify all utility offices which are affected by the construction operation at least seven (7) working days in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

C. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

D. Neither the City nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

F. Perform relocations to minimize downtime of existing facilities.

G. In the event the Contractor encounters water service lines or sewer laterals that interfere with trenching, he may, by obtaining prior approval of the property owner, the Engineer and the City, cut the service, dig through, and restore the service with similar and equal materials at the Contractor's expense. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.

H. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by City.

I. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.

J. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract documents or ordered by the Engineer.

K. Telephone and communications drops and signal systems may extend throughout the project area. Properly located cable, conduit, interface equipment, pull or junction boxes and other signal or systems equipment damaged by the Contractor shall be replaced at the Contractor’s expense.

1. Damaged cable shall be replaced as an entire run, from junction box to junction box.

2. Notify Broward County Engineering two business days in advance of the need to remove traffic detection loops.

3. Contractor shall verify marked cables and signal systems prior to excavation.

3.05 INTERFERING STRUCTURES

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground.

B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the City. Where such existing fences, gates, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the Owner involved at the Contractor's own expense. Notify the Engineer of any damaged underground structure, and make repairs or replacements before backfilling.

C. Without additional compensation, the Contractor may remove and shall replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the Contractor's operations.

3.06 EASEMENTS AND WORK ON PRIVATE PROPERTY

A. Where portions of the work are located on public or private property, easements and permits will be obtained by the City, except as otherwise noted in the Contract Documents. Easements will provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available upon request to the City. It shall be the Contractor's responsibility to determine the adequacy of the easement obtained in every case and to abide by all requirements and provisions of the easement. The Contractor shall confine his construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners or appropriate public agency for the additional area required. Any damage to property, either inside or outside the limits of the easements provided by the City or street rights-of-way, shall be the responsibility of the Contractor as specified herein. The Contractor shall provide immediate notice to the City of any damage to fencing and provide temporary fencing as required to provide a functionally similar level of security. The Contractor shall remove, protect, and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the Engineer, the Contractor will be required to furnish the City with written releases from property owners or public agencies where side agreements or special easements have been made by the Contractor or where the Contractor's operations, for any reason, have not been kept within the construction right-of-way obtained by the City or the street right-of-way.

B. It is anticipated that the required easements and permits will be obtained before construction is started. However, should the procurement of any easement or permit be delayed, the Contractor shall schedule and perform the work around these areas until such a time as the easement or permit has been secured.

C. Prior to removing an existing structure or item, provide written notice to the City at least fourteen (14) days in advance of the anticipated removal.

3.07 ADJACENT FACILITIES AND PROPERTIES A.

Examination:

4. After Effective Date of the Agreement and before Work at site is started, Contractor, City, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.

5. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions. B. Documentation:

6. Record and submit documentation of observations made on examination inspections in accordance with Section 01300 – Submittals.

7. Upon receipt, Engineer will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.

8. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and City.

PART 4 - SAFETY AND CONVENIENCE

4.01 SAFETY AND ACCESS

A. The Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. All barricades and signs shall be clean and serviceable, in the opinion of the Engineer.

B. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety. All lights shall be regularly maintained, and in a fully operational state at all times.

C. The Contractor shall notify all residences and businesses of planned construction at least seven (7) days prior to the start of work in the block where they are located. Such notices shall be brochures or door-hangers with sufficient information to describe the extent and duration of the planned work. Notification activities shall be coordinated with the City.

D. Homeowners and business owners shall be provided reasonable access. The Contractor shall provide temporary sidewalks, bridges or driveway access, including safe passage over open excavations as required.

4.02 ACCIDENT REPORTS

A. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer.

B. If a claim is made by anyone against the contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

4.03 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

A. Authorized representatives of the state, federal, or local governmental agencies, shall at all times have safe access to the work, and the Contractor shall provide proper facilities for such access and inspection.

4.04 PROTECTION OF PROPERTY

A. Protect stored materials located adjacent to the proposed work. Notify property owners affected by the construction no less than one (1) week and no more than two (2) weeks in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding two (2) hours, unless the Contractor has made special arrangements with the affected persons.

B. The Contractor shall identify and isolate his active work zone in such a manner as to exclude all personnel not employed by him, the Engineer, and the City.

4.05 FIRE PREVENTION AND PROTECTION

A. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

4.06 ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the City's approval of MOT plan. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without special written permission from the fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access.

B. The Contractor shall leave a night emergency telephone number or numbers with the police department, the Engineer, and the City, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Move mailboxes to temporary locations designated by the U.S. Postal Service, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

PART 5 - PRESERVATION, RESTORATION, AND CLEANUP

5.01 SITE RESTORATION AND CLEANUP

A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Replace excavated areas as specified in Section 02320 - Trench Backfill, raked and graded to conform to their original contours.

5.02 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain. Grassed areas shall be restored as specified.

B. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

C. Refinish surfaces to provide an even finish.

1. Refinish continuous surfaces to nearest intersection.

2. Refinish entire assemblies.

3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and Work is evident in finished surfaces.

D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.

E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

G. Remove specimens of installed Work for testing when requested by City or Engineer.

PART 6 - PERMITS

6.01 GENERAL

A. Permits obtained by the City include the following:

1. Environmental Resources Permit, Chapter 62-344

2. ROW Permits

3. Development and Environmental Review Approval

4. U.S. Army Corps of Engineers

B. Permits to be obtained by the Contractor include, but are not limited to, the following:

1. Stormwater Pollution Prevention Plan (SPPP) CGP:62-621.300

2. Local, County, and State contracting licenses including but not limited to: Broward County, Environmental Resources License (ERL), Aquatic and Wetland Resources License, Surface Water Management License, Tree Removal License, Dewatering approval, zoning approval.

C. The Contractor shall comply with all applicable permit conditions.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01005

INTENT OF DRAWINGS AND SPECIFICATIONS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The City will not be responsible for absence of any detail which the Contractor may require, nor for any special construction which may be found necessary as work progresses. If an item is either indicated or specified, it shall be considered sufficient for inclusion of said item in contract. The Contractor shall furnish and install materials and equipment usually furnished with such systems, and as needed to complete an operating installation, whether mentioned or not, which are customary to its trade.

B. Incidental accessories not usually shown or specified but which are necessary for the proper installation and operation shall be included in work without additional cost to the City, the same as if herein specified.

C. Any apparatus, appliance, material or work not shown on but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and ready for operation, shall be furnished, delivered, and installed by the Contractor without additional cost to the City.

D. Drawings are diagrammatic and indicate the general arrangement of systems and work indicated (do not scale the drawings). Consult the City or Engineer for exact locations of fixtures, appurtenances, etc., where these items are not definitely located on the drawings.

E. The Contractor shall visit site prior to submitting bid, and thoroughly investigate and verify all conditions under which work shall be performed.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE

A. City of Fort Lauderdale

1. City's Representative/Engineer: Juan Carlos Samuel, Project Manager

2. The Work to be performed under this Contract shall consist of furnishing and installation of all tools, equipment, materials, supplies, manufactured articles, transportation and services, including fuel, power, water, and essential communications, for the performance of all labor, work, and/or other operations as required for the fulfillment of the Contract in strict conformance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be performed, furnished, and installed by the Contractor as though originally so specified or shown, at no increase in cost to the City.

3. Project Location: This project is located on Cordova Road in the City of Fort Lauderdale.

4. The work includes, but not limited to, the installation of approximate 2166 LF of seawall, stormwater drainage systems and all work as shown in the Contract Documents. The work includes all associated general, civil, structural, electrical work, and all appurtenant work, complete, tested and ready for operation, all in conformance with the Contract Documents.

5. This work includes all construction sequencing requirements, all startup and training activities, and all other work required for a complete and operating systems.

6. All work shall be in compliance with all applicable Federal, State and Local laws and regulations, including those for materials that contain lead. All work shall meet OSHA compliance.

7. Wherever the Contract Documents address a third party, i.e., subcontractor, manufacturer, etc., it is to be considered as the Contractor through the third party.

8. Wherever a reference to number of days is noted, it shall be construed to mean calendar days.

1.02 NOTICE TO BIDDERS

A. The successful bidder, in order to be considered responsive, must possess the appropriate License as described in the Contract Documents.

B. It should also be noted that the successful bidder will, at the time of the preconstruction conference, be required to show that each of the Contractor's subcontractors is in compliance with the City's Code of Ordinances.

1.03 SITE INVESTIGATION

A. The Contractor, by virtue of signing the Contract and any associated acknowledges that Contractor and all subcontractors have satisfied themselves to the nature and location of the work, the general and local conditions including, but not restricted to: those bearing upon transportation; disposal, handling and storage of materials; access roads to the site; the conformation and conditions of the work area; and the character of equipment and facilities needed preliminary to and during the performance of the work. Failure on the part of the Contractor to completely or properly evaluate the site conditions shall not be grounds for additional compensation.

B. The Contractor, by virtue of signing the Contract, acknowledges that Contractor and subcontractors have satisfied themselves as to the nature and extent of soil and (underground) water conditions on the project site. No additional payment will be made to the Contractor because of differences between actual conditions and those shown by the boring logs.

C. In addition to the requirements presented above, site investigation and information on site conditions shall be in accordance with Section 01001 – General Requirements.

1.04 WORK BY OTHERS

A. Concurrent Work by Other Contractors: The Contractor's attention is directed to the fact that other Contractors may conduct work at the site during the performance of the WORK under this Contract. The Contractor shall conduct its operations so as to cause little or no delay to work of such other Contractors, and shall cooperate fully with such Contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.

B. Interference with Work on Utilities: The Contractor shall cooperate fully with all utility forces of the Owner or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.05 WORK SEQUENCE

A. The Contractor shall schedule and perform the work in such a manner as to result in the least possible disruption to the public's use of any parking lot or park facilities, roadways, driveways, and utilities. Utilities shall include but not be limited to water,

sewerage, drainage structures, ditches and canals, gas, electric, television, fiber optic lines, and telephone. Prior to commencing with the WORK, the Contractor shall perform a location investigation of existing underground utilities and facilities in accordance with Section 01530 - Protection of Existing Facilities and shall have obtained all required permits and permissions, the Contractor shall also deliver written notice to the City, and property occupants (private and public) of all planned disruption to roadway, driveways, temporary displacement of fences, mailboxes, street signs and traffic signs, and utilities seven (7) days in advance of disruption.

1.06 WORK SCHEDULE

A. The Contractor shall meet the requirements of Section 01310 – Progress Schedules.

B. REQUIRED PERIODS OF WORK SUSPENSION

1. Contractor shall shut down operations for all City Holidays, terminating production work by noon on the day preceding the holiday (or the weekend before said holiday) and not resuming operations until the day after the holiday. For a full list of holidays, please refer to the City's website, however these include, but are not limited to New Year's Eve and Day, Martin Luther King's Birthday, Memorial Day, the 4th of July, Labor Day, Thanksgiving Day and the day after Thanksgiving Day, Christmas Eve and Christmas.

2. The Contractor shall ensure that the site is restored per Sections 01001 – General Requirements and Section 01010 – Summary of Work and all areas that are off limits to the public will be clearly delineated and protected.

3. The Contractor shall include these provisions in the schedule required in Section 01310 – Progress Schedules and there shall be no additional time granted for these work suspensions.

4. No additional compensation shall be granted for demobilization, cleaning and remobilization as a result of these work suspensions.

5. During the work suspensions, the Contractor shall remain liable for the safety and security of the project site and be available 24 hours per the Contract Documents. Contractor shall have personnel visit the site daily during these suspensions to ensure the safety and security of the site.

C. SCHEDULE

1. CONTRACTOR shall submit scheduling information for the work noted in the Contract, as required in Section 01310 – Progress Schedules.

2. No separate payment shall be made for preparation and/or revision of the schedule.

D. Work Hours: 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 Supplementary Conditions, all work at the site shall be performed during regular working hours between 7 a.m. and 6:00 p.m., Monday through Friday. The Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday (designated by the City of Fort Lauderdale) without the City's written consent at least seventy two (72) hours in advance of starting such work. If the City permits overtime work, the Contractor shall pay for the additional charges to the City with respect to such overtime work. Such additional charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made to the Contractor for overtime work. It shall be noted that the City's Inspector work hours are from 8:00 AM to 4:30 PM and any Work requiring inspection oversight being performed outside of this timeframe shall be paid for by the Contractor as Inspector overtime. The cost to the Contractor to reimburse the City for overtime inspection is established at direct-labor and overtime costs for each person or inspector required. Incidental overtime costs for engineering, testing and other related services will also be charged to the Contractor at the actual rate accrued

1.07 COMPUTATION OF CONTRACT TIME

A. It is the CONTRACTOR'S responsibility to provide clear and convincing documentation to the ENGINEER as to the effect additional work will have with respect to additional contract time extension that may be justified. If additional quantities of work can be carried out concurrent with other existing construction activities without disrupting the critical path of the project then no contract time extension will be granted. The CONTRACTOR is obligated to provide documentation to the ENGINEER if additional elements of work affect the critical path of the project. If work set forth in the original scope of the project is deleted, the contract time may be reduced. This contract is a calendar day contract. While the CONTRACTOR may be granted time to suspend work operations for vacations or holidays, contract time will not be suspended. During suspensions, the CONTRACTOR shall be responsible for all maintenance of traffic and liability without additional compensation from the CITY.

B. The Contractor shall refer Section 01310 – Progress Schedule, Adjustment of Contract Times requirements.

1.08 CONTRACTOR USE OF PREMISES

A. The Contractor's use of the project site shall be limited to its construction operations. The Contractor will arrange for storage of materials and a copy of an agreement for use of other property shall be furnished to the Engineer.

1.09 PROJECT MEETINGS

A. Preconstruction Conference: After the award of Contract, a Pre-construction Work Conference will be held between the Contractor, its superintendent, and its subcontractors, safety representative, the Program Construction Manager (Engineer), the City, other interested Agencies, representatives of Utility Companies and others

affected by the work. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination shall be discussed and procedures for handling such matters established. The Engineer will set the time and place of this conference. The Engineer shall preside at the preconstruction conference and shall arrange for keeping the minutes and distributing the minutes to all persons in attendance. The agenda will include the following:

1. the preliminary work schedule for the approval by the Engineer of the proposed methods and manner of executing the work including but not limited to sequences of operation and time schedule including, critical work sequencing, preliminary procurement schedule of major equipment and materials and items requiring long lead time.

2. Status of Bonds and insurance

3. Preliminary shop drawing/sample/substitute or "Or Equal" submittal schedule.

4. Schedule of payment items (lump sum price breakdown) for progress payment purposes and processing of partial payment requests

5. Processing of field decisions and change orders

6. Adequacy of distribution of Contract Documents

7. Use of site requirements, access, office and storage areas, temporary facilities

8. Process for maintaining record documents

9. Designation of responsible personnel

10. Contractor's Safety Plan and representative (Safety and first aid procedures)

11. Security procedures

12. Housekeeping procedures

13. General regard for community relations

B. Progress Meetings: The Engineer shall schedule and hold regular on-site progress meetings at least bi-weekly and at other times as requested by Engineer and as progress of work dictates. The City, Contractor, Engineer, and subcontractors active

on the site, and others as may be requested by the City or Engineer shall be represented at each meeting. Contractor may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors. The Engineer shall preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings shall be to review the progress of the Work,

maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. The progress meetings will be held every two (2) weeks at City of Fort Lauderdale Public Works Department. The agenda shall include:

1. Review and approve minutes of previous meetings.
2. Review progress of Work since last meeting.
3. Review the proposed 2 week look ahead schedule.
4. Review the longer range 30 60 days construction schedule.
5. Critical work sequencing.
6. Note and identify problems which impede planned progress.
7. Develop corrective measures and procedures to regain planned schedule
8. Revise construction schedule as indicated and plan progress during next work period.
9. Maintaining of quality and work standards.
10. Transmittal, review, and distribution of Contractor's submittals
11. Processing applications for payment.
12. Maintaining record documents.
13. Field decisions and Change Orders.
14. Use of project site, office and storage areas, security, housekeeping and the City's needs.
15. Major equipment deliveries and priorities.
16. Schedule next progress meeting.

C. <u>Pre-installation Meetings:</u>

1. When required in individual Specification sections or as necessary to coordinate the Work, convene at site prior to commencing Work of that section.
2. Require attendance of entities directly affecting, or affected by, Work of that section.
3. Notify City four (4) days in advance of meeting date.

4. Provide suggested agenda to City to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

D. Florida Department of Transportation MOT Pre-application Meeting:

1. The Contractor shall coordinate a meeting with FDOT (Refer to FDOT permit for contact information) prior to preparation and submittal of the Contractor's MOT Plan.

2. Contractor shall be prepared to discuss the following subjects, as a minimum:

   a. Required schedules.

   b. Sequence of critical path work items.

   c. Contractors sequence of construction and paving plans.

   d. Discuss MOT plan submittal requirements.

3. Attendees may include but not limited to:

   a. City's representatives

   b. Contractor's office representative

   c. Contractor's resident superintendent

   d. Contractor's paving subcontractor

   e. Subcontractor's representatives whom Contractor may desire or City may request to attend.

   f. Engineer's representatives.

   g. Others as appropriate.

E. Broward County Environmental Assessment and Remediation Section Meeting:

1. If the construction requires dewatering it is the responsibility of the contractor to obtain all permits required.

2. The proposed pipeline is within 0.25 miles of existing contamination sites as identified by the Broward County Environmental Assessment and Remediation Section.

3. The Contractor shall coordinate a meeting with Broward County Environmental Assessment and Remediation Section (Contact: 954-519-1260) as soon as possible after the construction notice to proceed.

4. Contractor shall be prepared to discuss the following subjects, as a minimum:

   a. Overall scope of the construction project

   b. Required schedules.

c. Sequence of critical path work items.

d. Preliminary dewatering plans if dewatering will be required.

e. Water disposal locations if dewatering is required.

5. Attendees may include but not limited to:

a. City's representatives

b. Contractor's office representative

c. Contractor's resident superintendent

d. Contractor's dewatering subcontractor

e. Subcontractor's representatives whom Contractor may desire or City may request to attend.

f. Engineer's representatives.

g. Others as appropriate.

F. HOA Meetings: If required by the City, the Contractor shall attend coordination meetings with the residents of the different project area HOAs throughout the duration of the construction to share the scope of work to be performed, the timeline of the work to be performed, and to discuss any other coordination items.

G. Other Meetings: In accordance with the Contract Documents and as may be required by the City and Engineer.

1.10 UTILITY LOCATIONS

A. The Contractor retains responsibility for identification of all existing field conditions.

B. It is the intent of this Project that pre-existing utilities remain in service at all times unless specifically shown to be demolished / relocated on the plans. The Contractor shall plan its work accordingly to accommodate, protect and otherwise maintain existing utilities in service at all times.

C. The Contractor shall cooperate fully with all utility forces of the City or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the Work so as to minimize interferences with said relocation, altering, or other rearranging of facilities

D. As far as possible, all existing utility lines in the project area have been shown on the plans. However, the CITY does not guarantee that all lines are shown, or that said lines are in their true location. It shall be the Contractor's responsibility to identify and locate all underground or overhead utility lines or equipment affected by the project.

No additional payment will be made to the Contractor because of discrepancies in actual and plan location of utilities and damages suffered as a result thereof.

E. The Contractor shall notify each utility company involved at least thirty (30) days prior to the start of construction to arrange for positive underground location, relocation or support of its utility where that utility may be in conflict with or endangered by the proposed construction. The Contractor shall pay for relocation of water mains or other utilities for the convenience of the Contractor. The Contractor shall pay for all charges by utility companies for temporary support of its utilities. All costs of permanent utility relocations to avoid conflict shall be the responsibility of the Contractor and the utility company involved.

F. The Contractor shall schedule and coordinate their work in such a manner that they are not delayed by the utility companies relocating or supporting their utilities. No compensation will be paid to the Contractor for any loss of time or delay.

G. All overhead, surface, and underground structures and/or utilities encountered are to be carefully protected from damage or displacement. All damage to said structures and/or utilities is to be completely repaired within a reasonable time; needless delay will not be tolerated. The City reserves the right to remedy any damage by ordering outside parties to make repairs at the expense of the Contractor. All repairs made by the Contractor are to be made to the satisfaction of the utility owner and shall be inspected by a representative of the utility owner and the Engineer.

H. The Contractor should be aware of the Sunshine State One Call Center, which has a free locating service for Contractors and excavators. Within forty-eight hours before excavating, dial toll free 1-800-432-4770 (or local 811), and a locator will be dispatched to the work location. Contractor shall reasonably notify other utility companies not notified by Sunshine State One Call Center.

I. The permits listed below will be obtained for the project by the City prior to beginning construction (when applicable). The Contractor is responsible for compliance with any and all permit conditions. In the event that the City must obtain permits in addition to those listed below, the Contractor shall not have any claim for damages arising from any delay caused by the City's obtaining said additional permits.

   a. BCPGMD: Surface Water License.
   b. BCHCED General Permit
   c. FDOT Driveway or Drainage Connection Permit

J. Permits to be obtained by the Contractor include, but are not limited to the following:

   1. Local, County, and State contracting licenses.

1.11 PROTECTION AND RESTORATION OF SURVEY MONUMENTS

A. The Contractor shall carefully protect from disturbance all survey monuments, stakes and bench marks, whether or not established by Contractor, and shall not remove or

destroy any surveying point until it has been properly witnessed by the Engineer. All major survey monuments that have been damaged by the Contractor such as section corners, 1/4 section corners, property corners or block control points shall be replaced at the Contractor's expense with markers of a size and type approved by the Engineer. The replacement shall be under the supervision of a Florida Registered Land Surveyor where directed by the Engineer.

1.12 EQUIPMENT

A. All equipment necessary and required for the proper construction of all facilities shall be on the construction site, in first-class working condition.

1.13 STORAGE SITES

A. The Contractor shall furnish, at Contractor's expense, properly zoned areas suitable for field office, material storage and equipment service and storage. No material may be stored in the public right of way without prior authorization by the agency having jurisdiction. The Contractor shall keep these areas in a clean and orderly condition so as not to cause a nuisance or sight obstruction to motorists or pedestrians.

1.14 OWNERSHIP OF EXISTING MATERIALS

A. All materials removed or excavated from the job site shall remain the property of the City until released by the Contract Administrator, at which time it shall become the property of the Contractor, who shall dispose of it in a manner satisfactory to the Engineer.

1.15 EXCESS MATERIAL

A. Upon direction of the Engineer, all vegetation, debris, concrete or other unsuitable materials shall be disposed of in areas provided by the Contractor and approved by the Engineer. Any excess material desired to be retained by the City shall be delivered by the Contractor to a designated area within a 5-mile radius of the project, at no extra cost to the City.

1.16 AUDIO-VISUAL PRECONSTRUCTION RECORD

A. General: Prior to beginning any Contract work, the Contractor shall thoroughly photograph or have a continuous color audio-video recording taken along the entire length of the project to serve as a record of preconstruction conditions.

B. Photographically document all unique portions of the construction including tie-ins to existing pipelines or facilities, crossings of existing utilities, buried valve and piping intersections, and other work items that will not otherwise be visible after completion of construction.

C. City and Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken. D. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Monthly: Take digital photographs, unless otherwise approved by the City.
3. Label photo folders and photo files as follows:
   a. Project Name.
   b. Date and time photo was taken.
   c. Location and area designation.
   d. Schedule activity number, as appropriate.

1.17 AUDIO-VIDEO RECORDINGS AND PHOTOGRAPHS

A. General: Prior to commencing work, the Contractor shall have a continuous color audiovideo recording taken of each project area of the entire Project, including all major streets, adjacent work areas, existing manholes, plant site and all other areas that will be disturbed by the Contractor's operations, to serve as a record of preconstruction conditions. No construction shall begin prior to review and acceptance video recording covering the respective, affected construction area by the Engineer. Contractor shall refer to Section 01300 – Submittals for project recording and photographs requirements.

1.18 ENVIRONMENTAL PROTECTION

A. The Contractor shall furnish all labor and equipment and perform all work required for the prevention of environmental pollution during and as a result of the work under this contract. For the purpose of this contract, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, land and involves noise, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. Environmental pollution prevention shall be in accordance with NPDES requirements with no additional cost to the City.

1.19 MAINTENANCE AND PROTECTION OF TRAFFIC

A. The Contractor shall provide all necessary traffic control devices in order to redirect, protect, warn or maintain existing vehicular and pedestrian traffic during the course of construction.

   1. Construction Phasing Requirements
      Contractor shall phase construction as detailed on drawing A-1.1 for this project

B. TRAFFIC CONTROL

1. The Contractor is required to submit a conceptual Traffic Control Plan at the PreConstruction Conference. This preliminary plan should identify the phases of construction that the Contractor plans to proceed with and identify traffic flows during each phase. The Engineer will have ten (10) days to notify the Contractor of any comments. Once the conceptual plan for maintaining traffic has been approved, the Contractor will be required to submit a detailed plan showing each phase's Maintenance and Protection Plan prior to starting construction of any phase.

2. The "Maintenance of Traffic" plan shall include pedestrian traffic as well as vehicular traffic.

   It shall be the responsibility of the Contractor for any necessary Construction, Pavement Marking and Signage or any Pedestrian Signalization and/or Signal Modification to accommodate an alternate safe walk route.

3. The Contractor, at all times, shall conduct the work in such a manner as to insure the least obstruction to traffic as is practical. Convenience of the general public and of the residents adjacent to the work shall be provided for in a satisfactory manner, as determined by the City.

4. Sidewalks, gutters, drains, fire hydrants and private drives shall, insofar as practical, be kept in condition for their intended uses. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within twenty (20) feet of any such hydrant.

5. All existing stop and street name signs will be maintained as long as deemed necessary by the City.

6. The Contractor shall furnish a sufficient number of protective devices to protect and divert the vehicular and pedestrian traffic from working areas closed to traffic, or to protect any new work. Failure to comply with this requirement will result in the Engineer shutting down the work until the Contractor provides the necessary protection.

7. Any time traffic is diverted for a period of time that will exceed one-work day temporary pavement markings will be required. Existing pavement markings that conflict with the new work zone traffic pattern must be obliterated. Painting over existing pavement markings (black out) is not permitted.

1.20 MAINTENANCE AND PROTECTION OF EXISTING DRAINAGE SYSTEM

A. It shall be the responsibility of the contractor to maintain positive drainage on the surface and to ensure that the existing underground drainage system continues to function as intended during the construction. The contractor shall follow the plans to ensure that

existing catch basins and manholes are being protected during the entire phase of construction.

1.21 APPLICATION FOR PAYMENT FOR STORED MATERIALS

A. Application for payment for stored materials may not be made by the Contractor.

1.22 SPECIAL CONDITIONS FOR CONSTRUCTION BY OTHER AGENCIES

A. It will be the Contractor's responsibility to coordinate construction schedules with other contractors so as to minimize disruptions, and inconveniences. The project site shall be safe at all times.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01015

LONGITUDINAL CHANNELIZING BARRICADES

PART 1 - GENERAL

1.01 THE REQUIREMENTS

A. Plastic water filled barricades shall be high impact, UV resistant and constructed of polyethylene.

B. All plastic water filled barricades for traffic and safety control shall be suitable for traffic channeling and control, lane delineation, crowd control, identification of parking areas and other similar approved uses.

C. The barricade units provided under this Section shall be the only type of barricades permitted for use by the Contractor for the separation of work zone(s), pedestrian traffic, and other areas requiring partitioning and/or separation on the Project.

D. Please note that the use of standard barricades, chain link fencing, temporary plywood walls / handrails, and other similar types of installations shall not be considered acceptable.

PART 2 - PRODUCTS

2.01 BARRICADES

A. Composition: All barricades shall be constructed of ISO 9000 quality manufactured 100% recyclable LLDPE (Equistar 625) polyethylene. B. Colors: All barricades shall be safety orange.

C. Length: Each barricade shall be 45-inches in length.

D. Height: Each barricade shall be 42-inches.

E. Base width: Each barricade shall have a total base width of 23.5-inches.

F. Wall thickness: Minimum wall thickness shall be 0.2-inches (5mm).

G. Weight: Each barricade shall have a maximum dry weight of 44 lbs (22.7kg) and a maximum full weight of 760 lbs.

H. Barricades shall be designed to allow end-to-end installation with no visible gaps between units.

I. Barricades shall be graffiti / vandal-proof and have interlocking capability.

J. DOT Performance Evaluations: Barricades shall meet NCHRP-350 Test 3-71 and 1-10 requirements. Written certification to this effect must be provided.

K. FHWA Certification Letter WZ-8: Barricades shall be suitably accepted for Category II Traffic Control Device service at 62.5 mph.

L. Application of force for tipping: When filled, barricades shall resist tipping when a point force of up to 255.8 lbs is applied to the top edge.

M. Barricades shall be equipped with a pre-molded attachment area suitable for installation of flashing lights.

N. Barricades shall be pre-molded and be equipped with requisite stainless steel tamper proof hardware as necessary to readily accept interchangeable signage, including but not be limited to: directional, reflective and/or advertising types of signage.

O. Barricades shall be equipped with a tamper proof fill and drain caps, designed to be removed only by use of special tools.

P. Barricades shall be Model MB 42 x 45 LBC as manufactured by Off-the-Wall or approved equal.

PART 3 – EXECUTION

3.01 CONTRACTOR'S USE OF BARRICADES

A. Barricades shall be furnished as per MOT permit requirements.

B. Barricades shall also be used where other situations arise that require the installation of a temporary barrier between the public and the Work area.

C. The Contractor shall make all arrangements and provide all requisite labor for the delivery, loading, unloading, filling with water, deployment and redeployment of barricades as required to meet the intent of the Project.

D. The Contractor shall verify that all barricades, when deployed, are interlocked and filled with water in accordance with manufacturer's recommendation.

E. Draining, repositioning / interlocking, filling and refilling barricades shall be the responsibility of the Contractor for the duration of the Project. In this capacity, barricades will be refilled / cleaned, when deemed necessary to maintain aesthetic appearance or intended performance. If necessary, the Contractor shall utilize an anti-fungal inhibitor when filling barricades.

F. The source of water for filling of barricades shall be subject to City approval. The Contractor shall be responsible for all equipment costs, and labor required for filling / refilling / draining of barricades.

G. Remove barricades from the project site at a date and time agreed upon with the City.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Payment for the various items in the Bid, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, taxes, materials, commissions, transportation and handling, bonds, permit fees, insurance, overhead and profit, and incidentals appurtenant to the items of Work being described, as necessary to complete the various items of the Work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). Such compensation shall also include payment for any loss or damages arising directly or indirectly from the Work.

B. 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 in the Proposal items or this Section, it shall include the cost for that Work in some other applicable bid item, so that its proposal for the project does reflect its total price for completing the Work in its entirety.

1.02 SUBMITTALS

A. Informational:

1. Schedule of Values: Submit schedule on City's form.
2. Application for Payment.
3. Final Application for Payment.

1.03 SCHEDULE OF VALUES

A. Prepare a schedule of values for the Work.

B. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

C. Lump Sum Work:

1. Reflect schedule of values format included in conformed Bid Form.
2. List Bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.

3. Break down by Divisions 2 through 17 with appropriate subdivision of each Specification.

D. An unbalanced or front-end loaded schedule will not be acceptable.

E. Summation of the complete schedule of values representing all the Work shall equal the Contract Price.

1.04 APPLICATION FOR PAYMENT

A. Progress payments will be made monthly.

B. The date for Contractor's submission of monthly Application for Payment shall be established at the Preconstruction Conference.

C. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.

D. Use detailed Application for Payment Form provided by the City.

E. Include accepted schedule of values for each portion of Work and the unit price breakdown for the Work to be paid on unit price basis, and a listing of City-selected equipment, if applicable, and allowances, as appropriate. F. Preparation:

1. Round values to nearest dollar.

2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form.

3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form, a listing of materials on hand as applicable, and such supporting data as may be requested by City.

1.05 MEASUREMENT - GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and Specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

C. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities. Variations greater than one foot will be considered in adjusting quantities.

D. Units of measure shown on Bid Form shall be as follows, unless specified otherwise. All methods of measurement shall be approved by the City.

Item	Method of Measurement
AC	Acre - Field Measure
AL	Allowance
CY	Cubic Yard - Field Measure within limits specified or shown, or measured in vehicle by volume, as specified
EA	Each - Field Count
GAL	Gallon - Field Measure
HR	Hour
LB	Pound(s) - Weight Measure
LF	Linear Foot - Field Measure
LS	Lump Sum - Unit is one; no measurement will be made
SF	Square Foot
SY	Square Yard
TON	Ton - Weight Measure by Scale (2,000 pounds)

1.06 PROPOSAL ITEMS

A. General Bid Items

1. Item No. 1 – General Conditions/Contract Administration: The lump sum price for this item shall be full compensation for all general conditions of the construction contract and contract administration which includes but is not limited to the costs of project coordination, audio-visual documentation of the existing conditions (bridge abutments, bridge wing-walls, private seawalls adjacent to City's, curbs, existing catch basins, fences, vegetation, pavement markings, etc.), scheduling, meetings, distribution of flyers to the affected residents and businesses, project signs, and other administration work required in the Contract

Documents and General Conditions. This item includes all work not defined in other general bid items.

2. Item No. 2 – Mobilization and Demobilization: The lump sum price for this item shall be full compensation for mobilization and demobilization activities. This includes but is not limited to preparatory work and operations necessary for the movement of personnel and setting up of all equipment, instruments, and incidentals to the project site, the establishment of field offices and other facilities for the work, premiums on bond, site cleanup and site restoration, supplies and incidentals to/from the project site and for the establishment/deestablishment of the temporary environmental controls, staging area installation and removal at project completion (and all associated requirements including temporary fencing, gates, staging area entrance drives, opaque privacy screen, protection of existing trees within the staging area, warning and barrier fence, and all other requirements necessary for establishing the staging area and all other activities necessary to complete and to remove the same personnel and equipment from the site when construction is complete. The payment for mobilization and demobilization shall not exceed 3% of the contract price. Partial payments for mobilization and demobilization shall be made as follows:

Construction % Complete	Allowable % of Lump Sum for Mobilization/Demobilization
5	25
10	50
25	75
100	100

For partial payment, the schedule shall be as follows:

- 75% of the unit price for pipeline installed, backfilled, and compacted to grade including pavement restoration with the exception of the items included in other items of this bid schedule.
- 100% of the unit price upon completion of all testing.

3. Item No. 3 – Consideration for Indemnification: Payment for consideration for indemnification of the City shall be twenty-five dollars ($25.00) and shall constitute full compensation for indemnifying the City as specified in the Contract Documents. Upon payment, Contractor shall acknowledge payment in writing by providing the City with a letter.

4. Item No. 4 - Performance and Payment Guaranty and Insurance: The lump sum price for this item shall be full compensation for all performance and payment guaranties associated with this contract. This item shall also include the cost of required insurance for the work as specified in the Contract Documents. The payment for this item shall not exceed 3 percent of the Total Bid Price. Payment for 100 percent of this item, less standard retainage, may be made upon execution of the Contract and the submittal of the first payment request.

5. Item No. 5 – All Work Associated with the Maintenance of Traffic (shall not exceed 3% of the contact price): he lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for maintenance of traffic in accordance with FDOT Standards and/or City of Fort Lauderdale Engineering Department. This item includes but is not limited to, preparing maintenance of traffic plans (MOTs) to appropriate agencies for approval, providing personnel as required to direct traffic (flag men, crossing guards, local police, etc.), providing signs, cones, lights, signs and barricades, installing temporary fencing and walkways as required to maintain pedestrian traffic, installing temporary steel plates for vehicular traffic and all other work incidental to the maintenance of traffic as required by FDOT Standards and/or City of Fort Lauderdale Engineering Department and the Contract Documents.

6. Item No. 6 – All Work Associated with Record Drawings/Geodatabase Data: The lump sum price for this item shall be full compensation for the cost of preparing, submitting City approved electronic record drawings, and geodatabase data as outlined in the Contract Documents. This item includes, but is not be limited to, preparing record drawings in AutoCAD Civil 3D format (2017 version); providing elevations and GPS coordinates for the regraded Right-Of-Way, asphalt (if changed), new storm drains, stormwater structures, outfall to intracoastal, replaced seawalls, tie-ins to existing storm drains and water mains, deflections, and conflict separations; and other data as may be required in the Contract Documents. Initiation for payment of this bid item will not occur until all items in the list of submittals are approved and accepted by the City. Final payment for this item will not be made until final record drawings (signed and sealed by a Florida registered surveyor) have been received and accepted by the City. Payments for Record Drawings/GPS Data will be made as follows:

Payments for Record Drawings/GPS Data will be made as follows:

Item	Allowable Percent of Lump Sum For Record Drawings/Geodatabase Data
Record Drawings/Geodatabase Data Complete and Accepted	100%

7. Item No. 7 - All Work Associated with Erosion and Sediment Control: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the installation, maintenance, and removal of the temporary erosion and sediment control measures for the project.

B. Storm Drainage Bid Items

1. Item No. 8 – All Work Associated with Existing Catch Basin and Outfall Maintenance: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the maintenance of existing catch basins and the removal of barnacles and debri from outfall pipes for catch basins where proposed tidal valves shall be installed. This item includes,

but is not limited to, removal and reinstallation of existing baffle pollution baffles in catch basins with baffles, dewatering catch basins and outfall pipes using a dewatering pump, dewatering box(es) and silt fence at basins prior to discharge, removal of debri from outfall pipe, removal and disposal of barnacles from outfall pipes from catch basin to water body , and providing closed circuit TV inspection for pipes ranging from 8 in to 18 in. Payment for pipe cleaning shall be as follows:

PipeCleaningDescription
Desilt Pipe (8"- 18") (<20% Silt)
Desilt Pipe (8" -18") (20% - 50% Silt)
Desilt Pipe (8" - 18") (>50% Silt)
Closed Circuit TV Inspection (8" to 18")
Barnacle Outfall Removal
Inspect Drainage Structure
Dewatering Pipe System (8"- 18" Plug)

2. Item No. 9 – All Work Associated with Stormwater Structures: The unit price for this item shall be full compensation, on a per structure basis, as shown in the bid form, for all labor, equipment, material, and work required for installation of the stormwater structure installed in accordance with the Contract Documents and as described herein. This item includes, but is not limited to, locating, verifying and protecting existing utilities, surveying for layout for installation, excavating, pavement cutting and removal, dewatering (along with all required materials, equipment and labor for satisfactory disposal), temporary sheeting, shoring, inlet protections, removing unsuitable material below the structure, disposing of unsuitable material, graded stone bedding below structure, concrete structure and grating, leveling bricks as needed, non-shrink cementitious grout, riser sections, joint materials, backfill, compaction, along with all other appurtenant and miscellaneous items and work required for a complete installation.

Catch Basin Type
Type “C” Catch Basin
4” x 4” Storm Catch Basin

3. Item No. 10 – All Work Associated with Inline Check Valves (Tidal Valves) Installation: The unit price for this item shall be full compensation for all labor, equipment, material, and work required for the installation of the WASTOP inline check valves (tidal valves) as required by the Contract Documents. Payment for furnishing and installing tidal valves will be made at the unit price, per each, named in the Schedule of Values and includes but is not limited to all labor, tools, equipment, and material required to furnish, transport, store and

install each WASTOP inline check valve as described herein. This item includes, but is not limited to, locating, verifying and protecting existing utilities, surveying for layout for installation, and labor for satisfactory installing the inline check valve in the proposed catch basin as shown in the Drawings and as required for a complete and operable system.

Valve Size

15-inch Diameter

4. Item No. 11 - All Work Associated with RCP Installation for proposed catch basins along the seawalls: The unit price for this item shall be full compensation on a per linear foot basis for all labor, tools, equipment, and material required to furnish, transport, store and install the RCP storm drainage shown on the Contract Documents and described herein. This item includes, but is not limited to, site preparation, location of underground utilities installing temporary sheeting, shoring, removing unsuitable material below the pipe trench, disposing of unsuitable material, backfill, testing, and surface restoration as required for a complete and operable installation.

5. Item No. 12 - All Work Associated with Pollution Retardant Baffles: The unit price for this item shall be full compensation on a unit price per pollution retardant baffle basis for all labor, equipment, materials and work necessary for a complete installation. This item includes, but is not limited to, compensation for all hardware, caulking, gaskets, grout, brick, concrete, or any other items required to install the baffles in accordance with the Contract Documents. Payment shall be made for each pollution retardant baffle installed by authorization of the Engineer. Any damage to any drainage structure shall be repaired at the Contractor's expense. Pollution Retardant Baffles shall be installed in all drainage structures as shown on the drawings and described herein.

6. Item No. 13 – All Work Associated with Pavement Overlay (Asphalt): The unit price for this item shall be full compensation on a per square yard basis for all labor, equipment, material, and work necessary for pavement restoration in accordance with applicable City Standards. This item includes, but is not limited to, milling and replacing asphalt to a depth of 1-1/2”, removing and disposing of the existing asphalt, applying a friction course in accordance with City requirements to provide a uniform surface within the limits of pavement restoration, adjusting rim elevations of existing manholes, catch basins and valve boxes, providing permanent thermoplastic pavement markings and raised pavement markers, cleaning up the area affected by the construction and all other miscellaneous and appurtenant work. (Road base restoration and structural course paid for under Storm Drain installation).

7. Item No. 14 – All Work Associated with Restoration of the Right of Way Area: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work necessary for the restoration of the right of way

area, excluding driveway restoration and other items included in other bid items. This item includes, but is not limited to, restoring medians including preparing subgrade and base, installing median form material, furnishing and installing concrete and concrete reinforcement, furnishing and installing sod to match the existing conditions, providing top soil, replacing existing irrigation system and accessories, including piping, sprinkler heads, valves, replacing trees, palms, and other landscaping features to match existing conditions, restoring existing curb and gutter, restoring swales, sidewalks, replacing or resetting fences, edging and hedges restoring water service laterals including furnishing and installing service clamps and piping and other fittings all other

work incidental to the restoration of the right of way as required by the Contract Documents and all other work required by the Contract Documents not included under other bid items.

8. Item No. 15 – All Work Associated with Driveway Restoration (Concrete): The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for restoration of impacted concrete driveways including backfill, compaction, disposal, and finished surfaces as specified in the Contract Documents.

9. Item No. 16 – All Work Associated with Driveway Restoration (Pavement): The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for restoration of impacted driveways, excluding concrete and paved driveways, and including backfill, compaction, disposal, and finished surfaces.

10. Item No. 17 – All Work Associated with Driveway Restoration (Bricks, Stones and other materials): The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for restoration of impacted driveways excluding concrete and paved driveways, and including backfill, compaction, disposal, and finished surfaces.

C. Seawall Bid Items

1. Item No. 18 – All Work Associated with Steel Cantilever Steel Sheet Pile Wall with Concrete Cap: The unit price for this item is the payment for all materials, labor, and equipment, on a linear foot basis, for all Work necessary and required for the complete installation of Cantilevered Steel Sheet Pile Wall with Concrete Cap including site restoration.as shown in the Contract Documents and as required for a complete and operable system. This item also includes all work necessary and required for core drilling existing seawalls to install utility sleeve pipes of various sizes including excavation, grading, removal, and disposal of soil and debris and all other necessary appurtenances.

2. Item No. 19 – All Work Associated with Jet Filter Installation: The unit price for this item shall be full compensation for all labor, equipment, material, and work required for the installation of 4-inch Jet Filters as required by the Contract Documents. This item includes but not limited to, all general, civil, mechanical,

structural, site restoration, equipment testing, startup services, and construction sequencing requirements needed for a complete and operable system.

3. Item No. 20 – All Work Associated with Rip Rap for Seawalls: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work as shown in the Contract Documents and as required for the complete installation of rip rap for seawalls.

4. Item No. 21 – All Work Associated with FDOT #57 Stone: The unit price for this item is the payment, on a TON basis, for all Work necessary and required for the installation of FDOT #57 Stones as shown in the Contract Documents and as required for a complete installation.

5. Item No. 22 – All Work Associated with Core Drill Existing and Proposed Seawalls to Install Outfall Drainage Pipe : The unit price for this item is the payment, on a size basis, for all Work necessary and required for core drilling existing and proposed seawalls to install outfall drainage pipes of various sizes including excavation, grading, removal, and disposal of soil and debris and all other necessary appurtenances, including site restoration (excluding sodding which is included in a separate bid item).

6. Item No. 23 – All Work Associated with Grading, Sodding, Landscaping, Hardscaping Restoration, and Irrigation System: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work necessary for the grading, sodding, landscaping, hardscaping, and irrigation system restoration of the impacted areas of the project. This item includes, but is not limited to, grading, sodding, maintenance of sodded areas, and as required by the Contract Documents.

7. Item No. 24 – All Work Associated with Turbidity Barrier: The lump sum price for this item shall be full compensation for all labor, equipment, material, and work required for the installation of turbidity barrier at any working area, during demolition and construction. No additional compensation or extra payment will be allowed for relocating the turbidity barrier as many times as necessary or indicated by the Engineer to any working area or working project site under this contract.

D. **Allowance Accounts**

1. Item No. 25 – Permits, Licenses, and Fee Dedicated Allowance: The allowance account for this item shall be full compensation for all permits, licenses, and fees required of the Contractor from the various agencies having jurisdiction over the construction of the project. The allowance shown is an estimate of the fees required. Payment will be based on the actual permit, license or fee paid directly to the agency, documented by paid receipts and specifically excluding any labor, markups, overhead and profit, administration, or other costs involved in obtaining the permits, licenses or fees. Fees specifically excluded from this allowance include, but are not limited to, re-inspection fees and expired permit fees. Any portion of this fund remaining after all authorized payments have been made will

be withheld from contract payment and will remain with the City of Fort Lauderdale.

2. Item No. 26 - All Work Associated with Tree Protection, Tree Removal and Landscape Restoration within the Limits of the City: The allowance account indicated for this item is dedicated to the payment for all labor, equipment, material, and work required for the protection of existing trees and landscaping, removal of impacted trees and landscaping and the restoration of landscaping within the limits of the City and not included in other bid items. This item includes, but is not limited to, preparing submittals to the City that shows existing trees and their description, performing ISA tree appraisals for trees to be removed for mitigation purposes, relocating trees as required, trimming tree canopies interfering with construction activities, furnishing and planting trees for mitigation purposes as required by City codes, providing an ISA certified arborist to prune tree roots within paving areas, installing root barrier systems as required by the City, installing temporary tree barricades for protection during construction activities and all other work incidental to the protection and removal of trees and the restoration of landscaping as required by the City and the Contract Documents. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

3. Item No. 27 - All Work Associated with Removal of Docks: The allowance account for this item is the payment for all materials, labor, and equipment on a square foot basis, for all work necessary and required for complete removal of existing docks including, but not limited to, decks, accessories, utility stations with electrical and water lines, benches, storage, security cameras, timber marine piles, prestressed concrete piles, architectural, electrical, instrumentation and control equipment and all items at the docks. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

4. Item No. 28 – All Work Associated with Removal of Marine Timber and/or Concrete Piling: The allowance account for this item is the payment for all materials, labor, and equipment on a square foot basis, for all work necessary and required for complete removal of existing marine timber and/or concrete piling including, but permitting, removal, and disposal of all debris and material of the job site to a Broward County approved location. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

5. Item No. 29 – All Work Associated with Removal of Seawall Cap: The allowance account price for this item is the payment for all materials, labor, and equipment, on a linear foot basis, for all Work necessary and required for the complete removal and disposal of existing concrete seawall caps including but not limited to, seawall cap demolition, excavation and removal of all debris and materials off

the job site to a Broward County approved location. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

6. Item No. 30 – All Work Associated with Reinforced Concrete Seawall Demolition: The allowance account for this item is the payment for all materials, labor, and equipment, on a square foot basis, for all Work necessary and required for complete removal and disposal of existing reinforced concrete seawall including but not limited to, seawall concrete piles, concrete panels, and the excavation and removal of all debris and materials off the job site to a Broward County approved location. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

7. Item No. 31 – All Work Associated with Toe-Wall Footing Seawall Demolition: The allowance account for this item is the payment for all materials, labor, and equipment, on a square foot basis, for all Work necessary and required for complete removal and disposal of existing toe-wall footing or any type of existing footer, and any structure attached to it including its support. This item includes the removal of fallen debris and materials from the channel's bottom. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

8. Item No. 32 – All Work Associated with Diving Inspection No Boat: The allowance account for this item is the payment, on an hourly basis, for all Work necessary and required for furnishing all labor, material, for a fully equipped diver (no boat) to perform diving inspection at several locations as directed by the Engineer. Mobilization to and demobilization from the job site are included. Inspection time shall start after diving equipment is operational landside and diver enters the water as agreed by the City/Engineer. Inspection time shall end as soon as the diver exits the water as agreed by the City/Engineer. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

9. Item No. 33 – All Work Associated with Diving Inspection with Boat or Barge: The allowance account for this item is the payment, on an hourly basis, for all Work necessary and required for furnishing all labor, material, for a fully equipped diver with boat or barge to perform diving inspection at several locations as directed by the Engineer. Mobilization to and demobilization from the job site are included. Inspection time shall start after diving equipment is operational landside and diver enters the water as agreed by the City/Engineer. Inspection time shall end as soon as the diver exits the water as agreed by the City/Engineer. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

10. Item No. 34 – All Work Associated with the Sampling, Testing, Removal, Treatment and Discharge of Contaminated Groundwater: The allowance

account indicated for this item shall be full compensation for all labor, equipment, material, and work required for the sampling, testing, removal, treatment and discharge of contaminated groundwater as required by the Contract Documents and all applicable regulatory agencies. This item includes, but is not limited to, preparing a sampling plan, collecting and preserving samples, performing laboratory analyses, preparing reports, dewatering, providing and operating GAC treatment units, pumps, filters, piping, hoses, miscellaneous fittings, removing and disposing spent GAC, shipping and handling of equipment, discharging treated groundwater and all other work required to complete this task in conformance with applicable regulatory requirements. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

11. Item No. 35 - All Work Associated with the Sampling, Testing, Excavation, Removal and Treatment of Contaminated Soils: The allowance account indicated for this item shall be full compensation for all labor, equipment, material, and work required for the sampling, testing, excavation, removal and treatment of contaminated soils as required by the Contract Documents and all applicable regulatory agencies. This item includes, but is not limited to, preparing a sampling plan, collecting and preserving samples, performing laboratory analyses, preparing reports, excavating, removing, stockpiling, treating, transporting and disposing of contaminated soils and all other work required to complete this task in conformance with applicable regulatory requirements. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

12. Item No. 36 – For Replacement of Underground PVC Utilities less than 4 inches: The allowance account for this item is the payment, on a linear foot basis, for all Work and materials required to replace existing underground PVC utilities encountered during the installation of facilities under this contract which may not be identified on the drawings. Utilities less than four inches in diameter up to an 8-foot depth are included in this payment item. All Work shall be authorized in writing in advance, by the City. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

13. Item No. 37 – For Replacement of Underground Galvanized Steel/Cast Iron Utilities less than 4 inches: The allowance account for this item is the payment, on a linear foot basis, for all Work and materials required to replace existing underground galvanized steel/cast iron utilities encountered during the installation of facilities under this contract which may not be identified on the drawings. Utilities less than four inches in diameter up to an 8-foot depth are included in this payment item. All Work shall be authorized in writing in advance, by the City. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

14. Item No. 38 – For Replacement of Underground Utilities from 4 to 6 inches: The allowance account for this item is the payment, on a linear foot basis, for all Work and materials required to replace existing underground utilities encountered during the installation of facilities under this contract which may not be identified on the drawings. Utilities four to six inches in diameter up to an 8-foot depth are included in this payment item. All Work shall be authorized in writing in advance, by the City. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

15. Item No. 39 – For Replacement of Underground Utilities from 8 to 12 inches: The allowance account for this item is the payment, on a linear foot basis, for all Work and materials required to replace existing underground utilities encountered during the installation of facilities under this contract which may not be identified on the drawings. Utilities eight to twelve inches in diameter up to an 8-foot depth are included in this payment item. All Work shall be authorized in writing in advance, by the City. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

16. Item No. 40 – For Replacement of Underground Utilities from 16 to 24 inches: The allowance account for this item is the payment, on a linear foot basis, for all Work and materials required to replace existing underground utilities encountered during the installation of facilities under this contract which may not be identified on the drawings. Utilities sixteen to twenty-four inches in diameter up to an 8-foot depth are included in this payment item. All Work shall be authorized in writing in advance, by the City. Any portion of this fund remaining after all authorized payments have been made will be withheld from contract payment and will remain with the City of Fort Lauderdale.

1.07 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.

2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.

3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.

4. Material not unloaded from transporting vehicle.

5. Defective Work not accepted by City.

6. Material remaining on hand after completion of Work.

1.08 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: Payment for stored materials and equipment shall only be made with submittal of “paid” receipts. The Contractor shall also submit a separate list covering the cost of materials, delivered and unloaded with taxes paid. This list shall also include the installed value of the item with coded reference to the Work items in the Schedule of Payment Items. Copies of itemized invoices shall be submitted for along with the list of materials stored onsite. Payment of stored materials shall be in accordance with Section 005200, Contract Standard Terms and Conditions. No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to Engineer.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.09 ALLOWANCES

A. The allowances shall be used only at the discretion of and as ordered by the City.

B. Any portion of these allowances that remain after all authorized payments have been made will be withheld from contract payments and will remain with the City.

PART 2 - PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01035

MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide all labor, materials, equipment and appliances required for the complete execution of replacement of existing seawalls as shown on the Drawings and specified under the various Sections of the Contract Specifications and as required by conditions at the site.

B. The Contractor shall have examined all work to be performed and familiarize himself with the nature and extent to which the existing site will be damaged, items removed or rearranged due to the work under his Contract and that of other Contracts.

C. Major portions of the work are indicated on the Drawings and the accompanying Specifications thereto. All work must be complete in all respects and executed with high quality workmanship.

1.02 SITE AND BUILDINGS

A. Site Visit: Prior to submission of Bids, the Contractor shall have visited the site and thoroughly acquainted himself with the exact nature of the work indicated on the Drawings and the Specifications requirements. Failure to comply with the aforementioned requirements shall not constitute a basis for claims for additional compensation.

B. Measurements: Prior to ordering any materials or doing any work, the Contractor shall verify all measurements, dimensions and other conditions of seawall scheduled for work as may be necessary or required in connection with his work. The Contractor shall be responsible for the correctness of same.

1.03 MATERIALS

A. All materials to perform and complete the work shall be new.

B. All salvaged materials shall be sound and undamaged. Materials to be reused and or reinstalled shall be stored and protected as directed by the Engineer. Care shall be taken to prevent damage to materials or equipment to be reused.

1.04 SHORING, UNDERPINNING AND BRACING

A. When necessary and required, the Contractor shall provide underpinning and temporary shoring and bracings, all in accordance with code requirements, and as approved by the Engineer.

B. Shoring and bracing shall be of such form and so installed as to safely support the work and interfere as little as possible with the progress of the work. Suitable means shall be provided to adjust any settlement in the shoring supports. Temporary shoring shall consist

of sound timbers or rolled shapes of required dimensions which shall be removed after necessity for

same ceases to exist. All work removed or damaged through installation of temporary shoring or through improper shoring shall be replaced or repaired after the shoring is removed, at no additional cost to the City.

1.05 WORK PREPARATION AND TEMPORARY ACCESS

A. The Contractor, before commencing work, shall prepare and submit for approval a progress schedule in accordance with the requirements of Section 01300 - Submittals, in order to coordinate the work of all trades and to insure completion on or before the completion date. The City and the Engineer reserve the right to revise or modify such schedules as required to expedite each phase of work and to coordinate such work.

B. Detailed sequence of availability of areas within the present seawalls where work is to be performed under each Contract shall be in accordance with Section 01520 – Construction Constraints, but may be modified by the Contractor, upon authorization by the City and Engineer as the work progresses.

C. Existing built-in equipment to remain in the final work, but requiring temporary removal for the installation of new construction, alterations, repairs and/or renovations, shall be disconnected by the Contractor and removed to temporary storage areas designated by the City. Resetting of existing equipment under this heading shall be performed by the Contractor including connecting to electric service lines.

D. The Contractor shall furnish and install all temporary safety devices as may be required by authorities having jurisdiction.

E. Work within existing seawalls to be performed, once started, shall be completed as quickly as practicable and each trade shall determine before work is started that all required materials are at hand or readily obtainable to avoid delays.

1.06 DUST PROTECTION BARRIERS

A. Furnish and erect all necessary temporary dust protection barriers where as directed by the City or Engineer.

B. Furnish and install entrances as required through each dust protection barrier.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

PROJECT NO. 12337

- END OF SECTION -

PROJECT NO. 12337

SECTION 01070

ABBREVIATIONS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Wherever in these specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
ACOE	Army Corps of Engineers
ACPA	American Concrete Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGMA	American Gear Manufacturer's Association
AHGDA	American Hot Dip Galvanizers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APHA	American Public Health Association
APWA	American Public Works Association

ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASMM	Architectural Sheet Metal Manual
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BCDPEP	Broward County Department of Planning and Environmental Protection (formerly BCDNRP)
BCEPD	Broward County Environmental Protection Department (formerly BCDNRP and formerly BCDPEP)
BCEPGMD	Broward County Environmental Protection and Growth Management Department (formerly BCDNRP and formerly BCDPEP and formerly BCEPD).
BCHD	Broward County Health Department
BHMA	Builders Hardware Manufacturer's Association
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
FBC	Florida Building Code

FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FS	Federal Specifications
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Systems and Automation
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturers Association
MMA	Monorail Manufacturers Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Testing
NRCA	National Roofing Contractors Association
NSF	National Science Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Society for Protective Coatings
SSPWC	Standard Specifications for Public Works Construction

SFWMD	South Florida Water Management District
UL	Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date of the opening of bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists, Assignments: In certain instances, Specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes.

B. References herein to "Building Code" shall mean the Florida Building Code (FBC). The latest edition of the code as approved and used by the local agency as of the date of the opening of bids, as adopted by the agency having jurisdiction, shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, Drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall follow the most stringent requirements.

D. Applicable Standard Specifications: The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and Specifications listed herein.

E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. This section specifies the means of all submittals. All submittals, whether their final destination is to the City, Engineer, or other representatives of the City, shall be directed through the Engineer. A general summary of the types of submittals and the number of copies required is as follows:

Copies to Engineer	Type of Submittal
6	Progress Schedule
6	Construction Schedule
6	Schedule of Payment Items
2	Audio Visual Preconstruction Record
6	Progress Estimates
E	Shop Drawings
5	Shop Drawings (Hard Copies)
8	Functional and System Performance Test Schedules and Equipment Plan
4	Certificates of Compliance
2	Warranties
3*	Product Samples
3**	Final Operation and Maintenance Data (Manual) (Hard copies)
3**	Final Operation and Maintenance Data (Manual) (CDs with electronic formats
1	As-built Drawings
2	Elevation Certificates for New Buildings – Certified by Surveyor
8	Training Schedules and Plan

E Electronic submittal by email in pdf format.
* Unless otherwise required in the specific Section where requested.

** Submit Operation and Maintenance Data Outline and Preliminary Data in accordance with Section 01430 – Operation and Maintenance Data.

B. All submittals shall also be submitted to Engineer electronically.

1.02 SUBMITTAL PROCEDURES

A. The Contractor shall transmit each submittal with a form acceptable to the Engineer, clearly identifying the project Contractor, the enclosed material and other pertinent information specified in other parts of this section. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

B. Revise and resubmit submittals as required, identify all changes made since previous submittals. Resubmittals shall be noted as such.

C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.03 CONSTRUCTION PROGRESS SCHEDULE

A. The Contractor shall submit project schedules in accordance with Section 01310 – Project Schedules.

B. The Contractor shall present and discuss the proposed schedule at the preconstruction conference.

C. The construction progress schedule shall be developed and maintained using Primavera and Primavision software as manufactured by Primavera Systems, Inc., or equal.

1.04 SCHEDULE OF PAYMENT ITEMS

A. The Contractor shall submit a Schedule of Payment Items for review in accordance with Section 005200 Contract Standard Terms and Conditions and Section 01025 – Measurement and Payment. The schedule shall contain the installed value of the component parts of Work for the purpose of making progress payments during the construction period and shall directly correlate on an item by item basis (unless otherwise accepted by the Engineer) to each individual activity detailed in the construction progress schedule. The sum of all scheduled items shall equal the total value of the Contract. Reference Section 01025 - Measurement and Payment for further details.

1.05 PROGRESS PAYMENT APPLICATIONS

A. Applications for payments shall be made to the Engineer for review in accordance with Article 5 of Section 005200, Contract Standard Terms and Conditions.

1.06 SHOP DRAWINGS

A. The Contractor shall submit hard copy and electronic copies of shop drawings in Adobe Portable Document Format (PDF) format for review by all general, civil, mechanical, structural, architectural, electrical and instrumentation related improvements, including details, piping layout and appurtenances, wiring, color selection charts, materials and equipment fabricated especially for this Contract, and materials and equipment for which such Drawings are specified or specifically requested by the Engineer.

B. Contractor shall provide five (5) color hard copies of each shop drawing. Contractor may be required to submit certain sheets in large format to ensure all portions of shop drawing are legible. Engineer shall distribute electronic and hard copies to the City.

C. Shop drawings shall show the principal dimensions and relationships to other critical features of work, project-specific information drawn accurately to scale, weight, structural and operating features, space required, size, arrangement, clearances, type and/or brand of finish or shop coat, grease fittings, function of components, equipment identification or tag numbers, etc., depending on the subject of the Drawings.

D. Do not base Shop Drawings on reproductions of Contract Documents.

E. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in
Specification.

F. Index with labeled tab dividers in orderly manner.

G. When so specified, or if considered by the Engineer to be acceptable, the manufacturer's specifications, catalog data, descriptive matter, illustrations, etc. may be submitted for review in place of shop drawings. In such case, the requirements shall be as specified for shop drawings, insofar as applicable.

H. Time delays caused by rejection of submittals are not cause for extra charges to the City or time extensions.

I. Requirements: The Contractor shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to the Work due to the absence of such drawings. Electronic copies of all shop drawings shall be submitted as directed by the Engineer during the preconstruction meeting. Shop drawings shall be submitted as a single, complete, and searchable image format document in PDF format with bookmarks for shop drawings consisting of multiple sections and/or more than 20 pages total.

J. All shop drawings shall be submitted to the Engineer through the Contractor. Each shop drawing shall be individually submitted. The Contractor is responsible for obtaining shop

drawings from subcontractors and returning reviewed shop drawings to them. Contractor shall review each submittal and check for compliance with Contract Documents. Contractor shall stamp each submittal with uniform approval stamp before submitting to Engineer. Stamp shall include project name, project, City, submittal number, specification name and section number, equipment, structure to which the drawing applies. Contractor's reviewer name, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents. City and Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

K. Drawings shall be suitably numbered stamped and signed by the Contractor. Each shop drawing shall be accompanied by a transmittal form listing the information identified above. All submissions shall be dated and properly referenced to the specifications section and Contract Drawing number. The submittal number shall match the following submittal numbering system (or an equivalent system as approved by the Engineer):

Submittal Numbering System

1. Package ID: The package number will reflect the CSI (specification) section number as it appears in the specifications.
2. Subgroup ID: The submittal number will include the CSI number followed by the submittal number and a sequential letter indicating resubmittal number.

Example:

Package	Submittal	Description
03300	03300-001	Concrete Admixture A, First Submittal
	03300-001A	Concrete Admixture A, Second Submittal
	03300-001B	Concrete Admixture A, Third Submittal
	03300-002	Concrete Admixture B, First Submittal

L. Manufacturer's standard schematic drawings, data and diagrams: Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Modify to delete information that is not applicable to the work and supplement standard information to provide information specifically applicable to the work. Submissions showing only general information will not be accepted and will be returned without review.

M. Product data shall include materials of construction, dimensions, performance characteristics, capacities, wiring diagrams, piping and controls, etc. and as specified in individual Specification sections.

N. Warranties: When warranties are called for, a sample of the warranty shall be submitted with the shop drawings. The sample warranty shall be the same form that will be used for the actual warranty. Actual warranties shall be originals and notarized.

O. Contractor's Review: Only submittals which have been checked and corrected should be submitted to the Contractor by its subcontractors and vendors. Prior to submitting shop drawings to the Engineer, the Contractor shall check thoroughly all such shop drawings to satisfy itself that the subject matter thereof conforms to the Drawings and Specifications in all respects. Shop drawings which are correct shall be marked with the date, checker's name and indications of the Contractor's approval, and then shall be submitted to the Engineer. Other shop drawings submitted to the Engineer will be returned to the Contractor unreviewed.

P. Contractor's Responsibility: The Engineer’s review of shop drawings will be general and shall not relieve the Contractor of the responsibility for details of design, dimensions, etc., necessary for proper fitting and construction of the Work required by the Contract and for achieving the specified performance.

Q. Contractor's Modifications: For submissions containing departures from the Contract Documents, the Contractor shall include proper explanation in their letter of transmittal. Should the Contractor submit for review equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, or specified, Contractor shall also submit for review details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the City, shall do all Work necessary to make such modifications.

R. Substitutions: Whenever a particular brand or make of material, equipment, or other item is specified, or is indicated on the Drawings, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications. Any other brand or make which is equivalent to that specified or indicated may be offered as a substitute subject to the following provisions:

1. The Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature, and performance data together with samples of the materials, where feasible, to enable the Engineer to determine if the proposed substitution is equal, in all respects including, but not limited to, quality, performance, ease of maintenance, availability of spare parts, and experience record.

2. The Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.

3. A list of installations where the proposed substitution is equal. Such listing shall cover a minimum of the previous three years and will furnish project names and contact phone numbers.

4. Where the acceptance of a substitution requires excessive review by the Engineer, revision or redesign of any part of the Work, all such additional review costs, revisions and redesign, and all new drawings and details required therefore, shall be at the Contractor's expense.

5. In all cases the Engineer shall be the sole judge as to whether a proposed substitution is to be accepted. The Contractor shall abide by the Engineer's decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item as specified. No substitute items shall be used in the Work without written acceptance of the Engineer.

6. Acceptance of any proposed substitution shall in no way release the Contractor from any of the provisions of the Contract Documents.

7. The City may require, at Contractor's expense, a special performance guarantee or other surety with respect to any substitute.

8. Foreign Manufacturers: When proposed, in addition to the items mentioned above include the following additional information for the approval process:

   a. Names and addresses of at least 2 companies that maintain technical service representatives closest to Project.

   b. Complete list of spare parts and accessories for each piece of equipment.

S. Complete Submittals: Each submittal shall be complete in all aspects incorporating all information and data required to evaluate the products' compliance with the Contract Documents. Partial or incomplete submissions shall be returned to the Contractor without review. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.

T. Incomplete Submittals: The Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete. When any of the following are missing, submittal will be deemed incomplete:

1. Contractor’s review stamp, completed and signed.

2. Transmittal of Contractor’s Submittal, completed and signed.

3. Insufficient number of copies.

4. Submittals not required by Contract Documents: Will not be reviewed and will be returned stamped “Not Subject to Review”. City will keep one copy and return all remaining copies to Contractor.

U. Engineer's Review: The Engineer will review and return by email the reviewed shop drawings within 21 calendar days of receipt of such shop drawings. Resubmittals will be subject to same review time. Reviewed shop drawings will be returned to the Contractor by email and marked with the appropriate box checked either "Approved", "Approved as Noted", "Partial Approval - Resubmit as Noted", and "Revise and Resubmit". Engineer will review, mark, and stamp as appropriate, and will distribute marked up copies as noted:

1. Approved:

   a. Contractor may incorporate product(s) or implement Work covered by submittal.

   b. Distribution:

      1) One copy retained by City.

      2) One copy furnished Resident Project Representative.

      3) One copy retained in Engineer's file.

      4) Remaining copies returned to Contractor appropriately annotated.

2. Approved as Noted:

   a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.

   b. Distribution:

      1) One copy retained by City.

      2) One copy furnished Resident Project Representative.

      3) One copy retained in Engineer's file.

      4) Remaining copies returned to Contractor appropriately annotated.

3. Partial Approval, Resubmit as Noted:

   a. Make corrections or obtain missing portions, and resubmit.

   b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.

c. Distribution:

1) One copy retained by City.

2) One copy furnished Resident Project Representative.

3) One copy retained in Engineer's file.

4) Remaining copies returned to Contractor appropriately annotated.

4. Revise and Resubmit:

a. Contractor may not incorporate product(s) or implement Work covered by submittal.

b. Distribution:

1) One copy retained by City.

2) One copy furnished Resident Project Representative.

3) One copy retained in Engineer's file.

4) Remaining copies returned to Contractor appropriately annotated.

5. Not Subject to Review: Information received is not required by contract.

W. Work Prior to Review: No material or equipment shall be purchased, fabricated especially for this Contract, or delivered to the project site until the required shop drawings have been submitted, processed, reviewed by the Engineer and marked either "Approved" or "Approved as Noted". All materials and Work involved in the construction shall be as represented by said shop drawings.

X. The Contractor shall not proceed with any portion of the Work (such as the construction of foundations) for which the design and details are dependent upon the design and details of equipment for which submittal review has not been completed.

1.07 WARRANTIES

A. Warranties called for in the Contract Documents shall be originals and submitted in accordance on the individual Specification sections through the Engineer. When warranties are required, they shall be submitted prior to request for payment.

B. When advance copies of warranties are requested, they shall be submitted with, and considered as shop drawings.

1.08 CERTIFICATES AND STATEMENT OF QUALIFICATION AND TESTING DOCUMENTATION

A. Submit evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty subcontractor, trade, specialist, consultant, installer, and other professionals. Four copies of certificates of compliance and test reports shall be submitted for requested items to the Engineer prior to request for payment. B. General:

1. Provide notarized statement that includes signature of entity responsible for preparing certification.

2. Signed by officer or other individual authorized to sign documents on behalf of that entity.

C. Welding: shall be in accordance with individual Specification sections.

D. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.

E. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

F. Test Plan: Submit eight (8) copies of functional and system performance test schedules and plans for equipment, units, and systems shall be submitted to the Engineer at least 30 days prior to start of related testing in accordance with Section 01660 – Equipment Testing and Startup.

G. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.

1. General: Shall contain signature of person responsible for test, inspection, or report.
2. Factory:

   a. Identification of product and Specification section, type of inspection or test with referenced standard or code.

   b. Date of test, Project title and number, and name and signature of authorized person.

   c. Test results.

   d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.

e. Provide interpretation of test results, when requested by Engineer.

f. Other items as identified in individual Specification sections.

3. Field: As a minimum, include the following:

a. Project title and number.

b. Date and time.

c. Record of temperature and weather conditions.

d. Identification of product and Specification section.

e. Type and location of test, sample, or inspection, including referenced standard or code.

f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.

g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.

h. Provide interpretation of test results, when requested by Engineer.

e. Other items as identified in individual Specification sections.

G. Manufacturer's Certificate of Compliance: In accordance with Section 01660 – Equipment Testing and Startup.

H. Manufacturer's Certificate of Proper Installation: In accordance with Section 01660 – Equipment Testing and Startup.

I. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.

2. Transmit to City one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

1.09 PRODUCT SAMPLES

A. Contractor shall furnish for review all product samples as required by the Contract Documents or requested by the Engineer to determine compliance with the specifications.

B. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show complete project

identification, the nature of the material, trade name of manufacturer, model number, and location of the Work where the material represented by the sample will be used.

C. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available. D. Full size Samples:

1. Size as indicated in individual Specification section.

2. Prepared from same materials to be used for the Work.

3. Cured and finished in manner specified.

4. Physically identical with product proposed for use.

E. Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Engineer and shall bear the Contractor 's stamp certifying that they have been so checked. Transportation charges on samples submitted to the Engineer shall be prepaid by the Contractor.

F. The Engineer's review will be for compliance with the Contract Documents, and its comments will be transmitted to the Contractor with reasonable promptness.

G. Acceptable samples will establish the standards by which the completed Work will be judged.

1.10 OPERATION AND MAINTENANCE MANUALS

A. General: The Contractor shall furnish and deliver to the Engineer three (3) complete Final Operation and Maintenance (O&M) Data (Manuals) for the substantial, complete systems including instructions, technical bulletins, and any other printed matter such as diagrams, prints or drawings, containing full information required for the proper operations, maintenance, and repair of all Contractor furnished equipment as indicated in this Article and in accordance with Section 01430 – Operation and Maintenance Data. Also included shall be a spare parts diagram and complete spare parts list. These requirements are a prerequisite to the operation and acceptance of equipment. Each O&M Manual shall be bound together in appropriate three-ring hard cover binders. A detailed table of contents shall be provided for each Manual. Provide an appropriate label on the binder edge. Provide tabs and separate sections for operation, maintenance, spare parts, etc.

B. The Contractor shall also furnish and deliver to the Engineer three (3) CDs with all Final O&M Data (manuals) in an electronic format suitable for downloading into the City O&M database system. All manuals and drawings for the vendor provided equipment, subsystem or system shall be in Adobe Portable Document Format (PDF) format. They shall be PDF Formatted Text and Graphics (formerly Normal) or PDF Searchable Image (formerly Image+Text). If submitted in Searchable Image format, they shall be Optical

Character Recognized (OCR'ed) at a 95 percent confidence level, using Adobe Acrobat Capture 3.x or an equivalent product. There shall be links from all Table of Contents entries to the actual occurrence in the body of the manual. Bookmarks shall be created for all linked Table of Contents entries. This requirement applies to all equipment to be furnished on this project.

C. Submit O&M Data Outline and Preliminary Data in accordance with Section

1.11 AS-BUILT DRAWINGS

A. The Contractor shall submit As-built drawings in accordance with Section 01320 – Project Record Documents.

1.12 ELEVATION CERTIFICATES

A. Two copies of Elevation Certificates for each new building, certified by a registered surveyor, shall be submitted to the Engineer prior to the request for certificate of completion / certificate of occupancy from the City of Fort Lauderdale Building Department and in accordance with Section 01312 – Field Engineering.

1.13 AUDIO-VISUAL PRECONSTRUCTION RECORD

A. General: Prior to beginning any Contract work, the Contractor shall thoroughly photograph or have a continuous color audio-video recording taken along the entire length of the project to serve as a record of preconstruction conditions.

B. Photographically document all unique portions of the construction including tie-ins to existing pipelines or facilities, crossings of existing utilities, buried valve and piping intersections, and other work items that will not otherwise be visible after completion of construction.

C. City and Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken. D. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of site and adjacent properties as well as interior and exterior of new or impacted structures.

1. Monthly: Take digital photographs, unless otherwise approved by the City.

2. Label photo folders and photo files as follows:

Project Name.

Date and time photo was taken.

Location and area designation.

Schedule activity number, as appropriate.

1.14 AUDIO-VIDEO RECORDINGS

A. General: Prior to commencing work, the Contractor shall have a continuous color audiovideo recording taken of each project area of the entire Project, including all major streets, adjacent work areas, existing manholes, plant site and all other areas that will be disturbed by the Contractor's operations, to serve as a record of preconstruction conditions. No construction shall begin prior to review and acceptance video recording covering the respective, affected construction area by the Engineer. The Engineer shall have the authority to reject all or any portion of the video recording not conforming to the specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within five days after being notified. The Engineer shall designate those areas, if any, to be omitted from or added to the audio-video coverage. Recordings shall not be performed more than ninety days prior to construction in any area. All video recording and written records shall become property of the City.

B. Services: The Contractor shall engage the services of a professional electrographer. The color DVDs shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of preconstruction color audio-video DVD documentation. The electrographer shall furnish to the Engineer a list of all equipment to be used for the audio-video recording, i.e., manufacturer's name, model number, specifications and other pertinent information. Additional information to be furnished by the electrographer is the names and addresses of two references that the electrographer has performed color audio-video recordings for on projects of a similar nature within the last twelve months.

C. Equipment: All equipment, accessories, materials and labor to perform this service shall be furnished by the Contractor.

1. The total audio-video system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume and clarity and be free from distortion and interruptions.

2. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than twelve feet. In some instances, audio-video DVD coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance acceptable to the Engineer.

3. The color video camera used in the recording system shall have a horizontal resolution of 300 lines at center, a luminance signal to noise ratio of 45 dB and a minimum illumination requirement of twenty-five foot-candles.

D. Recorded Information - Audio: Each disc shall begin with the current date, project name and municipality and be followed by the general location; i.e., process structure, or area, viewing side and direction of progress. The audio track shall consist of an original live

recording. The recording shall contain the narrative commentary, recorded simultaneously with his fixed elevation video record of the zone of influence of construction.

E. Recorded Information - Video: All video recordings must, by electronic means, display continuously and simultaneously, generated with the actual recording, transparent digital information to include the date and time of recording. The date information shall contain the month, day and year. The time information shall contain the hours, minutes, and seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, process structure or area, and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen.

F. Conditions for Recording: All recording shall be done during times of good visibility. No recording shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recordings and to produce bright, sharp video recordings of those subjects.

G. Disc Coverage: Disc coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavement, landscaping, fences, signs and interior and exterior of existing structures affected by the work and the exteriors of structures adjacent to the work, and any other on-site area that will be occupied or impacted by the Contractor or any of his subcontractors or suppliers within the area covered.

1.15 CONSTRUCTION PHOTOGRAPHS

A. The CONTRACTOR shall document photographically ground level progress pictures each month during the course of the construction activities. A minimum of one progress photograph covering all completed work is required each month. Photographically document all unique portions of the construction including tie-ins to existing pipelines or facilities, crossings of existing utilities, buried valve and piping intersections, and other work items that will not otherwise be visible after completion of construction.

B. City and Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken.

C. Photographically demonstrate progress of construction, showing every aspect of site and adjacent properties as well as interior and exterior of new or impacted structures. Digital images of each photograph shall be submitted to the City and Engineer with the Contractor's monthly estimate. The prints shall be saved and labeled in folders with the following information.

1. Project Number
2. Photo Number

3. Location and area designation
4. Date picture was taken
5. Description
6. Name of photographer
7. City's witness (if required by City)
8. Schedule activity number, as appropriate

1.16 TRAINING DATA

A. Contractor shall submit eight (8) copies of written training schedule and written training plan to the Engineer at least 30 days prior to start of related operation and maintenance training. Contractor shall submit training data in accordance with Section 01660 – Equipment Testing and Startup.

1.17 CONTRACT CLOSEOUT SUBMITTALS

A. Contractor shall submit Contract Closeout submittals in accordance with Section 01780 – Contract Closeout.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01310

PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Preliminary Progress Schedule: Submit within 14 days after Notice to Proceed.

2. Detailed Progress Schedule:

   a. Submit initial Detailed Progress Schedule within 60 days after Notice to Proceed.

   b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.

3. Submit with Each Progress Schedule Submission:

   a. Contractor's certification that progress schedule submission is actual schedule being utilized for execution of the Work.

   b. The construction progress schedule shall be developed and maintained using Primavera and Primavision software as manufactured by Primavera Systems, Inc., or equal.

   c. Progress Schedule: Six (6) up to date color copies shall be submitted in accordance with the requirements of this specification.

   d. Narrative Progress Report: Same number of copies as specified for Progress Schedule.

4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

A. Submit a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.

B. The Contractor shall have the capability of preparing and utilizing the specified construction progress scheduling techniques. A statement of capability shall be submitted in writing to the Engineer with the return of the executed Agreement to the City and will verify that either the Contractor's organization has in-house capability qualified to use the technique or that the Contractor employs a consultant who is so qualified. Capability shall be verified by description of the construction projects to which the Contractor or its consultant has successfully applied the scheduling technique, and which were controlled throughout the duration of the project by means of systematic use and updating of the construction progress schedule, the network analysis and associated reports. The submittal shall include the name of the individual on the

Contractor's staff who will be responsible for the construction progress schedule, and associated reports and for providing the required updating information of same. The Contractor shall submit its proposed progress (baseline) schedule to the City and Engineer for review. The Engineer shall have the authority to determine acceptability/correctness of the schedule logic and activity interrelationships. The use of extraneous, nonworking activities and activities which add restraints to the construction schedule shall not be accepted. Baseline schedules that do not meet their contract completion dates shall not be accepted.

C. The Contractor's progress schedule (baseline and monthly updates) shall be computer generated and resource loaded. Show activities including, but not limited to the following:

1. Notice to Proceed
2. Permits
3. Submittals, with review time. Contractor may use schedule of Shop Drawings and Samples specified in Section 01300 - Submittals.
4. Early procurement activities for long lead equipment and materials
5. Status (whether critical)
6. Total float and free float
7. Resources plots
8. Initial site work
9. Earthwork
10. Specified Work sequences and construction constraints
11. Contract Milestone and Completion Dates
12. City-furnished products delivery dates or ranges of dates
13. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work
14. Any work that disrupts the operation of City facilities
15. System startup summary
16. Project closeout summary
17. Demobilization summary

D. Preliminary Progress Schedule will be resource/cost loaded to facilitate progress payments by the City. Cost loading will reflect cash flows and Schedule of Values.

E. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may cause City to withhold all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to City.

F. Format: In accordance with Article Progress Schedule Critical Path Network.

1.03 DETAILED PROGRESS SCHEDULE

A. Submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.

B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.

C. Detailed Progress Schedule will be resource/cost loaded to facilitate progress payments by the City. Cost loading will reflect cash flows and the Schedule of Values with the sum of all tasks equal to the Contract total.

D. When accepted by City, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.

E. Format: In accordance with Article PROGRESS SCHEDULE-CRITICAL PATH NETWORK.

F. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.04 PROGRESS SCHEDULE – CRITICAL PATH NETWORK

A. General: The Progress Schedule will be a comprehensive computer-generated schedule using CPM scheduling methodologies and techniques. The construction progress schedule shall be based upon the precedence diagramming method of scheduling and shall be prepared in the form of a horizontal bar chart showing in detail the proposed sequence of the Work and identifying all construction activities included but not limited to yard piping, all structures and treatment units and all related Work specified herein to be performed under the Contract. The schedule shall be time scaled, identifying the first day of each week, with the estimated date of starting and completion of each stage of the Work in order to complete the project within the contract time. The project critical path shall be clearly identified in color or by other means acceptable to the Engineer. B. Contents:

1. Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.

2. Identify Work calendar basis using days as a unit of measure.

3. Show complete interdependence and sequence of construction and
Project-related activities reasonably required to complete the Work.

4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.

5. Reflect sequences of the Work, restraints, delivery windows, review times, Contract Times and Project Milestones set forth in the Agreement and Section 01300 - Submittals.

6. Include as applicable, at a minimum:

    a. Obtaining permits, submittals for early product procurement, and long lead time items.

    b. Mobilization and other preliminary activities

    c. Initial site work

    d. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s) Subcontract Work.

    e. Major equipment design, fabrication, factory testing, and delivery dates

    f. Delivery dates for City-furnished products, as specified in Section 01010 Summary of Work, if applicable.

    g. Sitework

    h. Concrete Work

    i. Structural steel Work

    j. Architectural features Work

    k. Conveying systems Work

    l. Equipment Work

    m. Mechanical Work

    n. Electrical Work

    o. Instrumentation and control work

    p. Interfaces with City-furnished equipment, if applicable

    q. Other important Work for each major facility

    r. Equipment and system startup and test activities

    s. Project closeout and cleanup

    t. Demobilization

7. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day nor more than 14 days, unless otherwise approved.

8. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from City.

9. Constrained dates will not be utilized except for contractual start and complete dates, unless otherwise approved by the City. All tasks will be logically tied, unless approved by the City. C. Network Graphical Display:

1. The progress schedule shall be plotted on 22 inch by 34 inch and 11 inch by 17 inch paper and shall be revised and updated monthly, depicting progress through the last day of the current month and scheduled progress through completion. Six up to date copies of the schedule shall be submitted along with the application for monthly progress payments for the same period.

2. Title Block: Show name of Project, City, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate the current data date.

3. Identify horizontally across top of schedule the time frame by year, month, and day.

4. Identify each activity with a unique number and a brief description of the Work associated with that activity.

5. Indicate the critical path.

6. Show, at a minimum, the controlling relationships between activities.

7. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.

8. Plot activities on an early start basis unless otherwise requested by City.

9. Plot to include current Early Bars as well as Target/Baseline bars.

10. Provide a legend to describe standard and special symbols used. D. Schedule Report:

1. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.

2. List information for each activity in tabular format, including, at a minimum:

   a. Activity Identification Number

   b. Activity Description

   c. Original Duration

   d. Remaining Duration

   e. Early Start Date (Actual start on Updated Progress Schedules)

   f. Early Finish Date (Actual finish on Updated Progress Schedules)

g. Late Start Date

h. Late Finish Date

i. Total Float

3. Sort reports, in ascending order, as listed below:

a. Activity number sequence with predecessor and successor activity.

1.05 PROGRESS OF THE WORK

A. Updated Progress Schedule Shall Reflect:

1. Progress of Work to within 5 working days prior to submission

2. Approved changes in Work scope and activities modified since submission

3. Delays in Submittals or resubmittals, deliveries, or Work

4. Adjusted or modified sequences of Work

5. Other identifiable changes

6. Revised projections of progress and completion

7. Report of changed logic

B. Produce detailed subschedules during Project, upon request of City, to further define critical portions of the Work such as facility shutdowns.

C. Produce a highlighted 3-week Look Ahead Schedule for construction meetings on a weekly basis or as determined by the City, with schedule information compiled from the latest DETAILED PROGRESS SCHEDULE update.

D. If Contractor fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current progress schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

E. If the Contractor desires to make changes in its method of operating which affect the construction progress schedule and related items, the Contractor shall notify the Engineer in writing stating what changes are proposed and the reason for the change. If the Engineer accepts these changes, in writing, the Contractor shall revise and submit, without additional cost to the City, all of the affected portions of the construction progress schedule, and associated reports. The construction progress schedule and related items shall be adjusted by the Contractor only after prior acceptance, in writing by the Engineer. Adjustments may consist of changing portions of the activity sequence, activity durations, division of activities, or other adjustments as may be

required. The addition of extraneous, nonworking activities and activities which add restraints to the construction progress schedule shall not be accepted.

F. Except where earlier completions are specified, schedule dates which show completion of all Work prior to the contract completion date shall, in no event, be the basis for claim for delay against the City by the Contractor.

G. If Contractor fails to complete a Milestone activity by its completion date, satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to City or whenever it becomes apparent from the current construction progress schedule and associated reports that delays to the critical path have resulted and the contract completion date will not be met, or when so directed by the City or Engineer, the Contractor shall take some or all of the following actions at no additional cost to the City. They shall submit to the Engineer for approval, a written statement of the steps they intend to take to remove or arrest the delay to the critical path in the current construction progress schedule, including a computer-generated schedule revision to reflect proposed actions:

1. Increase construction personnel in such quantities and crafts as will substantially eliminate the backlog of work.

2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of work.

3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities and comply with the revised schedule.

H. If when so requested by the Engineer and City, the Contractor should fail to submit a written statement of the steps they intend to take or should fail to take such steps as reviewed and accepted in writing by the Engineer, the Engineer may direct the Contractor to increase the level of effort in personnel (trades), equipment and work schedule (overtime, weekend and holiday work, etc.) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the current construction progress schedule, and the Contractor shall promptly provide such level of effort at no additional cost to the City.

I. If the completion of any activity, whether or not critical, falls more than 100 percent behind its previously scheduled and accepted duration, the Contractor shall submit to the Engineer for approval a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted work.

J. Shop drawings which are not approved on the first submittal or within the time scheduled, and equipment which does not pass the specified tests and certifications shall be immediately rescheduled.

K. From time to time it may be necessary for the contract schedule of completion time to be adjusted by the City in accordance with the General Requirements and other portions of the Contract Documents as may be applicable. Under such conditions, the

Engineer will direct the Contractor to reschedule the Work or contract completion time to reflect the changed conditions, and the Contractor shall revise the construction progress schedule and related items accordingly, at no additional cost to the City.

L. Waiver of Inspector Overtime Costs: Certain phases of the directional drilling process will require 24-hour workdays. Therefore, the requirement to pay City inspector overtime as stated on Page OTC-1 of these Contract Documents shall be waived.

1.06 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.

2. Identify, on a cover letter, reporting period, date submitted, and name of author of report. B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).

2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.

3. Contractor's plan for management of site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.

4. Identification of new activities and sequences as a result of executed Contract changes.

5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.

6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.

7. In the case that actual or potential delays have been identified, the Narrative Progress report should be accompanied by a proposed work around schedule to mitigate potential and or actual delays.

8. Changes to activity logic.

9. Changes to the critical path.

10. Identification of, and accompanying reason for, any activities added or deleted since the last report.

11. Steps taken to recover the schedule from Contractor-caused delays.

1.07 SCHEDULE ACCEPTANCE

A. City's Acceptance Will Demonstrate Agreement That:

1. Proposed schedule is accepted with respect to:

   a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.

   b. Specified Work sequences and constraints are shown as specified.

   c. Specified City-furnished Equipment or Material arrival dates, or range of dates, are included.

   d. Access restrictions are accurately reflected.

   e. Start-up and testing times are as specified.

   f. Submittal review times are as specified.

   g. Startup testing duration is as specified and timing is acceptable

   h. Resource/cost loading and schedule of values are equal to the total sum of the signed Contract.

2. In all other respects, City's acceptance of Contractor's schedule indicates that, in City's judgement, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. City's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to City's attention in submittal. Review and acceptance of the construction progress schedule, and related reports, by the City and Engineer is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within the contract completion date. Omissions and errors in the construction progress schedule, and related reports shall not excuse performance less than that required by the Contract and in no way make the City and Engineer an insurer of the Contractor's success or liable for time or cost overruns flowing from any shortcomings in the construction progress schedule, and related reports. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

3. To the extent that the construction project schedule, or associated report or any revision thereof shows anything not jointly agreed upon or fails to show anything jointly agreed upon, it shall not be deemed to have been accepted by the Engineer and/or City. Failure to include on a schedule any element of Work required for the performance of this Contract shall not excuse the Contractor from completing all Work required within any applicable completion date, notwithstanding the review of the schedule by the Engineer. B. Unacceptable Preliminary Progress Schedule:

   1. Make requested corrections; resubmit within 10 days.

2. Until acceptable to City as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date. C. Unacceptable Detailed Progress Schedule:

1. Make requested corrections; resubmit within 10 days.

2. Until acceptable to City as Baseline Progress Schedule, continue review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to City's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.08 ADJUSTMENT OF CONTRACT TIMES

A. Reference General Conditions.

B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay. C. Float:

1. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.

2. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of City and Contractor.

3. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond contract completion date. D. Claims Based on Contract Times:

1. Where City has not yet rendered formal decision on Contractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Contractor shall reflect an interim adjustment in the progress schedule as acceptable to City.

2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or City, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.

3. Contractor shall revise progress schedule prepared thereafter in accordance with City's formal decision.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01312

FIELD ENGINEERING

PART 1 - GENERAL

1.01 REQUIREMENTS

A. Contractor shall provide and pay for field Engineering and Survey services required for the project.

B. Identify existing control points and property line corner stakes indicated on the Drawings, as required.

1.02 QUALIFICATIONS OF SURVEYOR

A. Qualified Registered Professional Surveyor & Mapper, acceptable to the City and the Engineer.

1.03 SURVEY REFERENCE POINTS

A. Location and elevation of benchmarks are shown on the Drawings. Identify basic horizontal and vertical control points for the construction project including:

1. Permanent coordinate reference points with horizontal and vertical control, located and staked as shown on the plans. B. Contractor's Responsibilities:

1. Provide survey and layout required to layout the Work.

2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.

3. In event of discrepancy in data or benchmarks, request clarification before proceeding with Work.

4. Retain professional land surveyor or civil engineer registered in state of Florida who shall perform or supervise engineering surveying necessary for construction staking and layout.

5. Maintain complete accurate log of survey Work as it progresses as a Record Document.

6. On request of City, submit documentation.

7. Provide competent employee(s), tools, stakes, and other equipment and materials as City may require to:

8. Establish control points, lines, and easement boundaries.

9. Check layout, survey, and measurement Work performed by others.

10. Measure quantities for payment purposes.

C. The Contractor shall locate and protect control points prior to starting site construction work and preserve all permanent reference points during construction.

1. Make no changes or relocations without prior written notice to City.

2. Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. Contractor's surveyor shall replace project control points which may be lost or destroyed.

a. Establish replacements based on original survey control.

D. Contractor shall be responsible for performing survey and preparing As-Built drawings for all other portions of the work in accordance with Section 01320 – Project Record Documents.

1.04 PROJECT SURVEY REQUIREMENTS

A. Contractor's surveyor shall establish a minimum of two permanent benchmarks on site, referenced to data established by survey control points.

B. Contractor shall establish lines and levels, locate and lay out, prepare a Horizontal and Vertical Control Plan for the purpose of construction staking by instrumentation and similar appropriate means:

1. Stakes for grading and fill placement.

2. Controlling lines and levels as required.

C. From time to time, verify layouts by same methods.

D. Horizontal and vertical control plan shall be made available to City in AutoCAD Civil 3D 2017 format or most current release.

E. Any plan released to the Contractor via electronic media is for as-built use only. They have not been geometrically calculated by a Surveyor. This applies to all aspects of the plans including, but not limited to, right-of-way, road utilities and drainage.

1.05 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. On completion of construction work, prepare a certified survey showing all dimensions, locations and elevations of project.

1.06 SUBMITTALS

A. Submit name and address of Professional Surveyor & Mapper and Professional Engineer to City and Engineer.

B. On request of City or Engineer, submit documentation to verify accuracy of field engineering work.

C. Submit certificate signed by Registered Engineer or Professional Surveyor & Mapper certifying that elevation and locations of work are in conformance, or non-conformance, with Contract Documents.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01320

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall keep and maintain at the site of the City a record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Approved Shop Drawings, Product Data and Samples.
6. Field Test Records.
7. Stormwater Pollution Prevention Plan (SWPPP)

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction:

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples. B.

File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

D. These master record drawings of the Contractor's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the Work. Make documents and samples available at all times for inspection by City and Engineer.

E. At a minimum the record drawings shall be reviewed on the 20th working day of every third month after the month in which the final Notice-to-Proceed is given as well as on completion of Work. Failure to maintain the record drawings up-to-date shall be grounds of withholding monthly progress payments until such time as the record drawings are brought up-to-date.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by City Project Manager. Record drawings shall be supplemented by detailed sketches as necessary or directed to indicate, fully, the Work as actually constructed.

1.04 RECORDING

A. Label each document, "PROJECT RECORD" in neat large printed letters, or by rubber stamp.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Drawings: Legibly mark to record actual construction: (hard copy and AutoCAD Civil 3D format). The Contractor shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including:

1. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

3. Field changes of dimension and detail.

4. Changes made by Field Order or by Change Order.

5. Details not on original Contract Drawings.

D. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each produce and item of equipment actually installed.

2. Changes made by Field Order or by Change Order.

1.05 AS-BUILT DRAWINGS

A. The term ‘AS-BUILT DRAWING’ refers to drawings signed and sealed by a Florida registered surveyor and mapper (PSM) provided by the Contractor. As-built information will be provided to the Engineer of Record who will prepare or have prepared record drawings based on as-built information provided by the PSM and from information provided by the engineer’s staff.

B. The as-built drawings cover sheet will be signed, sealed and dated by the PSM. The cover sheet will include the PSM’s name, business name, PSM number, address and telephone number and contain the following statement:

“I hereby certify that the as-built location information of the potable water, reclaimed water, wastewater and drainage facilities shown on these drawings conforms to the minimum

technical standards for land surveying in the State of Florida, Chapter 5J17.050(10)(i) (Florida Administrative Code), as adopted by the Department of Agriculture and Consumer Services, Board of Professional Surveyors and Mappers, and that said as-builts are true and correct to the best of our knowledge and belief."

C. As-builts will contain the information on the design drawings, plus the following additional requirements:

1. As-builts are to document changes between the design and construction. All information that is incorrect due to changes during construction will be corrected. Incorrect or no longer relevant information will be erased or struck through. Any facilities constructed in a horizontal or vertical location materially different (onetenth foot horizontal, one-tenth foot vertical) than the design location will have their design location struck through and will be redrafted at the constructed location. Design drawing dimensioning to water and wastewater facilities will be corrected as necessary.

2. Drawings will be a complete set including cover sheet, index (if one was included in the approved design drawings) and any other sheets included in the approved design set. Standard detail sheets are not necessary.

3. Drawings will include the Minimum As-Built and Record Drawing Contents described in the City of Fort Lauderdale minimum standards.

D. The Contractor shall maintain full size (22"x34") field drawings to reflect the "as-built" items of Work as the Work progresses. Upon completion of the work the Contractor shall prepare a record set of "AS-BUILT" Drawings on full-size, reproducible material and an electronic file in .DWG format (AutoCAD Civil 3D, latest Version). One set of full size design Drawings on reproducible material will be furnished to the Contractor by the design Engineer at the current square foot price. An electronic file of the design Drawings will be furnished to the Contractor by the design Engineer at no additional cost (for as-built purposes only). No additional payment will be made for those "as-built" Drawings.

E. The cost of maintaining record changes, and preparation of the AS-BUILT Drawings shall be included in the unit prices bid for the affected items. Upon completion of the Work, the Contractor shall furnish the City and Engineer the reproducible AS-BUILT Drawings and electronic files. The completed AS-BUILT Drawings shall be delivered to the City and Engineer at least 48 hours prior to final inspection of the Work. The Final Inspection will not be conducted unless the AS-BUILT Drawings are in the possession of the City and Engineer.

F. The completed AS-BUILT Drawings shall be certified by a Professional Surveyor and Mapper registered in the State of Florida. This certification shall consist of the surveyor's embossed seal bearing the registration number, the surveyor's signature and date on each sheet of the drawing set. In addition, the key sheet, cover sheet or first sheet of the plans set shall list the business address and telephone number of the surveyor. The final as-builts shall also be submitted using state plane coordinates. (NAVD 1988 for vertical; NAD '83 with 2011 adjustment).

G. Representative items of Work that should be shown on the record Drawings as verified, changed or added are shown below:

1. Plans:

a. Structure types, location with grade of rim and flow-line elevations.

b. Sewer type, length, size and elevations.

c. Utility type, length, size and elevation in conflict structures.

d. All maintenance access structures, valves and hydrants within right-ofway.

e. Spot (critical) elevations at plateaued intersections. (P.C., P.T., and mid point of all intersections, etc.)

f. Sewer lateralsshall be stationed between maintenance access structures.

2. Pavement Marking and Signing Plans: Sign location where installed if different from plans.

3. Water and Sewer Plans: Location (horizontal and vertical) of all pipe lines, structures, fittings, services, valves and appurtenances, and water main / sanitary sewer pipe crossings.

H. The Contractor shall submit three sets of progress AS-BUILT Drawings with each application for payment. These Drawings shall accurately depict the Work completed and for which payment is being requested. Upon substantial completion of the Work and prior to final acceptance, the Contractor shall finalize and deliver a complete set of ASBUILT drawings to the Engineer for transmittal to the City, conforming to the construction records of the Contractor. The information submitted by the Contractor and incorporated in the AS-BUILT will be assumed to be correct, and the Engineer will not be responsible for the accuracy of such information, and for any errors or omissions which may appear on the AS-BUILT drawings as a result.

I. The term 'RECORD DRAWING' refers to the final drawing set signed and sealed by the Engineer of Record. The Engineer of Record will prepare or have prepared record drawings based on as-built information provided by a PSM and from information provided by the engineer's staff. The Engineer of Record shall retain the signed and sealed 'as-built' drawings provided by the PSM with the other project records for possible review by City upon request. RECORD DRAWING shall meet the requirements of the Contract Documents.

J. AS-BUILT and RECORD Drawings shall include the following contents at a minimum.

1. The amount of information required on as-built and record drawings will require the drawing author to organize its presentation in order to make the drawings readable. On occasion, it may be necessary to put water and wastewater information

on separate sheets,and/or use a table to show coordinate information.

2. Show the location of easements used by the water and wastewater facilities.

3. Indicate pipe joint locations where water and wastewater or reclaimed water piping crosses.

4. Indicate the length of gravity wastewater piping and actual slope between manhole centers.

5. Show all abandoned in place facilities including the extent and method of abandonment.

6. Show elevations to the nearest tenth of a foot for:

   a. Top of pipe for water mains, force mains and reclaimed water mains at vertical deflection points and every 200 feet along straight runs.

   b. Top of pipe of water or wastewater facilities where they cross all other facilities (drainage, telephone, cable TV, electric, etc.)

7. Show elevations to the nearest one hundredth of a foot for:

   a. Manholes (MH) rims.

   b. Inverts of every gravity wastewater pipe and force main connections to MH.

   c. Lift station top of slab, bottom of wet well, influent pipe invert and control set points.

8. Coordinates will be provided for City maintained facilities, including:

   a. Water mains, force mains and reclaimed water mains at deflection points and every 200 feet along straight runs.

   b. The center of each MH, fitting, valve, blow off, hydrant, water meter box, wastewater cleanout, lift station wetwell, double detector check or other non-pipe water or wastewater facility.

   c. The location of each connection to existing facilities.

   d. The corners (vertices) of all easements being granted to the City as a part of the project.

   e. Other locations designated by City.

9. Show the changed location of any non-water/wastewater features so they are at the visually correct location relative to City maintained facilities.

10. Drawings shall include color photographs of all connections to existing City infrastructure as well as all critical utility crossings and where specifically required on the design drawings. The pictures will be taken with a GPS camera that automatically geotags the picture. A maximum of six photographs per sheet is acceptable. Each photograph shall have a minimum size of 8”x10”. Photographs shall have a density of 3.0 megapixel or greater. Plot resolution is to be minimum 300 dots per inch. Photographs shall normally be taken from a point between four feet (4’) and six feet (6’) above the subject infrastructure and shall show good detail in both shadow and sunlit areas. Include a measuring device in the photo for scale and where applicable to indicate the depth or separation of the utilities. A symbol (i.e. an arrow) is to be used in the plan views indicating the location and direction of view for each photograph submitted. The symbol must include the photograph number. A caption under each photograph shall include the following information:

    a. Photograph number

    b. Photograph description

    c. Date of photograph

    d. Location and direction of view (for example 201 NW 34 Street looking North)

    e. State plane coordinates

    f. All photographs included in the drawings will also be provided to City in JPEG format on CD or DVD media. The CD or DVD will be labeled with the City project name and number. Individual photo files will be named using the same photograph number contained in the drawings.

11. The size and material of the piping shall be verified by the survey crew at the time of as-built.

12. As-builts of all drainage lines shall include the following information:

    a. Rims, inverts, length of piping between structures, length of exfiltration trench, and weir elevations if applicable.

    b. The size and material of the piping shall be verified by the survey crew at the time of as-built.

13. As-builts for the edge of pavement and sidewalk locations shall include horizontal locations and shall indicate all deviations from the design plans.

14. All rock as-builts for parking lot, roadways and swales areas shall consist of the following:

    a. Rock elevations at all high and low points, and at enough intermediate points to confirm slope consistency and every 50' for roadways.

b. Rock as-builts shall be taken at all locations where there is a finish grade elevation shown on the design plans.

c. All catch basin and maintenance access structure rim elevations shall be shown.

d. Elevations around island areas will also be required.

e. As-builts shall be taken on all paved and unpaved swales prior to placement of asphalt and/or topsoil/sod, at enough intermediate points to confirm slope consistency and conformance to the plan details.

f. Note: Rock as-builts required prior to paving. Consultant shall review rock as-builts within five days of receipt.

15. Lake and canal bank as-builts shall include a key sheet of the lake for the location of cross sections. Lake and canal bank cross sections shall be plotted at a minimum of every 100 lf, unless otherwise specified. As-builts shall consist of the location and elevation of the top of bank, edge of water and the deep cut line, with the distance between each shown on the drawing.

16. Retention area as-built elevations shall be taken at the bottom of the retention area and at the top of bank. If there are contours indicated on the design plans, then they shall be as-built as well.

17. If a change is made via field order or deviation to any structure, pipeline, etc., a new location shall be noted on the as-builts. The City Project Manager may request additional as-built information to verify horizontal or vertical locations.

1.06 SUBMITTAL

A. Submittals of final AS-BUILT Drawings shall be made at the completion of 1.) the water system; 2.) the sewer system; 3.) the entire project. As-builts shall also be submitted with monthly pay requests. At Contract closeout, deliver all Record Documents to City Project Manager, for presentation to the City.

B. A complete set of AS-BUILT Drawings shall be prepared and delivered to the City Project Manager. Work shall be performed by a Registered Professional Surveyor and Mapper shall include, but not be limited to the following:

1. Valve boxes, splice boxes, pull boxes, all underground utilities-waterlines, electrical runs, irrigation system, storm drainage pipe and structures, sanitary sewer lines and structures, finished necessary grades, benches, curbs, fences, walls, signs, light fixtures and other items as necessary in accordance with City Record Plan/As-built plan requirements.

C. Accompany submittal with transmittal letter in duplicate, containing:

1. Date.

2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or authorized representative.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 OBSERVATION AT PLACE OF MANUFACTURE

A. Unless otherwise specified, all products, materials, and time and equipment shall be subject to observation by the Engineer at the place of manufacture.

B. The presence of the Engineer at the place of manufacture however, shall not relieve the Contractor of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of the Engineer.

1.02 SAMPLING AND TESTING

A. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the City reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the Engineer, will ensure the City that the quality of the work is in full accord with the Contract Documents.

B. Any waiver by the City of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the Engineer reserves the right to make independent investigations and tests and failure of any portion of the Work to meet any of the requirements of the Contract Documents, shall be reasonable cause for the Engineer to require the removal or correction and reconstruction of any such Work in accordance with the General Conditions.

D. Materials to be tested include, but are not necessarily limited to the following:

1. cement,
2. concrete aggregate,
3. concrete,
4. bituminous paving materials,

5. structural and reinforcing steel,

6. waterproofing,

7. select backfill, crushed stone or gravel and sand,

8. water during pipeline disinfection and bacteriological testing

1.03 SITE INVESTIGATION AND CONTROL

A. The Contractor shall verify all dimensions in the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to its failure to comply with this requirement.

B. The Contractor shall inspect related and appurtenant Work and shall report in writing to the Engineer any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor within the scope of the Project.

1.04 OBSERVATION AND TESTING

A. Unless otherwise specified, the City shall employ and pay for the services of an independent testing laboratory for specified testing as specified by the Engineer. Laboratory testing and checking required by the Specifications, including the cost of transporting all samples and test specimens, shall be provided and paid for by the City unless otherwise indicated in the Specifications.

B. The work or actions of the testing laboratory shall in no way relieve the Contractor of its obligations under the Contract. The laboratory testing work will include such observations and testing required by the Contract Documents, existing laws, codes, ordinances, etc. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform, accept or approve any of the Contractor's Work.

C. The Contractor shall allow the Engineer ample time and opportunity for field observation and testing materials and equipment to be used in the Work. The Contractor shall advise the Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for observation before shipment from the place of manufacture. The Contractor shall at all times furnish the Engineer and its representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and installation. The Contractor must anticipate that possible delays may occur in the execution of its work due to the necessity of materials and equipment being inspected and accepted for use. The Contractor shall furnish, at its own expense, all samples of materials required by the Engineer for testing, and shall make its own arrangements for providing water, electric power, or fuel for the various observations and tests of structures and equipment.

D. The Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other Sections of the Specifications. The Contractor shall also place his orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish the City with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by the Contractor, unless specified otherwise in the Section which covers a particular piece of equipment.

E. Where other tests or analyses are specifically required in other Sections of these Specifications, the cost thereof shall be borne by the party (City or Contractor) so designated in such Sections. The City will bear the cost of all tests, observations, or investigations undertaken by the order of the Engineer for the purpose of determining conformance with the Contract Documents if such tests, observations, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Engineer as a result of such tests, observations, or investigations, the Contractor shall bear the full cost thereof or shall reimburse the City for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by the Contractor.
F. Significance of Tests

1. Test results shall be binding on both the Contractor and the City, and shall be considered irrefutable evidence of compliance or noncompliance with the Specification requirements, unless supplementary testing shall prove, to the satisfaction of the City, that the initial samples were not representative of actual conditions.

G. Supplementary and Other Testing

1. Nothing shall restrict the Contractor from conducting tests he may require. Should the Contractor at any time request the City to consider such test results, the test reports shall be certified by an independent testing laboratory acceptable to the City. Testing of this nature shall be conducted at the Contractor's expense.

1.05 RIGHT OF REJECTION, IMPERFECT WORK, EQUIPMENT, OR MATERIALS

A. The Engineer, acting for the City, shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site, or during the subsequent guarantee period. If the Engineer or its representative, through an oversight or otherwise, has accepted materials or Work which is defective, or which is contrary to the Contract Documents, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be subsequently rejected by the Engineer for the City. Any defective or imperfect work, equipment, or materials furnished by the Contractor which is discovered shall be removed immediately

even though it may have been overlooked by the Engineer and estimated for payment. Satisfactory work or materials shall be substituted for that rejected.

B. The Contractor shall promptly remove rejected articles or materials from the site of the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.

C. The Engineer may order tests of imperfect or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor; and the nature, tester, extent and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the work, equipment, or material was not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work, equipment, or materials has been impaired, then such work, equipment, or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect work, equipment, or material in lieu of performing the tests.

1.06 OTHER CONSTRUCTION CONSIDERATIONS

A. Sleeves and Openings: The Contractor shall provide all openings, chases, etc., to fit its own work and that of any other subcontractors and Contractor's. All such openings or chases shown on the Contract Drawings, or reasonably implied thereby, or as confirmed or modified by acceptable shop, setting or erecting drawings, shall be provided by the Contractor.

B. Where pipes or conduits are to pass through slabs or walls, or where equipment frames or supports are to be installed as integral part of an opening, the sleeves, openings, forms or frames shall be furnished by the installer of the pipes, conduits or equipment, but shall be placed by the Contractor. Where hanger inserts, anchor bolts and similar items are to be embedded in concrete as an integral part of a slab or wall, they shall be furnished by the installer of the pipe or other equipment requiring the hanger, etc., but shall be placed by the Contractor.

C. Weather Conditions: Work that may be affected by inclement weather shall be suspended until proper conditions prevail. In the event of impending storms, the Contractor shall take necessary precautions to protect all work, materials and equipment from exposure.

D. Fire Protection: The Contractor shall take all necessary precautions to prevent fires at or adjacent to the Work, including its own buildings and trailers. Adequate fire extinguisher and hose line stations shall be provided throughout the work area.

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.01 BUOYANCY

A. The Contractor shall be completely responsible for any tanks, pipelines, utility access, foundations or similar improvements that may become buoyant during the construction operations due to groundwater levels. Should there be any possibility of buoyancy, the Contractor shall take the necessary steps to prevent damage due to floating or flooding, and shall repair or replace said improvements at no additional cost to the City.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01430

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and deliver to the Engineer three (3) complete Operation and Maintenance (O&M) Manuals for the substantial, complete systems including instructions, technical bulletins, and any other printed matter such as diagrams, prints or drawings, containing full information required for the proper operations, maintenance, and repair of all Contractor furnished equipment as required by individual Specification sections and as outlined in this Section. Also included shall be a spare parts diagram and complete spare parts list. These requirements are a prerequisite to the operation and acceptance of equipment. Each O&M Manual shall be bound together in appropriate three-ring hard cover binders. A detailed table of contents shall be provided for each Manual. Provide an appropriate label on the binder edge. Provide tabs and separate sections for operation, maintenance, spare parts, etc.

B. The Contractor shall also furnish all O&M manuals in an electronic format suitable for downloading into the City O&M database system. All manuals and drawings for the vendor provided equipment, sub-system or system shall be in Adobe Portable Document Format (PDF) format. They shall be PDF Formatted Text and Graphics (formerly Normal) or PDF Searchable Image (formerly Image+Text). If submitted in Searchable Image format, they shall be Optical Character Recognized (OCR'ed) at a 95 percent confidence level, using Adobe Acrobat Capture 3.x or an equivalent product. There shall be links from all Table of Contents entries to the actual occurrence in the body of the manual. Bookmarks shall be created for all linked Table of Contents entries. This requirement applies to all equipment to be furnished on this project.

C. Written operations and maintenance instructions are required for all equipment items supplied for this project. The amount of detail shall be commensurate with the complexity of the equipment item. Extensive pictorial cuts of equipment are required for operator reference in servicing.

D. Information not applicable to the specific piece of equipment installed on this project shall be struck from the Manual by the Contractor. Information provided shall include a source of replacement parts and names of service representatives, including addresses and telephone numbers.

E. When written instructions include shop drawings and other information previously reviewed by the Engineer, only those editions which were accepted by the Engineer, and which accurately depict the equipment installed, shall be incorporated in the O&M Manual.

F. Maintenance and Lubrication Schedules: The Contractor shall include in the O&M Manual, for all Contractor furnished mechanical and electrical equipment including switchgear and motor control centers, instrumentation, valves, gates, etc., complete maintenance and lubrication schedules. Separate forms shall be submitted for each piece of equipment.

Sample forms are included at the end of this section. As an alternate to the forms, the Contractor may submit an electronic copy of the manufacturer's recommended preventive maintenance requirements.

G. The Contractor shall include in the O&M Manual, for all Contractor furnished pumps and motors, complete data sheets. Separate forms shall be submitted for each different type and size of pump and motor. Sample forms are included at the end of this section.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Engineer's review.

B. Final Data: Engineer-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:

a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.

b. Submit prior to shipment date.

2. Final Data: Submit Compilation Formatted and Electronic Media Formatted data prior to initiation of Functional Testing as specified in the Section 01300 Equipment Testing and Startup. B. Materials and Finishes Data:

1. Preliminary Data: Submit at least 15 days prior to request for final inspection.

2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format and on electronic media, as specified herein**.** B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover. Provide an appropriate label on the binder edge.

2. Size: 8-1/2 inches by 11 inches, minimum.

3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:

a. Project title.

b. Designate applicable system, equipment, material, or finish.

c. Identity of separate structure as applicable.

d. Identity of equipment name, number and Specification section.

4. Title Page:

a. Contractor name, address, and telephone number.

b. Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate.

1) Identify area of responsibility of each.

2) Provide name and telephone number of local source of supply for parts and replacement.

5. Table of Contents:

a. Neatly typewritten and arranged in systematic order with consecutive page numbers.

b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

6. Paper: 20-pound minimum, white for typed pages.

7. Text: Manufacturer's printed data.

8. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.

9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.

2. Each set shall consist of the following:

a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover. Provide an appropriate label on the binder edge.

b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___," and list:

1) Project title.

2) Contractor's name, address, and telephone number.

3) If entire volume covers equipment or system provided by one Supplier include the following:

a) Identity of general subject matter covered in manual.

b) Identity of equipment number and Specification section.

c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.

d. Table of contents neatly typewritten, arranged in a systematic order:

1) Include list of each product, indexed to content of each volume.

2) Designate system or equipment for which it is intended.

3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

f. Section Dividers:

1) Heavy, 80-pound cover weight, tabbed with numbered plastic index tabs.

2) Fly-Leaf:

a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.

b) List with Each Product:

(1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.

(2) Identify area of responsibility of each.

(3) Provide local source of supply for parts and replacement.

c) Identity of separate structure as applicable.

g. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Electronic Media Format: All Final O&M data shall also be submitted in whole in electronic format. Electronic O&M manuals shall contain information in standard formats (Adobe, PDF, Word, AutoCAD, HTML, etc.) and shall be easily accessible through the use of standard, “off-the-shelf” software such as an Internet browser. Hypertext links shall be embedded throughout the text for ease of navigation between references.

1.05 SUBMITTALS

A. Informational:

1. Data Outline: Submit 2 copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
   a. Submit 4 copies for Engineer's review.
   b. If data meets conditions of the Contract:
      1) One copy will be returned to Contractor.
      2) One copy will be forwarded to Resident Project Representative.
      3) One copy will be retained in Engineer's file.
      4) One copy will be retained by the City.
   c. If data does not meet conditions of the Contract:
      1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
      2) Engineer’s comments will be retained in City's and Engineer's files.
      3) Resubmit 4 copies revised in accordance with Engineer's comments.
3. Final Data - Hardcopies: Submit 3 copies in format specified herein.
4. Final Data - Electronic Media Format: Submit 3 copies in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:
   1. Product Data:
      a. Include only those sheets that are pertinent to specific product.
      b. Clearly annotate each sheet to:
         1) Identify specific product or part installed.
         2) Identify data applicable to installation.
         3) Delete references to inapplicable information.
      c. Function, normal operating characteristics, and limiting conditions.
      d. Performance curves, engineering data, nameplate data, and tests.
      e. Complete nomenclature and commercial number of replaceable parts.
      f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
      g. Spare parts ordering instructions.

h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).

2. As-installed, color-coded piping diagrams.

3. Charts of valve tag numbers, with the location and function of each valve.

4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:

   a. Format:

      1) Provide reinforced, punched, binder tab; bind in with text.

      2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.

      3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.

      4) Identify Specification section and product on Drawings and envelopes.

   b. Relations of component parts of equipment and systems.

   c. Control and flow diagrams.

5. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

6. Instructions and Procedures: Within text, as required to supplement product data.

   a. Format:

      1) Organize in consistent format under separate heading for each different procedure.

      2) Provide logical sequence of instructions for each procedure.

      3) Provide information sheet for City's personnel, including:

         a) Proper procedures in event of failure.

         b) Instances that might affect validity of guarantee or Bond.

   b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.

   c. Operating Procedures:

      1) Startup, break-in, routine, and normal operating instructions.

      2) Test procedures and results of factory tests where required.

      3) Regulation, control, stopping, and emergency instructions.

      4) Description of operation sequence by control manufacturer.

      5) Shutdown instructions for both short and extended duration.

6) Summer and winter operating instructions, as applicable.

7) Safety precautions.

8) Special operating instructions.

d. Maintenance and Overhaul Procedures:

1) Routine maintenance.

2) Guide to troubleshooting.

3) Disassembly, removal, repair, reinstallation, and re-assembly. B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, nameplate data, and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
   d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards:
   a. Electrical service.
   b. Controls.
   c. Communications.
3. List of electrical relay settings, and control and alarm contact settings.
4. Electrical interconnection wiring diagram, including control and lighting systems.
5. As-installed control diagrams by control manufacturer.
6. Operating Procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Safety precautions.
   d. Special operating instructions.
7. Maintenance Procedures:
   a. Routine maintenance.
   b. Guide to troubleshooting.
   c. Adjustment and checking.

d. List of relay settings, control and alarm contact settings.

8. Manufacturer's printed operating and maintenance instructions.

9. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage. C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.

2. Format:

a. Use Maintenance Summary Form bound with this Section.

b. Each Maintenance Summary may take as many pages as required.

c. Use only 8-1/2-inch by 11-inch size paper.

d. Typed format.

3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.

4. Recommended Spare Parts:

a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.

b. “Unit” is the unit of measure for ordering the part.

c. “Quantity” is the number of units recommended.

d. “Unit Cost” is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:

a. Catalog number, size, and composition.

b. Color and texture designations.

c. Information required for reordering special-manufactured products.

2. Instructions for Care and Maintenance:

a. Manufacturer's recommendation for types of cleaning agents and methods.

b. Cautions against cleaning agents and methods that are detrimental to product.

c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:

a. Applicable standards.

b. Chemical composition.

c. Details of installation.

2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Forms: Maintenance Summary Form.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

PROJECT NO. 12337

CITY OF FORT LAUDERDALE

MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACTNO.: _____

1.EQUIPMENTITEM _____

_____

3.EQUIPMENT/TAGNUMBER(S) _____

4.WEIGHTOFINDIVIDUALCOMPONENTS(OVER100POUNDS)_____

5.NAMEPLATEDATA(hp,voltage,speed,etc.) _____

6.MANUFACTURER'SLOCALREPRESENTATIVE _____

Name_____ TelephoneNo. _____

b. Address _____

7.MAINTENANCEREQUIREMENTS
2. MANUFACTURER

a.

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Standard Oil	Gulf	Arco	Or Equal
List symbols used in No. 7. above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR CITY'S INVENTORY.

Part No.	**Description**	**Unit**	**Quantity**	**Unit Cost**
Note: Identify parts provided by this Contract with two asterisks.				

- END OF SECTION –

[ΧΟΝΤΡΑΧΤΟΡ'Σ ΝΑΜΕ]

[ΧΟΝΤΡΑΧΤΟΡ'Σ ΣΤΡΕΕΤ ΑΔΔΡΕΣΣ]

[ΧΟΝΤΡΑΧΤΟΡ'Σ ΧΙΤΨ, ΣΤΑΤΕ ΑΝΔ ΖΙΠ]

[ΧΟΝΤΡΑΧΤΟΡ'Σ ΤΕΛΕΠΗΟΝΕ ΝΥΜΒΕΡ]

[ΧΟΝΤΡΑΧΤΟΡ'Σ ΦΑΞ ΝΥΜΒΕΡ]

MEMORANDUM

ΤΟ: **ΡΕΣΙΔΕΝΤΣ ΟΦ [ΛΟΧΑΤΙΟΝ ΟΦ ΧΟΝΣΤΡΥΧΤΙΟΝ]**

DATE: **[ΧΥΡΡΕΝΤ DATE]**

ΡΕ: **ΧΟΝΣΤΡΥΧΤΙΟΝ ΙΝ ΨΟΥΡ ΑΡΕΑ**

ΦΡΟΜ: **[ΧΟΝΤΡΑΧΤΟΡ'Σ ΝΑΜΕ}**

Χονστρυχτιον ιν ψουρ αρεα ωιλλ χομμενχε ον [δατε οφ χονστρυχτιον χομμενχεμεντ].

Τηε χονστρυχτιον αρεα ισ φρομ [βουνδαρψ #1] το [βουνδαρψ #2].

Αχχεσσ το τηε αρεα ωιλλ βε λιμιτεδ ατ χερταιν τιμεσ δυε το τηε χονστρυχτιον αχτιϖιτιεσ. Ωε απολογιζε φορ ανψ ινχονϖενιενχε ανδ ωε ωιλλ δο ουρ βεστ το αχχομμοδατε αχχεσσ το ρεσιδεντσ.

Τηανκ ψου,

[Χοντραχτορ Νάμε]

PLANNING + CONSTRUCTION = PROGRESS

STARTING DATE DATE X,

DATECOMPLETION 2020DATE X, 2020

PROJECT No. 12337COST $X.X Million

Project Description

PROJECT NO. 12337

SECTION 01520

CONSTRUCTION CONSTRAINTS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The intent of this Section is to outline the minimum requirements necessary to provide continuous public services throughout the construction period.

B. The Contractor has the option of providing additional temporary facilities that can eliminate a constraint, provided it is done without cost to the City (including additional City labor) and provided that all requirements of these Specifications are fulfilled. Work not specifically covered in the following paragraphs may, in general, be done at any time during the contract period, subject to the operating requirements and constraints and construction requirements outlined hereinafter. All references to days in this Section shall be consecutive calendar days.

1.02 OPERATION REQUIREMENTS

A. Access to Plant Site, Roadways, and Parking Areas

1. An unobstructed traffic route through the project work site shall be maintained at all times. Parking for personal vehicles of construction personnel on the City's property is NOT permitted.

2. The Contractor shall provide temporary measures to protect the existing pavement by filling over with earthen material or supplying other measures acceptable to the Engineer, and he shall repair any damage to existing paved surfaces that occurs during the construction period. Any areas disturbed along the shoulders of the access road and interior roads and elsewhere shall be repaired, graded, seeded, etc. as necessary. Full lane restauration is required by the City.

3. It shall be the responsibility of the Contractor to obtain any permits required from the Florida Department of Transportation, Broward County Traffic Engineering Division and/or City of Fort Lauderdale Engineering Department and pay all associated fees.

B. Personnel Access: The Contractor shall locate stored material, dispose of construction debris and trash, provide temporary walkways, provide temporary lighting, and other such work as identified by the Engineer to maintain personnel access.

C. Coordination with Private Property Owners: Stormwater work is located in City of Fort Lauderdale right-of-way areas. Work is also adjacent to private residences and public access areas. The Contractor shall coordinate work with the City and shall minimize impacts to private property owners and public access areas. Contractor shall replace

surrounding ground affected including but not limited to pavers, sidewalks, sod, landscape and bring it to original or better conditions.

D. Sequence of certain major events and identification of time constraints for removing existing facilities from active service and installation of new facilities are described below. No phase of work (or tasks within a phase) shall preclude or be performed in parallel with a subsequent phase unless specifically defined so in these documents. In all cases, work in each phase shall be checked out an accepted for satisfactory use, subject to the City's approval, prior to the Contractor proceeding to the next phase of construction.

E. Critical events in the sequence of construction are specified herein. The outlined sequence of construction does not include all items necessary to complete the Work, but is intended to identify the sequence of critical events necessary to eliminate disruption to the public and to the City's facilities. It shall be understood by the Contractor that the critical events identified are not all inclusive and that additional items of work not shown may be required. The sequence of construction is a precedence requirement and does not attempt to schedule the Contractor's work.

1.3 SEQUENCE OF CONSTRUCTION

A. Mobilization / Site Preparation

1. Mobilize for work – video roadways, swales and adjacent area, obtain permits, develop and submit construction schedule, submit shop drawing schedule and being shop drawing submittals and procurement of materials in accordance with Section 01300 – Submittals.

2. For interfering utilities, construct new utilities up to tie-in points, perform tests, make final connections with minimum amount of shut down time. After acceptance of new utilities, remove existing interfering underground utilities and structures. Provide temporary services as required to maintain continuous operation.

B. Detailed Construction

1. No less than one (1) week and no more than two (2) weeks prior to excavation in an area, the Contractor shall distribute "Resident and Business Notification" flyers. The flyer will describe the type and duration of construction activities to be performed, work hours, traffic control plan, City of Fort Lauderdale information number and any other information to expedite work activities.

2. The Contractor shall be responsible for all damages/claims resulting from its activities on the surrounding neighborhood and its residents.

3. The Contractor is expected to work regular hours between 7:30 A.M. and 4:00 P.M., Monday through Friday, except for work required for tie-ins and work within the FDOT right of way as described in this Section. The requirements of the Sections entitled Inspection Overtime Costs and Special Conditions shall apply to the Work. Requests to work other than regular hours must be submitted to the Engineer for approval at least 72 hours in advance of the period proposed for such overtime work

and shall set forth the proposed schedule for overtime work to give Engineer ample time to arrange for his personnel to be at the site of the work. Contractor shall pay for the additional engineering charges on account of the overtime work which may be authorized. Such additional engineering charges shall be a subsidiary obligation of the Contractor and no extra payment shall be made by City on account of such overtime work.

C. Final Site Work and Closeout

1. Final grading, paving, sodding, landscaping, miscellaneous work, demobilization and related closeout activities shall be as defined elsewhere in the Contract Documents.

1.3 CONTRUCTION CONSTRAINTS

A. Construction Dewatering

1. All dewatering equipment such as pumps, air compressors, generators, etc. proposed for use during construction in residential areas shall be provided with noise enclosures suitable to meet the requirements of the City of Fort Lauderdale and/or Broward County Noise Ordinance, whichever is more stringent.

2. The Contractor is responsible for draining and dewatering all existing utilities impacted by the work as required to complete the relocation, demolition, bypass, or tie-in connections. Contractor is responsible for disposal of the contents of each line.

3. Additional requirements for construction dewatering are defined on the Drawings.

B. Work in City of Fort Lauderdale Right-of-Way

1. Final surface restoration shall be commenced within seven (7) days of passing bacteriological sampling test and hydrostatic pipe tests.

2. Contractor shall coordinate with City of Fort Lauderdale Engineering Department prior to start of restoration.

3. Contractors shall coordinate with City of Fort Lauderdale Landscape Architecture Department prior to start of landscaping and/or irrigation restoration.

C. Work in FDOT Right-of-Way

1. It is anticipated that night work will be required for construction within the FDOT right of way.

2. Work within the FDOT right of way is restricted to the closure of one traffic lane during day time hours. Day time hours are defined as 9 AM to 4 PM, Mondays through Fridays.

3. Work within the FDOT right of way is restricted to the closure of two traffic lanes during night time hours. Night time hours are defined as 9 PM to 4 AM, Sundays through Thursdays.

4. All traffic lanes must remain open during hours not listed above.

5. If closure of one or more lanes is required for a period of 24 hours or more, the Contractor is required to conduct a traffic analysis study and comply with all the requirements established by FDOT.

6. Additional restrictions and construction constraints may apply as defined by FDOT permit requirements.

D. Tie-in Connections

1. The Contractor shall plan construction activities for this tie-in such that operation of the existing water line is interrupted on no more than one occasion for up to six hours. Service interruption shall be Monday through Thursday between 8:00 A.M. and 4:00 P.M.

2. Before commencing work involving removing or placing in operation existing or new facilities or tie-ins to existing facilities, the Contractor shall notify the City at least seven (7) days in advance in writing.

3. The Contractor shall be responsible for draining and dewatering the existing line as required to complete tie-in activities. The Contractor is responsible for the disposal of contents of the line(s).

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 COORDINATION WITH EXISTING UTILITIES AND OTHER AGENCIES

A. The Contractor shall notify all utilities in writing with a copy to the City/Engineer prior to construction commencement. The Contractor shall cooperate with these utility owners as necessary to minimize service interruptions.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01526

TRAFFIC REGULATIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall develop a traffic control plan for all work sites that complies with the Florida Department of Transportation Roadway and Traffic Design Standards and MUTCD. The traffic control plan shall be signed and sealed by a Florida professional engineer.

B. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on haul routes, at site entrances, on-site access roads, and parking areas.

C. Remove temporary equipment and facilities when no longer required, restore grounds to original, or specified conditions.

1.02 RELATED REQUIREMENTS

A. All applicable sections of the Specifications.

B. Conditions of the Contract.

1.03 TRAFFIC SIGNALS AND SIGNS

A. Provide and operate traffic control and directional signals or signs required to direct and maintain an orderly flow of traffic in all areas under Contractor's control or affected by Contractor's operations.

1.04 FLAGPERSON

A. Provide qualified and suitably equipped flag-person when construction operations encroach on traffic lanes, as required for regulation of traffic.

1.05 FLARES AND LIGHTS

A. Provide flares and lights during periods of low visibility:

1. To clearly delineate traffic lanes and to guide traffic.

2. For use of flag-person in directing traffic.

B. Provide illumination of critical traffic and parking areas.

1. Maintain free vehicular access to and through parking areas.

2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

1.06 HAUL ROUTES

A. Consult with Owner and governing authorities, establish public thoroughfares which will be used as haul routes and site access.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to expedite traffic flow, to minimize interference with normal public traffic.

1.07 EMERGENCY ACCESS

A. In order to provide protection to the workers and residents, the Contractor shall maintain emergency access to all adjacent properties at all times during construction. If a road is required to be closed to vehicular traffic and the distance of the closure exceeds 150 feet between stabilized surfaces, or prevents access to properties for a distance that exceeds 150 feet, the Contractor shall provide a 10 foot wide stabilized access way on one side of the trench capable of supporting a Fire Truck. Contractor shall also provide stabilized access ways across the trench or unstabilized area a minimum of 6 feet in width at a spacing not to exceed 100 feet capable of supporting foot traffic. These access ways shall be protected and delineated with lighted barricades or other such devices as approved by the regulatory agency. Both ends of the emergency access way shall be blocked in accordance with the MOT permit approved by the City of Fort Lauderdale and FDOT with signage indicating that this access way is to be used by emergency vehicles only.

B. No trenches or holes shall be left open after working hours. In the event a trench must be left open after hours, it shall be done so only with the express written permission from the Engineer, and it shall be the Contractor's responsibility to provide proper protection of the open trench or hole as required by the regulatory agency. In addition, the Contractor shall provide a security guard at the site whenever the Contractor's personnel are not present, 24 hours per day/ 7 days per week. It shall be the Security Guard's responsibility to protect the open trench or hole from trespassers and to direct emergency personnel on site. The Security Guard shall not have any other responsibilities such as operation pumps or equipment but shall be dedicated to protecting the trench or open hole. The Security Guard shall be equipped with a wireless telephone capable of calling 911 to report an emergency and shall keep that telephone on their person at all times. In addition to this provision, the contractor shall maintain trench safety and comply with current OSHA regulations and the Trench Safety Act. The contractor shall maintain and keep all safety barricades, signage, flashers, and detours, in operation condition. A copy of the approved MOT plans, and details, shall be on site at all times.

C. Measurement and payment for security guard services shall be included in the utility pipe installation unit price. Measurement for temporary emergency access ways will be paid for under the specified line item at the unit price described in the bid schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MEASUREMENT AND PAYMENT

A. There shall be no special measurement and payment for work under the section; it shall be included in the lump sum price bid for Maintenance of Traffic.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of its operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

B. The Contractor shall comply promptly with such safety regulations as may be prescribed by the City or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, its employees. In the event of the Contractor's failure to comply, the City may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of its responsibility hereunder.

C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at its own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

A. During the progress of the work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract.

B. All work and materials shall be protected against damage, injury or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at its own expense. Protection measures shall be subject to the approval of the Engineer.

1.03 BARRICADES, WARNING SIGNS AND LIGHTS

A. The Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to insure safety to the public. All barricades

and obstructions along public roads shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise.

B. Each Contractor shall provide and maintain such other warning signs and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, City operating personnel, or those visiting the site.

1.04 TEMPORARY BRIDGES

A. Construct temporary bridges at all points where maintenance of traffic across pipeline construction is necessary.

B. Make bridges over public streets, roads, and highways acceptable to authority having jurisdiction thereover.

C. Bridges erected over private roads and driveways shall be adequate for service to which they will be subjected.

D. Provide substantial guardrails and suitably protected approaches.

E. Provide foot bridges not less than 4 feet wide with handrails and uprights of dressed lumber.

F. Maintain bridges in place as long as conditions of the Work require their use for safety of public, except that when necessary for proper prosecution of the Work in immediate vicinity of bridge. Bridge may be relocated or temporarily removed for such period as Engineer may permit.

1.05 EXISTING UTILITIES AND STRUCTURES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privatelyowned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

C. Prior to beginning any excavation work, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that interference exists, it shall modify the design as required.

D. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. In the event the Contractor fails to bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the City.

E. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure uninterruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at its own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

F. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over such work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Engineer may, at its discretion, have the respective authority to provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the Contractor.

G. Protection of existing utilities, structures and other facilities: The underground pipes, utilities and structures shown on the Drawings are located according to the best information available, but may vary by several feet from both the position and elevation shown. The Contractor shall explore far enough ahead of its work to determine the exact location and condition of such utilities, structures or facilities so that, before the Work is installed, the Engineer may change the line or grade of the pipe or other facility, should that become necessary to avoid a conflict. Should this exploration reveal that adjustments to the work are necessary; the Contractor shall immediately notify the Engineer and coordinate with him to adjust the work in a timely fashion avoiding delays to construction. No request for additional compensation or Contract time (except for a non-compensable time extension at the sole discretion of the Engineer, whose decision shall be final) resulting from encountering utilities or structures not shown, or differing in location or elevation from that shown, will be considered. The Contractor shall explore sufficiently ahead of the Work to allow time for any necessary adjustment without delay occasioned by encountering underground utilities or structures which could have or should have been discovered by timely exploration ahead of the Work shall rest solely with the Contractor.

H. Relocation of existing utilities: The relocation of existing utilities, as noted on the Plans, or for the convenience of the Contractor shall be the responsibility of the Contractor. This work shall be completed by either the forces of the existing utility or the Contractor's forces at the discretion of the responsible utility. If the work is to be performed by the Contractor, all work shall be done in accordance with the utility company's requirements. Under no

circumstances shall the Contractor be authorized extra payment for this work, and all cost for the relocation shall be the responsibility of the Contractor.

I. Any conflicts between the field investigation and the information shown on the Plans shall be brought to the immediate attention of the Engineer

1.06 TREES WITHIN PROJECT LIMITS

A. General: The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees on the project site, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or City. All existing trees which are damaged during construction shall be replaced by the Contractor or a certified tree company to the satisfaction of the City.

B. Replacement: The Contractor shall immediately notify the City if any tree is damaged by the Contractor's operations. If, in the opinion of the City, the damage is such that replacement is necessary, the Contractor shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the City compensatory payment acceptable to the City.

1.07 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation.

1.08 DETOURS

A. Where authority having jurisdiction requires that traffic be maintained over construction work in a public street, road, or highway, and traffic cannot be maintained on original roadbed or pavement, construct and maintain detour around the Work. Coordinate traffic routing with that of others working in same or adjacent areas.

1.09 RESTORATION OF PAVEMENT

A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing, signage, striping and/or other traffic controls as required, promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 01570

NPDES REQUIREMENTS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. This Section describes the required documentation to be prepared and signed by the Contractor before conducting construction operations, in accordance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Stormwater Permitting program for construction activity, as required by Florida Administrative Code (F.A.C.) Chapter 62-621 and administered by the Florida Department of Environmental Protection (FDEP).

B. The Contractor shall be responsible for implementation, maintenance and inspection of stormwater pollution prevention control measures in accordance with F.A.C. Chapter 62-621 including, but not limited to, erosion and sediment control, stormwater management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Drawings and/or specified elsewhere in this or other specifications. The stormwater pollution prevention control measures shall include protection of offsite public and private storm sewer facilities potentially impacted during construction. Stormwater facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.

C. The Contractor shall prepare and review implementation of the Stormwater Pollution Prevention Plan (SWPPP) in a meeting with the City prior to start of construction.

1.02 REFERENCE DOCUMENTS

A. “Guidelines for Erosion and Sediment Control, Planning and Implementation” and “Processes, Procedures and Methods to Control Pollution Resulting from all Construction Activity”, published by the United States Environmental Protection Agency.

PART 2 – PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

3.01 Contractor REQUIREMENTS

A. The Contractor is notified that the City of Fort Lauderdale has submitted a Notice of Intent (NOI) to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, (FDEP Form 62-621.300(4)(b)).

B. The Contractor shall provide all necessary labor and materials to maintain compliance with the permit requirements as found in FDEP document 62-621.300(4)(a) and the preliminary

Stormwater Pollution Prevention Plan (SWPPP). These documents are included in the Appendices of the contract documents for convenience.

C. The SWPPP submitted by the City is preliminary in nature. The Contractor shall be responsible for preparing, submitting, and complying with a final SWPPP in full accordance with all regulatory requirements

3.02 RETENTION OF RECORDS

A. Retain a copy of the SWPPP at the construction site and at the Contractor's office from the date that it became effective to the date of project completion.

B. At project closeout, submit to the City all NPDES forms and certifications, as well as a copy of the SWPPP. Stormwater pollution prevention records will be retained by the City for a period of three (3) years from the date of project completion.

3.03 REQUIRED NOTICES

A. The following notices shall be posted by the Contractor within 60 days of a notice to proceed until the date of project final completion:

1. A copy of the submitted NOI and a brief project description, as given in the SWPPP, shall be posted at the construction site and at the Contractor's office in a prominent place for public viewing.

2. Notice to drivers of equipment and vehicles, instructing them to stop, check and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.

3. Post a notice of waste disposal procedures in an easily visible location on site.

4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is known to all personnel.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01590

FIELD OFFICE, EQUIPMENT AND SERVICES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Contractor shall furnish, equip and maintain a field office at the site for his own use and the use of the Engineer as specified herein and shown on the Drawings. Field office shall be of a size required for the joint use of the Engineer and Contractor.

1.02 GENERAL FIELD OFFICE REQUIREMENTS

A. The CONTRACTOR shall provide steps and platforms with handrails to permit entry to the offices. This work shall conform to the Florida Building Code and OSHA requirements.

B. Trailers shall be blocked up and hurricane straps installed conforming to the applicable building codes.

C. The Contractor is responsible for procuring all necessary permits for the installation of the field offices.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S FIELD OFFICE

A. Contractor shall furnish, equip and maintain a field office at the site. Field office shall be of a size required for the joint use of the Engineer and Contractor. Contractor shall provide one (1) private office (minimum 12' x 12') for the exclusive use of the Engineer and/or City Inspector at each project site. Engineer/City Inspector's office shall be, at a minimum, provided with the following features at each site:

1. Entry door with cylinder lock, keyed differently from exterior door locks and two (2) sets of keys

2. Two (2) desks with adjustable computer chairs

3. Two (2) two drawer file cabinets

4. Two (2) bookshelves, 36" wide by 48" high.

5. Printer/copier with maintenance agreement for the duration of the contract. Printer/copier shall be equipped with 11-inch x 17-inch and 8 ½-inch by 11-inch paper trays. Printer/copier shall be capable of scanning, copying, enlarging, reducing, and printing in color and in black and white.

B. Equipment furnished shall be new or like new in appearance and function.

C. Contractor shall have readily accessible at the field office the following documents: copies of the Contract Documents, addenda, latest approved Shop Drawings, all field project related correspondence, change orders, etc.

D. Fire Protection: Furnish and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

E. The field office shall be provided with a central meeting room for the joint use of the Contractor and the Engineer and/or City Inspector. The central meeting room shall be furnished with the following:

1. One conference room table with seating and chairs for eight people.
2. Two paper towel dispensers with paper towels
3. One rack for handling drawings
4. One electric water cooler with bottle water supply and disposable drink cups
5. One first aid cabinet conforming to OSHA requirements for an office up to 15 persons
6. One four cubic ft capacity refrigerator with ice making section
7. One dry erase board (24-inch by 36-inch)

PART 3 - EXECUTION

3.01 ENGINEER/CITY INSPECTOR'S OFFICE

A. Make available for Engineer's use prior to start of Work at site, to remain on site for a minimum of 30 days after final acceptance of the Work.

B. Exterior door keys and interior office keys: Furnish two (2) sets of keys.

C. Telephone: Telephone service connections shall be obtained from off-site by the Contractor. The Contractor shall be responsible for all connections and wiring between the telephone company point of service and the field office. In addition, the Contractor shall coordinate with the local phone company to arrange startup and invoicing for service.

1. Arrange and provide onsite telephone service for Engineer and/or City Inspector's use during construction. Pay costs of installation and monthly bills.
2. Provide two incoming lines.
3. Provide high speed DSL line and service.
4. Provide appropriate jacks; locate as directed by Engineer.
5. Provide all necessary wiring for a complete and operable telephone system.
6. Provide one telephone for each desk. Telephones shall be equipped with intercom and conference speaker.

D. Maintain in good repair and appearance. Provide weekly cleaning service and replenishment as required, of paper towels, paper cups, hand soap, toilet paper, first aid kit supplies and bottled water.

E. Replenish, as needed, copier paper and toner.

3.02 UTILITY SERVICES

A. Potable Water: Potable water will be provided to the Contractor, free of charge, by the City. The Contractor shall furnish, install, and test all piping, valves, and flow meter for connection with the City's potable water services. The Contractor is responsible for obtaining all necessary permits.

B. Telephone: The Contractor is responsible for furnishing and paying all costs for all telephone services for the Contractor's field office. For telephone services the Contractor may contact the City to request City's account manager after project award.

C. Power: The Contractor shall provide all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform work in a safe and satisfactory manner. The Contractor shall pay all costs for installation, maintenance and removal for the work and power.

D. Sanitary Services – Contractor's Field Office: There is no access to the sanitary system for the Contractor Field Office. As such, the Contractor shall furnish all equipment and services required to convey, store and dispose of sanitary wastes from the Contractor's Field Office in accordance with jurisdictional regulatory requirements.

E. High Speed Internet Services: Contractor shall provide high speed internet service for his own use and for that of the Engineer.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DEFINITIONS A.

Products:

1. New items for incorporation in the Work, whether purchased by Contractor or City for the Project, or taken from previously purchased stock and may also include existing materials or components required for reuse.

2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in the construction industry.

3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

A. Provide systems, equipment, and components, including supports and anchorages, in accordance with provisions of latest edition of the Florida Building Code.

B. ENVIRONMENTAL REQUIREMENTS

C. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 0 – 25 feet above sea level.

D. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 30 degrees F to 110 degrees F.

1.03 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

C. Extra Materials, Special Tools, Test Equipment, and Expendables:

1. Furnish as required by individual Specifications.

2. Schedule:

a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.

b. Transfer to City shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.

3. Packaging and Shipment:

a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.

b. Prominently displayed on each package, the following:

1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.

2) Applicable equipment description.

3) Quantity of parts in package.

4) Equipment manufacturer.

5) Deliver Materials to the City at a location within the City of Fort Lauderdale.

4. Notify Engineer upon arrival.

5. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to City.

6. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of arrival.

D. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.04 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current progress schedule and coordinate to avoid conflict with the Work and conditions at site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of

manufacture and shelf life, where applicable. Include UL labels on products so specified.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at site. Inspect for completeness and evidence of damage during shipment.

D. Remove damaged products from site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.05 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01500 – Construction Facilities and Temporary Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by City.

B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

C. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.

D. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.

F. Hazardous Materials: Prevent contamination of personnel, storage building, and site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

F. Equipment, Components, Systems, Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

I. Provide materials and equipment listed by UL wherever standards have been established by that agency. J. Equipment Finish:

1. Provide manufacturer's standard finish and color, except where specific color is indicated.

2. If manufacturer has no standard color, provide equipment with finish as approved by Engineer.

K. Special Tools and Accessories: Furnish to City, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by City.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.

2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.

3. Design structural members for anticipated shock and vibratory loads.

4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.

5. Modify standard products as necessary to meet performance Specifications. B.

Lubrication System:

1. Require no more than weekly attention during continuous operation.

2. Convenient and accessible. Oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.

3. Provide constant-level oilers or oil level indicators for oil lubrication systems.

4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

A. Where Specifications call for factory testing to be witnessed by Engineer, submit functional and system performance test schedules and plans at least 30 days prior to start of related testing in accordance with Section 01300 – Submittal, unless otherwise specified.

B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).

C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion, Section 01660 – Equipment Testing and Startup, Section 01300 – Submittals, and in accordance with individual Specification sections.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects.

Remove damaged material or equipment from the site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Repaint painted surfaces that are damaged prior to equipment acceptance.

E. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at site, available for review at all times.

F. For material and equipment specifically indicated or specified to be reused in the Work:

1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.

2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.03 FIELD FINISHING

A. In accordance with individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by City.

PROJECT NO. 12337

- END OF SECTION -

PROJECT NO. 12337

SECTION 01640

CONSTRUCTION AND DEMOLITION WASTE MANAGEMEMT

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment, materials, submittals, and compliance documentation to meet the Construction and Demolition (C&D) Waste Management requirements outlined in this Section. C&D Waste diversion shall be the responsibility of the Contractor and requirements outlined herein shall apply to all subcontractors, material suppliers, haulers and fabricators involved in the onsite execution of the Work.

B. This Section specifies diversion of Construction and Demolition (C&D) waste from disposal at a landfill to reuse or recycling in accordance with State of Florida, Broward County and local regulations.

1. Waste Management Goal: a minimum of 95% (by weight) of the total project waste shall be diverted from disposal at a landfill to meet exemplary performance of LEED MR Credit 2.

   a. Disposal shall be defined as any materials hauled to a Municipal Solid Waste, Construction and Demolition Debris or Land Clearing and Inert Landfill, as defined in applicable State of Florida Regulations, for the purposes of placement within permitted disposal units. Salvaging of materials from the active face of a landfill shall not count towards the waste diversion goals.

   b. Materials generated on site and classified as Municipal Solid Waste by State of Florida Regulations shall be managed in accordance with these regulations and shall be included in computations to determine compliance with the Waste Management Goals.

2. Provide onsite separation of C&D Materials to allow for proper management of the waste.

3. Provide documents, including a Waste Management Plan, and documentation of recycling, and reuse of recovered materials.

4. Provide separate itemization of cost related to C&D Waste Management.

5. C&D Waste Management hierarchy shall be: reduce, reuse, and recycle.

6. Prevent environmental pollution and damage.

C. The Work specified herein shall be coordinated with Section 01540 entitled “Demolition and Removal of Existing Structures and Equipment”. In cases where conflicting requirements are specified, the Contractor shall comply with the more stringent requirement.

1.02 REFERENCE CODES AND STANDARDS

A. Regulations

1. State of Florida Division of Waste Management Chapter 62-701, Florida Administrative Code

2. Broward County Code of Ordinances Chapter 14 - Garbage and Trash, Chapter 27 - Pollution Control

1.03 SUBMITTALS

A. C&D Waste Management Plan: Before the start of Work, submit a C&D Waste Management Plan to the City and the Engineer for approval, including the following at a minimum:

1. Plan shall indicate how the Contractor proposes to recover at least 95% of the C&D wastes for reuse or recycling.

2. Provide a drawing illustrating the work areas, materials processing areas, materials storage and disposal areas, worker hand-washing and changing stations, first aid and medical information.

3. Submit list of reuse facilities, recycling facilities and processing facilities that will be receiving the recovered materials. Include the full facility name, location and permit number issued by the applicable State regulatory agency

4. Identify materials that cannot be reprocessed, are not recyclable or not recovered which will be disposed of in a permitted landfill.

5. List the permitted Municipal Solid Waste Landfill, or other permitted disposal facilities, that will be accepting the disposed waste materials.

6. Identify each type of waste material to be reused or recycled and estimate the amount, by weight.

B. C&D Waste Management Summary Reports: Provide delivery receipts for the recovered materials and waste materials sent to the permitted recycling facilities, processing facilities, or landfill for disposal with the following information:

1. Name of firm accepting the recovered materials or waste materials

2. Specify type of facility (e.g. retail facility, recycler, processor, class/type of disposal facility)

3. Facility permit number, where applicable

4. Location of the facility

5. Type of materials processed, recycled or disposed

6. Types and quantities (weight) of materials reused on site

7. Types and quantities (weight) of properly sorted and contained materials stored on site awaiting processing, reuse or recycling

8. Total weight of materials disposed, processed, recycled, reused or returned

9. Net weights of each type of material disposed, processed, recycled, reused or returned

10. Delivery tickets/gate receipts

11. Disposal, processing or drop-off fees

C. Application for Progress Payment: The following should be submitted with each Application for Progress Payment:

1. C&D Waste Management Summary Report.

2. Signed and notarized statement by Contractor that quantities and costs provided in Waste Management Report are true and correct.

3. Payment may be withheld if diversion goals are not met or if documentation is not accepted by the City or Engineer. The Contractor is ultimately responsible for implementation of the C&D Waste Management Plan and achieving the diversion goals.

D. Final Report: Provide project C&D Waste Management Summary Report at completion of project and in a form, approved by the Engineer, that can be submitted to show exemplary performance as defined by LEED MR credit 2.

1.04 RECYCLING PROGRAM

A. The Contractor shall employ a recycling program as part of the Contractor efforts to achieve the diversion and waste reduction goals outlined herein. The recycling program shall utilize one or a combination of any of the following common waste diversion strategies:

1. Source Separation

2. Time-Based Separation

3. Commingled or Off-site Separation

4. Back haul of packaging

B. Waste Material management hierarchy can be viewed as: reuse on-site, recycle on-site, reuse off-site, and recycle off-site.

C. Other innovative approaches to achieve the minimum diversion rate are encouraged and should be specified and described in the C&D Waste Management Plan.

D. Minimum diversion rate may be achieved by recovering and recycling the following materials, at a minimum:

1. Asphalt
2. Concrete and concrete masonry units
3. Brick, tile and masonry materials
4. Ferrous metal (reuse or recycling required by City)
5. Non-ferrous metals: copper, aluminum, etc (reuse or recycling required by City)
6. Untreated lumber - fastener free (reuse, recycling or processing required by City)
7. Wooden Pallets (reuse or recycling required - banned from disposal)
8. Plywood, OSB and particle board
9. Gypsum wallboard scrap
10. Paper and cardboard (recycling required - banned from disposal)
11. Beverage containers (recycling of cans and plastic bottles required – banned from disposal)
12. Insulation
13. Rigid foam
14. Glass
15. Carpet and pad
16. Trees and shrubs (reuse or recycling required - banned from disposal)
17. Soil
18. Motor Oil and Oil Filters (recycling required - banned from disposal)
19. Plumbing fixtures
20. Windows
21. Doors
22. Cabinets
23. Architectural fixtures
24. Millwork, paneling and other similar interior finishes
25. Electric fixtures, motors, switch gear and other similar equipment

26. HVAC equipment, duck work, control systems, switches and other similar equipment

27. Others as appropriate

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable requirements of the State of Florida, and Broward County ordinances and regulations concerning management of construction, clearing, and inert materials, including disposal bans established by Solid Waste Regulations.

B. Disposal Site, Recyclers and Waste Materials Processors: Use only facilities properly permitted by the State of Florida, and/or by local authorities where applicable.

C. Pre-C&D Waste Management Meeting

1. Prior to beginning work at the site, schedule and conduct a meeting to review the C&D Waste Management Plan and discuss procedures, schedules, coordination and specific requirements for waste materials recycling and disposal. Identify and resolve problems of compliance with requirements. Record minutes of the meeting, identifying conclusions reached and matters requiring further resolution. Maintain waste management as an agenda item at future construction meetings.

2. Attendees: The Contractor and related contractor personnel associated with work of this Section, including personnel in charge of the waste management program; C&D Quality Manager; Engineer; material and equipment suppliers where appropriate; and City personnel.

3. Plan Revision: Make revisions to C&D Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit revised plan to Engineer and the City personnel for approval.

D. Implementation

1. The Contractor shall designate a single on-site party employed directly by the Contractor to be responsible for instructing workers, including subcontractors, suppliers and haulers, and implementing the C&D Waste Management Plan.

2. Distribute copies of C&D Waste Management Plan to job site foreman and each subcontractor.

3. Establish dedicated location for collection and storage of materials to be recycled or processed. Clearly mark containers to assure proper storage and to minimize contamination.

4. Include waste management and recycling training in worker orientation.

5. Provide on-site instruction on appropriate separation, handling, recycling, and recovery methods to be used by all parties at the appropriate stages of the work at the site.

6. Include discussion of waste management and recycling in regular job meeting and job safety meetings conducted during the course of work at the site.

E. The Contractor shall be responsible for ensuring that the appropriate governmental entities are notified of the work and for establishing contracts, or accounts for processing, recycling, disposal, etc.

F. Remove and relocate reusable materials to be reinstalled or sent to a reuse facility in a manner to prevent damage or contamination.

G. Conduct construction and demolition in such a manner to minimize damage to trees, plants and natural landscape environment.

H. Arrange for adequate collection, and transportation to deliver the recovered materials to the approved recycling center or processing facility. Maintain records accessible to the Engineer for verification of diversion of recovered waste materials.

1.06 STORAGE AND HANDLING

A. Site Storage

1. The Contractor shall promptly remove materials for recycling and recovery from the Work locations to approved containers or storage area as required. Failure to remove waste or recovered materials will be considered cause for withholding payment.

2. Position containers for recyclable and recoverable waste materials at a designated location on the Project Site. If materials are sorted on site, also provide a sorting area and necessary storage containers.

3. Change-out loaded containers for empty containers as demand requires.

4. If recovered materials are stored on-site for project duration provide adequate security from pilferage.

B. Handling

1. Deposit recyclable, and recoverable materials in storage areas or containers in a clean (no mud, adhesive, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until materials have been cleaned.

2. Insure all recovered materials are made safe for handling and storage.

1.07 PROJECT CONDITIONS

A. Environmental Requirements

1. Transport recyclable and recoverable waste materials from the Work Area to containers and carefully deposit in the containers without excess noise and interference with other activities, to minimize noise and dust.

2. Provide measures to insure the containment of hazardous materials that may affect environmental health and safety conditions.

B. Site Condition

1. All recycling containers shall be clearly labeled and shall list acceptable and unacceptable materials. Signs shall be posted in English and Spanish, and in graphic symbols. Signs and instructions should be clear, and easy to understand.

2. The Contractor shall ensure the safety of all personnel involved in the C&D process.

3. All materials and containers shall be removed from the site at completion of the Work and the site shall be restored as directed by the Engineer.

PART 2 – PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

3.01 SALVAGED AND REUSE MATERIALS:

A. Where the following items are rejected for use in the Work due to wrong size, damage during construction or shipping and cannot be shipped back to the original manufacturer the material may be salvaged or taken to a Reuse Center where approved by the City and Engineer:

B. The following components and fixtures may be collected for reuse:

1. Plumbing fixtures

2. Windows

3. Doors

4. Cabinets

5. Masonry Units

6. Millwork, paneling and other similar interior finishes

7. Electric fixtures, motors, switch gear and other similar equipment

8. HVAC equipment, duct work, control systems, switches and other similar equipment

9. Architectural fixtures

10. Others as appropriate

C. Wood used for temporary walls and supports may be collected for reuse as temporary walls and supports or taken to a Reuse Center where approved by the City and Engineer.

3.02 RECYCLED MATERIALS

A. At a minimum the following materials shall be collected for recycling:

1. Asphalt
2. Concrete and concrete blocks
3. Tile and masonry materials
4. Ferrous metal
5. Non-ferrous metals: copper, aluminum, etc
6. Untreated lumber
7. Plywood, OSB and particle board
8. Gypsum wallboard scrap
9. Paper and cardboard
10. Beverage containers
11. Insulation
12. Rigid foam
13. Glass, Clear and Colored
14. Carpet and pad
15. Trees and shrubs
16. Soil
17. Motor Oil and Oil Filters

3.03 COMPOSTING

A. On-site composting is prohibited. Use of approved composted materials for horticultural soil amendment is encouraged.

3.04 ON SITE PROCESSING

A. On site processing of construction materials shall be approved in advance by the Engineer and the City. Processing may include, but not be limited to grinding and screening of land

clearing debris, clean wood wastes, pallets, concrete, and masonry generated on the site only. No materials from other sites shall be hauled to the site for storage or processing. Such processed materials may be reused on site, where allowed by the Specifications and approved by the Engineer or may be hauled for reuse on other sites.

- END OF SECTION -

PROJECT NO. 12337

SECTION 01660

EQUIPMENT TESTING AND STARTUP

PART 1 -- GENERAL

1.01 GENERAL

A. Equipment testing and startup are requisite to satisfactory completion of the contract and, therefore, shall be completed within the Contract time.

B. As construction of each system of the project enters the final stages of completion, the Contractor shall, in accordance with the requirements set forth in the Contract Documents, attend to the following items:

1. Complete all Punch List items required by the Engineer prior to startup.
2. Schedule equipment manufacturer's visits to site.
3. Calibration of instruments and controls.
4. Perform required testing adjusting and balancing of project components.
5. Complete all Punch List items that result from testing.
6. Schedule and coordinate training and testing activities.
7. Furnish skilled personnel from manufacturers and suppliers during training and testing activities.
8. Furnish operation and maintenance training for City's personnel.
9. Successfully demonstrate reliable operation of project systems.

1.02 DEFINITIONS

A. Facility Startup: Includes putting Project in operating order, cleaning, adjusting and balancing equipment, initial operation (startup) of equipment item, operating equipment, starting systems, operation of systems, testing of equipment and systems, completing required punch list items, and demonstration and verification of the completed facility as a unit.

B. Functional Test: A test or tests in the presence of the Engineer and/or City to demonstrate that the installed equipment or system meets manufacturer's installation and adjustment requirements and other requirements specified including, but not limited to, noise, vibration, alignment, speed, proper operation of electrical, mechanical and information and control equipment, thrust restraint, proper rotation, and initial servicing.

C. System Performance Test: A test performed in the presence of the Engineer and/or City after satisfactory completion of required functional testing, to demonstrate and confirm that

the equipment and/or system meet the specified performance requirements for a specified minimum operation period without significant interruption. System performance testing shall not begin until the following are completed:

1. The Contractor has submitted written test reports, installation reports, and performance affidavits as required in the Contract Documents.

2. The Contractor has completed all punch list items.

3. The Contractor has completed all functional testing.

D. Operation Period: The operation period for each system Performance Test shall be 7 consecutive calendar days without significant interruption.

E. Significant Interruption: May include any of the following events:

1. Failure of Contractor to maintain qualified onsite startup personnel as scheduled.

2. Failure to meet specified performance for more than two consecutive hours.

3. Failure of any critical equipment unit, system, or subsystem that is not satisfactorily corrected within five hours after failure.

4. Failure of noncritical unit, system, or subsystem that is not satisfactorily corrected within eight hours after failure.

5. Failure of power supply installed by the Contractor.

6. As may be determined by Engineer.

F. System: The overall process, or a portion thereof, that performs a specific function. A system may consist of two or more subsystems as well as two or more types of equipment. The “System” shall be as determined by the Engineer.

G. Training: The services provided by the Contractor and his equipment supplier to ensure that the City’s staff is completely prepared to operate and maintain the contract facilities. Training shall include classroom instruction, as well as “hands-on” field / equipment demonstration, operation, and maintenance. Equipment / contract facilities shall be 100 percent “operational” (as defined by the Engineer) during training activities.

1.03 CONTRACTOR’S RESPONSIBILITIES

A. The Contractor shall designate and furnish one or more persons to be responsible for coordinating and expediting Contractor’s facility startup, testing, and training duties. The person or persons shall be present during Facility Startup, Functional Testing, and Training meetings and shall be available at all times during the Facility Startup and training period. In addition, the person or persons shall be “on call” (available to assist the City) at all times during the System Performance Testing.

B. The Contractor shall provide the services of an experienced and authorized representative of the supplier of each item of equipment (excluding minor items of equipment specifically

exempted by the Engineer in writing), who shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, the Contractor shall arrange to have the supplier's representative revisit the job site as often as necessary

until any and all trouble is corrected and the equipment installation and operation are satisfactory to the Engineer.

C. The Contractor shall require that each supplier's representative furnish to the Engineer a written report addressed to the City, and copied to the Engineer, certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, has been operated satisfactorily under the complete range of, including but not limited to, full-load, conditions, is ready for operation and the City's operating personnel have been instructed in the operation, maintenance and lubrication of the equipment.

D. The Contractor shall furnish all personnel, power, water, chemicals, fuel, oil, grease, and all other necessary equipment, facilities, and services required for conducting the tests.

E. The Contractor shall coordinate startup, testing, and training activities with City / Engineer in advance and in writing.

1.04 SUBMITTALS

A. Completed Manufacturer’s Certificate of Proper Installation for each equipment item specified for the project. Submit prior to beginning functional testing procedures.

B. Test Schedules and Test Plans: Eight (8) copies of functional and system performance test schedules and plans for equipment, units, and systems shall be submitted to the Engineer, in accordance with the Section 01300 – Submittals at least 30 days prior to start of related testing. Startup shall not commence without prior approval of the test plan. The test plan shall contain the following at a minimum:

1. A schedule of all testing to be conducted.
2. A brief description of the testing to be performed.
3. Testing criteria.
4. Checklists and procedures for performing each test.
5. Sample forms for the collection of test data.
6. Sample test results documentation.
7. Requirements for other parties.

C. Test Reports: Functional and performance testing reports in a format acceptable to the Engineer, shall be furnished in accordance with the Section 01300 - Submittals. Test reports shall be submitted prior to project closeout in accordance with the requirements of the Section 01700 - Project Closeout.

D. Training Schedules and Plan: Eight (8) copies of written training schedule and written training plan shall be submitted to the Engineer, in accordance with the Section 01300 Submittals at least 30 days prior to start of related operation and maintenance training. The training plan shall contain the following at a minimum:

1. A schedule of all training to be conducted. The training schedule shall be adjusted as deemed necessary by the City, to allow full participation by the supplier's representative, City's personnel and as needed if the operability of the system being trained on is interrupted for any reason. This may require training during three separate shifts.

2. A brief description of the training to be performed.

3. Sample training materials and handouts.

4. Qualifications of the supplier's representative performing the training.

5. Training agenda for each major equipment item shall be prepared. As a minimum, the agenda shall include but not limit to the following items:

a. General description of the equipment item

b. Start-up procedure

c. Shutdown procedure

d. Operation and control description

e. Adjustment and trouble-shooting

f. Maintenance

E. Written Notification: Any Contractor activity that may impact operation of existing facilities shall be confirmed in writing at least seven (7) days in advance of initiation of that activity. This requirement is in addition to the 30-day advance submittal of plans to more clearly confirm coordination efforts required. This notification shall include, as minimum:

1. Scheduled date and time (start, finish, duration) of Contractor's activity.

2. Brief description of activity.

3. Brief description of any City activity that is required to coordination with Contractor's activity (such as shutdown of a unit process or system, power supply, etc.).

PART 2 – PRODUCTS

2.01 WATER, FUEL, CHEMICALS, AND ELECTRICITY

A. The City will supply potable water for system checkout, start-up and testing. The Contractor shall notify the City a minimum of one (1) week prior to taking water at a rate greater than 1 mgd.

B. The City will provide electricity for system checkout, start-up and testing.

C. The Contractor shall furnish all chemicals and fuel required throughout the checkout, testing, and start-up period.

PART 3 -- EXECUTION

3.01 PREPARATION FOR EQUIPMENT FUNCTIONAL TESTING

A. The following shall be completed prior to the Contractor initiating the Functional Testing:

1. Conduct (or have previously conducted, whichever is appropriate) all field inspections and tests as defined in the individual specification sections, installation checks, disinfection, hydrostatic tests, other preliminary or initial tests, and necessary corrections required, to demonstrate that individual components of the Work have been properly erected and found to operate in accordance with the Contract Documents, so that they can be utilized for their intended purposes.

2. Remove all electrical jumpers, bypasses or other items connected to the equipment which are not intended to remain in the facility and are not required by the specifications. Demonstrate that each component is operating under its own control as designated.

3. Confirm that all electrical circuits are energized in the automatic position, that valves and gates are set to their normal position and that the flow path through the Work is unobstructed.

4. All identification tagging and pipe identification shall be complete prior to initiation of functional testing.

5. All spare parts and special tools shall be delivered to City prior to initiation of function testing.

6. Notification by Contractor of equipment readiness for testing.

7. Acceptable testing plan.

8. Acceptable Operation and Maintenance Manuals.

9. Receipt of Manufacturer's Certificate of Proper Installation.

10. Adequate completion of Work adjacent to, or interfacing with, equipment to be tested.

11. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.

12. Satisfactory fulfillment of other specified manufacturers' responsibilities.

3.02 FUNCTIONAL TESTING A.

General:

1. Begin testing at a time mutually agreed upon by the City and/or Engineer, manufacturer's representative(s), and Contractor.

2. Submit functional and system performance test schedules and plans for equipment, units, and systems shall be submitted to the Engineer at least 30 days prior to start of related testing in accordance with Section 01300 – Submittals.

3. Separate items of equipment demonstrated to function properly during subsystem testing may require no further functional test if documentation of subsystem testing is acceptable to Engineer.

4. Conduct functional test until each individual component item or system has achieved a minimum of 2 continuous hours of satisfactory operation; unless a longer length of time is specified elsewhere in the Technical Specifications for specific equipment items. The longer period of time shall apply. Demonstrate all operational features and controls function during this period while in automatic modes.

5. If, in Engineer's opinion, each system meets the functional requirements specified, such system will be accepted as conforming for purposes of advancing to performance testing phase, if required. Complete and initial appropriate section of the Manufacturer's Certificate of Proper Installation. This Certificate shall be retained by the Engineer.

6. If, in Engineer's opinion, functional test results do not meet requirements specified, the systems will be considered as nonconforming.

3.03 SYSTEM PERFORMANCE TESTING A.

General:

1. The startup of each facility and performance testing is a highly complex operation requiring the combined technical expertise of the Contractor, suppliers, subcontractors, the Engineer, and the City. The Contractor shall provide the effective and advance coordination of all parties necessary for the successful startup.

2. System performance testing shall not commence until Punch List items are adequately addressed to the Engineer's satisfaction, and the equipment or system meets functional tests specified.

3. All defects in materials or workmanship that appear during the system performance test shall be immediately corrected by the Contractor. Time lost for equipment repairs, wiring corrections, control point settings, or other reasons which actually interrupt the startup may, at the discretion of the Engineer, be justifiable cause for extending the system performance test Operation Period.

4. Should a significant interruption as defined previously in this Section be incurred, the test shall be restarted from the beginning, unless the failure is of two hours or less in duration, or considered minor by the Engineer. The Contractor shall bear all costs associated with restarting the test period. Restart of the test period shall be solely at the Engineer's discretion.

B. System Performance Testing:

1. The duration of the system performance test shall be as defined in Article 1.02 of this Section, or as defined elsewhere in the Documents, whichever is longer.

2. The Contractor shall provide technical representatives of all equipment manufacturers, system suppliers, subcontractors, etc. for as-needed service to address mechanical malfunctions.

3. The Contractor shall furnish and coordinate the services of technical representatives of all equipment manufacturers to perform the testing services outlined in Contract Documents and the testing plan. The technical representatives of all equipment manufacturers shall perform startup testing and prepare test reports.

4. During the System Performance Testing, the Contractor shall assist the City in directing the City's personnel performing routine operating functions for the new facility.

5. The Contractor shall also be responsible for furnishing mechanics, labor, materials, and equipment that may be required to repair any malfunctions to equipment furnished and installed under the scope of this project.

6. Upon successful completion of the performance test complete, date and initial the appropriate section of the Manufacturer's Certificate of Proper Installation. This form shall be retained by the Engineer.

3.04 O&M TRAINING

A. The training period shall not begin until successful completion of all system Functional Testing. The training period may be concurrent with the Performance Testing period; however, shall not be deemed complete, or shall be considered interrupted if there is a Significant Interruption of the Performance Testing. If a Significant Interruption occurs, training shall be repeated and/or continued at the City's option, at the time that the Performance Testing restarts. Also, training shall not begin until all O&M Manuals, specified in the Section 01300 - Submittals and Section 01430 – Operation and Maintenance Data, have been accepted by the Engineer.

B. During the training period the Contractor shall provide the services of an experienced representative of the supplier of each item of equipment (excluding minor items of equipment specifically exempted by the Engineer in writing), who shall visit the site and instruct the City's operating and maintenance personnel in correct operation and maintenance procedures. It is noted that training requirements are specified throughout the Contract Documents. The instruction shall demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment. Training shall include classroom and field / hands-on (with operational equipment) instruction. Training shall be provided only while the respective representative's equipment is fully operational. On-site instruction shall be given by qualified persons who have been made familiar in advance with the equipment and systems at the project site.

C. Training shall be scheduled and coordinated by the Contractor. Training hours shall be arranged in writing with the City at least 14 days in advance of the scheduled training with a subsequent written confirmation at least 48 hours in advance.

- END OF SECTION -

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

TO ENGINEER:_____

_____ PROJECT NO: _____

_____

EQPT/SYSTEM: _____ SPEC SECTION: _____

EQPT SERIAL NO: _____ EQPT TAG NO: _____
PROJECT:

CITY:

I hereby certify that the above-referenced equipment/system has been:

PROPER INSTALLATION CHECKLIST:

- ☐ Installed in accordance with Manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards. ☐ All applicable safety equipment has been properly installed.

FUNCTIONAL TEST CHECKLIST:

- ☐ Has been functionally tested, and meets specified requirements.

Functional Test Date: _____ Start Time: _____ End Time: _____

PERFORMANCE TEST CHECKLIST:

- ☐ Has been performance tested, meets specified requirements, and is ready for startup.

Performance Test Start Date: _____ End Date: _____

NOTE: *Attach functional test and performance test documentation from manufacturer.*

Comments:

PROJECT NO. 12337

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____ , 20 ____

Manufacturer: _____

ByManufacturer'sAuthorizedRepresentative: _____

Authorized Signature

PROJECT NO. 12337

SECTION 01700

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Final Cleaning

1. At the completion of the work, the Contractor shall remove all rubbish from and about the site of the work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which he or any of his Subcontractors may have used in the performance of the work. Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds.

2. Contractor shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces so as to leave work in a clean and new appearing condition.

3. Contractor shall maintain cleaning until project closeout

B. Lubrication Survey

1. NOT USED

C. Spare Parts and Special Tools

1. As soon as practicable after approval of the list of equipment, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and source or sources of supply.

2. Contractor shall also furnish a list of parts, and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified to be furnished as part of the Contract and a list of additional items recommended by the manufacturer to assure efficient operation for a period of one-hundred and twenty (120) days for the particular installation.

3. All parts shall be securely boxed and tagged, and clearly marked on the box and individually for identification as to the name of manufacturer or supplier, applicable equipment, part number, description and location in the equipment. All parts shall be protected and packaged for a shelf life of at least ten (10) years.

4. Unless otherwise specified in the Contract Documents, the Contractor shall, as a minimum, furnish at no additional cost to the City with each piece of equipment, one (1) complete set, or the number of sets called for in the Technical Specifications

(whichever is greater), of suitably marked special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment.

5. The Contractor shall submit, for approval by the Engineer, a complete list of the special tools and appliances to be furnished. Such tools and appliances shall be furnished in approved painted steel cases properly labeled and equipped with good grade cylinder locks and duplicate keys.

D. Equipment Start-Up Services

1. In the event a system, equipment or component proves defective or is unable to meet specified performance criteria, the Contractor shall replace the defective item and the minimum one (1) year guarantee period, or the guarantee period called for in the Technical Specifications shall start after satisfactory replacement, testing and acceptance of the item along with the completion of all other pre-requisites as required bt the Contract Documents.

E. Final Cleanup; Site Rehabilitation

1. Before finally leaving the site, the Contractor shall wash and clean all exposed surfaces which have become soiled or marked, and shall remove from the site of work all accumulated debris and surplus materials of any kind which result from his operation, including construction equipment, tools, sheds, sanitary enclosures, etc. The Contractor shall leave all equipment, fixtures, and work, which he has installed, in a clean condition. The completed project shall be turned over to the City in a neat and orderly condition.

2. The site of the work shall be rehabilitated or developed in accordance with other sections of the Specifications and the Drawings. In the absence of any portion of these requirements, the Contractor shall completely rehabilitate the site to a condition and appearance equal or superior to that which existed just prior to construction, except for those items whose permanent removal or relocation was required in the Contract Documents or ordered by the City.

F. Final Inspection

1. Final cleaning and repairing shall be so arranged as to be finished upon completion of the construction work. The Contractor will make his final cleaning and repairing, and any portion of the work finally inspected and accepted by the Engineer shall be kept clean by the Contractor, until the final acceptance of the entire work.

2. When the Contractor has finally cleaned and repaired the whole or any portion of the work, he shall notify the Engineer that he is ready for final inspection of the whole or a portion of the work, and the Engineer will thereupon inspect the work. If the work is not found satisfactory, the Engineer will order further cleaning, repairs, or replacement.

3. When such further cleaning or repairing is completed, the Engineer, upon further notice, will again inspect the work. The "Final Payment" will not be processed until the Contractor has complied with the requirements set forth, and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

G. Project Close Out

1. As construction of the project enters the final stages of completion, the Contractor shall, in concert with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to his contract:

   a. Scheduling equipment manufacturers' visits to site.

   b. Required testing of project components.

   c. Scheduling start-up and initial operation.

   d. Scheduling and furnishing skilled personnel during initial operation.

   e. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the Engineer's "Punch" Lists.

   f. Attend to any other items listed herein or brought to the Contractor's attention by the Engineer.

2. Just before the Engineer's Certificate of Substantial Completion is issued, the Contractor shall accomplish the cleaning and final adjustment of the various structure components as specified in the Specifications and as follows:

   a. Remove all stains, marks, fingerprints, soil, spots, and blemishes from all finished surfaces, tile, stone, brick, and similar surfaces.

3. In addition, and before the Certificate of Substantial Completion is issued, the Contractor shall submit to the Engineer (or to the City if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. A partial list of such items appears below, but it shall be the Contractor's responsibility to submit any other items which are required in the Contract Documents:

   a. Test results of project components.

   b. Performance Affidavits for equipment.

   c. Certification of equipment or materials in compliance with Contract Documents.

   d. Operation and maintenance instructions or manuals for equipment.

e. One set of neatly marked-up record drawings showing as-built changes and additions to the work under his Contract.

f. Any special guarantees or bonds (Submit to City).

4. The Contractor's attention is directed to the fact that required certifications and

information under Item 3 above, must actually be submitted earlier in accordance with other Sections of the Specifications.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

Advancement of Constructic Technology

ΠΥΝΧΗ ΛΙΣΤ

Προφεχτ 12337 _____ Φρομ(Α/Ε): _____

_____ Σιτες ισιτ Δατε: _____

Το(Χοντραχτορ): _____ Α/Ε Προφεχτ Νυμβερ: _____

_____ Χοντραχτ Φορ: _____

Τη εφλλοωινγ ιτεμς ρεθυιρε τη εατεντιον οφ τη εΧοντραχτορ φορ χομπλετιον ορ χορρεχτιον. Τη ισ λιστ μαψ νοτ βε αλλ-ιν χλυσιε, αν δ τη εφαιλυρε τοιν χλυδε αν ψ ιτεμ σον τη ισ λιστ δοεσ νοτ αλτερ τη ε ρεσπονσιβιλιτψ οφ τη ε Χοντραχτορ το χομπλετε αλλ Wορκ ιν αχχορδανχε ωιτη τη ε Χοντραχτ Δοχυμεντς.

Ιτεμ Νυμβερ	Ροοm Νυμβερ (Αρεα)	Λοχατιον	Δεσχριπτιον	Χορρεχτιον/Χομπλετιον Δατε	ς ερ ιφχατιον Α/Ε Χηεχκ

☐ Ατταχημεντς

Σιγνεδ βψ: Δατε:

Χοπιεσ ☐ Οωνερ ☐ Χονσυλταντσ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ Φυλε

Σεπτεμβερ 1996
ΧΣΙ Φορm 14.1A

Public Works Department-Engineering

Final Inspection Punch-List Corrective Action Form

Project Number:12337 **Project Name:**_____ **Inspection Date:**_____

Contractor:_____ **Project Manager:**_____ **Inspector:**_____

Item No.	Description of Deficiency	Date Completed		Comments
		Contractor	PM/CI	

Instructions for completing the *Final Inspection Punch-list Corrective Action Form.*

The Construction Project Manager, in conjunction with the assigned construction inspector is responsible for preparing this form. It shall be completed in cooperation with the project's prime contractor and will be used as the official record for any and all punch-list items. Under no circumstances shall final payment be made until all items identified on this form are corrected to the satisfaction of the Construction Project Manager.

1. Prior to scheduling Substantial Completion/Final Inspection, all permits should be cleared by the building department, all O&M Manuals should be turned over to the city, and all warranty information should be provided in a three ring binder and on CD-ROM.
2. Schedule inspection, coordinating with necessary staff to properly evaluate the completeness of the project.
3. The Final Inspection Punch-list Corrective Action Form is to be used to document discrepancies that are minor in nature (i.e., paint chips, minor blemishes, etc….) if major items of work are not complete, lack required quality, or are not acceptable for any reason, the final inspection should be rescheduled for a time when these items have been completed.
4. Fill in the form completely: Project Number and Name, Date of inspection, the contractor's name, PM and inspector's names should all be filled in.
5. Beginning with item number 1, list the description of the deficiency, and any amplifying information required to fully document the item to be corrected. For instance, Item No. 1; Description of Deficiency - Door entering main office sticks; Notes – Door should be adjusted to open and close properly.
6. Use as many forms as required to fully document the inspection results. In the lower right hand side of the form indicate page number and total number of forms used (for example 1 of 4)
7. If there is any disagreement as to whether or not an item is a deficiency, it should be documented and then
8. When an item is corrected, the Contractor shall initial the form and indicate the date work was completed. If the PM/CI concurs with the acceptance of the work, they will initial and date in the corresponding block.
9. Substantial completion will not be issued if there is a large number of punch list items or if there are major deficiencies with the work. If you have any questions regarding whether or not an item is major, or if there are a large number deficiencies, contact the Senior Project Manager.
10. Under no circumstances will final payment be made without documented completion of the Punch-List.
11. This is a four part carbonless form: white copy – project file (scanned copy to unifier project file), yellow copy – to superintendent or CQC representative, pink – copy to contractor home office, orange copy – Construction Inspector

PROJECT 12337

SECTION 01780

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.

   a. Record Documents.

   b. As-built drawings (signed and sealed hardcopies and electronic format – PDF and CAD files)

   c. Special Bonds, Special Guarantees, and Service Agreements.

   d. Consent of Surety to Final Payment.

   e. Releases or Waivers of Liens and Claims.

   f. Releases from Agreements.

   g. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 001025, Measurement and Payment.

   h. Spare Parts, Special Tools and Extra Materials: As required by individual Specification sections.

B. Subcontractor Identification Form:

1. Submit form with final pay request.

2. Submit a separate form for each subcontractor used.

3. For Capital Improvement Projects, submit form along with final pay request to the PCM.

4. Form is attached as a Supplement to this Section.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.

2. Accuracy of Records:

   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.

b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.

3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.

4. Prior to submitting each request for progress payment, request PCM's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by PCM to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way. B. In the Event Contractor is Unable to Secure Written Releases:

1. Inform PCM of the reasons.

2. Owner or its representatives will examine the site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.

3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory Bond in a sum to cover legal claims for damages.

4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

1.04 AS-BUILT DRAWINGS

A. Quality Assurance

1. As-built drawings must meet all minimum City of Fort Lauderdale CAD standards and be submitted in the latest version of AutoCAD available at the time the contract is signed.

2. As-built drawings will be submitted in both electronic and hard copy forms as follow:

a. 3 hard copy sets of as-builts will be submitted on 24x36 paper signed, sealed, and dated by a Florida Professional Licensed Surveyor (PLS).

b. 1 CD or jump drive which will include both DWG files for the package and a PDF document including the surveyors signature and seal.

3. As-built drawings will include the following:

a. PLS name, business name, license numbers, address, and telephone number

b. The following statement must be included:

"I hereby certify that the as-built location information of the potable water, reclaimed water, wastewater and drainage facilities shown on these drawings conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050(10)(i) (Florida Administrative Code), as adopted by the Department of Agriculture and Consumer Services, Board of Professional Surveyors and Mappers, and that said as-builts are true and correct to the best of our knowledge and belief."

c. As-built drawings will contain the information on the design drawings (plan and profile views) plus document changes between the design and construction including correcting all information that is incorrect due to changes during construction. Incorrect or no longer relevant information will be erased or struck through. All location changes constructed materially different (one-tenth foot horizontal, one tenth vertical) than the design location will have their design location struck through and will be redrafted at the constructed location. Design drawing dimensioning will be corrected as necessary.

4. Drawing will be a complete set including cover sheet, index, and any other sheets included in the approved design set. Standard detail sheets are not necessary.

B. Minimum As-Built Drawing Requirements (Not applicable for this project), except in cases where a permitting agency requires an as-built.

1. Show the location of easements used by the water and wastewater facilities.

2. Indicate pipe joint locations where water and wastewater or reclaimed water piping crosses.

3. Indicated the length of gravity wastewater piping and actual slope between manhole centers.

4. Show all abandoned in place facilities including the extent and method of abandonment.

5. Show elevations to the nearest tenth of a foot for top of pipe for water mains, force mains, and reclaimed water mains at vertical deflection points, all bends,

valves and fittings and every 200 feet along straight runs and where they cross all other facilities.

6. Show elevations to the nearest one hundredth of a foot for manhole rims, gravity main inverts at the manhole, force main connections to manholes, lift station top of slab, bottom of wet well, influent pipe invert and control set points.

PART 2 - PRODUCTS (NOT USED) PART 3 - EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS A.

General:

1. Promptly following commencement of Contract Times, secure from Engineer, at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.

2. Delete Engineer title block and seal from all documents.

3. Label or stamp each record document with title, “RECORD DOCUMENTS,” in neat large printed letters.

4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded. Contractor is responsible for maintaining up-to-date “red-lined” markups, on site, of all changes including revised locations of buried features and provide access to the City for review at any time.

5. All piping inserts, fittings, and valve locations shall be located by a Florida Licensed Surveyor in accordance with City of Fort Lauderdale surveying standards and per NAVD 88. Contractor shall provide adequate notice to the surveyor to ensure that all locations are accessible, prior to backfill. B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

2. Make documents and Samples available at all times for observation by PCM or Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.

a. Color Coding:

1) Green when showing information deleted from Drawings.

2) Red when showing information added to Drawings.

3) Blue and circled in blue to show notes.

2. Date entries.

3. Call attention to entry by “cloud” drawn around area or areas affected.

4. Legibly mark to record actual changes made during construction, including, but not limited to:

   a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.

   b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.

   c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.

   d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.

   e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.

   a. Clearly identify the item by accurate notes such as “cast iron drain,” “galv. water,” and the like.

   b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).

   c. Make identification so descriptive that it may be related reliably to Specifications.

D. Coordination with Florida Licensed surveyor:

1. Contractor shall not cover any bends, valves, or fittings installed until they have been located by the survey crews for the purpose of preparing as-built and/or Record Drawings.

2. If the above conditions are not met, for any reason, Contractor shall bear the cost of potholing the constructed installation to allow for the locations.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and PCM.

2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.

3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.

4. Clean all windows.

5. Clean and wax wood, vinyl, or painted floors.

6. Broom clean exterior paved driveways and parking areas.

7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.

8. Rake clean all other surfaces.

9. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.

10. Leave water courses, gutters, and ditches open and clean.

    a. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

    b. Meet all requirements of Section 02575, Surface Restoration.

3.03 SUPPLEMENTS

A. The supplements listed below, following “END OF SECTION,” are part of this Specification.

1. Subcontractor Identification Form.

- END OF SECTION -

DIVISION 2

SITEWORK

PROJECT NO. 12337

SECTION 02015

MOBILIZATION, SITE PREPARATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Work specified in this section consists of all Work necessary to move in personnel and equipment and prepare the site for construction, complete and to remove the same personnel and equipment from the site when construction is complete.

B. The limits of the Contractor's staging area and other applicable restrictions are shown on the Drawings.

PART 2 - PRODUCTS

2.01 TEMPORARY UTILITIES

A. The Contractor shall provide all temporary facilities required for performing the Work as specified in Section 01500 – Construction Facilities and Temporary Controls and Section 01590 – Field Office, Equipment and Services.

PART 3 - EXECUTION

3.01 LAYOUT

A. The Contractor shall set up construction facilities in a neat and orderly manner within designated areas as noted on the Staging Plan drawing of the Contract documents. It shall accomplish all required Work in accordance with applicable portions of these specifications and shall confine its operations to Work areas as shown on the drawings or as approved by the City and Engineer.

3.02 DEMOBILIZATION

A. At the completion of Work the Contractor shall remove its personnel, equipment, and temporary facilities from the site in a timely manner. The Contractor shall also be responsible for transporting all unused materials belonging to the City to a place of storage on site designated by the City and for removing from the site and disposing of all other materials and debris resulting from the construction. It shall then return all areas used for its activities to a condition as noted on the Contract Documents.

- END OF SECTION –

02015 MOBILIZATION, SITE PREPARATION AND DEMOBILIZATION
1

PROJECT NO. 12337

SECTION 02200

SITE PREPARATION

PART 1 - GENERAL

1.01 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches caliper to a depth of 12 inches below subgrade.

D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.

E. Stripping: Removal of topsoil remaining after applicable scalping is completed.

F. Project Limits: Areas, as specified, within which Work is to be performed.

1.02 QUALITY ASSURANCE

A. Obtain CONSULTANT's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

B. The Contractor shall protect areas shown on the Drawings or designated by the Engineer to remain protected from damage by construction operations by erecting suitable barriers of other acceptable means. Areas outside the limits of construction as shown on the Drawings shall be protected and no equipment or materials shall be stored or allowed to damage these areas.

1.03 SCHEDULING AND SEQUENCING

A. Prior to any site preparation activity, all protected areas must be clearly delineated by barrier and all erosion and sediment controls must pass inspection by the City. Limit areas exposed to uncontrolled erosion during installation of temporary erosion and sediment controls.

PART 2 - MATERIALS

(NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or site improvements within limits specified.

B. Property obstructions which are to remain in-place, such as buildings, sewers, drains, water or gas pipes, bridges, etc., are to be carefully protected from damage.

C. Do not injure or deface vegetation that is not designated for removal. Any branches potentially interfering with construction operations shall be inspected by the City of Fort Lauderdale Urban Forester for approval; and tied back away from construction activity or pruned consistent with standard arboricultural practice prior to starting work.

3.02 LIMITS

A. Activity limits are as follows, but not to extend beyond project limits.

1. Excavation Including Trenches: 5 feet offset from top of cut slopes or shored wall.

2. Fill:

a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.

b. Stripping and Scalping: 2 feet beyond toe of permanent fill.

3. Waste Disposal:

a. Clearing: 5 feet beyond perimeter.

b. Scalping and Stripping: Not required.

c. Grubbing: Around perimeter as necessary for neat finished appearance.

4. Overhead Utilities:

a. Clearing, Grubbing, Scalping, and Stripping: Wherever grading is required, including borrow pits, ditches, etc.

b. Other Areas: As shown.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 TEMPORARY REMOVAL OF INTERFERING PLANTINGS

A. Remove and store, as specified in the Contract Documents, Trees, Palms, Shrubs and Ground Covers, that are not designated for removal but do interfere with construction or could be damaged by construction activities.

B. Photograph and document location, orientation, and condition of each plant prior to its removal. Record sufficient information to uniquely identify each plant removed and to assure accurate replacement.

C. The storage areas for all plants shall include optimal irrigation, loose rooting media (mulch, etc.) and adequate space for continued health and vigor of the stored plant material until time of planting.

3.04 CLEARING

A. Clear areas within limits specified.

B. Fell trees so that they fall away from facilities and vegetation not designated for removal.

C. Cut stumps not designated for grubbing 12 inches below the ground surface.

D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.05 GRUBBING

A. Grub areas within limits specified.

3.06 SCALPING

A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.

B. Scalp areas within limits specified.

3.07 STRIPPING

A. Do not remove topsoil until after scalping is completed.

B. Strip areas within limits to minimum depths specified. Do not remove subsoil with topsoil.

C. Stockpile strippings, meeting requirements of Section 02911 - Soil Preparation, for topsoil, separately from other excavated material.

3.08 TREE REMOVAL OUTSIDE CLEARING LIMITS A.

Remove Within Project Limits:

1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling, as determined by a certified arborist or the City of Fort Lauderdale Urban Forester.

2. Trees designated by Engineer.

3. Cut stumps off flush with ground, remove debris, grind stump and if disturbed, restore surrounding area to its original condition.

3.09 TREE CROWN REDUCTION

A. Conduct a Class IV Crown Reduction Pruning on trees designated by CITY utilizing NAA standard arboricultural practices so remaining portion will not strike facilities in falling. Where topping will remove more than 1/2 of a tree's crown, remove entire tree; and grind stump to 12 inches below grade.

B. Treat wounds resulting from topping in accordance with standard arboricultural practice to preserve the natural character of the tree.

3.10 PRUNING

A. Utilizing NAA standard arboricultural practices remove branches below the following heights:

1. Sixteen feet above roadways and shoulders.

2. Nine feet above sidewalks.

3. Six feet above roofs.

B. Prune in accordance with NAA standard arboricultural practice to preserve the natural character of the plant. Perform in presence of the CONSULTANT. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools. Do not cut lead shoot.

3.11 DISPOSAL

A. Clearing and Grubbing Debris:

1. Woody debris may be chipped. Chips may be sold to Contractor's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4-inch by 2 inch. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.

2. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.

B. Scalpings: As specified for clearing and grubbing debris.

C. Strippings:

1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite or in waste disposal areas approved by CONSULTANT.

2. Stockpile topsoil in sufficient quantity to meet Project needs. Ensure all proper sedimentation and erosion control measurements are maintained as long as stockpiles are stored. Dispose of excess strippings as specified for clearing and grubbing.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02220

DEMOLITION

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The work specified in this section consists of the removal and disposal or salvage of any existing structures, piping, conduits, electrical equipment, mechanical equipment, pavement surfaces, sidewalks, underground obstructions, and other appurtenances or portions thereof, as shown on the Drawings or as required to prepare the area for construction and complete the work.

B. Contractor shall refer to the Demolition notes included on the Drawings. Contractor shall provide a waste manage plan for approval. Contractor shall implement a waste management plan as per drawings demolition notes.

C. All materials designated for disposal shall, when released by the Engineer, become the Contractor's property and shall be removed from the site and disposed of by the Contractor. Contractor shall implement a waste management plan as per drawings demolition notes.

D. All materials designated to be salvaged shall be carefully removed and moved to a designated location as approved by the City and the Engineer.

E. The Contractor shall assume full responsibility for coordinating with City staff and Engineer as necessary to visit the Project site, verify existing conditions, and properly include all costs associated with demolition, clearing and grubbing, protection of existing improvements and facilities, and the installation of all Work through Project completion and closeout in accordance with all requirements noted in these specifications and the Drawings.

F. No additional payment to the Contractor will be made as a result of impacts to the Work that may result from existing conditions and improvements, whether readily identifiable on the contract drawings or not.

G. The Contractor acknowledges that it has investigated the site and satisfied itself as to the conditions affecting the demolition work. The Contractor further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by the Drawings and Specifications made a part of this Contract, or any other information made available to it prior to receipt of Bids. Any failure by the Contractor to acquaint itself with the available information will not relieve it from responsibility for estimating properly the difficulty or cost of successfully performing the work.

H. The City assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the City.

1.02 DIMENSIONS OF EXISTING FACILITIES AND COMPONENTS

A. Where the dimensions, locations, number and type of existing improvements are of critical importance, the Contractor shall field verify.

1.03 SUBMITTALS

A. The Contractor shall submit for review, in accordance with the Section 01300 – Submittals.

B. Submit Demolition Work Plan indicating the proposed methods, equipment and operation sequence, including coordination for shut-off and isolation of existing facilities and utilities, temporary connections for continuation of service, buried utility location effort, and other applicable items to ensure no interruption of utility services except as agreed to with the City.

C. Submit Waste Management Plan as indicated on the Drawing Notes.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 UTILITIES

A. Notify City or appropriate utilities to turn off affected services before starting demolition or alterations. Provide not less than seven (7) days notice to the owner of the utility prior to the shutdown.

B. Remove utility lines exposed by demolition excavation.

C. Remove electric, sanitary, and storm drainage adjacent to buildings to be demolished.

D. Excavate utility lines serving buildings to be demolished and provide a permanent leakproof closure for water and gas lines.

E. Plug sewer lines at locations shown or at limits of excavation if not shown with concrete length of plug, 5 feet minimum to prevent groundwater infiltrating sewer systems.

3.02 REMOVAL AND STORAGE OF EQUIPMENT FOR REUSE

A. Do not remove equipment and materials without approval of Engineer.

B. Properly store and maintain equipment and materials in same condition as when removed.

C. Engineer will determine condition of equipment and materials prior to removal.

D. Contractor shall refer to Waste Management Requirements indicated on the Drawing Notes.

3.03 DEMOLITION AND DISPOSAL

A. Additional quantities of new construction or additional work caused by the demolition, beyond the limits, will be performed at the Contractor’s expense.

B. Drawings define minimum portion of structures to be removed. Unless otherwise shown, rough cuts or breaks may be made exceeding limits of demolition shown. Provide sawcut at limits of all pavement removal. Structures shall be removed in such a way as to leave no obstructions to any proposed new structures or to any waterways.

C. Core drill floor slabs, catch basins, and other concrete improvements to remain in place below ground, or break holes at structure's lowest point to allow water to freely migrate through.

D. Remove piping from areas to be backfilled. Pipe, valves, and fittings adjacent to those to be removed may also be removed as salvage.

E. Remove all materials associated with existing equipment that is to be removed or relocated.

F. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.

G. Extract existing piling, which conflict with new piles, prior to driving new piles.

H. Dispose of debris and other non-salvaged materials offsite in licensed landfills.

I. The removal of all equipment and piping, and all materials from the demolition of buildings and structure shall, when released by the City and Engineer, shall be done by the Contractor and shall become the Contractor's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to the Contractor's own place of disposal.

J. The Contractor shall de-energize all panelboards, lighting fixtures, switches, circuit breakers, electrical conduits, and similar power equipment prior to removal. Any electric panels or equipment that are to be retained shall be relocated or isolated prior to the removal of the equipment specified herein. All existing electrical equipment to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to keep the integrity of the grounding systems.

K. Conduits and wires shall be abandoned or removed as approved by the Engineer. All wires in abandoned conduits shall be removed. Abandoned conduits concealed in structures,

shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged and the area repaired in a flush, smooth, approved manner. Exposed conduits and their supports shall be disassembled and removed from the project site. Repair all areas of removal to prevent rust spots on exposed surfaces.

L. The Contractor shall proceed with the removal of equipment, piping and appurtenances only after approval of the Engineer.

M. Any equipment piping and appurtenances removed without proper authorization, shall be replaced to the satisfaction of the Engineer at no cost to the City.

N. Excavation caused by demolitions shall be backfilled with suitable fill free from rubbish and debris.

O. Demolition and removal work shall be performed by competent experienced workers for the various type of demolition and removal work and shall be carried out through to completion with due regard to the safety of worker on-site and the public. The work shall be performed with as little nuisance as possible.

3.04 BACKFILL

A. Demolished Areas: Backfill to existing ground level or foundation level of new construction.

B. Backfill Material and Compaction: Conform to Section 02315 – Fill and Backfill.

C. Do not use demolition debris as backfill material.

3.05 SALVAGE

A. Equipment and materials, including piping within the limits of demolition, unless otherwise specified, will become the property of Contractor.

B. Any material designated to remain by the City shall be stored in neat piles in a location directed by the City.

3.06 FIRE HYDRANTS

A. Salvage for future use by City.

B. Remove and leave for City in location directed by the City.

3.07 PROTECTION OF EXITING FACILITIES

A. The Contractor shall make such investigations, explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. The Contractor shall give particular attention to shoring and bracing requirements so as to prevent any damage to new or existing construction.

B. The Contractor shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, worker engaged in demolition operations, and adjacent construction.

C. The Contractor shall provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

D. The Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled or equipment moved.

E. The Contractor shall take necessary precautions to prevent dust from rising by wetting demolished masonry, concrete, plaster and similar debris. Unaltered portions of the existing buildings affected by the operations under this Section shall be protected by dust proof partitions and other adequate means. Existing electrical and mechanical equipment to remain shall be protected from damage, dust, and debris.

F. The Contractor shall provide adequate fire protection in accordance with local Fire Department requirements.

G. The Contractor shall not close or obstruct walkways, passageways, or stairways and shall not store or place materials in passageways, stairs or other means of egress. The Contractor shall conduct operations with minimum traffic interference.

H. The Contractor shall be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

3.08 QUALITY ASSURANCE

A. The demolition and removal shall be done with care, and shall include all required shoring, bracing, etc. The Contractor shall be responsible for any damage which may be caused by demolition and removal work to any part or parts of existing structures, landscape, utilities or items designated for reuse or to remain. The Contractor shall perform patching, restoration and new work in accordance with applicable specifications and in accordance with the details and notes shown on the Drawings. Prior to starting of work, the Contractor shall provide a detailed description of methods and equipment to be used for each operation and the sequence thereof for review by the Engineer.

B. All supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise specified or required. Concrete bases, anchor bolts and other supports shall be removed to approximately 1 inch below the surrounding finished area and the recesses shall be patched to match the adjacent areas. Superstructure wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, as specified under applicable Sections of these Specifications, as shown on the Drawings, or as directed by the Engineer. The Contractor shall clean existing surfaces of dirt, grease, loose paint, etc., before refinishing. Wall sleeves and castings shall be plugged or blanked off, all openings in concrete shall be closed in a manner meeting the requirements of the

appropriate Sections of these Specifications, as shown on the Drawings, and as directed and approved by the Engineer.

C. In general, masonry shall be demolished in small sections, and where necessary to prevent collapse of any construction, the Contractor shall install temporary shores, struts, and bracing.

D. The Contractor shall confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. The Contractor shall cut and remove insulation, etc., and provide temporary weather tight protection as required until new roofing and flashings are installed.

E. Materials or items designated to remain the property of the City shall be as hereinafter tabulated. Such items shall be removed with care and stored at a location at the site to be designated by the City.

F. Where equipment is shown or specified to be removed and relocated, the Contractor shall not proceed with removal of this equipment without specific prior approval of the Engineer. Upon approval, and prior to commencing removal operations, the equipment shall be operated in the presence of representatives of the Contractor, City and Engineer. Such items shall be removed with care, under the supervision of the trade responsible for reinstallation and protected and stored until required. Material or items damaged during removal shall be replaced with similar new material or item. Any equipment that is removed without proper authorization shall be replaced at no cost to the City.

G. Wherever piping is to be removed for disposition, the piping shall be drained by the Contractor and adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner.

H. Materials or items demolished and not designated to become the property of the City or to be reinstalled shall become the property of the Contractor and shall be removed from the property and legally disposed of.

I. The Contractor shall remove temporary work, such as enclosures, signs, guards, and the like when such temporary work is no longer required or when directed at the completion of the work.

3.09 MAINTENANCE

A. The Contractor shall maintain the buildings, structures and public properties free from accumulations of waste, debris and rubbish, caused by the demolition and removal operations.

B. The Contractor shall provide on-site dump containers for collection of waste materials, debris and rubbish in accordance with the Waste Management Plan.

C. At reasonable intervals during the progress of the demolition and removal work or as directed by the Engineer, the Contractor shall clean the site and properties, and dispose

of waste materials, debris and rubbish in accordance with the Waste Management Plan and Contract Documents.

3.10 CLEANUP

A. The Contractor shall, promptly and on a regular basis, remove from the project site all debris resulting from the demolition and removal operations as it accumulates in accordance with the Waste Management Plan. Upon completion of the demolition work, all materials, equipment, waste and debris of every sort shall be removed and the premises shall be left clean, neat and orderly.

B. Upon completion of the demolition work the disturbed areas shall be graded and prepared to receive proposed construction as specified in Division 2 of these documents.

3.11 EQUIPMENT AND MATERIALS RETAINED BY CITY/OWNER

A. The Contractor shall coordinate with the City about equipment they wish to salvage. Any items tagged by the City to be salvaged shall remain the property of the City and shall be delivered by the Contractor to the address as provided by the City.

B. All salvaged equipment and materials shall be relocated by the Contractor to the designated storage area. Contractor shall provide City and Engineer with a minimum 7 days written notice of Contractor's intent to deliver salvaged equipment to aforementioned storage facility.

C. Items to be salvaged shall include, but are not limited to the following:

1. Docks and dock equipment

3.12 STATEMENT OF RESPONSIBILITIES REGARDING ASBESTOS

A. The Contractor is responsible for performing a pre-demolition asbestos inspection as required by the Broward County Environmental Protection and Growth Management Department (BCEPGMD) and Florida Department of Environmental Protection (FDEP) for purposes of procuring permits.

B. The Contractor shall furnish all labor, equipment and materials, and perform all operations necessary for the removal, containment, cleanup and disposal of all asbestos containing materials. The Contractor shall obtain any required permits and pay any fees in connection with this work. The Contractor shall perform their own quality control, administer and supervise their work force as specified herein.

3.13 REMOVAL OF LEAD CONTAINING PAINT STRUCTURES

A. A limited Lead Based Paint Inspection shall be performed at each area to be impacted by construction.

B. The Contractor shall furnish all labor, equipment and materials, and perform all operations necessary for the removal, containment, cleanup and disposal of all leadcontaining paint

structures. The Contractor shall obtain any required permits and pay any fees in connection with this work. The Contractor shall perform their own quality control, administer and supervise their work force as specified herein.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02224

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment and materials required to complete all work associated with excavation, including off-site borrow excavation, dewatering, backfill, foundation and backfill stone, stockpiling topsoil and any excess suitable material in designated areas, backfill and subgrades beneath foundations, excavation support, disposing from the site all unsuitable materials, providing erosion and sedimentation control grading, preparation of structure subgrade, and other related and incidental work as required to complete the work shown on the Drawings and specified herein.

B. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

C. It is the intent of this Specification that the Contractor conduct the construction activities in such a manner that erosion of disturbed areas and off-site sedimentation be absolutely minimized.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements of related work are included in Division 1 and Division 2 of these Specifications.

1.03 DEFINITIONS

A. Maximum Density: Maximum weight in pounds per cubic foot of a specific material.

B. Optimum Moisture: Percentage of water in a specific material at maximum density.

1.04 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the Specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced Specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

2. American Society for Testing and Materials (ASTM):

   a. ASTM C 127 Test for Specific Gravity and Absorption of Coarse Aggregate.

   b. ASTM C 136 Test for Sieve Analysis of Fine and Coarse Aggregates.

c. ASTM D 422 Particle Size Analysis of Soils.

d. ASTM D 423 Test for Liquid Limit of Soils.

e. ASTM D 424 Test for Plastic Limit and Plasticity Index of Soils.

f. ASTM C 535 Test for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

g. ASTM D 698 Standard Method of Test for the Moisture Density Relations of Soils Using a 5.5 lb. (2.5 kg) Rammer and a 12 inch (305 mm) Drop.

h. ASTM D1556 Test for Density of Soil in Place by the Sand Cone Method.

i. ASTM D1557 Test for Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 10 lbs. (4.5 kg) Rammer and 18 inch (457 mm) Drop.

j. ASTM D2049 Test Method for Relative Density of Cohesionless Soils.

k. ASTM D2167 Test for Density of Soil in Place by the Rubber Balloon Method.

l. ASTM D2216 Test for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.

m. ASTM D2487 Test for Classification of Soils for Engineering Purposes.

n. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth).

1.05 SUBSURFACE CONDITIONS

A. Information on subsurface conditions is referenced under Division 1, General Requirements.

B. A separate geotechnical report is included as an Appendix as a reference for information purposes. The report identifies properties below grade and also offer recommendations for foundation design, primarily for use of the Engineer. The recommendations shall not be construed as requirements of the Contract unless specifically referenced by the Contract Documents.

C. The City and/or the Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the geotechnical investigation was made. The Contractor shall examine the site and review the available geotechnical boring logs or undertake its own subsurface investigation prior to submitting his bid, taking into consideration all conditions that may affect his work.

D. The Contractor shall satisfy himself as to the character and amount of different soil materials, groundwater and the subsurface conditions to be encountered in the work to be performed. Information and data, when furnished, are for the Contractor's general information. However, it is expressly understood that any interpretation or conclusion drawn there from is totally the responsibility of the Contractor. Engineer and City assume no liability for the accurateness of the data reported. No claim for extra compensation or for extension of time will be allowed on account of subsurface conditions inconsistent with Contractor's assumptions.

E. Excavation and backfill for relocation of existing utilities shall conform to the requirements of Section 02316 - Excavation, Section 2320 – Trench Backfill and Section 02500 – Conveyance Piping. The Contractor shall coordinate relocation of utilities with utility companies having jurisdiction in the area.

F. Attention is directed to the fact that there may be water and wastewater pipes, storm drains and other utilities located in the area of proposed excavation. The Contractor shall have responsibility for pre-locating existing underground utilities in areas of work and reaching agreement with City as to such lines are to be addressed, prior to commencing any demotion or excavation work. Test pits and hand excavation in critical areas will be required prior to initiating work. Perform all repairs to same in the event that excavation activities disrupt service.

G. All existing utilities including piping, electrical conduits, electrical duct banks and telephonecables that are shown on the Contract Documents to be relocated, shall be relocated prior to initiating earthwork. The Contractor shall coordinate relocation of utilities with utility companies having jurisdiction in the area. Should unknown or incorrectly identified piping or other utilities be encountered during excavation, the Contractor shall consult the City and the Engineer immediately for directions.

H. The Contractor shall cooperate with the City and utility companies in keeping respective services and facilities in operation.

1.06 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 Submittals, the Contractor shall submit the following:

3. Name and location of all material suppliers.

4. Certificate of compliance with the standards specified above for each source of each material.

5. Plans and cross sections of open cut excavations showing side slopes and limits of the excavation at grade.

6. List of disposal sites for waste and unsuitable materials and all required permits for use of those sites.

7. Construction drawings and structural calculations for any types of excavation support required. Drawings and calculations shall be signed and sealed by a currently registered Professional Engineer in the State of Florida.

8. Monitoring plan and pre-construction condition inspection and documentation of all adjacent structures, utilities, and roadways near proposed installation of excavation support systems.

9. Dewatering procedures: The Contractor shall submit his proposed methods of handling groundwater and the locations at which the water will be disposed of. Methods shall be acceptable to the Engineer before starting and excavating. Contractor shall submit plans showing the methods and location of dewatering and discharge. The drawings shall include a sufficient number of detailed sections to clearly illustrate the Scope of Work. The Drawings showing all of the above information, including calculations, shall be prepared by a qualified Professional Engineer registered in the State of Florida, and shall bear its seal and signature. If required by regulatory agencies, a copy of the dewatering permit shall be submitted.

10. The Contractor shall notify the Engineer of the offsite and on-site sources of structural fill and submit to the Engineer a representative sample weighing approximately 50 lbs. The sample shall be delivered to a designated location on site.

11. Prior to any earthwork, the Contractor shall submit a sieve analysis of the proposed structural fill to Engineer for review and approval.

12. The Contractor shall not place any foundation reinforcement steel until excavations have been tested for compaction.

13. The Contractor shall apply for and obtain all necessary permits for dewatering as necessary. Contractor shall be responsible for all permit fees.

1.07 QUALITY CONTROL

A. All soils testing shall be performed by an independent testing laboratory as specified in Section 01400 - Quality Control. The Contractor shall schedule his Work so as to permit a reasonable time for testing before placing succeeding lifts of backfill and shall keep the laboratory informed of his progress. In the event any test shows the work is not in conformance with these Contract Documents, the cost of any subsequent testing to show conformance shall be borne by the Contractor. All test results shall be sent directly to the Engineer.

1.08 PRODUCT HANDLING

A. Soil and rock material shall be excavated, transported, placed, and stored in a manner so as to prevent contamination, segregation and excessive wetting. Materials which have become contaminated or segregated will not be permitted in the performance of the work and shall be removed from the site.

1.09 GROUNDWATER

A. The Contractor shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure construction in the dry, stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

1.10 USE OF EXPLOSIVES

A. The use of explosives for excavation work is strictly prohibited on this project.

1.11 PROTECTION OF PROPERTY AND STRUCTURES

A. The Contractor shall, at his own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of his work. The Contractor shall take all risks attending the presence of proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of his work. He shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by his work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.

PART 2 - PRODUCTS

2.01 SELECT FILL

A. Soils from the excavations meeting requirements stipulated herein with the exceptions of topsoil and organic material may be used as select fill for backfilling and as structural subgrade support. All fill material shall be provided by the Contractor from any excess suitable on-site material or from offsite sources, all subject to review by the Engineer prior to use. The Contractor must determine the volume of material required for the site.

B. Select fill used for backfill shall be noncohesive, nonplastic, granular mixture of local sand and limerock, shall be free from vegetation, organic material or muck, and shall contain not more than 8 percent material by weight which passes the No. 200 sieve. Broken concrete shall not be used in the fill. Fill material containing limerock shall have sufficient sand to fill the voids in the limerock, and no individual rocks or pieces or hard material that will not pass a 3-inch diameter ring shall be used in the fill. Maximum Plasticity Index (PI) shall be 6. Backfill against walls shall not contain any rock larger than AASHTO #57.

C. Select fill used under structures (structural fill) shall be furnished from off-site or on-site sources as required. Structural fill material shall be clean sand or sand and rock free from vegetation, organic material, muck, or other deleterious matter. Not more than 10 percent by weight shall pass the No. 200 sieve and shall have a Unified Soil Classification System designation of GP, GW, GP-GM, GW-GM, SP, SW, SP-SM, or SW-SM. All rock shall pass through a 3 inch diameter ring. Broken Portland cement or asphaltic concrete will not be considered an acceptable fill material. Unsuitable Fill

Material: Classified as A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, and A-8 in accordance with AASHTO Designation M 145. Peat and other highly organic soils are also unsuitable as structural fill.

D. Crushed limestone placed below foundation slabs shall be hard, durable, subangular particles of proper size and gradation, and shall be free from organic materials, wood, trash, sand, loam, chalk, excess fines and other deleterious materials. Maximum aggregate size shall be ¾ inches.

E. Regardless of material used as select fill, materials shall be compacted at a moisture content satisfactory to the Engineer, which shall be approximately that required to produce the maximum density except that the moisture content shall not be more than 2% below nor more than 2% above the optimum moisture content for the particular material tested in accordance with the ASTM D1557.

F. Where excavated material does not meet requirements for select fill, Contractor shall furnish off-site borrow material meeting the specified requirements herein.

2.02 CLEAN SAND

A. Clean sand for use in backfilling shall be furnished from off-site or on-site sources as required. Material shall be clean sand free from vegetation, organic material, muck, or other deleterious material. Not more than 10 percent by weight shall pass the No. 200 sieve and shall have a classification of A-3 in accordance with AASHTO Designation M 145.

PART 3 - EXECUTION

3.01 STRIPPING OF TOPSOIL

A. In all areas to be excavated, filled, paved, or graveled, the topsoil shall be stripped to its full depth and shall be deposited in storage piles on the site, at locations designated by the Engineer, for subsequent reuse. Remove all tree stumps, concentration of roots and other deleterious materials. Topsoil shall be kept separated from other excavated materials and shall be piled free of roots and other undesirable materials.

3.02 EXCAVATION

A. All excavation shall be made in such a manner, and to such widths, as will give ample room for properly constructing and inspecting the structures they are to contain. Excavation shall be made in accordance with the details shown on the Drawings, and as specified herein. Attention shall be given to the handling of storm water runoff.

B. Highly organic soils (peat or muck), weak silty materials, asphalt and concrete shall be removed from all foundation areas. In addition, all sandy silt zones shall be completely removed from mat foundation areas. Unsuitable material within structure footprints shall be over-excavated and backfilled with structural fill.

C. As a minimum, excavations shall be carried 5-feet outside slab or footing limits or by one foot for each foot excavated below the bearing grade of the mat or footing, whichever is less, unless noted otherwise.

D. All material excavated, regardless of its nature or composition, shall be classified as UNCLASSIFIED EXCAVATION. Excavation shall include the removal of all soil, rock, weathered rock, rocks of all types, boulders, conduits, pipe, and all other obstacles encountered and shown to be removed within the limits of excavation shown on the Drawings or specified herein. No additional payment will be made for the removal of obstacles encountered within the excavation limits shown on the Drawings and specified herein.

E. Excavated unsuitable material shall be removed from the site and disposed of by the Contractor.

F. All suitable material removed in the excavation shall be used as far as practicable in the formation of embankments, subgrades, and shoulders, and at such other places as may be indicated on the Drawings or indicated by the Engineer. No excavation shall be wasted except as may be permitted by the Engineer. Refer to the drawings for specific location and placement of suitable excavated materials in the formation of embankments, backfill, and structural and roadway foundations. THE ENGINEER WILL DESIGNATE MATERIALS THAT ARE UNSUITABLE. The Contractor shall furnish offsite disposal areas for the unsuitable material and shall dispose of unsuitable material at such areas. Where suitable materials containing excessive moisture are encountered above grade in cuts, the Contractor shall construct above grade ditch drains prior to the excavation of the cut material when in the opinion of the Engineer such measures are necessary to provide proper construction.

G. All excavations shall be made in the dry and in such a manner and to such widths as will give ample room for properly constructing and inspecting the structures and/or piping they are to contain and for such excavation support, pumping and drainage as may be required. Excavation shall be made in accordance with the grades and details shown on the Drawings and as specified herein.

H. Excavation slopes shall be flat enough to avoid slides that will cause disturbance of the subgrade or damage of adjacent areas. Excavation requirements and slopes shall be as indicated in the Drawings or as specified herein. The Contractor shall intercept and collect surface runoff both at the top and bottom of cut slopes. The intersection of slopes with natural ground surfaces, including the beginning and ending of cut slopes, shall be uniformly rounded as shown on the Drawings or as may be indicated by the Engineer. Concurrent with the excavation of cuts the Contractor shall construct intercepting berm ditches or earth berms along and on top of the cut slopes at locations shown on the Drawings or designated by the Engineer. All slopes shall be finished to reasonably uniform surfaces acceptable for seeding and mulching operations. No rock or boulders shall be left in place which protrude more than 1 foot within the typical section cut slope lines, and all rock cuts shall be cleaned of loose and overhanging material. All protruding roots and other objectionable vegetation shall be removed from slopes. The Contractor

shall be required to submit plans of open cut excavation for review by the Engineer before approval is given to proceed.

I. The bottom of all excavations for structures and pipes shall be examined by the Engineer for the presence of unsuitable material. If, in the opinion of the Engineer, additional excavation is required due to the in place soils being soft, yielding, pumping and wet, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, and/or crushed stone or screened gravel as indicated by the Engineer. No payment will be made for subgrade disturbance caused by inadequate dewatering or improper construction methods.

J. All cuts shall be brought to the grade and cross section shown on the Drawings, or established by the Engineer, prior to final inspection and acceptance by the Engineer.

K. Slides and overbreaks which occur due to negligence, carelessness or improper construction techniques on the part of the Contractor shall be removed and disposed of by the Contractor as indicated by the Engineer at no additional cost to the Owner. If grading operations are suspended for any reason whatsoever, partially completed cut and fill slopes shall be brought to the required slope and the work of seeding and mulching or other required erosion and sedimentation control operations shall be performed.

L. Where the excavation exposes sludge, sludge contaminated soil or other odorous materials, the Contractor shall cover such material at the end of each workday with a minimum of 6 inches and a maximum of 24 inches of clean fill. The work shall be an odor abatement measure and the material shall be placed to the depth deemed satisfactory by the Engineer for this purpose.

M. The Contractor shall ensure that its excavation work does not adversely affect the bearing capacity of the structural subsurface. Also, the Contractor shall proceed with foundation work immediately after excavation work and as expeditiously as possible so as to minimize any potential for subsurface disturbance due to environmental factors, adverse weather, etc. The Contractor shall also take all necessary precautions to protect its work from potential adverse impacts. Where excavated areas are disturbed by subsequent operations or adverse weather, scarify surface, reshape, fill as required and compact to required density.

3.03 UNAUTHORIZED EXCAVATION

A. Excavation Work carried outside of the Work limits required by the Contract Documents shall be at the Contractor's expense, and shall be backfilled by the Contractor at his own expense with suitable material, as directed by the Engineer. Where, in the judgment of the Engineer, such over excavation requires use of lean concrete or crushed stone, the Contractor, at his expense shall furnish and place such materials.

3.04 EXCAVATION SUPPORT

A. The Contractor shall furnish, place, and maintain such excavation support which may be required to support sides of excavation or to protect pipes and structures from possible

damage and to provide safe working conditions. Excavation for deep structures shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation, excavation support, or bracing, of not less than 3 feet. Materials encountered in the excavation which have a tendency to slough or flow into the excavation, undermine the bank, weaken the overlying strata, or are otherwise rendered unstable by the excavation operation shall be retained by an excavation support, stabilization, grouting or other acceptable methods. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports put in at the expense of the Contractor. The Contractor shall be responsible for the adequacy of all supports used and for all damage resulting from failure of support system or from placing, maintaining and removing it.

B. Selection of and design of any proposed excavation support systems is exclusively the responsibility of the Contractor. Excavation support shall comply with all applicable OSHA requirements. Contractor shall submit drawings and calculations on proposed systems sealed by a Professional Engineer currently registered in the State of Florida.

C. The Contractor shall exercise caution in the installation and removal of supports to ensure that excessive or unusual loadings are not transmitted to any new or existing structure. The Contractor shall promptly repair at his expense any and all damage that can be reasonably attributed to installation or removal of excavation support system.

D. Contractor shall monitor movement in the excavation support systems as well as movement at adjacent structures, utilities and roadways near excavation supports. Contractor shall submit a monitoring plan developed by the excavation support design engineer. All pre-construction condition assessment and documentation of adjacent structures on-site and off-site shall be performed by the Contractor. If any sign of distress such as cracking or movement occurs in any adjacent structure, utility or roadway during installation of supports, subsequent excavation, service period of supports, subsequent backfill and construction, or removal of supports, Engineer shall be notified immediately. Contractor shall be exclusively responsible for any damage to any roadway, structure, utility, pipes, etc. both on-site and off-site, as a result of his operations.

E. All excavation supports shall be removed upon completion of the work except as indicated herein. The Engineer may permit supports to be left in place at the request and expense of the Contractor. Any excavation supports left in place shall be cut off at least two (2) feet below the finished ground surface or as directed by the Engineer.

3.05 DEWATERING

A. It is the basic intent of these Specifications that excavations shall be free from water before pipe or structures are installed. Reference the Section 01010 - Summary of Work and Section 02240 - Dewatering for specific requirements pertaining to on-site dewatering.

B. The Contractor shall do all dewatering as required for the completion of the work. Procedures for dewatering proposed by the Contractor shall be submitted to the Engineer for review prior to any earthwork operations. Disposal of water to any surface water body will require silt screens. All water removed by dewatering operations shall be

disposed of in accordance with the Florida Air and Water Pollution Control Act. The Contractor is responsible for obtaining any dewatering permits as required by regulatory agencies.

C. The dewatering system shall be of sufficient size and capacity as required to control groundwater or seepage to permit proper excavation operations, embankment construction and reconstruction, subgrade preparation, and to allow concrete to be placed in a dry condition except where authorized tremie concrete construction work is shown or permitted. The system shall include a sump system or other equipment, appurtenances and other related earthwork necessary for the required control of water, and shall include automatic starting devices and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps. The Contractor shall drawdown groundwater to at least 24 inches below the bottom of excavations (subgrade) at all times in order to maintain a dry and undisturbed condition. The groundwater level shall be controlled so as to permit the placing and curing of concrete and the maintenance of supporting foundations and adjacent work and structures. The Contractor is fully responsible for protecting structures from flotation until final acceptance of the work.

D. The Contractor shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps. It shall be totally responsible for protecting structures from flotation until final acceptance of the Work. The Contractor shall also modify the dewatering system during the course of construction to satisfy faults, legitimate complaints or legal requirements.

E. The Contractor shall control, by acceptable means, all water regardless of source. Water shall be controlled and its disposal provided for at each berm, structure, etc. The entire periphery of the excavation areas shall be ditched and diked to prevent water from entering the excavation. The Contractor shall be fully responsible for disposal of the water and shall provide all necessary means at no additional expense to the City. The Contractor shall be solely responsible for proper design, installation, proper operation, maintenance, and any failure of any component of the system.

F. The Contractor shall be responsible for and shall repair without cost to the City, any damage to work in place and the excavation, including damage to the bottom due to heave and including removal of material and pumping out of the excavated area. The Contractor shall be responsible for damages to any other area or structure caused by any failure to maintain and operate the dewatering system proposed and installed by the Contractor.

G. The Contractor shall take all the steps considered necessary to become familiar with the surface and subsurface site conditions, and shall obtain the data that is required to analyze the water and soil environment at the site and to assure that the materials used for the dewatering systems will not erode, deteriorate, or clog to the extent that the dewatering systems will not perform properly during the period of dewatering. Copies

of logs of borings and laboratory test results are available to the Contractor for information purposes only, and it is expressly understood that the City and Engineer will

not be held responsible for any interpretations or conclusions drawn therefrom by the Contractor.

H. Prior to the execution of the work, the Contractor, City and Engineer shall jointly survey the condition of adjoining structures. Photographs and records shall be made of any prior settlement or cracking of structures, pavements, and the like, that may become the subject of possible damage claims.

I. If a surface to receive foundation slabs cannot be maintained dry by the Contractor's dewatering efforts, the Contractor shall provide tremie seals at no additional cost to the City. The placement of tremie seals shall not preclude dewatering operations specified herein. The limits of tremie seals shall be recommended by the Contractor and reviewed and accepted by the Engineer.

3.06 PROTECTION OF SUBGRADE

A. To minimize the disturbance of bearing materials and provide a firm foundation, the Contractor shall comply with the following requirements:

1. Use of heavy rubber tired construction equipment shall not be permitted on the final subgrade unless it can be demonstrated that drawdown of groundwater throughout the entire area of the structure is at least 3 feet below the bottom of the excavation (subgrade). Even then, the use of such equipment shall be prohibited should subgrade disturbance result from concentrated wheel loads.

2. Subgrade soils disturbed through the operations of the Contractor shall be excavated and replaced with compacted select fill or crushed stone at the Contractor's expense as indicated by the Engineer.

3.07 PROOF-ROLLING

A. Proof-rolling of in-place granular soils shall be performed on the subgrade of all structures and all areas that will support select fill. Surface area to be proof-rolled shall extend 5 feet out from the footing perimeter. After stripping of topsoil, excavation to subgrade and prior to placement of fills, the exposed subgrade shall be carefully inspected by probing and testing as needed. Any topsoil or other organic material still in place, frozen, wet, soft, or loose soil, and other undesirable materials shall be removed. Each section of subgrade shall be subjected to multiple, overlapping (minimum of 20 percent overlap) coverages of the compactor. Proof-rolling shall continue to check for pockets of soft material hidden beneath a thin crust of better soil and until no further vertical settlement of the surface is visually discernable. Any unsuitable materials thus exposed shall be removed and replaced with an approved compacted material.
Groundwater shall be maintained at least 30 inches below the work area.

3.08 BACKFILLING

A. All structures shall be backfilled with the type of materials shown on the Drawings and specified herein. Select fill shall be deposited in successive, uniform, approximately

horizontal layers not exceeding 12 inches in loose lifts for the full width. Compaction shall be in accordance with the requirements of Paragraph 3.09, COMPACTION.

B. Where excavation support is used, the Contractor shall take all reasonable measures to prevent loss of support beneath and adjacent to pipes and existing structures when supports are removed. If significant volumes of soil cannot be prevented from clinging to the extracted supports, the voids shall be continuously backfilled as rapidly as possible. The Contractor shall thereafter limit the depth below subgrade that supports will be installed in similar soil conditions or employ other appropriate means to prevent loss of support.

C. Backfill against concrete or masonry structure shall not be performed until the Work has been reviewed and backfilling permitted. Backfill against walls shall also be deferred until the structural slab for floors above the top fill line have been placed and attained design strength or earlier at the discretion of the Engineer. Partial backfilling against adequately braced wall may be considered by the Engineer on an individual situation basis. Where walls are to be waterproofed, all Work shall be completed and membrane materials dried or cured according to the manufacturer's instructions before backfilling.

3.09 COMPACTION

A. The Contractor shall compact embankments, backfill, crushed stone, aggregate base, and in place subgrade in accordance with the requirements of this Section. The densities specified herein refer to percentages of maximum density as determined by the noted test methods. Compaction of materials on the project shall be in accordance with the following schedule:

	Density % Mod. Proctor	Max. Lift Thickness as (D1557) Compacted Inches
Backfill around structures*	98	8
Backfill beneath structures	98	8
Crushed stone beneath structures	**	12
Select sand	98	8
Crushed stone backfill	**	12
In place subgrade beneath structures	95	Top 24-inches

	Density % Mod. Proctor (D1557)	Max. Lift Thickness as Compacted Inches

** Embankments beneath structures shall be considered to include a zone 10 feet out from the foundation of the structure extending down to the natural ground on a 45 degree slope. **The aggregate shall be compacted to a degree acceptable to the Engineer by use of a vibratory compactor and/or crawler tractor.*

B. Compaction shall be conducted as follows:

1. A vibratory compactor that imparts a dynamic force of not less than 44,000 pounds shall be used. Each section of subgrade shall be subjected to multiple, overlapping (minimum 20% overlap) coverages of the compactor as it operates at normal walking speed. Vibratory equipment shall not be used within 25 feet of any existing structure.

2. Within 25 feet of any existing structure, non-vibratory compaction equipment such as a drum roller with a maximum weight of 4 tons should be used. Within 5 feet of any existing structure, a walk behind vibratory sled or roller shall be used. A sufficient number of passes should be made within the construction area to compact the in-place soil as required in Article 3.09 A above.

C. Field density tests will be made by independent testing agency as described in Article 1.06. These tests shall be the basis for accepting or rejecting the compaction. In-place density tests will be performed in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938. The Engineer will be the sole judge as to which test method will be the most appropriate. Failure to achieve the specified densities shall require the Contractor to re compact the material or remove it as required. The Contractor shall, if necessary, increase his compactive effort by increasing the number of passes, using heavier or more suitable compaction equipment, or by reducing the thickness of the layers. The Contractor shall adjust the moisture contents of the soils to bring them within the optimum range by drying them or adding water as required.

D. Testing will be performed as frequently as deemed necessary by the Engineer. As a minimum, one in place density test shall be performed for each 1000 cubic yards of embankment placed, 500 cubic yards of backfill placed, 2500 square feet of foundation area, or one test performed each day for either.

E. Final grades shall be within 0.1 foot of elevations shown. Where shown on the Drawings surfaces shall be sloped for drainage or other purposes.

F. Vibration monitoring shall be performed at nearby structures when compaction work is ongoing. A single monitoring point using vibration monitoring equipment capable of detecting velocities of 0.1 inch/second or less and survey measurements shall be used for vibration monitoring at each of the nearest structures. An elevation measurement on nearby structures shall be taken before compaction work starts, and then at least twice a day during the work with one reading taken at the conclusion of the day's operations.

Elevation measurements shall be recorded to an accuracy of 0.001 foot. If at any time the Contractor detects settlement or heave of 0.005-feet or more, or vibration levels of

0.5 inch/second or more, the vibratory compaction shall be stopped immediately and the Engineer notified.

3.10 REMOVAL OF EXCESS AND UNSUITABLE MATERIALS

A. The Contractor shall remove and dispose of off-site all unsuitable materials. Within thirty (30) consecutive days after Notice to Proceed, the Contractor shall submit to the Engineer for review all required permits and a list of disposal sites for the unsuitable materials. If the disposal site is located on private property, the submittal shall also include written permission from the owner of record.

B. All unsuitable materials shall be disposed of in locations and under conditions that comply with federal, state and local laws and regulations.

C. The Contractor shall obtain an off-site disposal area prior to beginning demolition or excavation operations.

D. All excess and unsuitable materials shall be hauled in trucks of sufficient capacity and tight construction to prevent spillage. Trucks shall be covered to prevent the propagation of dust.

E. When all excess and unsuitable material disposal operations are completed, the Contractor shall leave the disposal sites in a condition acceptable to the Owner and Owner(s) of the disposal site(s).

- END OF SECTION -

PROJECT NO. 12337

SECTION 02240

DEWATERING

PART 1 - GENERAL

(NOT USED)

PART 2 - MATERIALS

(NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for design, installation, and operation of a dewatering system to dewater specified excavations.

1. The dewatering system shall be designed in accordance with the Best Management Practices (BMP's) adopted by FDEP.

2. Inspection and control of dewatering system operations will be in accordance with the FDEP guidelines established in the Florida Erosion and Sediment Control Inspector's Manual (current edition).

B. Continuously manage and control excavation water recharge in order to facilitate and not impede construction activities at all times, including weekends, holidays, and during periods of work stoppages, and furnish and install, and operate, a contingency backup dewatering system to maintain control of excavation water levels to facilitate construction (i.e.; no construction delays).

C. Contractor shall refer to dewatering requirements specified in Section 02224 – Excavation and Backfill for Structures.

3.02 SUBMITTALS

A. Submittals shall be made in accordance with the requirements specified in Contract Documents and the requirements of this section.

B. Provide name, address, and phone numbers of all subcontractors.

C. The Contractor shall submit a Dewatering Best Management Practices (BMP) plan prior to the start of excavation expected to include dewatering operations. The plan shall provide detailed descriptions of dewatering procedures to be utilized to meet the requirements of this Section. Methodologies to control dewatering discharge contamination include, but are not limited to:

3. Holding tanks of adequate size and volume.

4. Wellpoint systems.

5. Sump pumping systems.

6. Chemical precipitation of particulates.

7. Filter systems and siltation controls.

8. Outfall booms.

D. The Contractor shall provide a Site Health and Safety Plan and Activity Hazard Analysis (AHA) for contaminated soil as specified in the Contract Documents and/or groundwater as specified in this Section, to include the following:

1. A written description of the proposed method for temporary stockpiling, transportation, and disposal of all wastes.

2. Copy of permits of disposal facilities.

3. Certification of disposal of all wastes.

4. Directions to the nearest hospital and phone number.

5. Emergency contact phone numbers.

6. Laboratory analyses and sampling plan required for transportation and disposal of all wastes in accordance with applicable federal, state, and local requirements.

E. Upon Completion of Remediation Activities, the following shall be provided:

1. Copy of manifests for all wastes leaving the site.

2. Copy of the laboratory analyses results from all sampling activities.

3. Copy of closure reports that may be required.

3.03 SURFACE WATER CONTROL

A. Remove surface runoff controls when no longer needed.

B. Seal off or berm catch basins in the area of construction to prevent discharge of untreated dewatering effluent or runoff from unstabilized construction areas into storm drains.

C. All drain inlets or catch basins used for dewatering discharge shall be provided with silt and sediment removal barriers as approved by the Engineer.

1. All barriers shall be cleaned regularly to avoid sediment discharge into the storm drain system.

2. Construction activities will be stopped at no cost to the City until sediment controls are properly maintained, installed, and in compliance with the dewatering permit.

3. All barriers shall be removed upon issuance of a hurricane warning.

3.04 DEWATERING SYSTEMS

A. Design, furnish, and install, operate, and maintain a dewatering system of sufficient size and capacity to permit excavation and subsequent construction activities in water-free conditions, and to lower and maintain the excavation area groundwater level a minimum of 2 feet below the lowest point of excavation. The dewatering system shall be designed and operated such that the system continuously maintains excavations water levels so as to maintain the excavation water level in order to allow for the initiation and completion of excavation backfill compaction and restoration activities.

B. Dewatering systems shall include, but is not limited to, furnishing and installing wells or well points, and or other equipment and appurtenances as may be necessary, including system components or equipment, installed outside the outermost perimeter of the excavation limits, and sufficiently below lowest point of excavation, to maintain the specified or required groundwater elevation.

C. Open trench pumping maybe permitted upon the approval of the Engineer.

D. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.

2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.

3. Avoid surface water pollution or discharge of sediment to storm drain systems or waterways.

E. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering. The Contractor shall not direct any flow of water over pavement surfaces. Discharge of water shall be conducted as approved by the local, state, and federal agencies and the Engineer.

F. Provide controls to prevent surface water from entering excavation pits, trenches, or stockpiled materials.

3.05 PIPELINES CONSTRUCTED UNDER WATER

A. In the event that it is found that the water in a trench cannot be lowered by ordinary means, i.e., well points and pumps, an alternate construction method may be proposed by the Contractor. Complete details, specifications, manufacturer's descriptive literature, installation lists and any other pertinent data regarding the

proposed alternate method shall be submitted as an alternate by the Contractor to the City within 5 calendar days of the time that the Contractor anticipates using such alternate method.

B. If the CITY approves the alternate method in writing, it may be used, so long as the Work is performed in a manner which, in the opinion of the Engineer, conforms to the method and procedure as set forth in the information supplied by the Contractor in his original application for use of an alternate method. The City may revoke approval of the alternate method if at any time, in his opinion, the Work is not conforming to any applicable portion of these specifications.

C. No pipeline shall be laid under water without approval of the City and Engineer.

D. If the dewatering system is eliminated or the effort reduced, and the pipe is laid underwater, additional pipe zone material will be required as backfill to the water table elevation, or to the level it was reduced to.

3.06 DISPOSAL OF WATER

A. All water generated, pumped, or removed from excavations as a result of excavation dewatering activities shall be collected, containerized, and managed prior to discharge and or treatment at an approved discharge point or facility, in accordance with Broward County Code of Regulation, Sections 27. Contractor shall secure, obtain, and pay for all necessary local, state, and federal permits, licenses, fees, and or approvals to discharge water or perform onsite or offsite treatment and disposal. Treat water collected by dewatering operations as required by regulatory agencies, prior to discharge.

B. Discharge water as permitted, and in regulatory compliance with Contractor obtained discharge permits/licenses.

1. All discharge activities shall be performed so as to prevent silt and sediment discharge and eliminate any soil erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.

2. Maximum allowable turbidity of discharges to surface waters or storm drains will be 10 NTU's.

3. Sump discharges cannot be discharged directly to storm drains or surface waters without treatment.

C. Affected storm sewer outfalls shall be protected with floating silt booms as approved by the Broward County Department of Environmental Protection and Growth Management Division (BCEPGMD) and the CONSULTANT. All accumulated debris resulting from the dewatering discharge collecting in the boom shall be removed on a daily basis.

D. Visible silt plumes emanating from the area around the outfalls will be considered a failure of the silt and sediment removal measures and may result in a Notice of Violation issued by BCEPGMD. The Contractor will be responsible for all fines

associated with the violation of the dewatering permit conditions issued to the Contractor.

E. Failure to control dewatering discharges as described above and as detailed in the Florida Erosion and Sediment Control Inspector's Manual, may result in an order to cease dewatering operations until the discharge problems are corrected. No claims will be accepted for costs or delays associated with unacceptable dewatering discharge practices.

3.07 WELL POINT REMOVAL

A. Well point holes shall be filled with sand which shall be washed into the hole.

B. Well point holes located within asphalt pavement surfaces or concrete pavements, shall be filled with sand to the subgrade. The remaining hole shall be filled with nonshrink grout.

3.08 CONTAMINATED GROUNDWATER AND DISPOSAL REQUIREMENTS

A. If Contractor suspects, witnesses, or identifies, groundwater contamination at any time during the performance of the work, Contractor shall notify the City immediately. Results will be obtained by the onsite mobile laboratory.

B. If analytical testing documents and indicates elevated concentrations above FDEP action levels (Chapter 62-777, Florida Administrative Code) dewatering operations will be suspended until appropriate treatment and or construction measures can be implemented. Contractor shall not resume operations until notified to do so in writing by the City and construction of the remaining pipelines in that area will be installed in the wet or normal construction activities shall be resumed in another areas determined by the CONSULTANT. There shall be no delay or mobilization claim associated with moving to another project area, unless all other work has been completed. In addition, the local agency will be immediately notified via telephone and in writing by the Contractor. Dewatering activities in the area will not proceed until review of the matter with the local agency is resolved and written authorization is issued.

C. The Contractor shall submit a dewatering plan to the CITY PROJECT MANAGER for review. The Contractor is advised that the SFWMD, FDOT, BCEPGMD, etc. May require that a dewatering plan, prepared by a state of Florida licensed professional engineer or registered professional geologist, be submitted and approved prior to issuance of a dewatering permit. The Contractor will retain a state of Florida licensed Professional Engineer or registered Professional Geologist to provide an initial report of potential dewatering issues in the site vicinity. The Contractor shall retain a state of Florida licensed Professional Engineer or registered geologist to provide any additional services required by regulatory agencies regarding dewatering and contaminated sites.

D. The Contractor is advised that the BCEPGMD may have identified contaminated sites within ¼ mile radius of the project site. The Contractor may be required to

provide testing and monitoring of the dewatering operations, and to institute dewatering methods and controls, as required by BCEPGMD, SFWMD, FDOT, etc. The contractor will be responsible for all costs associated with means and methods of dewatering which will be set forth by dewatering permits.

E. Treatment of the groundwater will include three options depending on the magnitude of the contamination in the trench or as determined by the Engineer: Granular Activated Carbon (GAC) Treatment vessels, Mobile Air Stripping Units, or Vacuum Truck Removal and Disposal or other method as approved by the Engineer. The Contractor will provide a submittal list of all qualified groundwater remediation subcontractors for GAC vessel treatment/portable air stripping unit and vacuum truck disposal including phone numbers, contact names, and addresses prior to start of construction. The selected groundwater treatment/recycling facility for hauling contaminated groundwater shall also be identified.

F. If contaminated groundwater in the dewatering trench is encountered, the remediation operations will begin once local agency approval is obtained. Contaminated water will be disposed first into a high volume holding (FRAC) tank and then treated through a GAC unit/portable air stripper or recovered into vacuum hauling trucks for disposal.

G. Effluent water from the treatment system will be analyzed by the onsite mobile laboratory to confirm that concentrations are below regulatory limits. Effluent water will then be directed to a pre-approved alternative location as determined by local agency and/or the Engineer.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02316
EXCAVATION

PART 1 – GENERAL

1.01 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized over-excavation.

1.02 WEATHER LIMITATIONS

A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.03 SEQUENCING AND SCHEDULING

A. Clearing, Grubbing, and Stripping: Complete applicable work specified in Contract Documents prior to excavating.

B. Contractor shall call the utility companies 72 hours before excavation per the requirements of the Contract Documents.

1.04 SUBMITTALS

A. General: Submit information and samples to the Engineer for review as specified herein in accordance with the Section 01300 - Submittals.

B. Dewatering: The Contractor shall submit to the Engineer its proposed methods of handling trench water and the locations at which the water will be disposed of. Methods shall be acceptable to the Engineer before starting the excavation.

C. Bedding and Backfill Materials: The Contractor shall notify the Engineer of the off-site sources of bedding and backfill materials.

1. Submit to the Engineer a representative sample weighing approximately 25 lbs. The sample shall be delivered to a location at the work site determined by the Engineer.

2. The Contractor shall notify the Engineer in writing of the sources of each material at least ten calendar days prior to the anticipated use of the materials.

D. Sheeting System: Drawings of the sheeting system and design computations shall be submitted to the Engineer; however, the review of these drawings shall in no way relieve the Contractor of the responsibility to provide a safe and satisfactory sheeting and shoring system. Sheeting and shoring shall be designed by the Contractor, and the proposed design shall be sealed by a Professional Engineer registered in the State of Florida. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, it may order additional supports put in at the Contractor's expense.

E. Dewatering Permits: If the quantity or nature of water withdrawn requires approval/permits from regulatory agencies, the Contractor shall procure such permits at its expense and submit copies to the Engineer before commencing the work.

1.05 QUALITY CONTROL

A. An independent testing laboratory will be retained by the City to do appropriate testing as described in the Section 01400 - Quality Control. The Contractor shall schedule its work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. A minimum of 48 hours of notice shall be provided to the testing laboratory to mobilize its activities.

B. Field Density Testing Frequency for Pipeline Backfill: The frequency of the field density testing shall be in accordance with the notes on the Drawings. If the Drawings do not indicate a frequency then field density testing shall be as follows:

1. Pipeline Within the Fiveash Water Treatment Plant: For each layer (i.e., lift) of compacted material perform a minimum of one density test at 100 foot intervals.

1.06 SUBSURFACE INFORMATION

A. A separate geotechnical report is provided for information purposes with the Contract Documents. The report identifies properties below grade and also offers recommendations for foundation design, primarily for use of the Engineer. The recommendations shall not be construed as requirements of the Contract.

B. The City and the Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the geotechnical investigation was made. The Contractor shall examine the site and review the available geotechnical report or undertake its own subsurface investigation prior to submitting its bid, taking into consideration all conditions that may affect its work.

1.07 GROUNDWATER

A. The Contractor shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

B. The Contractor shall be responsible for obtaining all permits required for dewatering operations.

1.08 TRENCH SAFETY ACT COMPLIANCE

A. The Contractor by signing and executing the contract is, in writing, assuring that it will perform any trench excavation in accordance with the Florida Trench Safety Act,

Section 553.60 et. seq.. The Contractor has further identified the separate item(s) of cost of compliance with the applicable trench safety standards as well as the method of compliance as noted in the "Bid Forms" Section of the Contract front-end documents.

B. The Contractor acknowledges that this cost is included in the applicable items of the Proposal and Contract and in the Grand Total Bid and Contract Price.

C. The Contractor is, and the City and Engineer are not, responsible to review or assess the Contractor's safety precautions, programs or costs, or the means, methods, techniques or technique adequacy, reasonableness of cost, sequences or procedures of any safety precaution, program or cost, including but not limited to, compliance with any and all requirements of Florida Statute Section 553.60 et. seq. cited as the "Trench Safety Act". The Contractor is, and the City and Engineer are not, responsible to determine if any safety or safety related standards apply to the project, including but not limited to, the "Trench Safety Act".

1.09 PROTECTION OF PROPERTY AND STRUCTURES

A. The Contractor shall, at its own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of its Work. Such sustaining shall be done by the Contractor. The Contractor shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and its Work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its Work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are shown on the Drawings.

B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Barricades with flashing lights shall also be placed along excavation from sunset each day to sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded where required to meet OSHA, local and Federal Code requirements, in such a manner to prevent persons from falling or walking into any excavation within the site fenced property limits.

PART 2 – MATERIALS

(NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. It shall be the Contractor's responsibility to notify business establishments and residents not less than 72 hours prior to construction. Contractor shall provide temporary sidewalks and driveway entrances at his own expense, including safe bridges over trenches and fencing around excavations for pedestrian protection.

C. Provide adequate survey control to avoid unauthorized over excavation. Do not over excavate without written authorization of Engineer. If the Contractor excavates beyond the limits shown or specified, the Contractor shall replace such excavation at his own expense. Replace over excavated material as specified in Contract Documents.

D. Where muck, rock, clay, or other material within the limits of excavation is unsuitable in its original position, excavate such material to the cross-sections shown or specified. Backfill with suitable material and shape to the required cross-section. E. Remove or protect obstructions as shown on the Drawings.

3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:

a. Less than 4-Inch Outside Diameter or Width: 18 inches.

b. Greater than 4-Inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.

2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.

3. Increase trench widths by thicknesses of sheeting, if used.

4. The maximum trench width shall not exceed the minimum stated width of the trench unless approved by the Engineer. Restoration for excavation beyond the minimum required width shall be at the Contractor's sole expense.

B. The Contractor shall be responsible to design, provide, and maintain shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

C. Consider all available geotechnical information available when designing the excavation support system.

D. Remove excavation support in a manner that will maintain support as excavation is backfilled.

E. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed Work, or adjacent property.

F. Remove excavation support in a manner that does not leave voids in the backfill.

G. For trench excavation exceeding 5 feet in depth, provide adequate safety system meeting requirements of the Occupational Safety and Health Administration's (OSHA), Trench Safety Standards, 29 C.F.R., S.1926.650, Subpart P, and all subsequent revisions or updates adopted by the Department of Labor and Employment Security.

3.04 EMBANKMENT AND CUT SLOPES

A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.

B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.

C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 ADDITIONAL EXCAVATION AND BACKFILL

A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of the Engineer, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe bedding material, it shall be removed to a depth of two feet below the outside bottom of the pipe or to a greater depths as directed by the Engineer and removed from the site. Sheeting shall be installed if necessary to maintain pipe trenches within the limits identified by the Engineer. The resulting excavation shall be backfilled with suitable backfill material, placed in 12-inch layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Lean concrete may be used in lieu of backfill when pipe installation is in the wet or at the Contractor's option. Construction shall then proceed in accordance with the provisions of Article 3.05 "Pipe Bedding".

B. Additional excavation (more than two feet below the pipe) shall be performed when ordered by the Engineer. Where organic or other material is encountered in the excavation, the Contractor shall bring the condition to the attention of the Engineer and obtain his determination as to whether or not the material will require removal, prior to preparing the pipe bedding. The excavation of material up to a depth of two feet below the outside bottom is an incidental item of construction and the Work shall be done at no additional cost to the City. Where ordered by the Engineer, excavation greater than two feet below the pipe and additional backfill will be compensated by the OWNER.

3.06 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads, streets, public thoroughfares, or access to fire hydrants.

D. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation sideslopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.07 DISPOSAL OF SPOIL

A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.

B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in the Contract Documents, for clearing and grubbing debris.

3.08 COMPACTION AND DENSITIES

A. Compaction of backfill shall be 98 percent of the maximum density where the trench is located under structures or paved areas, and 95 percent of the maximum density elsewhere per ASTM D 1557. More thorough compaction may be required when Work is performed in other regulatory agencies jurisdictions, such as the FDOT. Methods of control and testing of backfill construction are:

1. Maximum density of the material in trenches shall be determined by ASTM D 1557.

2. Field density of the backfill material in place shall be determined by ASTM D 1556 or D 2922.

B. Testing: Laboratory and field density tests, which in the opinion of the Engineer are necessary to establish compliance with the compaction requirements of these Specifications, shall be ordered by the Engineer. The Contractor shall coordinate and cooperate with the testing laboratory. The testing program will be implemented by the Engineer establishing depths and locations of tests. Modifications to the program will be made as job conditions change.

C. Trench backfill which does not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no additional cost to the City. The costs for retesting such Work shall be paid for by the Contractor.

3.09 RESTORATION OF EXISTING SURFACES

A. Restore all grassed areas disturbed by the trenching operations by resodding in accordance with the Section 02930 - Landscaping.

B. Restore all asphaltic concrete pavement areas disturbed by the trenching operations in accordance with the Section entitled “Asphaltic Concrete Pavement.”

C. Restore all concrete pavement, curbs, and sidewalks disturbed by the trenching operations in accordance with the Section 02771 - Concrete Curbs and Sidewalks.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02320

TRENCH BACKFILL

PART 1 - GENERAL

1.01 DEFINITIONS

A. Base Rock: Granular material upon which manhole bases and other structures are placed.

B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.

C. Imported Material: Material obtained by the Contractor from source(s) offsite.

D. Lift: Loose (uncompacted) layer of material.

E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.

F. Above Pipe Zone: Backfill from the pipe zone to the road bed base in pavement or to existing grade in landscape areas.

G. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.

H. Selected Backfill Material: Material available onsite that City determines to be suitable for a specific use.

I. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-Graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

PART 2 - PRODUCTS

2.01 GEOTEXTILE

A. As specified in the Contract Documents.

2.02 MARKING TAPE

A. Plastic:

1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.

2. Thickness: Minimum 4 mils.

3. Minimum Width: 2 inches.

4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.

5. Manufacturers and Products:

a. Reef Industries; Terra Tape.

b. Allen; Markline. B. Metallic:

1. Solid aluminum foil, visible on unprinted side, encased in a protective high visibility, inert polyethylene plastic jacket.

2. Foil Thickness: Minimum 5.5 mils.

3. Width: 2 inches.

4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.

5. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.

6. Manufacturers and Products:

c. Reef Industries; Terra ”D”.

d. Allen; Detectatape.

C. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color[a]	**Facility**
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Water, irrigation, and slurry lines
Aas specified in ansi z53.1, safety color code.	

2.03 TRENCH STABILIZATION MATERIAL

A. Foundation stabilization rock as specified in the Contract Documents.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

A. Granular fill as specified in the Contract Documents.

2.05 EARTH BACKFILL

A. Earth fill as specified in the Contract Documents.

PART 3 - EXECUTION

3.01 TRENCH PREPARATION A.

Water Control:

1. As specified in the Contract Documents.

2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.

3. Provide continuous water control until trench backfill is complete.

B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

C. Where the trench has been dewatered, backfilling must be done before the pumps are shut off so that the pipe will not float. Any pipe which has been displaced because of floatation will be removed and installed correctly at the Contractor's expense.

3.02 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify City. The City will determine depth of over-excavation, if any, required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material as directed by the Engineer.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

A. Furnish granular fill as indicated in the details and provided in the schedule below.

B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum thickness from the following depths below the bottom to the springline of the pipe are as follows, except increase depths listed by 6 inches in areas of rock excavation:

1. Pipe, 15 Inches and Smaller: 4 inches.

2. Pipe, 18 Inches to 36 Inches: 6 inches.

3. Pipe, 42 Inches and Larger: 8 inches.

4. Conduit: 3 inches.

5. Direct-Buried Cable: 3 inches.

6. Duct Banks: 3 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

A. Furnish granular fill as indicated in the schedule below.

B. Upper Limit of Pipe Zone Shall Not Be Less Than Following:

1. Pipes:

a. Up to 12-Inch Diameter: 6 inches above top of pipe.

b. Greater than 12-Inch Diameter: 12 inches above top of pipe, unless shown otherwise.

2. Conduit: 3 inches, unless shown otherwise.

3. Direct-Buried Cable: 3 inches, unless shown otherwise.

4. Duct Bank: 3 inches, unless shown otherwise.

C. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.

D. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench. Compact to 90 percent density as determined by AASHTO T99.

1. Pipes 10 Inches and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter but not less than 3 inches. .

2. Pipes Over 10-Inch Diameter: Maximum 6-inch lifts.

E. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift. Compact material in pipe zone to at least 98 percent maximum density as determined by AASHTO T180.

F. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls. Contractor shall exercise proper care to ensure that no pipe joints will be broken, damaged, or disturbed through the use of any compacting equipment.

G. Do not use power-driven impact compactors to compact pipe zone material.

H. Where approved by the City, hydraulic compaction of the pipe zone material and granular trench backfill may be used providing density testing requirements are met. A submittal describing the method of hydraulic compaction will be required.

3.06 MARKING TAPE INSTALLATION

A. Continuously install marking tape along centerline of all buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.

1. Metallic Marking Tape: Install with nonmetallic piping and waterlines.

2. Plastic Marking Tape: Install with metallic piping.

3.07 BACKFILL ABOVE PIPE ZONE A.

General:

1. Process excavated material to meet specified gradation requirements.

2. Adjust moisture content as necessary to obtain specified compaction.

3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.

4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.

5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.

6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.

7. Hydraulic compaction may be allowed based upon approval by the City of the Contractor's detailed compaction and testing procedures. B. Backfill for Areas in Landscaped Areas:

1. Place in lifts not exceeding 12-inch thickness.

2. Mechanically compact each lift to a minimum of 80 percent of the maximum density prior to placing succeeding lifts.

C. Backfill for Areas under Facilities and Pavements: Backfill trench above the pipe zone with granular backfill in lifts not exceeding 12 inches. Compact each lift to a minimum of 98 percent of the maximum density compaction as determined by AASHTO Method T180, 100% for Broward County Rights of Way, prior to placing succeeding lifts.

3.08 ALTERNATE METHOD OF CONSTRUCTION

A. When high water tables, porous soils or other limitations to dewatering are encountered, the Contractor may request the approval of the City for an alternate method of construction.

B. Use of alternative methods shall not relieve the Contractor of the work, result in increased costs to the City or reductions in the quality of the work as defined by testing and acceptance requirements.

C. Removal of water requirements will be waived and the pipe and appurtenances will be permitted to be installed underwater.

D. Excavation shall be performed in accordance with the Contract Documents to the specified limits. The excavation shall be cleared of silt and other fines.

E. Pipe bedding shall be placed from the bottom of the excavation to 6 inches above the top of the pipe. The bedding shall be granular fill as described in the Contract Documents.

F. Select backfill material shall be used to backfill the trench from the top of the bedding to a level 1 foot above the standing water level in the trench. Select material shall be FDOT # 57 stone or granular fill as described in the Contract Documents. This lift shall be compacted in accordance with the provisions of this Section after which the remainder of the backfill can proceed as normal.

G. If the above described method is used, all backfill material used below the water table shall not be released into the trench until the bucket or container is less than 1 foot above the water level. Pipe bedding and pipe zone material as defined above shall not be dumped or pushed into the trench.

3.09 MAINTENANCE OF TRENCH BACKFILL

A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.

B. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

C. Water shall be applied to the unstabilized trench backfill to control dust as directed by the CONSULTANT.

D. Placement of lime rock base course and prime coat shall occur no longer than 5 days following trench backfill or as soon thereafter as record information is available to verify that pipe inverts and slopes are acceptable.

3.10 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill or of fill or facilities constructed over trench backfill within the warranty period for the project will be considered a result of defective compaction of trench backfill.

PART 4 – MATERIALS

4.01 EARTHFILL

A. Excavated material from required excavations and designated borrow sites, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.

C. Provide imported material of equivalent quality, if required to accomplish Work.

4.02 GRANULAR FILL

A. Use graded aggregate base material of uniform quality throughout, substantially free from vegetable matter, shale, lumps and clay balls, and having a Limerock Bearing Ratio value of not less than 100.

B. Aggregate is composed of limestone, marble, or dolomite.

C. Use material retained on the No. 10 sieve composed of aggregate meeting the following requirements:

1. Soundness Loss, Sodium, Sulfate: AASHTO T 104, 15 percent.

2. Percent Wear: AASHTO T 96 (Grading A) 45 percent.

Sieve size	**Percent by Weight Passing**
2 inch	100
1-1/2 inch	95 to 100
¾ Inch	65 to 90
3/8 inch	45 to 75
No. 4	35 to 60
No. 10	25 to 45
No. 50	5 to 25
No. 200	0 to 10

4.03 WATER FOR MOISTURE CONDITIONING

A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

4.04 FOUNDATION STABILIZATION ROCK

A. General: Materials may be either limerock, shell rock, cemented coquina, or shell base sources approved by the FDOT.

B. Specific Requirements for Limerock: For limerock, carbonates of calcium and magnesium shall be at least 70 percent. Materials having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer. The gradation of limerock shall be FDOT No. 57 stone or such that 97 percent of these materials will pass a 3-1/2 inch sieve.

C. Crushed Shell: Crushed shell for this use shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina). Steamed shell will not be permitted.

D. Crushed shell shall meet the following requirements:

1. Material having a plasticity index of more than ten or a liquid limit greater than 40 shall not be used as a stabilizer.

2. At least 97 percent by weight of the total material shall pass a 3-1/2 inch sieve and at least 50 percent by weight of the total material shall be retained on the No. 4 sieve.

3. Not more than 20 percent by weight of the total material shall pass the No. 200 sieve. The determination of the percentage passing the No. 200 sieve shall be by washing only.

4. If the shell meets the above requirements without crushing, crushing will not be required.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02340

EROSION CONTROL AND SOIL STABILIZATION

PART 1 – GENERAL

1.01 DEFINITIONS

A. Soil Erosion Stabilization:

1. Provide erosion control measures on the Project and in areas where work is accomplished in conjunction with the Project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the Project.

2. Ground surfaces exposed during the wet season.

3. Areas which will not be subjected to heavy wear by ongoing construction traffic.

4. Temporary and long-term stabilization of new disturbed ditches, swales, storm water ponds, or disturbed ground with intermittent construction traffic.

B. Buffer Zone: Undisturbed area or, strip of natural vegetation, or an established suitable planting adjacent to disturbed area that reduces erosion and runoff.

C. Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution.

D. Permanent Stabilization:

1. Permanently stabilize exposed soil surfaces at finished grades

2. Permanent stabilization methods include, but are not limited to, sodding (permanent), mulching, and landscaping.

3. Immediately perform permanent stabilization at each completed excavation and embankment areas except for areas that are scheduled to be redisturbed.

4. Incorporate all permanent erosion control features into the Project at the earliest practical time.

1.02 DELIVERY, STORAGE, AND PROTECTION

A. General: Prevent or reduce the discharge of pollutants to storm water from all material delivery or storage by minimizing the storage of hazardous materials onsite, storing materials in a designated area, installing secondary containment, conducting regular inspection, and training employees or subcontractors.

B. Sod: As specified in the Contract Documents.

C. Mulch: Mark package of mulch to show air-dry weight.

1.03 SEQUENCING AND SCHEDULING

A. Contractor shall accept responsibility for existing soil and erosion control on the site, including maintenance, installed before starting earth disturbance activities.

B. Projects permitted by the South Florida Water Management District require written approval of the erosion/sedimentation control plan. City's acceptance of Construction Period Erosion/Sedimentation Control Plan required prior to starting earth disturbing activities.

C. Complete soil preparation, sodding, fertilizing, mulching, and matting on disturbed areas that will require stabilization either because the area has reached final grade (permanent landscaping) or because the area remains unworked for over 14 days (temporary sodding) during the wet season.

D. Notify CITY PROJECT MANAGER at Least 3 Working Days in Advance of:

1. Materials delivery.

2. Start of planting activity.

E. Sodding: Perform under favorable weather conditions during seasons that are normal, for such Work as determined by accepted local practice.

1.04 MAINTENANCE

A. Operations:

1. Sodded Areas: Perform during maintenance period to include:

a. Watering: Keep surface moist.

b. Washouts: Repair by filling with topsoil, and replace sodded areas.

c. Mulch: Replace wherever and whenever washed or blown away.

d. Resod unsatisfactory areas or portions thereof immediately if a satisfactory stand has not been produced.

2. Inspect, repair, and replace as necessary all erosion control measures during the time period from start of construction to completion of construction.

3. Inspect a minimum of at least once every 7 days or after each storm event and at least daily during prolonged rainfall. At no time shall more than 1 foot of sediment be allowed to accumulate in any erosion control device. The cleaning operation shall not dispose of sediment offsite.

B. Sediment Removal:

1. Remove sediment from erosion control devices and work into the grading plan at least once a week as required to maintain proper operation of devices. The cleaning operation shall not dispose of sediment offsite.

2. Sediment shall be removed and the controls upgraded or repaired as needed as soon as practicable, but not later than 2 days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment needed for repair operations.

3. In the event of continuous rainfall over a 24 hour period, or other circumstances that preclude equipment operation in the area, hand carry and install additional sediment controls as approved by the CITY PROJECT MANAGER.

4. Replace rock filters with new rock at least once a month or when the sediment reduces by one half the filtering capacity of the facility.

PART 2 – MATERIALS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

B. Fertilizer shall have the Following Minimum Percentage of Plant Food by Weight:

1. Nitrogen: 16 percent.

2. Phosphoric Acid: 4 percent.

3. Potash: 8 percent.

C. At least 50 percent of phosphoric acid shall be from normal superphosphate or an equivalent source which will provide a minimum of two units of sulfur.

2.02 SOD

A. As specified in the Contract Documents.

2.03 MULCH

A. The mulch material shall be dry straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal bermuda, or bahia grass, hay or compost; and shall be free from noxious weeds and plants.

B. Any plant officially listed as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Furnish to the CITY PROJECT MANAGER, prior to incorporation onto the project, a certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, stating that the Mulch materials are free of noxious weeds. Any such noxious plant or plant part found to be

delivered as mulch will be removed by the Contractor at his expense and in accordance with the law.

C. Only undeteriorated mulch which can readily be cut into the soil shall be used. The “air-dry” weight (as defined by the Technical Association of the Pulp and Paper Industry, for wood cellulose) shall be marked on each package by the producer.

2.04 SOIL TACKIFIER

A. Derived from natural organic plant sources containing no growth or germinationinhibiting materials.

B. Capable of hydrating in water, and readily blend with other slurry materials.

C. Wood Cellulose Fiber: Add as tracer, at rate of 150 pounds per acre.

2.05 EROSION CONTROL MATTING

A. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

2.06 REINFORCED PLASTIC COVERING

A. Co-extruded, copolymer laminate reinforced with a nonwoven grid of high strength nylon cord submersed in a permanently flexible adhesive media allowing for equal tear resistance in all directions.

B. Black in color and ultraviolet stabilized.

C. Physical Requirement (Minimum Average Roll Values):

1. Tear Strength: 130 pounds.

2. Elongation: 620 percent.

3. Minimum Thickness: 6 mil.

2.07 SILT FENCE

A. Support Posts: As recommended by manufacturer of geotextile.

B. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

C. Filter Fabric: Polyester, polypropylene, or nylon filaments, woven into a uniform pattern, distinct and measurable openings.

1. Filaments: Resistant to damage from exposure to ultraviolet rays and heat.

2. Material Edges: Finish so that, filaments retain their relative positions under stress.

D. In accordance with requirements of Table No. 1:

Table No. 1 - Filter Fabric		
Physical Property	Required Value	Test Method
Weight, lbs/sq yd, min.	4	ASTM D3776
Equivalent Opening Size, max.	50-70	U.S. Standard Sieve
Grab Tensile Strength, lb, min. ARV	400	ASTM D4632
Elongation, % max.	25	ASTM D1682
Mullen Burst Strength, psi, min. ARV	200	ASTM D3786
Ultraviolet Radiation Resistance, % Strength Retention	80	ASTM D4355
Flow Rate, gpm/sf, min. ARV	30 to 50	ASTM D4491

2.08 STRAW BALES

A. Machine baled clean salt hay or straw of oats, wheat, barley, or rye, free from seed of noxious weeds, using standard baling wire or string.

2.09 POSTS FOR STRAW BALES

A. Two-inch by 2-inch untreated wood, rebar, or commercially manufactured metal posts.

2.10 STABILIZED CONSTRUCTION ENTRANCES A.

Clean pit run or 2 inches minus gravel.

B. Subgrade geotextiles as specified in the Contract Documents.

2.11 DUST CONTROLLER

A. Nontoxic materials that do not have an adverse effect on soil structure or establishment and growth of vegetation.

1. Calcium chloride meeting the meeting the requirements of AASHTO M144.

2. Water; reasonably clean, and shall be free from suspended water.

2.12 FILTER FABRIC

A. All existing and newly constructed storm drainage structures onsite or adjacent to the site shall be protected with two (2) layers of non-woven filter secured beneath the frame and grate.

B. Filter Fabric shall meet the requirements of Type D-3 meeting the FDOT specifications Section 985.

2.13 FLOATING/STAKED TURBIDITY CURTAINS

A. Curtains shall be minimum 18 ounce nylon reinforced PVC fabric (300 psi Test).

B. Curtains are five (5') standard height and shall reach the bottom for depths up to ten (10') feet of water.

C. Turbidity barriers are required on all outfalls located within the site or adjacent to the site. Location of turbidity barriers will be as approved by City.

PART 3 – EXECUTION

3.01 GENERAL

A. Erosion control measures are required during all construction and site disturbance activities, and shall remain until permanent site ground covers are in-place.

B. Limitation of Exposure of Erodible Earth: The City may limit the surface areas of unprotected erodible earth exposed by the construction operation, and may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments, or to prevent detrimental effects on property outside the project right-of-way or damage to Project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

C. Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 ft^2 without specific prior approval by the City. This limitation applies separately to clearing and grubbing operations and excavation and filling operation.

D. The City may increase or decrease the amount of surface area the Contractor may expose at any one time.

E. The implementation of the erosion control plan and the construction maintenance, replacement and upgrading the erosion control devices are the responsibility of the Contractor until all construction is completed and landscaping established and approved. During the construction period, the erosion control devices shall be upgraded for unexpected storm events and to ensure that sediment and sediment laden water do not leave the site.

F. Maintain existing buffer zones adjacent to Project Limits. Keep all construction equipment, debris, and soils out of the natural buffer zone.

3.02 STABILIZED CONSTRUCTION ENTRANCES

A. Provide a graveled construction access at each access point between the site and any public or private road or other paved surfaces.

B. Place subgrade geotextile on the ground prior to aggregate placement.

C. Place aggregate over the subgrade geotextile to a minimum thickness of 8 inches.

D. Minimum dimensions for stabilized construction entrances are 50 feet in length by 20 feet in width.

3.03 SOIL PREPARATION

A. Before start of sodding, and after surface has been shaped and graded, and lightly compacted to uniform grade, scarify soil surface to minimum depth of 1 inch.

3.04 SODDING

A. As specified in the Contract Documents.

3.05 MULCHING

B. Apply uniformly on disturbed areas that will remain undisturbed for 7 days or more, as requested by City, and on all sodded areas.

C. Application: Sufficiently loose to permit penetration of sunlight and air circulation, and sufficiently dense to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil.

1. As recommended by manufacturer.

3.06 SOIL TACKIFIER

A. Spray on after mulch is in place.

B. The soil tackifier shall be applied at the rate per acre specified by manufacturer for applicable grades.

3.07 REINFORCED PLASTIC COVERING

A. Place on areas where sodding and erosion control matting have not controlled erosion, and over all temporary stockpiles.

B. Install in single thickness, strips parallel to direction of drainage. Anchor plastic in 6-inch by 6-inch trench backfilled with compacted native material.

C. Maintain tightly in place by using sand bags on ropes with a maximum 10-foot grid spacing in all directions.

D. Tape or weight down full length, overlap seams at least 12 inches.

E. Remove at final acceptance unless notified otherwise by City.

3.08 SILT FENCE

A. Install prior to starting earth disturbing activities upslope of fence.

B. Install silt fence along contour where shown on the Drawings. Do not deviate from grade more than 4 inches.

C. One-piece filter fabric or continuously sewn to make one-piece filter fabric for full height of the fence, including portion buried in the toe trench.

D. When joints are necessary, splice filter fabric together only at a support post, with a minimum 6-inch overlap, and securely fasten both ends to support post.

E. Filter fabric shall not extend more than 30 inches above the ground surface. Securely fasten to upslope side of each support post using ties. Filter fabric shall not be stapled to existing trees.

F. Take precaution not to puncture filter fabric during installation. Repair or replace damaged area.

G. Remove silt fence after upslope area has been permanently stabilized. Immediately dress sediment deposits remaining after the sediment fence has been removed to conform to existing grade. Prepare and sod graded area.

3.09 TEMPORARY SOIL STOCKPILES

A. Cover with reinforced plastic covering, as directed in Article Reinforced Plastic Covering.

B. Protect perimeter of stockpile from erosion with ditches.

3.10 DUST CONTROL

A. Apply appropriate dust control measures on a continuous basis until permanent stabilization measures are in place.

B. Apply on construction routes and other disturbed areas subject to surface dust movement and where off-site damage may occur if dust is not controlled. C. Avoid creating erosion when using water as a dust controller.

3.11 STRAW BALES

A. Embed minimum of 4 inches in flat-bottomed trench.

B. Place with ends tightly abutting or overlapped. Corner abutment is not acceptable.

C. Install so that bale bindings are oriented around the sides and not over the top and bottom of the bale.

D. Use two posts for each bale. Drive posts through the bale until top of post is flush with top of bale and post is 1-1/2 feet to 2 feet in the ground. E. Wedge loose straws in any gaps between bales.

3.12 EROSION CONTROL MATTING

A. Place on sodded slopes 3H to 1V, and steeper.

B. Apply sod and fertilizer prior to matting.

C. At top of slope, entrench material in 6-inch by 6-inch trench. Secure matting at 1 foot intervals down the slope. At the bottom of the slope, extend the mat 2 feet beyond the toe of slope, turn material under 4 inches, and staple at 1 foot intervals.

D. Mats shall be stapled in-place as they are installed down the slope face. The mats shall have direct contact with the soil surface.

E. Overlap:

1. Lengthwise: 1 foot minimum.

2. Crosswise: 6 inches minimum.

3.13 CLEANUP

A. Sediment trapped in erosion control devices shall be removed from the site or regraded into the slopes on the site. Do not flush sediment-laden water into drainage system.

B. After site restoration is complete and when approved by the City, all temporary erosion control measures shall be completely removed and disposed offsite to locations that are approved by federal, state, and local authorities.

C. Silt fence, straw bales, reinforced plastic covering, and any other erosion control devices shall be disposed offsite to locations that are approved by federal, state, and local authorities.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02369

STEEL SHEET PILING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish and install steel sheet piling, complete with wales and other incidentals required for a complete system as shown on the Drawings or when required to maintain the integrity of existing structures or excavations. Sheet piling when shown is mandatory for this project. The Contractor assumes responsibility for the sheeting designs not shown on the drawings.

B. Contractor shall consider the possibility of encountering hard rock materials during sheet piling installation. No additional payment will be made for installation of sheet piling through hard rock materials.

1.02 QUALITY ASSURANCE

A. Unless otherwise indicated, all workmanship and practices shall be in accordance with ASTM A328. Welding shall conform to AWS DI.1 Structural Welding Code. Steel for sheet piling shall conform to ASTM A572 Grade 50. Protective tape for tie rods (if required) shall conform to F.S. L-T-1512A and Military Spec. MIL, 1-631D and AM5.

1.03 DESIGN

A. Pipe trenches and excavations shall be constructed of interlocked steel sheeting as shown on the drawings. Sheeting for pipe trenches and excavations, whether permanent or temporary, shall be designed and installed by the Contractor. Wales and cross struts required for pipe trenches shall also be designed and installed by the Contractor. B. Sheet piling design for seawalls shall be as shown on the Drawings.

1.04 SUBMITTALS

A. Design Calculations: Design calculations signed and sealed by a Professional Engineer registered in the State of Florida shall be submitted for all sheeting, wales and struts that are designed by the Contractor. The submittal of design calculations is only required to demonstrate that proper engineering judgment has been used to design the sheeting. The Engineer will only acknowledge the receipt of the submittals. No approvals of the submittals will be made.

B. Shop Drawings: Submit shop drawings specifying the following:

- Sheeting type, layout, pipe penetrations, connection details, special corner piles (for turns) and elevations.

- Overhead obstructions such as powerlines shall be clearly indicated and clearances from such obstructions shall be followed per local regulations.
- Coating for piles per Specification 09900 – Painting.
- Driving guide, falsework, sequence of construction, driving equipment including pile hammer, power plant, leads, and cushion material and helmet.
- Steel mill reports, certifying the ASTM designation of the material
- Connection details and dimensions of the wales and struts to be installed under this Contract, if applicable. The review of these drawings shall in no way relieve the Contractor of the responsibility to provide a safe and satisfactory sheeting and shoring system.

1.05 DESIGN CRITERIA

A. The Contractor retains the design responsibility for the sheeting within the constraints specified herein.

B. The layout of the sheeting shall not be changed without the written permission of the Engineer.

C. The sheets shall be driven to retain water and earth to the bottom of the proposed trenches or excavations. The top elevation of the sheeting shall not be lowered by the Contractor.

D. Earth loads on the sheeting shall be estimated by the Contractor based on soil information presented.

E. Live loads shall be estimated by the Contractor based on equipment used.

F. The Owner and Engineer assumes no responsibility for the safety or serviceability of the sheeting, construction methods employed, or due to adverse weather conditions, hurricanes or other natural forces. No additional compensation will be made due to damage or collapse of the sheeting during construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sheet Piling: Z-shaped interlocked panels, including special fabricated sections, having a normal web thickness of at least 3/8 inch and being of a design such that they shall be continuously interlocked throughout their entire length. Piling shall conform to ASTM A572 with a yield strength of 50,000 psi. Higher strength sheets may be used at the Contractor's option at no additional cost to the Owner.

PROJECT NO. 12337

B. Corner Piles (Connection Knuckles): Special corner piles (connection knuckles) shall be furnished from the manufacturer and installed where there are turns in the sheet pile wall which are beyond the allowable turn for standard sheet pile. The standard sheet pile shall not be turned at an angle greater than what is allowable by the manufacturer.

C. Wales and Struts: Shall be provided when deemed necessary by the Contractor and shall conform to ASTM A36. Wales and struts shall be used when required by design for pipe trenches.

PART 3 - EXECUTION

3.01 PLACING PILES

A. Carefully locate piling as shown on the Contractor submittals. Place piles in a plumb position with each pile interlocked with adjoining piles for its entire length, so as to form a continuous diaphragm throughout the length of each run of wall. Place all piles as true to line as possible and provide suitable temporary wales or guide structures to insure that the piles are driven to correct alignment.

3.02 DRIVING PILES

A. Driving: Drive all piles to the elevation required and extend to the elevation indicated for the top of piles. A tolerance of +/- ½-inch top elevation will be permitted. Drive piles by approved methods in such manner as not to subject the piles to serious damage and to insure proper methods throughout the length of the piles. Pile hammers shall be maintained in proper alignment during driving operations by use of suitable leads or by guides attached to the hammer. A protecting cap shall be employed in driving to prevent damage to the top of piles. Adequate precautions shall be taken to insure that piles are driven plumb. If at any time the forward or leading edge of the piling is found to be out of plumb in the plane of the wall, the piles already assembled and partly driven shall be removed to the first plumb pile, and the Contractor shall take corrective measures to insure the plumbness upon installation. Each run of piling shall be driven to grade progressively from the start and no pile shall be driven to a lower grade than those behind it in the same run except when the piles behind it cannot be driven deeper. If the pile next to the one being driven tends to follow below final grade it may be pinned to the next adjacent pile. Should obstructions render it impracticable to drive a pile to the specified penetration, the Contractor shall make such changes in design alignment of the pile structure as may be deemed necessary by the Owner's representative to insure the adequacy and stability of the structure. Piles driven out of interlock with adjacent piles or otherwise damaged shall be removed and replaced by new pile at the Contractor's expense. If the Contractor encounters difficulty driving the sheet piling to the specified tip elevation, he shall provide driving shoes for sheets and/or pre-auger and backfill with concrete in order to obtain the specified tip elevation. No additional payment will be made for driving shoes, auguring and backfill with concrete or spudding.

B. Pile Hammer: Select and use a vibratory type hammer which has sufficient weight and energy to suitably install the specified pile, without damage, into the soils as indicated on the Drawings.

C. Driving Shoes: The Contractor will be permitted to provide hardened cast steel shoes which fully support the pipe pile and sheet pile tips for driving. Driving shoes shall be installed according to manufacturer's recommendations.

3.03 MONITORING

A. Before starting work, the Contractor shall check and verify governing dimensions and elevations. In company with the Engineer, he shall jointly survey the condition of adjoining structures. He shall take photographs, as directed by the Engineer, recording any prior settlement of cracking of structures, pavements, and other improvements. He shall prepare a list of such damages, verified by dated photographs, and signed by the Contractor and the Engineer participating in the investigation.

B. The Contractor shall survey adjacent structures and improvements, establishing exact elevations at fixed points to act as bench marks. He shall clearly identify bench marks and record existing elevations. Datum level used to establish bench mark elevations shall be located at a sufficient distance so as not to be affected by movement resulting from excavation or construction operations.

C. During excavation, the Contractor shall resurvey bench marks weekly, employing a licensed Land Surveyor or registered Professional Engineer. He shall maintain an accurate log of surveyed elevations for comparison with original elevations. He shall promptly notify the Engineer if changes occur or if cracks, sags or other damage is evident.

D. Vibration monitoring shall be performed at nearby structures when sheet piling work is ongoing. A single monitoring point using vibration monitoring equipment capable of detecting velocities of 0.1 inch/second or less and survey measurements shall be used for vibration monitoring at each of the nearest structures. An elevation measurement on nearby structures shall be taken before sheet piling work starts, and then at least twice a day during the work with one reading taken at the conclusion of the day's operations. Elevation measurements shall be recorded to an accuracy of 0.001 foot. If at any time the Contractor detects settlement or heave of 0.005-feet or more, or vibration levels of 0.5 inch/second or more, the sheet piling shall be stopped immediately, and the Engineer notified.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02371

GEOTEXTILES

PART 1 - GENERAL

1.01 DEFINITIONS

A. Fabric: Geotextile, a permeable geosynthetic comprised solely of textiles.

B. Minimum Average Roll Value (MinARV): Minimum of series of average roll values representative of geotextile furnished.

C. Maximum Average Roll Value (MaxARV): Maximum of series of average roll values representative of geotextile furnished.

D. Nondestructive Sample: Sample representative of finished Work, prepared for testing without destruction of Work.

E. Overlap: Distance measured perpendicular from overlapping edge of one sheet to underlying edge of adjacent sheet.

F. Seam Efficiency: Ratio of tensile strength across seam to strength of intact geotextile, when tested according to ASTM D4884.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Deliver each roll with sufficient information attached to identify it for inventory and quality control.

B. Handle products in manner that maintains undamaged condition.

C. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements. If stored outdoors, elevate and protect geotextile with waterproof cover.

PART 2 - PRODUCTS

2.01 NONWOVEN GEOTEXTILE

A. Pervious sheet of polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous or discontinuous (staple) fibers held together through needle-punching, spun-bonding, thermal-bonding, or resin-bonding.

PROJECT NO. 12337

B. Geotextile Edges: Selvaged or otherwise finished to prevent outer material from pulling away from geotextile.

C. Unseamed Sheet Width: Minimum 6 feet.

D. Physical Properties: Conform to requirements in Table No. 1.

TABLE NO 1
PHYSICAL PROPERTY REQUIREMENTS FOR NONWOVEN GEOTEXTILE

Property	Requirement	Test Method
Water Permittivity	14 $sec.^{-1}$, MinARV	ASTM D4491 (Falling Head)
Air Permeability	200 cf/min/sq ft, MinARV	ASTM D737
Transmissivity, Planar Waterflow/Siphonage	0.5 ft^2/sec., MinARV	ASTM D4716
Apparent Opening Size (AOS)	30 U.S. Standard Sieve Size	ASTM D4751
Grab Tensile Strength, Machine Direction	400 lb/in, MinARV	ASTM D4632
Grab Elongation, Machine Direction	50 percent, MaxARV	
Puncture Strength	400 lb, MinARV	ASTM D4833
Trapezoid Tear Strength	400 lb, MinARV	ASTM D4533
Abrasion Resistance	20 percent loss, 250 cycles, MaxARV	ASTM D4886
Ultraviolet Radiation Resistance	80 percent strength retention, MinARV after 500 hours	ASTM D4355

PART 3 - EXECUTION

3.01 LAYING GEOTEXTILE

A. Lay and maintain geotextile smooth and free of tension, folds, wrinkles, or creases.3.02

3.02 SHEET ORIENTATION FOR SUBSURFACE DRAINAGE

A. Orient geotextile in the trench with the long dimension parallel to the trench.

B. The filter material shall not be dropped on the geotextile from heights greater than 3 feet.

3.03 JOINTS

A. Unseamed Joints:

1. Overlapped.
2. Overlap, unless otherwise shown:
   a. Foundation/Subgrade Stabilization: Minimum 18 inches.
   b. Riprap: Minimum 18 inches.
   c. Other Applications: Minimum 12 inches.

3.04 INSTALLING GEOTEXTILE IN TRENCHES

A. Place geotextile in a way that will completely envelope granular drain material to be placed in trench and with specified overlap at joints. Overlap geotextile in direction of flow. Place geotextile in a way and with sufficient slack for geotextile to contact trench bottom and sides fully when trench is backfilled.

B. After granular drain material is placed to required grade, fold geotextile over top of granular drain material, unless otherwise shown. Maintain overlap until overlying fill or backfill is placed.

3.05 REPAIRING GEOTEXTILE

A. Repair or replace torn, punctured, flawed, deteriorated, or otherwise damaged geotextile.

B. Repair Procedure:

1. Place patch of undamaged geotextile over damaged area and at least 18 inches in all directions beyond damaged area.
2. Remove interfering material as necessary to expose damaged geotextile for repair.
3. Sew patches or secure them with heat fusion tacking or with pins and washers, as specified above in Article SECURING GEOTEXTILE, or by other means approved by Engineer.

3.06 REPLACING CONTAMINATED GEOTEXTILE

A. Protect geotextile from contamination that would interfere, in Engineer's opinion, with its intended function. Remove and replace contaminated geotextile with clean geotextile.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02481

TREE RELOCATION AND PROTECTION

PART 1 – GENERAL

1.01 WORK TO BE PERFORMED AND WORK INCLUDED

A. Prepare and relocate trees and palms designated for relocation within the project boundaries, to include all aspects of preparation, relocation, protection, and maintenance.

B. Protection and care of existing trees and palms to remain within the project boundaries, to include all aspects of protection, pruning, fertilization, and watering. C. Watering by water truck.

D. Follow up maintenance as required by these Specifications.

E. Labor, materials, equipment, and services to complete all preparation, relocations and protection work as shown on the Drawings, as specified herein, or both.

1.02 SUBMITTALS

A. Verification of Qualifications: The Contractor shall provide a list of references and project list of a minimum of 5 projects that the Contractor has successfully completed that are similar in scope and nature.

B. List of all equipment to be utilized during tree preparation and transplanting.

C. Literature on specified wetting agents, fertilizers, and soil conditioners.

1.03 APPLICABLE STANDARDS AND SPECIFICATIONS

A. Comply with the following standards and specifications for all materials, methods, and workmanship unless otherwise noted:

1. Codes and Standards of the American Association of Nurserymen.
2. Codes and Standards of the National Arborists Association.
3. Codes and Standards of the International Society of Arboriculture
4. ANSU A300 Tree Care Operations: Standard Practices for Tree, Shrub and Other Woody Plant Maintenace.

1.04 PERMITS

A. The Contractor shall secure and pay for any permits, including tree relocation permits, required in order to complete the work under this Section.

1.05 DESCRIPTION

A. Trees to be relocated within the project area will be specifically designated in the field as project work progresses.

B. Existing trees to be relocated shall be crown pruned and be treated with soil amendments prior to relocation.

C. Existing trees to be relocated or to remain shall be protected with barricades during construction. Trees or shrubs to remain which are scarred or destroyed shall be replaced at the direction of the CITY Forester with the same species, size, and quality at no cost to the CITY.

D. Tree pits resulting from relocated material shall be backfilled with clean fill and brought flush with surrounding grade.

1.06 GUARANTEES

A. The Contractor Shall Guarantee His Work in the Following Way:

1. Any tree or palm that dies or is deemed in unacceptable condition for one year following final project acceptance shall be removed by the Contractor, including root ball, and backfilling of pit, at no cost to the City.

2. The Contractor shall provide a comparable specimen at no additional cost to the CITY.

3. The guarantee shall be enforced if it is deemed by the CITY Forester that tree mortality or decline is a product of negligence by the Contractor.

PART 2 – MATERIALS

2.01 SOIL AMENDMENTS

A. Root stimulant shall be Roots Biostimulant, concentrate or powder, as manufactured by LISA Products Corp., (305) 797-6801, or CITY-approved equal. Stimulant shall be applied either as a wash, or by injection, mixed per manufacturer's recommendation.

B. Soil conditioner shall be Lesco Wet, as manufactured by Lesco, Inc. or NoburN, as manufactured by Roots or CITY-approved equal.

C. Minor element liquid fertilizer mix shall be Micro Mix liquid as produced by Lesco, Inc., or equal; to be diluted at a rate of 1 gallon per 100 gallons of water and applied at a rate of 50 gallons per 1,000 square feet of canopy, or Iron Roots, applied per manufacturer's instructions.

D. Time Release Fertilizer tablets shall be Agriform, 15 grams, designation 8-8-8; or approved equal.

2.02 EQUIPMENT

A. Soil amendments shall be injected into the soil by means of a spray apparatus utilizing mechanical agitation to keep powdered amendments suspended.

B. Root pruning equipment shall be designed for this task, and shall produce clean cuts of roots without damage to the resulting root ball. All equipment shall be wellmaintained, with sharp cutting blades, clean and free of leaking fuel, oils, and hydraulic fluids.

C. Relocation equipment shall be capable of lifting and transporting trees without damage.

2.03 SOIL

A. Soil to be placed once trees or palms are transplanted shall meet the requirements specified in the Contract Documents.

2.04 WATER

A. Water shall be clean and potable, from municipal Fort Lauderdale source, or from onsite wells.

2.05 MULCH

A. Grade A Eucalyptus mulch as supplied by Action Nursery Products, Inc., Fort Myers, Florida, 1-800-433-2050, or approved equal, and shall be free of viable weed seeds.

B. Grade A Melaleuca mulch or Australian Pine mulch as supplied by Advanced Mulch, Inc., Boynton Beach, Florida, 1-877-256-9685, or approved equal; and shall be free of sand, seed and inorganic materials.

2.06 BRACING AND STAKES

A. All bracing and stakes shall be pressure treated pine. Compression bands shall be stainless steel.

PART 3 – EXECUTION

3.01 EXCAVATING NEAR EXISTING TREES

A. Maintain a minimum 6-foot clearance from all tree trucks except palm trees.

B. Use a 24-inch minimum depth saw cut in pavement or dirt/gravel roadway before start of excavation in areas where there are large trees close to the construction area. No coating application is required after saw cutting roots.

3.02 PREPARATION FOR RELOCATION OF TREES AND PALMS WITHIN THE PROJECT BOUNDARIES

A. Crown Pruning: All trees and palms shall be crown pruned prior to relocation.

1. Broadleaf Trees:

a. All trees are to be trimmed by thinning the crown only, and not by reducing crown dimensions. Complete a Class II Standard Pruning in Compliance with to NAA Standards, including removal of dead wood.

b. Repair any existing injuries to trees including cavities and machinery marks.

2. Palms:

a. Remove all fruits and seed pods, and all but the 7 youngest fronds.

b. Tie all remaining fronds with untreated cotton twine or burlap straps. B.

Fertilization and Watering:

1. Preparation: Clear the root ball area of all foreign material, trash, etc., to expose undisturbed soil.

2. Application/Schedule:

a. Trees shall be deep injection fertilized a minimum of 14 days prior to relocation. Specified liquid fertilizer shall be used and applied at the concentration and application rates stated herein.

b. Mix wetting agent, biostimulant, and minor element mix to produce a single fluid with each component included at the specified concentration. Inject into the root zone within the limits of proposed root ball at the rate of 50 gallons fluid per 1,000 square feet of tree canopy, using only approved spray equipment.

c. Form an earth berm 6 inches high outside the proposed root ball prior to watering. Water application shall saturate the root ball to its entire depth.

C. Root Pruning:

1. Technique:

a. All trees shall be excavated by digging a trench a minimum of 36 inches deep by 6 inches wide, either by hand or with a trenching machine designed for this purpose. Provide continuous trenching around the tree or palm at a minimum distance of 30 inches from the trunk. Hand cut

broadleaf tree roots after trenching to produce clean cuts with no splits or tears.

b. Barricades: Barricade all root pruned trees and palms at outside of soil berm with minimum 4-foot chain link fence or other barricade approved by the CITY.

c. Timing:

1) All oaks to be relocated shall be maintained for a minimum of 10 weeks after root pruning prior to relocation.

2) Palms shall be maintained a minimum of 4 weeks prior to relocation.

3.03 RELOCATION OF TREES AND PALMS

A. General: Trees to be relocated shall be as directed by the CONSULTANT.

B. Preparation:

1. Trees and palms shall be injected with soil amendments a minimum of 14 days prior to relocation. Apply at manufacturer's recommended concentration and application rates.

2. Trees and palms shall be thoroughly soaked to the full depth of the root ball daily for 7 consecutive days prior to relocation.

3. Accurately locate position and elevation where all trees are intended to be planted, for verification by CITY Forester. Verify that no overhead or underground utilities, existing or proposed, conflict with proposed locations.

4. Ascertain that all proposed paths for machinery are clear of utilities and other obstructions.

C. Excavation of Tree Pits: Dig all pits with vertical sides and flat bottom. Existing soil may be utilized as backfill as directed by the CITY Forester. All Tree Pits to be lined with root barrier adjacent to roadways and sidewalks as directed by CITY PROJECT MANAGER.

D. Digging and Handling - Broadleaf Trees:

1. Notify CITY 2 business days in advance of each relocation to allow for observation of procedures.

2. Determine line of previous root pruning and excavate around root mass to leave area 12 inches out from line of root pruning undisturbed. Digging shall be accomplished so as to produce clean cuts on all roots without tearing or splitting. Trenching shall be a minimum of 36 inches deep.

3. Trees are to be handled in such a way as to avoid damage to bark and limbs subject to support cables or chains. Attach padded support cables or chains at multiple points where possible. Alternatively, tree trunks may be drilled and doweled for broadleaf trees. The CITY Forester reserves the right to require doweling in lieu of lifting by straps.

4. Root balls are to be undercut prior to lifting. Do not force tree from ground prior to undercutting. Ball depth to be determined upon assessing conditions at time of trenching, to keep intact the entire root ball.

5. Trees shall be properly wrapped during moving so trunks will not be scarred and damaged and to avoid broken limbs. Broken limbs or scarred trunks shall cause tree to be unacceptable and rejected at the CITY's option. Broken limbs and wounds which do not (in the judgment of the CITY Forester) cause the tree to be rejected shall be cleanly cut.

6. Transport plant material on vehicles of adequate size to prevent overcrowding, broken limbs, foliage damage or root ball damage.

7. Root balls and foliage shall be kept moist during all phases of relocation.

8. Partially backfill tree pits with 12 inches of approved planting soil prior to setting tree. This layer of soil to be thoroughly drenched prior to relocation to achieve a stable platform at the correct elevation so that the top of rootball is 1 inch above proposed grade.

9. Rotate tree prior to setting to achieve best positioning relative to adjacent trees and viewing angles. E. Backfilling:

1. Flood bottom soil layer to settle tree into best position and to remove air pockets.

2. Continue to flood root ball as planting soil is deposited to ensure removal of all air pockets.

3. Create a saucer to retain water. F. Bracing:

1. Support tree with machinery until bracing is complete.

2. Buttresses may support separate trunks on multiple trunk trees.

3. Maintain braces until completion of project. Removal of braces shall be by others.

G. Watering: Relocated trees shall by watered using water-truck. Watering schedule shall be: once per day for first 6 weeks; followed by 3 times per week for following 6 weeks.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02500

CONVEYANCE PIPING - GENERAL

PART 1 - GENERAL

1.01 DELIVERY, STORAGE, AND HANDLING

A. In accordance with manufacturer's recommendations and as specified in the individual Specification(s) following this Section.

B. Marking at Plant: Mark each pipe and fitting at plant. Include date of manufacture, manufacturer's identification, specification standard, diameter of pipe, pipe class, and other information required for type of pipe.

C. Pipe, specials, and fittings received at Project site in damaged condition will not be accepted.

D. Gasket Storage: Store rubber gaskets in cool, well ventilated place and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.

E. Handling:

1. Heavy canvas or nylon slings of suitable strength shall be used for lifting and supporting materials. Do not use chains or cables.

2. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workmen. Slings shall bear uniformly against pipe.

3. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.

1.02 SUBMITTALS

A. The Contractor shall submit complete shop drawings and certificates, test reports, affidavits of compliance, of all piping systems, in accordance with the requirements in Section 01300 – Submittals, and as specified in the individual piping sections.

B. Each shop drawing submittal shall be complete in all aspects incorporating all information and data listed herein and all additional information required to evaluate the proposed piping material's compliance with the Contract Documents. Partial or incomplete submissions will be returned to the Contractor without review. C. Data to be submitted shall include, but not be limited to:

1. Catalog Data consisting of specifications, illustrations, and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.

2. Complete layout and installation drawings with clearly marked dimensions and elevations. Piece numbers which are coordinated with the tabulated pipe layout schedule shall be clearly marked. Piping layout drawings shall indicate the following additional information; pipe supports, location, support type, hanger rod size, insert type and the load on the hanger in pounds.

3. Weight of all component parts; including pipe hanger load calculations signed and sealed by a registered professional engineer.

4. Tabulated pipe layout schedule which shall include the following information for all pipe and fittings, service, pipe size, working pressure, wall thickness and piece number.

D. Certifications: prior to installation, the Contractor shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings and specials furnished under this Contract comply with all applicable provisions of AWWA and these specifications. No pipe or fittings will be accepted for use in the Work on this project until the affidavits have been submitted and accepted in accordance with Section 01300 – Submittals.

E. All expenses incurred in making samples for certification of tests shall be borne by the Contractor.

PART 2 - MATERIALS

2.01 PIPE

A. As specified in the individual Specification(s) following this Section and as shown on the Drawings.

B. Color Coding for Water Mains:

1. All pipe used for water main applications shall be color-coded blue in accordance with FAC 62-555.320(21)(b)(3).

2. Continuous blue stripes, parallel to the axis of the pipe, shall be applied using tape or paint applied to the dry pipe exterior surface.

3. Pipe striped during manufacture shall have stripes applied at 90-degree intervals around the pipe that remain intact following installation of the pipe.

4. Pipe striped during installation shall be in a continuous line along the top of the pipe. Pipes 24 inches and greater shall have two additional stripes on each side.

5. Aboveground water main piping shall be color-coded or marked similar to underground piping.

2.02 JOINTS

A. As specified in the individual Specification(s) following this Section.

2.03 COUPLINGS A.

General:

1. Coupling linings for use in potable water systems shall be in conformance with NSF 61B. Linings for wastewater piping shall be in accordance with the provisions of the Contract Documents.

2. Couplings shall be rated for appropriate operating pressure and hydrostatic test pressure.

3. Exposed, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

4. Buried, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213. B. For Pipe with Plain Ends:

1. Bolted, sleeve-type couplings in accordance with AWWA C219.

2. Fabricated steel, mechanical slip-type expansion joints, in accordance with AWWA C221.

C. Unless thrust restraint is provided by other means, bolted, sleeve-type couplings shall be harnessed. Harness details shall be in accordance with requirements of appropriate reference standard or as shown on Drawings. D. For Pipe with Grooved Ends:

1. Grooved couplings in accordance with AWWA C606. System shall provide for flexible or rigid joints as shown on Drawings.

2. Exposed couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.

3. Buried couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213. E. For Pipe with Flanged Ends:

1. Flanged coupling adapters in accordance with AWWA C219.

2. Dismantling joints for connecting flanged pipe shall be AWWA C219 compliant. Studs and nuts provided to seal gasket shall be separate and independent from tie-bar restraint system.

F. Bolting Materials: As recommended by coupling manufacturer for specified conditions.

2.04 SLEEVES

A. Sleeves shall be long or short pattern as appropriate to the application conforming to AWWA C110.

B. Sleeves shall be mechanical joint with restraint if required, provided by external mechanical joint restraints.

C. Sleeves shall have a minimum pressure rating of 250 psi.

D. Linings and coatings ductile iron sleeves shall be in accordance with the provisions of the Contract Documents.

2.05 TAPPING SLEEVES – DUCTILE IRON

A. Ductile iron tapping sleeves are preferred for force main and water main taps.

B. Tapping sleeves shall meet ASTM A536 Grade 65-45-12.

C. Side flange seals shall be O-ring type with round, oval, or rectangular cross section.

D. Contractor shall inspect and/or verify diameter of the pipe to be tapped and order the correct sleeve.

E. Sleeves shall be coated in accordance with the provisions of this Specification.

F. Tapping sleeve and tapping valve shall be of the same or compatible manufacturer to assure proper fit of the aligning ring on the valve and the recess on the sleeve. No post factory modifications to either the sleeve or valve will be permitted.

G. Tapping sleeve shall be American Flow Control Series 1004 or 2800, Mueller H615, US Pipe T-9 or Clow F-5205.

H. Tapping machine and cutter shall provide the full-size of the tapped connection.

I. The coupon shall be removed from the pipe shall be given to the PCM.

2.06 TAPPING SLEEVES - STEEL

A. Steel tapping sleeves are acceptable for use where ductile iron sleeves are not practical and as approved by the CONSULTANT.

B. Tapping sleeve composed of two halves of heavy welded steel, bolting together on the pipe and sealing against a concave Buna-N wedge gasket around the nozzle opening. Both halves of the sleeve are fabricated to accurately conform to the outside diameter of the ductile iron host pipe and to provide reinforcement without the use of shims or pads.

C. The sleeve half opposite the nozzle shall be solid and shall not consist of straps or U-bolts. Sleeve and nozzle shall be fabricated from ASTM 285, Grade C, carbon steel. Branch leg flange shall conform to AWWA, Class D, Schedule C-207, 150-pound drilling to match tapping valve. The flange face shall be recessed to accommodate the tapping valve in accordance with MSS-SP60. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

D. The ferrous metal parts of the fitting shall receive a factory applied fusion-bonded, epoxy coating, 12-mil minimum dry film thickness in accordance with AWWA C213.

E. Minimum wall thickness of the sleeve shall be 0.375 inch.

F. Tapping sleeve shall be pressure rated to 150 psi, minimum.

G. Tapping sleeve shall be, Dresser Style 630, JCM Series 412; or equal.

H. Tapping machine and cutter shall provide the full-size of the tapped connection.

I. The coupon removed from the pipe shall be given to the PCM.

2.07 SERVICE SADDLES

A. Service saddles shall be ductile iron with double stainless steel straps conforming to AWWA C-111/A.21.11-00.

2.08 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS A.

Modular Mechanical Seal:

1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.

2. Assemble interconnected rubber links with Type 316 stainless steel bolts, nuts, and pressure plates.

3. Size modular mechanical seals according to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening. B. Wall Sleeves:

1. Diameter, ends, and length shall be as shown on Drawings.

2. Shall include integral seep ring to minimize seepage between metal sleeve and concrete.

C. Wall Couplings:

1. Diameter, ends, and length shall be as shown on Drawings.

2. Wall couplings shall provide flexible mechanical joint.

3. Body and end rings shall be coated with fusion bonded epoxy.

4. Body shall include integral seep ring.

5. Shall comply with AWWA C219.

D. If core drilling is required for penetrations of existing concrete walls or slabs, locations of drilling shall be determined by radiograph to avoid damage to reinforcing steel and conduits.

2.09 FLANGES, FLANGE GASKETS, AND BOLTING MATERIALS

A. As specified in individual Specifications following this Section.

B. Flanges, bolting materials, and flange gaskets for steel flanges shall conform to AWWA C207.

C. Flanges, bolting materials, and flange gaskets for ductile iron flanges shall conform to AWWA C110 and C115.

2.10 INSULATING FLANGES AND COUPLINGS

A. Dielectric Flange Manufacturers or equal:

1. Pipeline Seal and Insulator, Inc.; Houston, Texas.

2. Central Plastics Co.; Shawnee, Oklahoma.

3. Calpico, Inc.; South San Francisco, California. B. Insulating Flanges:

1. Bolt holes sized as required.

2. Manufacturers and Products or equal:

a. Dresser Industries; Style 39.

b. Baker Coupling Company, Inc.; Series 216.

2.11 PIPE LOCATING TAPE

A. As specified in the Contract Documents.

2.12 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Granular material as specified in the Contract Documents.

2.13 TRENCH STABILIZATION MATERIAL

A. As specified in the Contract Documents.

PART 3 - EXECUTION

3.01 GENERAL

A. Notify City at least 2 weeks prior to field fabrication of pipe or fittings.

B. Furnish feeler gauges of proper size, type, and shape for use during installation for each type of pipe furnished.

C. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by Engineer. Placement of materials shall not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

3.02 EXAMINATION

A. Verify size, material, joint types, elevation, and horizontal location of existing pipeline to be connected to new pipeline or new equipment.

B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

C. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Prepare trench as specified in the Contract Documents.

B. Unless otherwise permitted by Engineer, maximum length of open trench shall not exceed 400 feet. C. Trench Grade:

1. Grade bottom of trench by hand to specified line and grade, with proper allowance for pipe thickness and pipe base, when specified. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.

2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.

D. Pipe Bedding: Place and compact pipe bedding material as follows:

1. Install to full width of trench, from the following depths below bottom to springline of pipe:

   a. For Pipe 12-Inch Diameter: 4 to 6 inches.

   b. For Pipe Larger than 12-Inch Diameter: 6 to 8 inches.

2. Compact to at least 98 percent of its maximum density as determined by AASHTO T180.

3. Ensure that no unfilled or uncompacted areas occur beneath pipe.

E. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

3.04 INSTALLATION A.

General:

1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of Work.

2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings and linings.

3. Do not drop or dump pipe materials into trench.

4. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.

5. Install individual pipe lengths in according to approved lay diagram. Misplaced pipe shall be removed and replaced.

6. Inspect pipe and fittings before installation, clean ends thoroughly, remove foreign matter and dirt from inside.

7. Flanged Joints:

   a. Install perpendicular to pipe centerline.

   b. Bolt Holes: Straddle vertical centerline, aligned with connecting equipment flanges or as shown on Drawings.

   c. Use torque-limiting wrenches to provide uniform bearing and proper bolt tightness.

   d. Flange Type: Use flat-faced flange when joining with flat-faced ductile or cast iron flange.

8. Couplings:

   a. Install in accordance with manufacturer's written instructions.

   b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.

c. Do not remove pipe coating. If damaged, repair before joint is made.

d. Clean and lubricate gaskets before installation.

e. Tighten coupling bolts progressively, drawing up bolts on opposite sides gradually until bolts have uniform tightness. B. Cleaning Pipe and Fittings:

1. Remove lumps, blisters, and excess coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.

2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.

C. Laying Pipe:

1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of CONSULTANT.

2. Mechanical Joint, Push-On Joint, and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in-place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.

3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.

4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.

5. Do not allow foreign material to enter pipe while it is being placed in trench.

6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.

7. Pipe shall be installed in a straight alignment and deflections made as required after the joint has been completed.

D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:

1. Join pipe with push-on joints and mechanical joint fittings in strict accordance with manufacturer's recommendations.

2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.

3. Lubricate all pipe gaskets and pipe ends using lubricant furnished by pipe manufacturer. No substitutes will be permitted.

4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. Lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid. E. Cutting Pipe:

1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.

2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.

3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer. F. Buried Pressure Pipe:

1. Concrete Encased or Embedded Pipe: Do not encase joints in concrete unless specifically shown on Drawings.

2. Placement:

   a. Keep trench dry until pipe laying and joining is completed. If the excavation cannot be effectively dewatered the Contractor shall propose alternate pipe installation methodology for approval by the City prior to proceeding. All requirements of trench backfill per the Contract Documents will remain in effect.

   b. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.

   c. Measure for grade at pipe invert, not at top of pipe.

   d. Excavate trench bottom and sides of ample dimensions to permit proper joining, welding, visual inspection, and testing of entire joint.

   e. Prevent foreign material from entering pipe during placement.

   f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.

   g. In general, lay pipe upgrade with bell ends pointing in direction of laying.

   h. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:

1) Shorter pipe lengths.

2) Special mitered joints.

3) Standard or special fabricated bends.

i. Check gasket position with feeler gauge to assure proper seating.

j. After joint has been made, check pipe alignment and grade.

k. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.

l. Prevent uplift and floating of pipe prior to backfilling.

3. Tolerances:

a. Deflection From Horizontal Line: Maximum 2 inches.

b. Deflection From Vertical Line: Maximum 1 inch.

c. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.

d. Horizontal position of pipe centerline on alignment around curves maximum variation of 1 foot from position shown.

4. Cover Over Top of Pipe: Minimum 3 feet, unless otherwise shown.

5. Disposal of Excess Excavated Material: As specified in Section 02316, Excavation.

G. Line and Grade:

1. No high points will be allowed between air valves on pressure piping.

2. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations from existing ground surface to top of pipe.

3. Install air valves as shown on the Drawings and as verified in the field and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Engineer.

4. Deviations exceeding 1/2 inch from specified line or 1/4 inch from specified grade will not be allowed without express approval of CONSULTANT.

5. Pipeline sections that are not installed to elevations shown or installed as approved by City shall be reinstalled to proper elevation.

3.05 THRUST RESTRAINT

A. Location: At pipeline tees, plugs, valves, caps, bends, and locations where unbalanced forces exist, and as shown on the Drawings.

B. All pressure pipe will be restrained at all valves and fittings. Provide additional restraint as shown on the Drawings.

C. Use of thrust blocks is not permitted.

3.06 CORROSION PROTECTION

A. Buried Pipe: As specified in the individual Specifications following this Section.

B. Notify City at least 3 days prior to start of surface preparation, coating application, and corrosion protection work.

3.07 PLACEMENT OF PIPE LOCATING TAPE

A. Place pipe locating tape in accordance with the Contract Documents.

3.08 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Placepipe bedding and pipe zone material in accordance with the Contract Documents.

3.09 FIELD QUALITY CONTROL – INSPECTION AND TESTING A.

General:

1. Notify City in writing at least 15 days in advance of testing. Perform testing in presence of Engineer.

2. Using water as test medium, all newly installed pipelines shall successfully pass hydrostatic leakage test prior to acceptance.

3. Conduct field hydrostatic test on buried piping after trench has been completely backfilled. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.

4. Contractor may, if field conditions permit and as approved by Engineer, partially backfill trench and leave joints open for inspection and conduct initial service leak test. Final field hydrostatic test shall not, however, be conducted until backfilling has been completed as specified above.

5. Supply of Temporary Water: In accordance with the Contract Documents.

6. Install restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.

7. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.

8. New Piping Connected to Existing Piping: Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.

9. Service connections for water mains are to be installed to the angle stop prior to disinfection and testing of the installed main.

10. Fire hydrant leads are to be installed to the shut-off valve prior to disinfection and testing of the installed main. B. Tapping Sleeve and Valve:

1. Install mechanically restrained test plug with relief port.

2. Test tapping sleeve and valve prior to performing tap.

   a. Test at 150 psi for 15 minutes.

   b. Successful test will be no visible leakage.

3. Test sleeve and valve together with valve open. C.

Hydrostatic Testing Procedure:

1. Furnish testing equipment, as approved by Engineer, which provides observable and accurate measurements of leakage under specified conditions.

2. Maximum Filling Velocity: 0.25 foot per second calculated based on full area of pipe.

3. Expel air from piping system during filling.

4. Test Pressure: 150 psi as measured at low point of pipeline.

5. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.

6. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding makeup water only as necessary to restore test pressure.

7. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.

D. Maximum Allowable Leakage:

20-ft nominal length pipes	$= \frac{\quad}{148{,}000 \quad D\sqrt{\quad}}$
18-ft nominal length pipes	

	$= \frac{133{,}200}{D\sqrt{P}}$

where:

L = Allowable leakage, in gallons per hour.

S = Length of pipe in feet.

D = Nominal diameter of pipe, in inches.

P = Average test pressure during leakage test, in pounds per square inch.

3.10 CLEANING AND DISINFECTION

A. Pipelines shall be kept clean during installation. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines with water at 2.5 fps minimum flushing velocity until foreign matter is removed.

B. Water shall be obtained from a potable, City source and shall be metered. The City shall be notified at least 2 working days prior to the intended use such that the meter can be installed. The Contractor shall pay the City for all water used. Water cost shall be incidental to the related pipeline installation work items.

C. Flushing shall be accomplished by partially opening and closing valves several times under expected line pressures with velocities adequate to remove foreign materials from the pipe, valves, and hydrants.

D. If impractical to flush large diameter pipe at 2.5 fps, clean pipe by use of pipe pig as approved by CONSULTANT. Multiple passes of pipe pig may be required to adequately clean line.

E. Remove accumulated debris through blowoffs 2 inches and larger or by removing spools and valves from piping. If hydrants are used, they must be adequately flushed and cleaned prior to being put into service.

F. Disinfection of Water Mains: As specified in the Contract Documents.

3.11 ABANDONMENT OF WATER MAINS

A. Water mains, 8 inches and less, being replaced shall be abandoned in-place.

B. When new mains have been tested, approved, and services relocated, cut, cap, and restrain any connections to remaining pressurized mains.

3.12 REPAIR OF DAMAGED PIPING

A. All existing piping damaged by the Contractor as a result of construction activities shall be repaired by the Contractor.

1. The Utilities Department shall be notified of all water main and force main damage and for all control valve operation.

2. Damage to unmarked mains shall be considered additional work or will be repaired by the City.

3. Damage to marked mains shall be repaired at no additional cost to the City.

B. Cleaning and disinfection of water main repairs shall be in accordance with the provisions of the Contract Documents.

C. If the City is required to make repairs for damaged mains that are the responsibility of the Contractor, the cost of the work will be charged to the Contractor.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02519

DISINFECTION OF WATER SYSTEMS

PART 1 - GENERAL

1.01 GENERAL

A. All work under this Section to be done in the presence of the City's Representatives.

B. Existing valves and connections to the water system are to be operated by the City's staff only.

PART 2 - MATERIALS

2.01 WATER FOR DISINFECTION AND TESTING

A. Clean, uncontaminated, and potable.

B. City will supply potable quality water. Contractor shall convey in disinfected pipelines or containers.

2.02 CONTRACTOR'S EQUIPMENT

A. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.

B. Provide protection as required by AWWA Standards C651, C652, C653, and/or C654 against cross-connections.

PART 3 - EXECUTION

3.01 GENERAL

A. Disinfection procedures shall conform to AWWA Standards C651, C652, C653, and/or C654 and this Specification.

B. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:

1. Pumps
2. Tanks
3. Wells
4. Filters

5. Pipelines: Disinfect new pipelines that connect to existing pipelines up to point of connection.

6. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.

C. Prior to application of disinfectants, clean pump, tank, filters, wellhead works and pipelines of loose and suspended material. Flush pipelines until clear of suspended solids and color. Use water suitable for flushing and disinfecting.

D. Conform to AWWA C651 for pipes and pipelines, C652 for tanks and reservoirs, C653 for water treatment plants and filters, and C654 for wells, except as modified in these Specifications. AWWA Specification requirements will be made available to the Contractor upon request.

E. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so that chlorine-water solution is at specified strength. Do not place concentrated commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

3.02 SEQUENCING AND SCHEDULING

A. Commence Initial Disinfection After Completion of Following:

1. Installation of water services, valves, and hydrant leads.

2. Completion and acceptance of internal painting of system(s).

3. Hydrostatic and pneumatic testing, pressure testing, functional and performance testing and acceptance of pipelines, pumping systems, structures, and equipment.

4. Disinfection of:

a. Pumps and associated system piping.

b. Treatment plant basins and processes used to supply water to system.

B. Provide 48 hour's notice to City's Representative for scheduling of valve operation, sampling, or laboratory testing.

3.03 PIPING AND PIPELINES A.

Flushing:

1. Before disinfecting, flush and/or pig as required all foreign matter from pipe in accordance with AWWA C651. Provide hoses, temporary pipes, ditches, and

other conduits as needed to dispose of flushing water without damage to adjacent properties.

2. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections.

3. Flush pipe through flushing branches and remove branches after flushing is completed.

4. Operate new valves during flushing process at least twice during each flush.

B. Disinfecting Procedure: In accordance with AWWA C651. The piping and appurtenances shall be sterilized by introducing the sterilizing agent into the water which is being pumped into the system in such a manner that the entire system involved will be filled with water containing a minimum chlorine concentration of 50 ppm at any point. The water shall be allowed to remain in the system for a minimum contact period of 24 hours before the system is flushed out.

C. Pipelines larger than 36 inches in diameter may be disinfected by spraying in accordance with the method described in AWWA C652.

D. Sampling Points: Provide sampling points on all water mains at the end of each water main and at a maximum spacing of 1,500 feet.

E. Water mains can be put into service when the chlorine concentration is less than 0.1 ppm free chlorine and 3.0 ppm total chlorine.

3.04 DAMAGED WATER MAINS

A. All pipe and fittings used to repair a damaged water main or service shall be swabbed or sprayed with hypochlorite as specified above.

1. Hypochlorite concentration shall range from 4 to 12 percent.

2. Hypochlorite solution must remain in contact with all pipe and fittings for a minimum of 10 minutes.

3.05 PUMPS

A. Disinfecting Solutions: Minimum free chlorine concentration of 100 ppm.

B. Application:

1. Inject disinfecting solution into pump and associated piping and circulate for a minimum 3 hour period of time. At end of 3 hour period, solution shall have a strength of at least 50 ppm free chlorine.

2. Operate valves and pump appurtenances during disinfection to ensure that disinfecting solution is dispersed into all parts of pump and lines.

3. If disinfecting solution contained in pump has a residual free chlorine concentration less than 50 ppm after the 3 hour retention period, reclean pump, reapply disinfecting solution, and retest until a satisfactory test result is obtained.

4. After chlorination, flush water from pump until water through the unit is chemically and bacteriologically equal to permanent source of supply.

3.06 TANKS AND RESERVOIRS A.

Cleaning:

1. Clean interior surfaces using water under pressure before sterilizing. Isolate tank and/or reservoir from system to prevent contaminating materials from entering the distribution system. Cleaning shall:

   a. Remove all deposits of foreign nature.

   b. Remove all biological growths.

   c. Clean the slopes, walls, top, and bottom.

   d. Avoid damage to the structure.

   e. Avoid pollution or oil deposits by workers and equipment.

2. Dispose of water used in cleaning in accordance with applicable regulations before adding disinfecting solution to tank and/or reservoir.

B. Disinfecting Procedure: In accordance with AWWA C652, unless herein modified. Parts of structures, such as ceilings or overflows that cannot be immersed, shall be spray or brush disinfected.

3.07 FILTERS

A. Prior to disinfection, remove foreign material from filtration structures. Clean using fire hoses and tools suitable for adequate scrubbing and cleaning. Pump or drain scrub water from structures.

B. Disinfection Procedure: In accordance with AWWA C653, unless herein modified.

C. Disinfect the Following Components:

   1. Influent pipes and channels

   2. Filter structure

   3. Filter media and underdrains

   4. Filter effluent pumping

5. Backwash supply piping

6. Finished water piping

7. Potable water piping

D. Clean other new facilities designed to hold or transport process water prior to disinfection of filter system including:

1. Raw water piping

2. Flocculation and sedimentation basins

3.08 WELLS

A. Disinfection Procedures: In accordance with AWWA C654, unless herein modified.

1. After well has been completed and tested, it shall be cleaned of all foreign substances. Swab the inner lining using alkalis, if necessary, to remove oil, grease, or other extraneous matter.

2. Use chlorine solution of a volume and strength so that a concentration of at least 50 ppm of free chlorine is contained in well.

3. Chlorine solution shall be poured into well and well surged for at least 5 minutes. After 4 hours, well shall be pumped or bailed until chlorine concentration is less than 5 ppm.

4. Tack weld capping plate to casing after well has been disinfected and pumped out.

5. Take care to prevent the entrance into well of dirt or other contamination while installing pump.

6. Before being placed into the well thoroughly wash pump bowl, column, and air line, first with clear water and then with chlorinated solution in accordance with AWWA C654.

7. Chlorinate well in accordance with AWWA C654 and applicable State standards. In case of a discrepancy between AWWA and State standard, the strictest requirement shall apply.

3.09 DISPOSAL OF HEAVILY CHLORINATED WATER

A. Do not allow flow into a waterway without neutralizing disinfectant residual.

B. See the appendix of AWWA C651, C652, C653, and/or C654 for acceptable neutralization methods.

3.10 TESTING

A. After tanks, reservoirs, filters, pumps, channels, and pipelines have been cleaned, disinfected, and refilled with potable water, City will take water samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.

B. Sampling and testing shall be in accordance with AWWA C-651 and FAC 62555.340. Any main installed, tested and put into service shall pass all required testing as a single unit. If any single sampling point on the main fails, all testing shall be repeated (at no additional cost) until all sampling points pass.

C. Bacteriological samples must be collected on two consecutive days. The Contractor will coordinate and provide a means of sampling for CITY personnel to collect the samples. Samples will be analyzed by the CITY's laboratory. Failure to provide adequate notice and any subsequent delay in sampling will not be considered grounds for project delay.

D. If minimum samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met at no additional cost.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02535

STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All applicable provisions of the Bidding and Contract Requirements, and Division 1 General Requirements shall govern the work under this section.

1.02 WORK INCLUDED

A. The work covered by this section shall include the furnishing of all labor, equipment, services, materials, products and tests to perform all operations in connection with the construction of all structures as shown on the plans, defined in these specifications and subject to the terms and conditions of this contract, including, but not limited to, manhole, catch basins, and inlets.

1.03 SUBMITTALS

A. The Contractor shall furnish the Engineer shop drawings of the precast manhole for approval. Shop drawings should illustrate all dimensions, reinforcements and specifications for the complete manual.

PART 2 - PRODUCTS

2.01 MORTAR

A. Mortar for use in constructing and plastering sewer structures shall conform to ASTM C270, "Specifications for Mortar for Unit Masonry". A Portland cement-hydrated lime mixture or a masonry cement may be used provided that the same materials are used throughout the project.

B. Mortar materials shall be proportioned by volume and shall consist of one part Type II Portland Cement to two parts aggregate (sand). Portland Cement shall conform to ASTM C-150, "Specifications for Portland Cement". Aggregate shall conform to ASTM C-144, "Specifications for Aggregate for Masonry Units."

2.02 PRECAST CONCRETE MANHOLE

A. Precast manhole sections shall conform to the plans or ASTM C-478, Specifications for Precast Reinforced Concrete Manhole Sections as modified thereto whichever is more restrictive. Concrete shall attain a minimum compressive strength of 4,000 psi at 28 days. Minimum wall thickness shall be eight (8”) inches.

B. Unless otherwise specified on the plans, all joints shall be made with neoprene or rubber "O" ring compression joints; mastic joint sealing compound, or approved equal. After assembly, all joints shall be filled with mortar and pointed to provide a smooth surface without joint voids.

C. The base and walls that compose the bottom section of precast manhole shall be of monolithic construction, minimum 8 inches thick, and the edge of the base slab shall project a minimum 4 inches beyond the outside diameter of the wall.

D. Holes for piping shall be 6 inches larger than the outside diameter of the respective pipe. After the pipe is set, the void space between the pipe and the hole perimeter shall be completely filled with non-shrinking, quick-setting, waterproof cement mortar and struck smooth.

E. The minimum height of precast base section shall be 36 inches from the bottom of the base slab; however, no holes for piping shall be cast less than 8 inches from the top of the base section or less than 2 inches from the top of the base slab.

2.03 ENDWALLS, CATCH BASINS, INLETS AND JUNCTIONS BOXES

A. Endwalls, catch basins, inlets and junction boxes shall be constructed at the locations shown and to the dimensions indicated on site plans. Unless otherwise specified on the plans, inlets, junction boxes, catch basins, and similar structures may be constructed of brick, concrete block, poured concrete or precast concrete. Precast catch basins shall conform to latest A.C.I. and P.C.A. specifications. Concrete shall have not less than 4,000 psi compressive strength at 28 days. Minimum wall thickness shall be six (6”) inches.

B. Unless otherwise specified on the plans, all concrete for these structures shall be Class I concrete as specified in the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", latest revision, Section 345. Mortar for use in constructing and plastering shall be as previously set forth in this section.

C. Brick shall be solid hard-burned clay conforming to ASTM Serial C-32-93, Grade SM. Concrete brick shall conform to ASTM Serial C-55-75, Grade P-I. Concrete block shall conform to ASTM Serial C-90-78, Grade PI.

D. All brick or concrete block structures covered in this Section shall be plastered inside and outside with 1/2 inch of cement mortar. Inside surfaces shall be smooth and even.

E. Base slabs and walls of concrete structures shall be constructed in a continuous pour between expansion joints.

F. For each grate type inlet, two layers of Mirafi 140 fabric of "Poly Filter X" polypropylene material or approved equal, shall be sandwiched between 2 x 2 x 10/10 welded wire fabric cut to the grate size and attached to the underside of the grate. The sandwiched filter material shall be wired to the cross members of the grate each way on 4-inch centers. After inlet construction and the roadway construction is completed and the project site work (including landscaping) has been established, the filter material and fabric shall be removed with any retained silt or sand.

2.04 CASTINGS (INCLUDING FRAMES, COVERS AND GRATINGS)

A. Iron castings shall conform to ASTM A-48, "Specifications for Gray Iron Castings", and shall be Class 30. Frames and grates may be Class 20.

B. All castings shall be made of clean, even grain, tough grey cast iron. The castings shall be smooth, true to pattern and free from projections, san holes, warp and other defects. The horizontal surface of the frame cover seats and the under surface of the frame cover seat which rests upon the cover seat shall be machined. After machining, it shall not be possible to rock any after it has been seated in any position in its associated frame. Machining shall be required only on those frames and covers intended for vehicular traffic.

C. Bearing surfaces between cast frames, covers and grates shall be machined and fitted together to assure a true and even fit. Within areas of vehicular traffic, the frames, covers and gratings shall be machined-ground so that irregularity of contact will be reduced to a minimum and will be rattle-proof.

D. All manhole covers shall be provided with concealed pick holes. Manufacturer's name and catalog number shall be cast on all frames, covers, grates, etc. Covers shall be lettered "Storm" "Storm Drain" or "Storm Sewer" or "Sanitary Sewer" as applicable and shall be plainly visible. The manhole frames and covers shall be flush with finished grade. Sanitary Sewer manhole covers shall bear the CITY logo as manufactured by US Foundry or approved equal.

E. Grates and covers for inlets shall be as shown on the plans, set to the grades indicated and conforming with the requirements of the castings described above. Grates shall be furnished complete with frames specifically constructed to provide full bearing at all points of contract.

PART 3 - EXECUTION

3.01 CHANNELS

A. Channels shall be accurately and smoothly formed in accordance with the plans. Channels shall be constructed of concrete with trowel finished surfaces. The upper surface of the manhole shall be sloped toward the channels as shown.

B. Drop pipe at sanitary sewer manhole shall be installed when the difference in elevation between the pipe invert and the invert at the center of the manhole exceeds two feet (2'), or where directed by the City. The drop manhole shall be built according to the plans and specifications.

C. After channels are formed and section joints are pointed, the interior of the manhole shall be painted with two coats of Koppers Bitumastic 300-M (7 mils per coat) or approved equal. The exterior shall be painted in a similar manner, if required by local regulations.

3.02 CONCRETE GRADE RINGS

A. All concrete grade rings shall meet ASTM C478 and shall be a minimum 4,000 psi @ 28 days. Concrete grade rings shall be a minimum thickness of 2 inches and a maximum thickness of 6 inches. No more than 8 inches of concrete grade rings shall be installed on one manhole. Concrete grade rings shall be laid in mortar and all joints shall be finished smooth and not be less than ¼ inch or more than ½ inch in thickness. Concrete grade rings shall be painted with two coats of Koppers Bitumastic 300-M (7 mils per coat) or approved equal.

3.03 MANHOLE AND STRUCTURES

A. All joints shall be finished water tight, all openings for sewers, frames, etc., in precast manhole and catch basins shall be cast at time of manufacture. Spaces around all piping entering or leaving manhole shall be completely filled with Embeco mortar or equal.

B. All manhole shall be set plumb to line and grade and shall rest on a firm carefully graded subgrade which shall provide uniform bearing under base.

C. Grout for manhole bottoms shall consist of broken block, brick and 2:1 cement mortar.

3.04 CLEANING AND MAINTENANCE

A. All structures shall be cleaned and maintained in workable condition until accepted by the City.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02575

SURFACE RESTORATION

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this Section, Standard Specifications shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

1.02 INTENT

A. Specific surface restoration requirements are detailed in this and other sections.

B. The intent of these Specifications is that the roadway, adjacent Right-of-Way, and properties affected by construction activity shall be returned to new or like new or as indicated by notes in the drawings.

1. For pipelines constructed in the Right-of-Way between the sidewalk and edge of pavement, the ground surface will be graded into a swale as shown on the Drawings and provided with sod.

    a. Argentine Bahia sod will be used for areas without irrigation systems, except where St. Augustine turf existed previously.

    b. St. Augustine “Floritam” sod will be used for areas with irrigation systems and in locations with similar, existing turf.

    c. Seashore Paspalum sod will be used in areas prone to salt water flooding, Driveways and sidewalks will be placed in kind, using similar materials of construction.

2. Trees, shrubs, and personal property (e.g. mail boxes) located in the swale area shall be relocated or replaced in kind, in accordance with the provisions of the Contract Documents.

C. For work areas disturbed by the Contractor for convenience, the area affected shall be restored in kind.

1. The costs of this restoration shall be incidental to the cost of the Work.

2. Payment for restoration outside the limits of work shall be repaired at the Contractor’s expense.

1.03 WORK INCLUDED

A. This Section covers the Work necessary to replace all pavement, curbs, sidewalks, rock surfacing, and other street features damaged either directly or indirectly by the operations incidental to the construction described in other sections of the Contract Documents.

B. Where the materials, construction procedures, degree of compaction of materials, and the method of control and testing, as required in the Contract Documents differ from the Standard Specifications requirements, the more stringent requirements shall apply.

C. The intent of the Drawings is to provide a full lane, permanent trench repair for all work crossing or running parallel with roadways. Temporary restoration to provide a passable surface is also required.

D. Overlay of asphalt pavement may be required as shown on the Drawings.

E. Provide finished gradation and grassing in accordance with the Contract Documents.

1.04 OPTIMUM MOISTURE CONTENT

A. "Optimum moisture content" shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

1.05 TEMPORARY TRENCH REPAIR OR STABILIZATION

A. Following pipe installation and prior to permanent trench repair or asphalt replacement, temporary trench repair will be defined as one of the following:

1. Installation of flowable fill as described in this Section and the Contract Documents.

2. Installation of the compacted base course and an asphalt prime coat as described in this Section and the Contract Documents.

B. Temporary trench repair shall be maintained in accordance with the requirements of this Section and the Contract Documents until the final trench repair or asphalt surface is installed to provide a dust-free, drivable, and safe roadway surface.

PART 2 – MATERIALS

2.01 GENERAL

A. All materials for replacement of existing base course and asphalt surfacing shall conform to the Standard Specifications except as modified herein.

B. The Contractor will be responsible for furnishing satisfactory materials that meet the specifications of the Contract Documents and shall provide such tests during the course of the Work as are necessary to assure that the quality of the material used meets the specifications of the Contract Documents.

2.02 LIME ROCK BASE COURSE

A. Aggregate quality and gradation shall meet the requirements of the Standard Specifications.

2.03 BITUMINOUS PRIME AND TACK COAT

A. Prime Coat: Material shall be cutback asphalt, Grade RC-70 or RC-250 meeting the requirements of the Standard Specifications, or approved equal.

B. Tack Coat: Material shall be emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of the Standard Specifications.

C. Tack coats used for temporary trench stabilization shall be sanded to prevent damage to vehicles.

2.04 ASPHALT CONCRETE

A. The asphalt concrete for trench leveling, restoration and overlay shall be Type SP9.5, meeting the requirements of the Standard Specifications and the Contract Documents.

B. Aggregate: The aggregate shall meet the requirements of the Standard Specifications.

C. Submit test results from commercial testing laboratories to the City to show that the materials meet the quality and gradation requirements.

2.05 CONCRETE PAVERS

A. Pavers shall be placed on approved restored base and subgrade with a 1” layer of bedding sand meeting the requirements of the Standard Specifications.

2.06 FLOWABLE FILL

A. Provide flowable fill with a mix design meeting the requirements of the (FDOT) Standard Specifications for excavatable, flowable fill. Flowable fill may be allowed as a substitute for compacted base upon approval of the CONSULTANT, at no additional cost.

2.07 CONCRETE

A. Concrete shall be 3,000 psi minimum concrete meeting the requirements of the Standard Specifications.

B. Concrete Forms: All forms for curbs and sidewalks shall be either 2-inch dimensioned lumber, plywood, or metal forms. Forms on the face of the curb shall have no horizontal form joints within 7 inches of the top of the curb.

C. Curing Compound: Meeting the requirements of the Standard Specifications.

D. Reinforcing Steel: Conform to ASTM A615, Grade 60.

2.08 TRAFFIC MARKINGS

A. All traffic striping markings (i.e., lane, edge of pavement, directional, informational, etc.) damaged by the Contractor during construction shall be replaced with new markings meeting the requirements of the Broward County Traffic Engineering Division and the Standard Specifications.

B. Raised reflective pavement markers (rpm's) damaged by the Contractor during construction shall be replaced with new rpm's meeting the requirements of the Broward County Traffic Engineering Division and the Standard Specifications.

C. The Contractor shall place and maintain temporary striping markings throughout the course of the work until the permanent striping marking is placed on the final roadway surface.

D. The Contractor shall provide traffic stripping at all intersections including stop bars and crosswalks as required whether they are currently stripped or not. It shall be the Contractor's responsibility to take a complete inventory and provide the appropriate permanent stripping after the completion of the Work.

2.09 SWALE STABILZATION

A. Materials used for stabilization of swale areas as indicated on the Drawings shall consist of suitable excess existing base material removed from trenching operations, if approved by the Engineer, crushed limerock, rock screenings, or other suitable material as approved by the CONSULTANT.

1. Materials having a plasticity index of more than 10, or a liquid limit greater than 40 shall not be used.

2. Maximum dimension shall not exceed 1.5 inches.

PART 3 - EXECUTION

3.01 CONSTRUCTION PROCEDURE

A. The City reserves the right to vary the type of resurfacing as best serves the interest of the City. Trench backfill shall be as specified in the Contract Documents.

B. Replace all bituminous and concrete roadway pavement damaged or removed under this Contract with asphalt concrete regardless of original type. Pavement thickness shall be in accordance with the Drawings.

C. In addition to the requirements set forth herein, the work shall conform to the applicable workmanship requirements of the state and county highway or municipal specifications.

D. Water to control dust shall be used as directed by the City until the trench repair has been stabilized. If control of dust is inadequate by these means, the City may

direct the immediate application of a prime or tack coat in accordance with the provisions of this Section, at no additional cost to the City. The City reserves the right to delay additional excavation activities until dust control measures are adequate.

E. Base course and prime coat shall be installed to provide temporary trench stabilization within 5 working days of trench backfill or as soon thereafter as the asbuilt conditions and pipe slopes have been verified.

F. Final, permanent trench repair, and paving shall be installed within 3 weeks of pipe verification and temporary trench stabilization, unless flowable fill is used for temporary trench repair, in accordance with the provisions of this Section.

3.02 REMOVAL OF PAVEMENT, SIDEWALK, CURBS, AND GUTTERS

A. Removal of all pavement, sidewalks, curbs, and gutters shall conform to the Contract Documents, and payment for removal shall be included in that Section of the Contract Documents. Payment for removal is incidental to the cost of pipe installation except where required for water and sewer service installation.

3.03 CUTTING EXISTING PAVEMENT

A. Where new pavement abuts existing pavement, the old pavement shall be trimmed by saw cutting to a straight line. Any pavement which has been damaged or which is broken and unsound shall be removed to provide a smooth, sound edge for joining new pavement.

3.04 STREET MAINTENANCE

A. Maintain all trenches as specified in this section and the Contract Documents.

3.05 CONSTRUCTION OF BASE COURSE

A. Base course shall be constructed in accordance with the City of Fort Lauderdale Standards and the Standard Specifications.

B. Compact base materials to a minimum of 98 percent of the maximum density as determined by AASHTO T180. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer. Where the base is constructed in more than one course, the density shall be obtained in each lift.

C. Alternately, and with the approval of the Engineer, the Contractor shall provide a minimum 10 inches of excavatable, flowable fill. The flowable fill shall be placed up to 1 ½ inches from the top of the existing pavement or to the fill line without vibration or compaction. Flowable fill shall not be placed during periods of inclement weather

and rainfall. Provide a means to confine the material within the designated space. Flowable fill installed in accordance with this provision shall comply with temporary pavement restoration provisions.

3.06 MILLING OR GRINDING OF EXISTING ASPHALT PAVEMENT

A. Milling of existing asphalt pavement shall meet the requirements of the Standard Specifications.

B. Milling shall be used to lower the grade of adjacent existing asphalt prior to trench repair to completely remove existing asphalt.

C. Milled and ground asphalt can be mixed for use with the limerock base course material.

3.07 BITUMINOUS PRIME AND TACK COAT

A. The bituminous prime coat shall be applied to the lime rock base immediately following the placement of the compacted base course. The prime coat shall be maintained with additional coats as determined by the City as temporary restoration until the final asphalt surface is installed. Additional prime coats will be provided at no cost to the City.

B. The lime rock base shall be hard planed with a blade grader immediately prior to the application of the prime coat.

C. The rate of application of the bituminous prime coat shall meet the requirements of the Standard Specifications.

D. The bituminous tack coat shall be applied to existing asphalt surfaces prior to the placement of new asphalt, between layers of asphalt concrete surface courses, surfaces of concrete footings that will come in contact with the asphalt concrete pavement, and vertical faces of all longitudinal and transverse joints that have become compacted or cooled.

E. The rate of application for the bituminous tack coat shall meet the requirements of the Standard Specifications.

3.08 ASPHALT CONCRETE PAVEMENT REPLACEMENT A.

Preparation for Paving:

1. A prime coat shall be applied over the full length of the roadway, and asphalt concrete pavement shall not be placed until the prime coat has cured as per the manufacturer's recommendations.

2. Should any holes, breaks, or irregularities develop in the roadway surface after the prime coat has been applied, they shall be patched with asphalt concrete immediately in advance of placing the asphalt concrete.

3. After the maintenance, patching, or repair work has been completed and immediately prior to placing the asphalt concrete pavement, the surface of the prime coat shall be swept clean of all dirt, dust, or other foreign matter.

B. The proposed pavement reconstruction schedule consists of immediately paving over trenches as soon as possible after it has been determined that subbase and base have achieved required compactions. The base course will be brought up to the elevations indicated on the Drawings and asphalt placed to bring grade up to match existing pavement elevations as shown on the Drawings.

C. For deep excavations where the pavement repair constitutes a full lane or roadway, workmanship shall conform to the standards and details of new road way construction.

1. Existing pavement more than 2 feet wide beyond the trench area shall be left in place and a full overlay applied to the limits of the existing road width.

2. Existing base beyond the trench area shall be left in place.

3. Full lane or width roadways shall have a consistent cross-section and straight edge of pavement delineation's.

3.09 CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT OVERLAY – IF REQUIRED

A. The Contractor shall place a layer of tack coat at a rate of 0.05 to 0.12 gallon per square yard over all areas to receive asphalt concrete.

B. Lay asphalt concrete over all areas designated to be resurfaced. The asphalt concrete pavement overlay shall be placed in minimum 1-inch lift and maximum lift as shown in the Contract Documents. The method of proportioning, mixing, transporting, laying, processing, rolling the material, and the standards of workmanship shall meet the applicable requirements of the Standard Specifications. At no time shall the coarse aggregate segregated from the mix either from hand spreading or raking of joints be scattered across the paved mat. Such material shall be collected and disposed of.

C. The City will examine the prepared roadway before the paving is begun and bring any deficiencies to the Contractor's attention to be corrected before the paving is started. Roll each lift of the asphalt concrete until roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture. The grade, line, and cross section of the finished surface shall conform to the Drawings. Asphalt or asphalt stains which are noticeable upon surfaces of concrete or materials which will be exposed to view shall be promptly and completely removed.

3.10 ASPHALT CONCRETE PAVEMENT

A. Workmanship in producing, hauling, placing, compacting, and finishing asphalt concrete shall meet the applicable portions of the Standard Specifications.

3.11 CONNECTIONS WITH EXISTING FACILITIES

A. Where the bituminous pavement is to be connected with an existing roadway surface or other facility, the Contractor will be required to modify the existing roadway profile in such a manner as to produce a smooth riding connection to the existing facility. The Contractor shall meet existing neat lines where required.

B. Where it is necessary to remove existing asphalt surfaces or oil mat surfaces to provide proper meet lines and riding surfaces, the Contractor shall sawcut the existing surface so that there will be sufficient depth to provide a minimum of 1-inch of asphalt concrete, and the waste material shall be disposed of to the satisfaction of the Engineer. Prior to placing the asphalt concrete, these areas shall be tacked. Meet lines shall be straight and the edges vertical. The edges of meet line cuts shall be painted with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, the meet line shall be sealed by painting with a liquid asphalt or emulsified asphalt and immediately covered with clean, dry sand.

3.12 CONSTRUCTION OF COURSES

A. The asphalt concrete pavement shall be constructed in one or more courses as shown on the Drawings.

B. Rolling shall continue until all roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture has been obtained.

3.13 SURFACE TOLERANCE

A. Tests for conformity with the specified grade shall be made by the Contractor immediately after initial compression. Any variation shall be immediately corrected by the removal or addition of materials and by continuous rolling.

B. The completed surface of the pavement shall be of uniform texture, smooth, uniform as to grade, and free from defects of all kinds. The completed surface shall not vary more than 1/8 inch from the lower edge of a 12-foot straightedge placed on the surface along the centerline or across the trench.

C. After completion of the final rolling, the smoothness and grade of the surface shall again be tested by the Contractor.

D. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected as stated in the Standard Specifications.

E. All areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Engineer.

F. All costs involved in making the corrections of defects described above shall be borne by the Contractor and no compensation will be made for this Work.

3.14 SAMPLES

A. If directed by the Engineer, the Contractor shall without additional charge, provide the City with test results of samples of asphalt concrete cut from the completed pavement or the individual courses thereof for each occurrence. Provide a minimum of three test cores located as directed by the Engineer. He shall also provide the City with test results of samples of the uncompressed asphalt concrete mixtures and all materials incorporated in the Work.

3.15 WEATHER CONDITIONS

A. Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or any imminent storms that might adversely affect the construction. The City will determine when surfaces and materials are dry enough to proceed with construction. Asphalt concrete shall not be placed during heavy rainfall or when the surface upon which it is to be placed is wet.

3.16 PROTECTION OF STRUCTURES AND ADJUSTMENT OF APPURTENANCES

A. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from the paving operations. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the Contractor shall adjust the tops of these facilities to conform with the proposed surface elevations. The Contractor shall notify the proper authority and either raise or lower the appurtenances or make arrangements with that authority for having the facilities altered at the Contractor's expense before proceeding with the resurfacing. The Contractor will be responsible for making certain that appurtenances are brought to proper grade to conform with finished surface elevations and any delays experienced from such obstructions will be considered as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application. All adjustments shall be made in accordance with the requirements of the respective utility.

C. To extend manhole use grade rings as specified, do not use leveling rings. Remove the frame and cover, rebuild the manhole top to raise it so that the new height meets the overlay elevations and then replace the frame and cover in accordance with the Contract Documents.

3.17 EXCESS MATERIALS

A. Dispose of all excess materials. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

3.18 CONTRACTOR'S RESPONSIBILITY

A. Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subbase or base materials. The Contractor shall promptly repair all pavement deficiencies noted during the warranty period at the Contractor's sole expense.

3.19 SIDEWALKS AND CURBS

A. Replace concrete sidewalks and curbs to the same section width, depth, line, and grade as that removed or damaged or as shown on the Drawings. The minimum thickness of sidewalks shall be 6 inches. Cut ends of existing curb to a vertical plane. Prior to replacing the sections, properly backfill and compact the trench to prevent subsequent settlement.

B. Replace concrete sidewalks at scored joints and make replacement in a manner that will avoid a patched appearance. Provide a minimum 2-inch thick compacted leveling course of clean sand or gravel of quality hereinbefore specified. Finish concrete surface similar to the adjacent sidewalks. All curbs and all gutters shall have a minimum of 4” LBR 100 limerock “curb pad”.

3.20 DRIVEWAYS AND WALKS

A. Replace asphalt driveways and walks in accordance with Paragraph Asphalt Concrete Pavement Replacement.

B. Replace concrete and paver driveways in kind, using similar materials of construction. Concrete driveways shall consist of a reinforced, 6-inch section installed in accordance with the Contract Documents.

3.21 TRAFFIC STRIPES

A. All areas having traffic stripes prior to paving shall be restriped. Temporary traffic striping shall be applied immediately after asphalt pavement has been placed. Permanent traffic striping may be applied only after the proper curing time for the asphalt. Traffic stripes (temporary and permanent) shall meet the requirements of Broward County Traffic Engineering Division Standards and the Standard Specifications.

3.22 INSTALLATION OF RAISED REFLECTIVE PAVEMENT MARKERS

A. All areas having raised reflective pavement markers prior to paving shall have those markers replaced. Temporary pavement markers shall be applied immediately after asphalt pavement has been placed. Permanent pavement markers may be applied only after the proper curing time for the asphalt. Pavement markers and adhesive (temporary and permanent) shall meet the requirements of Broward County Traffic Engineering Division and the Standard Specifications.

B. Spacing: As shown in the Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility operations on the State Highway System by the State of Florida, Department of Transportation, current edition and the Broward County Traffic Engineering Division Standards.

3.23 PAVEMENT REPAIR

A. All damage to pavement as a result of work under this Contract shall be repaired in a manner satisfactory to the City and at no additional cost to the City. The repair

shall include preparation of the subgrade, placing and compaction of the lime rock base and placement of the final asphalt surface as described in this Section.

B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage with the edge of pavement left saw cut to a true edge with no irregularities. For county roads and City streets recently constructed or overlaid, the repair may be required to be full-lane width as shown on the Drawings.

3.24 SWALE RESTORATION

A. New or existing swale areas (areas between pavement edge and sidewalks, or right-of-way line if there is no existing or proposed sidewalk) shall be graded and reshaped to the cross section shown on the Drawings. Where storm inlets are present, the swale shall have a consistent longitudinal slope towards the inlet.

B. Swale areas with previously existing improved surfaces, including but not limited to asphalt, concrete, pavers, crushed or decorative rock, shall be restored in kind. Asphalt paved areas shall be constructed with a minimum 6-inch stabilized subbase and minimum 6-inch compacted limerock base, primed and topped with minimum 1-inch asphalt.

C. Swale areas with previously unimproved or turfed surfaces will be restored with soil stabilization where existing natural soil will not support vehicle loads normally imposed by movement and parking of heavy vehicles without rutting and shifting of soil. Subject to the approval of the Engineer, this work may be performed in connection with preparation of subgrade or construction of the limerock base course.

D. Swale areas with previously unimproved or turfed surfaces will be topped with sod. St. Augustine “Floritam” and two inches of topsoil shall be used in irrigated areas and where St. Augustine sod was previously established. Bahia sod shall be placed in all other areas not previously improved or sodded.

3.25 SWALE STABILIZATION

A. Where swale stabilization is required as indicated above, stabilization shall be achieved by the addition and mixing in of suitable stabilizing materials. It shall be incorporated into the existing swale soils by plowing, disking, harrowing, blading or mixing with rotary tillers or other appropriate equipment approved by the CONSULTANT, until the mixed materials are of uniform bearing value throughout the width and at least 6-inch depth from the top of the swale after the swale is graded and shaped to the section indicated on the plans.

B. The swale areas shall be mixed and compacted to achieve a minimum average dry density of 90 percent throughout the 6-inch thickness, as determined by AASHTO

T180. In the determination of such average, the minimum acceptable density shall be 85 percent and the maximum density which shall be used in calculations shall be 100 percent (if the tested density is reported above 100 percent).

C. Density tests for swale stabilization shall be made at intervals not less than one set of three per City block on each side of the roadway, or at increased intervals as directed by the City when required to measure small or isolated sections (except where such testing may be considered unnecessary by the Engineer). Each set of three shall be averaged as indicated above for determination of meeting the minimum requirements.

3.26 SPECIAL SWALE REPAIR

A. Certain swale areas (designated on Drawings) have longitudinal trench filled with ballast rock for drainage. If appropriate, a separate pay item applies for removal and reconstruction of ballast rock drainage damaged during installation of pipelines. All other aspects of restoration work in the swale will be paid for separately under the restoration item. Swale stabilization will not be required in those areas with ballast rock drainage.

3.27 BRICK OR PAVER RESTORATION

A. Remove and salvage bricks or paver materials to be disturbed by the work. Payment will be made in accordance with the unit price for these items.

B. Restore pavers and apron area shall be constructed as shown in the Drawings. Payment will be made in accordance with the unit price for these items. C. Paver and apron areas shall be constructed as shown in the Drawings.

D. If brick and paver materials are damaged, new materials shall match or all materials within the crossing must be replaced at no additional cost. New materials shall be approved by the City.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02630

STORM DRAINAGE FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section shall consist of providing all labor, plant facilities, materials, tools, equipment, shop drawings and supervision necessary and required to install all of the storm drainage facilities, including piping, fittings, structures, bedding, and backfilling, as specified in accordance with the contract documents.

1.02 WORK INCLUDED

A. Provide all labor, materials, necessary equipment and services to complete the Storm Drainage Facilities work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".

1.03 REFERENCE STANDARDS

A. American Society For Testing and Materials (ASTM)

1. A185 – Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
2. A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. A760 – Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
4. A798 – Installation of Corrugated-Steel Pipe for Sewers and Other Applications
5. A929 – Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
6. C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
7. C478 – Precast Reinforced Concrete Manhole Sections
8. C1479 – Installation of Reinforced Concrete Pipe
9. C990-01A – Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
10. D2321 – Installation of Thermoplastic Pipe for Sewer/Gravity-Flow Applications
11. D3034 – Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
12. D3212 – Joints for Drain and Sewer Plastic Pipes Using Elastomeric Seals
13. F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe

14. F794 – Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

15. F949 – Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

B. American Association of State Highway and Transportation Officials (AASHTO)

1. M198 – Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

2. M252 – Corrugated Polyethylene Drainage Tubing

3. M274 – Aluminum-Coated (Type 2), for Corrugated Steel Pipe

4. M294 – Corrugated Polyehtylene Pipe. 12 to 14 inch Diameter

5. M36 – Metallic Coated Corrugated Steel Culverts and Underdrains

6. M190 – Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches

7. M199 – Standard Specification for Precast Reinforced Concrete Manhole Sections

C. American Water Works Association (AWWA)

1. C110 – Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in (75 mm through 1200 mm), for Water and Other Liquids (revision of ANSI/AWWA C110/A21.1093)

2. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

3. C151 – Ductile-Iron Pipe, Centrifugally Cast, for Water

D. American Concrete Institute (ACI)

1. 301 – Structural Concrete for Buildings, Specifications for

2. 318 – Building Code Requirements for Structural Plain Concrete

1.04 CLEARING

A. Clearing or installation of pipe and all drainage structures shall be confined within the working limits of the trenches. Trees, utility poles, survey monuments, underground and overhead utilities shall be suitably protected and preserved.

1.05 EXISTING UTILITIES

A. Furnish temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, cables, etc., and other obstructions encountered in the progress of the work.

B. When the grade of alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, branch connections to water or sewer mains, and other obstructions, the obstructions shall be permanently supported, relocated, removed or reconstructed by the Contractor in cooperation with the owners of such structures. No deviation shall be made from the required line or grade except as directed in writing by the City.

C. It shall be the responsibility of the Contractor to notify the owners of existing utilities in the area of construction a minimum of 48 hours prior to any excavation adjacent of such utilities, so that field locations of said utilities may be established.

D. Temporary relocation of existing utilities (to be removed) to accommodate installation of storm drain pipe shall be the responsibility of the Contractor and approved by the City. No additional payment shall be made for temporary relocation of existing utilities and shall be considered part of the bid item for the pipe.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record as-built locations of pipe runs, connections, catch basins, cleanouts, top elevations and invert elevations.

B. Identify and describe unexpected variations of subsurface conditions and location of any utilities encountered.

1.07 QUALITY ASSURANCE

A. All costs related to re-inspection due to failures shall be paid for by the Contractor at no additional expense to the City. City reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

PART 2 - PRODUCTS

2.01 PIPE

A. REINFORCED CONCRETE CULVERT PIPE:

1. Concrete pipe shall be produced by a reputable manufacturer engaged in the full time business of manufacturing concrete pipe. Pipe manufacturer shall produce the pipe from an approved, permanent plant acceptable to the City.

2. All concrete pipe shall be reinforced and shall conform to the requirements of ASTM C-76. "Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe". All pipe shall be a minimum of Class III. Pipe shall have an interior surface which is smooth, uniform and free from rough spots, irregularities and projections. Nominal pipe

lengths shall be 8' unless authorized otherwise by the City. Lifting holes will be permitted, one hole per length.

3. Concrete pipe may be either bell and spigot, tongue and groove or modified tongue and groove.

4. Internal rubber gasket joints shall be used. The internal rubber gasket joint shall be supplied by the pipe manufacturer and shall be completely compatible in every respect with the pipe furnished. The rubber gasket on the inside of the bell or groove shall be installed on the pipe at the plant by the pipe manufacturer. All materials and accessories for the rubber gasket joint and the methods of jointing shall be in strict conformance with the pipe manufacturer's direction and recommendation. Joint must be completely water tight.

5. Cement grout joints shall be completely water tight and acceptable to the City. A full bed of mortar shall be placed in the bell and/or groove and on the tongue and/or spigot. The annular space in the pipe joint shall be wiped with cement mortar to insure the joint is filled and to present a smooth surface. The complete exterior periphery of the joint shall have a standard cement grout diaper joint. Diaper shall be installed with the aid of an approved cloth ring. Cement mortar joints shall be made in the dry. Mortar and grout shall be one part Portland Cement to two parts by weight of sand. Mortar shall have enough water to make a stiff mixture that can be molded and worked. Cement mortar joints shall not be covered until inspected and approved by the City.

B. HIGH PERFORMANCE POLYPROPYLENE PIPE

1. High Performance polypropylene storm pipe shall be produced by a reputable manufacturer engaged in the full time business of manufacturing of piping.

2. All High Performance polypropylene storm pipe shall have a smooth wall interior and annular exterior corrugations conforming to the requirements of ASTM F2736 and AASHTO M330.

3. Joints: Pipe shall be joined with a gasket integral bell and spigot joint meeting the requirements of ASTM F2736. Joint must be completely water tight according to the requirements of ASTM 3212. Spigots shall have gaskets meeting requirements of ASTM F477. The gasket joint on the inside of the bell shall be installed on the pipe at the plant by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant provided from the manufacturer shall be used on the gasket and bell during assembly. All materials and accessories for the gasket joint and the methods of jointing shall be in strict conformance with the pipe manufacturer's direction and recommendation.

C. HIGH DENSITY POLYETHYLENE PIPE:

1. High Density Polyethylene Pipe (HDPE), shall be corrugated type, smooth interior, conforming to ASTM F2648, ASTM F477, ASTM 3212, AASHTO M252 and

AASHTO M294 and shall be smooth interior and annular exterior corrugations with a Manning's "n" value of 0.012l.

2. Basic Material:

   a. Extruded Pipe and Blow Molded Fittings: Pipe and fittings shall be made of virgin PE compounds which conform with the requirements for Type III, Category 4 or 5, Grade P33, Class C; or Grade P34, Class C, as defined and described in ASTM D 1248.

   b. Rotational Molded Pipe and Fittings: Pipe and fittings shall be made of virgin PE compounds which conform with the requirements of Type III, Category 3, Grade P33, Class C: or Grade P34, Class C, as defined and described in ASTM D1248.

3. Corrugated Polyethylene Pipe shall meet the requirements as describe in ASTM D 2412 for pipe stiffness.

4. Corrugated Polyethylene Pipe shall be in accordance for brittleness with ASTM D 2444.

D. PVC CORRUGATED PIPE

1. PVC Corrugated storm pipe shall be produced by a reputable manufacturer engaged in the full time business of manufacturing of piping and conform to the requirements of ASTM F949.

2. PVC Corrugated storm pipe shall have smooth wall interior and annular exterior corrugations. Pipe shall be made of PVC having a minimum cell classification of 12454 per ASTM D1784.

3. Joints: Pipe shall be joined with a gasket integral bell and spigot joint meeting the requirements of ASTM F2736. Joint must be completely water tight according to the requirements of ASTM 3212. Spigots shall have gaskets meeting requirements of ASTM F477. The gasket joint on the inside of the bell shall be installed on the pipe at the plant by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant provided from the manufacturer shall be used on the gasket and bell during assembly. All materials and accessories for the gasket joint and the methods of jointing shall be in strict conformance with the pipe manufacturer's direction and recommendation.

PART 3 – EXECUTION

3.01 GENERAL

A. Contractor shall only use the pipe material as specified on the plans. Alternate materials will not be allowed unless approved by the City in writing.

B. The Contractor shall install all drainage structures and pipe in the locations shown on the drawings and/or as approved by the City. Pipe shall be of the type and sizes specified on the drawings and shall be laid accurately to line and grade. Structures shall be accurately located and properly oriented.

C. Excavation and Backfilling for Utilities – The provisions of the Contract Documents for Excavation and Backfilling shall govern all work under this Section.

D. Storage and Handling of Pipe – All pipe shall be protected against impact, shock and free fall, and only equipment of sufficient capacity and proper design shall be used in the handling of the pipe. Storage of pipe on the job shall be in accordance with the pipe manufacturer's recommendations.

E. Damage to Pipe

1. Pipe which is defective from any cause, including damage caused by handling, and determined by the City as unrepairable, shall be unacceptable for installation and shall be replaced at no cost to the City and as directed by the City; and,

2. Pipe that is damaged or disturbed through any cause prior to acceptance of the work, shall be repaired realigned or replaced as directed by the City, at the Contractor's expense.

F. Manholes, catch basins and drain inlets shall be constructed as soon as the pipe laying reaches the location of the structures. Should the Contractor continue his pipe laying without making provisions for completion of the structures, the City shall have the authority to stop the pipe laying operations until the structure is completed.

G. Any structure, which is mislocated or oriented improperly, shall be removed and re-built in its proper location, alignment and orientation at the Contractor's expense.

3.02 EXCAVATIONS

A. Excavation shall be as per Section 02316 – Excavation

3.03 PREPARATION TO TRENCH BOTTOM

A. Water shall not be allowed in the trenches while the trench bottom is being prepared or while pipe is being installed, unless directed by the City.

B. A continuous trough shall be shaped to receive the bottom quadrant of the pipe barrel. Bell holes shall be excavated so that after placement, only the barrel of the pipe receives bearing pressure from the trench bottom.

C. Where unsuitable soil conditions are encountered, the trench bottom shall be excavated to a minimum of 8 inches below the proposed bottom of the pipe, and a trough as described above shall be formed with sharp sand or bedding rock to uniformly support the bottom quadrant of the pipe barrel.

3.04 BEDDING

A. Bedding material, when required, shall be in accordance with the Contract Documents.

3.05 PIPE INSTALLATION

A. Laying Pipe

1. Unloading and Handling: All pipes shall be unloaded and handled with reasonable care. Pipes shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce stress fatigue in the pipe and the lifting device used uniformly distributes the weight of the pipe along its axis or circumference.

2. Each length of pipe shall be inspected for defects and cracks before carefully lowered into the trench. Any damaged or any pipe that has had its grade disturbed after laying shall be removed and replaced. Bituminous coated pipe shall be handled with special care and repair of damaged coating shall conform with AASHTO M190.

3. Lay pipe on prepared foundation starting at the downgrade end according to line and grade with the necessary drainage structures, fittings, bends and appurtenances as shown on the drawings. Rigid pipes shall be laid with the bell or groove ends upgrade with the spigot or tongue fully inserted. Reinforced concrete pipe shall be installed in accordance with ASTM C1479.

4. Pipe sections shall be firmly joined together with appropriate gaskets or bands.

5. Pipe shall be protected during handling against impact shocks and free falls. Pipe shall be kept clean at all times and no pipe shall be used that does not conform to the Specifications.

6. The laying of the pipe shall be commenced at the lowest point with spigot ends pointing in the direction of flow. All pipe shall be laid with ends abutting and true to line and grade. They shall be laid in accordance with manufacturer's requirements as approved by the City.

7. Pipe shall be laid accurately to the line and grade as designated on the plans. Preparatory to making pipe joints, all surfaces of the portions of the pipe to be jointed, or of the factory made jointing material, shall be clean and dry. Lubricant, primers, adhesive, etc., shall be used as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined and adjusted in such a manner as to obtain a water tight line. As soon as possible after the joint is made, sufficient backfill material shall be placed along each side of the pipe to prevent movement of pipe off line and grade.

8. The exposed ends of all pipe shall be suitably plugged to prevent earth, water, or other substances from entering the pipe when construction is not in progress.

3.06 BACKFILLING TRENCHES

A. No trenches or excavations shall be backfilled until the trench and installation has been inspected and approval given by the City. Under no circumstances shall water be permitted to rise in unbackfilled trenches after pipe has been placed. Trenches shall be backfilled with approved material, free of large clods, stones or rocks and carefully deposited in layers not to exceed 6 inches until enough fill has been placed to provide a cover of not less than 1 foot above the pipe. Each layer shall be placed, then carefully and uniformly tamped, so as to eliminate the possibility of pipe displacement. The remainder of backfill materials shall then be placed, moistened and compacted in 8 inch layers to 98% maximum AASHTO T-180 density.

B. Whenever the trenches have been improperly filled or if settlement occurs, they shall be refilled, compacted, smoothed off and made to conform to grade. Unless otherwise directed or shown on the plans, backfill in trenches in or through roadways shall be made as specified above, except that the entire fill above 1 foot over the pipe shall be deposited in layers not to exceed 8 inches in thickness, moistened, and compacted to density equal to or greater than that of adjacent material so that pavement can be placed immediately.

3.07 CONCRETE ENCASEMENT OF DRAINAGE PIPE

A. Trenches in which encasement for pipe are to be placed may be excavated completely with mechanical equipment. Prior to formation of the encasement, temporary supports consisting of timber wedges or masonry shall be used to support the pipe in place. Temporary supports shall have minimum dimensions and shall support the pipe at no more than two places, one at the bottom of the barrel of the pipe adjacent to the shoulder of the socket and the other near the spigot end.

3.08 DRAINAGE STRUCTURES

A. All structures shall be built to the line and grade shown on drawings. All reinforced concrete work shall be in strict conformance with the concrete specifications contained herein. After erection of the forms and placing of the steel, the Contractor must have inspection and approval from the City before placing any concrete. After removal of the forms, the Contractor shall backfill around each structure with approved granular fill. The fill shall be placed in layers not exceeding 8 inches in depth measured loose and compacted to 98% of the maximum density as determined by the modified proctor, AASHTO T-180. No defects of any kind in the pipe section will be accepted. All pipe stubs shall be made of the same type of pipe. Pipe stubs shall be sealed with a concrete plug, water tight. The ends of the pipes which enter masonry shall be neatly cut to fit the inner face of the masonry. Cutting shall be done before the pipes are built in.

3.09 INFILTRATION AND EXFILTRATION TESTS

A. Tests for watertightness shall be made by the Contractor. Leakage of completed storm drainage system shall not exceed 500 U.S. gallons per day per inch diameter per mile of pipe under minimum hydrostatic pressure of 2 feet. Test shall be conducted in a manner satisfactory to the City. Any portion of the project not conforming to the above requirements shall be corrected by the Contractor, at his own expense, prior to acceptance by the City.

3.10 RESTORATION OF SURFACES AND/OR STRUCTURES

A. The Contractor shall restore and/or replace paving, curbing, sidewalks, fences and survey points, or any other disturbed surfaces or structures to a condition equal to that before the work was begun and to the satisfaction of the City. Relative to restoration of surfaces and/or structures, the Contractor shall comply with all requirements of governing agencies including city, town, county and state.

3.11 PROTECTION AND CLEANING

A. The Contractor shall maintain all pipe installations and drainage structures in a condition such that they will function continuously and shall be kept clean of silt, debris and other foreign matter from the pipe and drainage structure is installed until the project is accepted.

3.12 FINAL INSPECTION

A. All storm sewers shall be lamped by the City prior to acceptance of the work. Repairs or misalignment shown necessary by the tests shall be corrected at the Contractor's expense. All sewers shall be thoroughly cleaned before being placed into use and shall be kept clean until final acceptance by the City.

B. Upon completion of the work and before final acceptance by the City, the entire drainage system shall be subject to a final inspection in the presence of the City. The work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02710

LIMEROCK BASE

PART 1 - GENERAL

1.01 DEFINITIONS

A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross section.

B. Completed Lift: Compacted with uniform surface reasonably true to cross-section.

PART 2 – MATERIALS

2.01 LIMEROCK BASE ROCK

A. The material used in limerock base shall be material classified as Miami Oolite Formation.

B. The minimum of carbonates of calcium and magnesium in the limerock shall be 70 percent. The maximum percentage of water-sensitive clay material shall be 3.

C. Limerock material shall be uniform in color and not contain cherty or other extremely hard pieces, or lumps, balls, or pockets of sand or clay size material in sufficient quantities as to be detrimental to the proper bonding, finishing, or strength of the limerock base.

D. The limerock base shall be uniformly graded from coarse to fine with 97 percent passing a 3-1/2-inch sieve, 80 percent passing a 2-inch sieve. The fine material shall consist entirely of dust of fracture. All crushing or breaking up, which might be necessary in order to meet such size requirements, shall be done before the material is placed on the road. E. Physical Qualities:

1. Liquid Limit, AASHTO T89: Maximum 35 percent.

2. Nonplastic.

3. Limerock material shall have an average limerock bearing ratio (LBR) value of not less than 100.

2.02 SOURCE QUALITY CONTROL

A. Contractor: Perform tests necessary to locate acceptable source of materials meeting specified requirements.

B. Final approval of aggregate material will be based on materials' test results on installed materials.

C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. As specified in the Contract Documents.

B. Obtain Engineer's acceptance of subgrade before placement of limerock base rock.

C. Do not place base materials on soft, muddy subgrade.

3.02 EQUIPMENT

A. Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. For areas where the use of a mechanical spreader is not practicable, the Contractor may spread the rock using bulldozers or blade graders.

3.03 HAULING AND SPREADING

A. Hauling Materials:

1. The limerock shall be transported to the point where it is to be used and dumped on the end of the preceding spread.

2. Do not haul over surfacing in process of construction.

3. Loads: Of uniform capacity.

4. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection. B. Spreading Materials:

1. Distribute material to provide required density, depth, grade and dimensions with allowance for subsequent lifts.

2. Produce even distribution of material upon roadway without segregation.

3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection. B. Limerock Base:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread lift on preceding course to required cross-section.
4. Lightly blade and roll surface until thoroughly compacted.
5. Blade or broom surface to maintain true line, grade, and cross-section.

C. Gravel Surfacing:

1. Maximum Completed Lift Thickness: 6 inches or equal thickness.
2. Completed Course Total Thickness: As shown.
3. Spread on preceding course in accordance with cross-section shown.
4. Blade lightly and roll surface until material is thoroughly compacted.

3.05 ROLLING AND COMPACTION

A. Commence compaction of each layer of base after spreading operations and continue until density of 98 percent of maximum density has been achieved as determined by AASHTO T 180.

B. Density tests will be conducted every 500 square yards or as directed by the City.

C. Roll each course of surfacing until material shall not creep under roller before succeeding course of surfacing material is applied.

D. Commence rolling at outer edges of surfacing and continue toward center; do not roll center of road first.

E. When the material does not have the proper moisture content to ensure the required density, wet or dry, as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate as a unit, the entire width and depth of the course that is being compacted.

F. Place and compact each lift to required density before succeeding lift is placed.

G. Bind up preceding course before placing leveling course. Remove floating or loose stone from surface.

H. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.

I. Surface Defects: Remedy surface defects by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.

J. Finished Surface: True to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

A. Finished Surface of Base Course and Leveling Course: Within plus or minus 0.04-foot of grade shown at any individual point.

B. Compacted Surface of Leveling Course: Within 0.04-foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.

C. Overall Average: Within plus or minus 0.01-foot from crown and grade specified.

3.07 DRIVEWAY RESURFACING

A. Replace gravel surfacing on driveways which were gravel surfaced prior to construction.

B. Provide compacted gravel surfacing to depth equal to original, but not less than 4 inches.

C. Leave each driveway in as good or better condition as it was before start of construction.

3.08 FIELD QUALITY CONTROL

A. In-Place Density Tests:

1. Construct base course so areas shall be ready for testing.

2. Allow reasonable length of time for City to perform tests and obtain results during normal working hours.

3.09 CLEANING

A. Remove excess material; clean stockpile areas of aggregate.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02761

PAVEMENT MARKING

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this section, Standard Specifications shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition. All Pavement Markings and Signage shall conform to the Broward County Traffic Engineering Division Standards, latest revision.

1.02 SUBMITTALS

A. The Contractor shall submit its proposed formula for the asphaltic concrete paving for review in accordance with the Section entitled “Submittals”.

1.03 DELIVER, STORAGE, AND PROTECTION

A. Packaging and Labeling: All coatings and traffic marking materials shall be shipped in strong containers plainly marked with the weight in pounds per gallon, the volume of coatings and traffic marking materials content in gallons, the color, user information, date of manufacture, LOT, batch and DOT code number. Each batch manufactured shall have a unique number. A true statement of the percentage composition of the pigment, the proportion of pigment to vehicle, and the name and address of the manufacturer, also shall be shown. The label shall warn the user of any special handling or precautions of the material, as recommended by the manufacturer. Any package not so marked will not be accepted for use under these Specifications.

B. Storage: Any coatings and traffic marking materials which, although inspected and approved at the point of manufacture, hardens or livers in the containers so that it cannot be readily broken up with a paddle to a smooth, uniform painting consistency, will be rejected. All materials shall have a container storage life of one year from date of manufacture. Any coatings and traffic marking materials not acceptable for proper application will be rejected, even though it conforms to these Specifications in all other respects.

C. Mixing: All paints except aluminum shall be delivered to the project completely mixed, and ready to be used without additional oil or thinner. Gasoline shall not be used for thinner under any circumstances.

PART 2 - MATERIALS

2.01 PAINT

A. Color: White, yellow, or blue traffic striping meeting the requirements of Broward County Traffic Engineering Division and the Standard Specifications.

B. Homogeneous, easily stirred to smooth consistency, with no hard settlement or other objectionable characteristics during a storage period of 6 months.

2.02 THERMOPLASTIC STRIPING

A. White or yellow thermoplastic striping material meeting the requirements of Broward County Traffic Engineering Division and the Standard Specifications.

2.03 RAISED REFLECTIVE MARKERS

A. Metallic or nonmetallic, or prismatic reflector type, of permanent colors retaining color and brightness under action of traffic.

B. Rounded surfaces presenting a smooth contour to traffic. The minimum area of each reflective face shall be 2-1/2 inches squared.

C. Marker and adhesive epoxy in accordance with ASTM D4280

D. Markers shall meet the requirements of Broward County Traffic Engineering Division and the Standard Specifications.

2.04 GLASS SPHERES

A. Glass spheres shall be of a composition designed to be highly resistant to traffic wear and to the effects of weathering.

B. In accordance with AASHTO M247, Type I with moisture resistant coating or a formulation specified by the traffic striping material manufacturer and the Broward County Traffic Engineering Division and the Standard Specifications.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION A.

Cleaning:

1. Thoroughly clean surfaces to be marked before application of pavement marking material.

2. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water or a combination of these methods.

3. Completely remove rubber deposits, surface laitance, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion.

4. Scrub areas of old pavement affected with oil or grease with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.

5. Surfaces shall be completely free of dry dirt and ice, and dry of water at the time of application of any of the materials specified herein.

6. Oil-Soaked Areas: After cleaning, seal with cut shellac to prevent bleeding through the new paint.

7. Reclean surfaces when Work has been stopped due to rain.

8. Existing Pavement Markings:

   a. Remove existing pavement markings that may interfere or conflict with newly applied marking patterns, or that may result in a misleading or confusing traffic pattern.

   b. Do not apply thermoplastic markings over existing preformed or thermoplastic markings.

   c. Perform grinding, scraping, sandblasting or other operations so finished pavement surface is not damaged.

B. Pretreatment for Early Striping: Where early striping is required on rigid pavements, pretreat with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride. C. New Concrete Pavement:

1. Allow a minimum cure time of 30 days before cleaning and marking.

2. Clean by either sandblasting or water blasting to the following results:

   a. No visible evidence of curing compound on peaks of textured concrete surface.

   b. No heavy puddled deposits of curing compound in valleys of textured concrete surface.

   c. Remaining curing compound is intact, with loose and flaking material completely removed.

   d. Peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.

3. Allow a minimum drying time of 24 hours after water blasting before applying thermoplastic markings.

3.02 ALIGNMENT FOR MARKINGS

A. The Contractor shall be responsible for all measurements, reference points and marks, string lining, and any other steps required in establishing pavement marking locations and alignment. On tangents and on curves up to 1 degree, the alignment of the marking shall not deviate from the string line by more than 1 inch. On curves

exceeding 1 degree, the maximum permissible deviation shall be 2 inches. All alignment width and location shall conform to the details shown on the Drawings.

3.03 PAINT APPLICATION A.

General:

1. Thoroughly mix pigment and vehicle together prior to application, and keep thoroughly agitated during application.

2. Do not add thinner.

3. Apply only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Maintain paint temperature within these same limits.

4. Apply only when surface is dry.

5. Do not apply when conditions are windy to the point of causing overspray or fuzzy line edges.

6. New Asphalt Pavement: Allow a minimum pavement cure time as recommended by the manufacturer before applying paint.

7. Provide guide lines and templates to control paint application.

8. Take special precautions in marking numbers, letters, and symbols.

9. Sharply outline edges of markings and apply without running or spattering. B.

Rate of Application:

1. Reflective Markings:

   a. Paint: Apply evenly, 105 plus or minus 5 square feet per gallon.

   b. Glass Beads: Apply uniformly, 6 plus or minus 0.5 pounds of glass spheres per gallon of paint.

2. Nonreflective Markings: Apply paint evenly to pavement surface at a rate of 105 plus or minus 5 square feet per gallon.

3. On new pavement or new asphalt surface treatments, apply two coats of paint at a uniform rate of 210 square feet per gallon. C. Drying:

1. Provide maximum drying time to prevent undue softening of bitumen and pickup, displacement, or discoloration by traffic.

2. If drying is abnormally slow, discontinue painting operations until cause is determined and corrected.

3.04 THERMOPLASTIC MARKING APPLICATION

A. Following specified surface preparation, prime and apply marking and glass beads to provide a reflectorized strip as shown on Drawings.

B. The material shall be applied to the pavement by the extrusion method only, wherein one side of extrusion shaping die is the pavement and the other sides are formed by suitable equipment for heating and controlling the flow of the material. C. Application Temperatures:

1. Pavement Surface: Minimum 40 degrees F and rising.

2. Thermoplastic: Minimum 375 degrees F, maximum 425 degrees F. D.

Primer:

1. On portland cement concrete and existing asphalt pavements, apply epoxy resin primer/sealer according to the thermoplastic manufacturer's recommendations.

2. All primer/sealer to dry prior to applying thermoplastic. E.

Thermoplastic Marking:

1. Extrude in a molten state, free of dirt or tint. at a thickness of 0.10 to 0.15 inch for lane lines and 0.07 to 0.10 inch for edge or other lines in accordance with FDOT Design Standards.

2. Apply centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator.

3. Apply special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable, extrusion-type applicator. F. Glass Bead Application:

1. Immediately after marker application, mechanically apply such that the beads are held by and imbedded in the surface of the molten material.

2. Application Rate: One pound per 20 square feet of compound.

G. Cool completed marking to ambient temperature prior to allowing vehicular traffic.

3.05 INSTALLATION OF RAISED REFLECTIVE MARKERS

A. Apply markers to the bonding surface using bituminous adhesives only.

B. Apply the adhesive to the binding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered.

C. Align markers carefully, projecting no more than 3/4-inch above level of pavement. Reflective face of the marker shall be perpendicular to a line parallel to the roadway centerline. Do not install markers over longitudinal or transverse joints of the bonding surface.

D. Spacing: As shown on the Drawings.

E. Immediately remove excess adhesive from the bonding surface and exposed surface of the marker.

F. Use only a mineral spirits meeting Federal Specifications TT-T-291 to remove adhesive from exposed faces of markers.

3.06 GLASS BEAD APPLICATION

A. Apply immediately following application of paint.

B. Use evenly distributed, drop-on application method.

C. Rate: 10 pounds per gallon of paint.

3.07 PROTECTION

A. The Contractor shall erect adequate warning signs and/or provide sufficient number of flagmen, and take all necessary precautions for the protection of the materials and safety of the public.

B. Protect surfaces from disfiguration by paint spatters, splashes, spills, or drips.

3.08 CLEANUP

A. Remove paint spatters, splashes, spills, or drips from Work and staging areas and areas outside of the immediate Work area where spills occur.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02771

CONCRETE CURBS AND SIDEWALKS

PART 1 – GENERAL

(NOT USED)

PART 2 – MATERIALS

2.01 EXPANSION JOINT FILLER

A. 1/2-inch thick, preformed asphalt-impregnated, expansion joint material meeting AASHTO M153 Type I, II, or III, or AASHTO M213, or cellulose fiber types meeting the requirements of AASHTO M213, except the asphalt content is acceptable provided they contain minimum of 0.2 percent copper pentachlorophenate as a preservative and 1 percent water proofing wax.

2.02 CONCRETE

A. Ready-mixed meeting ASTM C94, Option A, with compressive strength of 3,000 psi at 28 days.

B. Maximum Aggregate Size: 1-1/2 inch.

C. Slump: 2 to 4 inches.

2.03 CURING COMPOUND

A. Liquid membrane-forming, clear or translucent, suitable for spray application and meeting ASTM C309, Type 1.

PART 3 - EXECUTION

3.01 FORMWORK

A. Lumber Materials:

1. 2-inch dressed dimension lumber, or metal of equal strength, straight, free from defects that would impair appearance or structural quality of completed curb and sidewalk.

2. 1-inch dressed lumber or plywood may be used where short-radius forms are required.

B. Metals: Steel in new undamaged condition.

C. Setting Forms:

1. Construct forms to shape, lines, grades, and dimensions.

2. Stake securely in place.

D. Bracing:

1. Brace forms to prevent change of shape or movement resulting from placement.

2. Construct short-radius curved forms to exact radius. E. Tolerances:

1. Do not vary tops of forms from gradeline more than 1/8 inch when checked with 10-foot straightedge.

2. Do not vary alignment of straight sections more than 1/8 inch in 10 feet.

3.02 PLACING CONCRETE

A. Excavate to the required depth, place and compact limerock base rock as specified in the Contract Documents. Compact directly under the area and 1 foot beyond each side of the sidewalk and curb.

B. Prior to placing concrete, remove water from excavation and debris and foreign material from forms.

C. Place concrete as soon as possible, and within 1-1/2 hours after adding cement to mix without segregation or loss of ingredients, and without splashing.

D. Place, process, finish, and cure concrete in accordance with applicable requirements of ACI 304, and this section. Wherever requirements differ, the more stringent shall govern.

E. To compact, vibrate until concrete becomes uniformly plastic.

F. All edges shall be smooth and rounded.

3.03 CURB CONSTRUCTION

A. Construct ramps at pedestrian crossings in compliance with FDOT and PROWAG minimum standards. Standards apply to work in the City's Rights of Way.

B. Expansion Joints: Place at maximum 20-foot intervals and at the beginning and end of curved portions of curb, and at connections to existing curbs. Install expansion joint filler at each joint.

C. Gutter minimum slope shall be 0.33% unless otherwise approved by the City.

D. Curb Facing: Do not allow horizontal joints within 7 inches from top of curb.

E. All gutters and curb and gutters shall have a minimum 4” think limerock “curb pad” LBR 100.

F. Contraction Joints:

1. Maximum 10-foot intervals in curb.

2. Provide open joint type by inserting thin, oiled steel sheet vertically in fresh concrete to force coarse aggregate away from joint.

3. Insert steel sheet to full depth of curb.

4. Remove steel sheet with sawing motion after initial set has occurred in concrete and prior to removing front curb form.

5. Finish top of curb with steel trowel and finish edges with steel edging tool. G.

Front Face:

1. Remove front form and finish exposed surfaces when concrete has set sufficiently to support its own weight.

2. Finish formed face by rubbing with burlap sack or similar device to produce uniformly textured surface, free of form marks, honeycomb, and other defects.

3. Remove and replace *defective* concrete.

4. Apply curing compound to exposed surfaces of curb upon completion of finishing.

5. Continue curing for minimum of 5 days.

H. Backfill curb with earth upon completion of curing period, but not before 7 days has elapsed since placing concrete.

1. Backfill shall be free from rocks 2 inches and larger and other foreign material.

2. Compact backfill firmly.

3.04 SIDEWALK CONSTRUCTION A.

Thickness:

1. 6 inches.

B. Connection to Existing Sidewalk:

1. Remove old concrete back to an existing contraction joint.

2. Clean the surface.

3. Apply a neat cement paste immediately prior to placing new sidewalk.

C. Expansion Joints: Place at maximum 20-foot intervals, at adjacent curb expansion joint, where sidewalk ends at curb, and around posts, poles, or other objects penetrating sidewalk. Install expansion joint filler at each joint. D. Contraction Joints:

1. Provide transversely to walks at locations opposite contraction joints in curb.

2. Dimensions: 3/16-inch by 1-inch weakened plane joints. 3.

Construct straight and at right angles to surface of walk. E. Finish:

1. Broom surface with fine-hair broom at right angles to length of walk and tool at edges, joints, and markings.

2. Ensure that the surface variations are not more than ¼ inch under a 10-foot straightedge, or more than 1/8 inch on a 5-foot transverse section.

3. Mark walks transversely at 5-foot intervals, or in pattern shown on Drawings, with jointing tool; finish edges with rounded steel edging tool.

4. Apply curing compound to exposed surfaces upon completion of finishing.

5. Protect sidewalk from damage and allow to cure for at least 7 days. F. Curb Ramps:

1. All curb ramps and detectable warnings shall comply with the current FDOT Index 304 and the Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way by the United States Access Board.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02772

ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS

A. When referenced in this Section, Standard Specifications shall mean Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition.

1.02 QUALITY ASSURANCE

A. Qualifications:

1. Independent Testing Laboratory: In accordance with ASTM E329.

2. Asphalt concrete mix formula shall be prepared by an approved certified independent laboratory under the supervision of a certified asphalt technician.

1.03 SUBMITTALS

A. The Contractor shall submit its proposed formula for the asphaltic concrete paving for review in accordance with the Section entitled “Submittals”.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Temperature: Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 10 degrees C (50 degrees F), or air temperature is lower than 4 degrees C (40 degrees F). Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.

B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

PART 2 - MATERIALS

2.01 MATERIALS

A. Prime Coat: Cut-back asphalt, Grades RC-70 or RC-250 meeting the requirements of the Standard Specifications.

B. Tack Coat: Emulsified asphalt, Grade RS-2, SS-1, or SS-1H meeting the requirements of the Standard Specifications. The bituminous material shall be heated to a suitable consistency as directed by the City.

C. Sand (Blotter Material): Clean, dry, with 100 percent passing a 4.75 mm (No. 4) sieve, and a maximum of 10 percent passing a 75 mm (No. 200) sieve.

2.02 ASPHALT CONCRETE MIX A.

General:

1. Mix formula shall not be modified except with the written approval of City.

2. Source Changes:

   a. Should material source(s) change, establish a new asphalt concrete mix formula before the new material(s) is used.

   b. Perform check tests of properties of the plant-mix bituminous materials on the first day of production and as requested by City to confirm that properties are in compliance with design criteria.

   c. Make adjustments in gradation or asphalt content as necessary to meet design criteria.

B. Asphalt Concrete: Type SP meeting the requirements of the Standard Specifications.

C. Composition: Hot-plant mix of aggregate, mineral filler, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the mix formula. D. Aggregate:

1. The aggregate shall meet the requirements of the Standard Specifications.

2. Mineral Filler shall meet the requirements of the Standard Specifications

E. Asphalt Cement: Paving Grade AC-30 meeting the requirements of the Standard Specifications.

PART 3 - EXECUTION

3.01 GENERAL

A. Traffic Control: Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.

B. Driveways: Repave driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

A. Provide and maintain intermediate control of line and grade, independent of the underlying base to meet finish surface grades and minimum thickness. B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 PREPARATION

A. Prepare subgrade as specified in the Contract Documents.

B. Existing Roadway:

1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce a smooth riding connection to existing facility.

2. Resurface entire roadway following adjustment of base and asphalt grades.

3. Paint edges of meet line with tack coat prior to placing new pavement.

C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

3.04 PAVEMENT APPLICATION

A. General: Place asphalt concrete mixture on an approved, prepared base in conformance with this Section.

B. Cold Milling

1. Milling of existing asphalt pavement shall be at the depth and location as indicated on the Construction DRAWINGS or as directed by the City.

2. The milled surface shall be reasonably smooth and free of excessive scarification marks, gouges, ridges, continuous grooves, or other damage. The milled pavement surface shall be thoroughly cleaned of all loose aggregate particles, dust, and other objectionable material by the use of power brooms, power blowers, power vacuums or other means.

3. The Contractor shall coordinate the adjustment of maintenance access structures, meter boxes, drainage inlets, and valve boxes with the milling operation.

4. All milled material shall become the property of the Contractor and shall be disposed of off-site or used in conformance with the Contract Documents, or for utilization as Reclaimed Asphalt Pavement, in conformance with the specification provided above, as approved by the OWNER. C. Prime Coat:

1. Heat cut-back asphalt between 100 degrees F and 150 degrees F prior to application.

2. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.

3. Do not apply when moisture content of upper 3 inches of base exceeds optimum moisture content of base, or if free moisture is present.

4. Application Rate: Minimum 0.1 gallons per square yard of surface area.

5. Remove or redistribute excess material.

6. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.

D. Tack Coat:

1. Apply uniformly to clean, dry surfaces. Avoiding overlapping of applications.

2. Do not apply more tack coat than necessary for the day's paving operation.

3. Touch up missed or lightly coated surfaces and remove excess material.

4. Application Rate:

a. Minimum 0.05 gallons to maximum 0.12 gallons of asphalt (residual if diluted emulsified asphalt) per square yard of surface area.

b. Apply at rate, within range specified, sufficient to assure good bonding, but not so heavy that surplus asphalt flushes into asphalt concrete being placed.

E. Pavement Mix:

1. Prior to Paving:

a. Sweep primed surface free of dirt, dust, or other foreign matter.

b. Patch holes in primed surface with asphalt concrete pavement mix.

c. Blot excess prime material with sand.

2. Place asphalt concrete pavement mix in lifts as shown.

3. Compacted Lift Thickness:

a. Minimum: Twice the maximum aggregate size, but in no case less than 1 inch. Minimum thickness for Type SP-9.5 is 1.0 inches.

b. Maximum: 4 inches.

4. Total Compacted Thickness: Per Contract Documents.

5. Apply such that meet lines are straight and edges are vertical.

6. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.

7. Joints:

   a. Offset edge of each layer a minimum of 6 inches so joints are not directly over those in underlying layer.

   b. Offset longitudinal joints in roadway pavements, so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.

   c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.

8. Succeeding Lifts: Apply tack coat to pavement surface between each lift.

9. After placement of pavement, seal meet line by painting a minimum of 6 inches on each side of the joint with cut-back or emulsified asphalt. Cover immediately with sand. F. Compaction:

1. Roll until roller marks are eliminated and compacted to 100 percent of the laboratory compacted mixture.

2. Joint Compaction:

   a. Place top or wearing layer as continuously as possible.

   b. Pass roller over unprotected end of freshly laid mixture only when placing of mix is discontinued long enough to permit mixture to become chilled.

   c. Cut back previously compacted mixture when Work is resumed to produce a slightly beveled edge for full thickness of layer.

   d. Cut away waste material and lay new mix against fresh cut. G. Tolerances:

1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.

2. Completed Surface or Wearing Layer Smoothness:

   a. Uniform texture, smooth, and uniform to crown and grade.

   b. Maximum Deviation: 1/8 inch from lower edge of a 12-foot straightedge, measured continuously parallel and at right angle to centerline.

   c. If surface of completed pavement deviates by more than twice the specified tolerances, remove and replace wearing surface.

3. Transverse Slope Maximum Deviation: ¼ inch in 12 feet from the rate of slope shown.

4. Finished Grade:

   a. Perform a field differential level survey on a maximum 50-foot grid and along all grade breaks.

   b. Maximum Deviation: 0.02 foot from the grade shown. H.

Seal Coat:

1. General: Apply seal coat of paving grade or emulsified asphalt to finished surface at longitudinal and transverse joints, joints at abutting pavements, areas where the asphalt concrete was placed by hand, patched surfaces, and other areas as directed by the City.

2. Preparation:

   a. Maintain surfaces that are to be sealed free of holes, dry, and clean of dust and loose material.

   b. Seal in dry weather and when the temperature is above 35 degrees F.

3. Application:

   a. Fill cracks over 1/16 inch in width with an asphalt-sand slurry or approved crack sealer prior to sealing.

   b. When sealing patched surfaces and joints with existing pavements, extend minimum 6 inches beyond edges of patches.

3.05 PAVEMENT OVERLAY

A. Preparation:

1. Remove fatty asphalt, grease drippings, dust, and other deleterious matter.

2. Surface Depressions: Fill with asphalt concrete mix, and thoroughly compact.

3. Damaged Areas: Remove broken or deteriorated asphalt concrete and patch as specified in Article Patching.

4. Portland Cement Concrete Joints: Remove joint filler to minimum 1/2 inch below surface. B. Application:

1. Tack Coat: As specified in this Section.

2. Place and compact asphaltconcrete as specified in Article Pavement

Application.

3. Place first layer to include widening of pavement and leveling of irregularities in the surface of the existing pavement.

4. When leveling irregular surfaces and raising low areas, the actual compacted thickness of any one lift shall not exceed 2 inches.

5. The actual compacted thickness of intermittent areas of 120 square yards or less may exceed 2 inches, but not 4 inches.

6. Final wearing layer shall be of uniform thickness, and meet grade and crosssection as shown.

3.06 PATCHING HOT MIX ASPHALT A.

Preparation:

1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.

2. Prepare patch subgrade as specified in the Contract Documents. B.

Application:

1. Patch Thickness: 3 inches or thickness of adjacent asphalt concrete, whichever is greater.

2. Place asphalt concrete mix across full width of patch in layers of equal thickness.

3. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched. C. Compaction:

1. Roll patches with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Use hand tampers where rolling is impractical.

2. Begin rolling top course at edges of patches, lapping adjacent asphalt surface at least 1/2 the roller width. Progress toward center of patch overlapping each preceding track by at least 1/2 the width of roller.

3. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface. D. Tolerances:

1. Finished surface shall be flush with and match grade, slope, and crown of adjacent surface.

2. Tolerance: Surface smoothness shall not deviate more than plus 1/4 inch or minus 0 when a straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

3.07 FIELD QUALITY CONTROL

A. General: Provide services of an approved certified independent testing laboratory to conduct tests.

B. Field Density Tests:

1. Perform tests from cores or sawed samples.

2. Measure with properly operating and calibrated nuclear density gauge.

3. Maximum Density: In accordance with ASTM D2041, using a sample of mix taken prior to compaction from the same location as the density test sample.

C. Testing Frequency:

1. Quality Control Tests:

a. Asphalt Content, Aggregate Gradation: Once per every 500 tons of mix or once every 4 hours, whichever is greater.

b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 1,000 tons or once every 8 hours, whichever is greater.

2. Density Tests: Once every 500 tons of mix or once every 4 hours, whichever is greater.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02832

TEMPORARY CONSTRUCTION FENCE

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Furnish and install temporary chain link fencing, posts, gates, etc. at the staging area where shown on the Drawings.

1.02 PERMITS

A. Obtain permits as required by local jurisdiction.

PART 2 - PRODUCTS

2.01 TEMPORARY CONSTRUCTION FENCE

A. Type: Chain link, galvanized.

B. Height: 8’-0”.

C. Posts: Pounded 2’-0” into ground.

D. Gates: Provide gates of the size and location as determined by the Contractor to be needed.

E. Lock and Chain: Provide locks and chains as required to secure gate(s).

F. Windscreen: Provide fence with windscreen for privacy.

G. Supplier or Equal: National Construction Rentals, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install per supplier’s instructions.

- END OF SECTION –

PROJECT NO. 12337

SECTION 02920

SODDING

PART 1 - GENERAL

1.01 DEFINITIONS

A. Maintenance Period: Begin maintenance immediately after each area is planted (sod) and continue for a period of 8 weeks after all planting under this Section is completed.

B. Satisfactory Stand:

1. Grass or Section of Grass that has:

a. No bare spots larger than 3 square feet.

b. Not more than 10 percent of total area with bare spots larger than 1 square foot.

c. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.02 DELIVERY, STORAGE, AND PROTECTION A.

Sod:

1. Do not harvest if sod is excessively dry or wet to the extent survival may be adversely affected.

2. Harvest and deliver sod only after laying bed is prepared for sodding.

3. Roll or stack to prevent yellowing.

4. Deliver and lay within 24 hours of harvesting.

5. Keep moist and covered to protect from drying from time of harvesting until laid.

1.03 WEATHER RESTRICTIONS

A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

1.04 SEQUENCING AND SCHEDULING

A. Prepare topsoil as specified in the Contract Documents, before starting Work of this Section.

B. Complete Work under this Section within 10 days following completion of soil preparation.

C. Notify the CITY at Least 3 Days in Advance of:

1. Each material delivery.

2. Start of planting activity.

D. Planting Season: Those times of year that are normal for such Work as determined by accepted local practice.

1.05 MAINTENANCE SERVICE

A. Contractor: Perform maintenance operations during maintenance period to include:

1. Watering: Keep surface moist.

2. Washouts: Repair by filling with topsoil, and replace sodded areas.

3. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3 1/2 inches.

4. Re-sod unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced, at which time maintenance period shall recommence.

5. Re-sod during next planting season if scheduled end of maintenance period falls after September 15.

PART 2 – MATERIALS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.

B. Mix:

1. Nitrogen: Sixteen.

2. Phosphoric Acid: Four.

3. Potash: Eight.

2.02 SOD

A. Unless noted otherwise in the Contract drawings, Contractor shall provide sod as detailed below.

1. Use Bahia grass where no irrigation system exists.

2. Use St. Augustine Floritam here an irrigation system is in use.

3. Seashore Paspalum sod will be used in areas prone to salt water flooding.

B. Strongly rooted pads, capable of supporting own weight and retaining size and shape when suspended vertically from a firm grasp on upper 10 percent of pad.

1. Grass Height: Normal.

2. Strip Size: Supplier's standard, commercial size rectangles.

3. Soil Thickness: Uniform; 1-inch plus or minus 1/4-inch at time of cutting.

4. Age: Not less than 10 months or more than 30 months.

5. Condition: Healthy, green, moist; free of diseases, nematodes and insects, and of undesirable grassy and broadleaf weeds. Yellow sod, or broken pads, or torn or uneven ends will not be accepted

6. Any netting contained within the sod shall be certified by the manufacturer to be bio-degradable within a period of 3 months from installation.

PART 3 - EXECUTION

3.01 PREPARATION

A. Grade Areas to Smooth, Even Surface with Loose, Uniformly Fine Texture:

1. Roll and rake, remove ridges, fill depressions to meet finish grades.

2. Limit such Work to areas to be planted within immediate future.

3. Remove debris, foreign material and stones larger than 1 1/2 inches diameter, and other objects that may interfere with planting and maintenance operations.

B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.

C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.

D. Limit preparation to those areas that can be sodded within 72 hours after preparation.

3.02 FERTILIZER

A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of top soil.

B. Application Rate: 20 pounds per 1,000 square feet (1,000 pounds per acre).

3.03 SODDING

A. Do not plant dormant sod, or when soil conditions are unsuitable for proper results.

B. Pre-wet the area prior to placing sod. Lay sod to form solid mass with tightly fitted joints; butt ends and sides, do not overlap:

1. Stagger strips to offset joints in adjacent courses.

2. Work from boards to avoid damage to subgrade or sod.

3. Tamp or roll lightly to ensure a smooth surface in contact with subgrade; work sifted soil into minor cracks between pieces of sod, remove excess to avoid smothering adjacent grass.

4. Complete sod surface true to finished grade, even, and firm.

C. Fasten sod on slopes to prevent slippage with wooden pins 6 inches long driven through sod into subgrade, until flush with top of sod. Install at sufficiently close intervals to securely hold sod.

D. Water sod with fine spray immediately after planting. During first month, water daily or as required to maintain moist soil to depth of 4 inches.

3.04 FIELD QUALITY CONTROL

A. Eight weeks after sodding is complete and on written notice from Contractor, CITY PROJECT MANAGER will, within 15 days of receipt, determine if the sod has been satisfactorily established.

B. If the sod is not satisfactorily established, Contractor shall replace the sod and repeat the requirements of this Section.

- END OF SECTION -

PROJECT NO. 12337

SECTION 02930

LANDSCAPING

PART 1 - GENERAL

1.01 DEFINITIONS

A. Measurement:

1. In size grading Balled and Burlapped (B & B), caliper takes precedence over height.

2. Take trunk caliper 6 inches above the ground level (up to and including 4-inch caliper size) and 12 inches above the ground level for larger trees.

3. Measure size of container-grown stock by height and width of plant.

4. Measure herbaceous perennials pot size, not top growth.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Inspection and Transporting: Movement of nursery stock shall comply with all Federal, State, and local laws and regulations. Therefore, required inspection certificates shall accompany each shipment, and shall be filed with the CONSULTANT.

B. Cover plants during shipment with a tarpaulin or other suitable covering to minimize drying.

C. Balled and Burlapped Plants: Wrap each ball firmly with burlap and securely bind with twine, cord, or wire for shipment and handling. Drum-lace balls with a diameter of 30 inches or more. Wire wrap burlap if root ball is not sufficiently compacted. Palms will not require burlap wrapping if the following requirements are met:

1. Dug from marl or heavy soil that adheres to roots and retains shape without shattering.

2. Moistened material used to cover ball and roots not exposed to wind and sun.

3. Transport material on vehicles large enough to allow plants not to be crowded. Plants shall be covered to prevent wind damage during transit and shall be kept moist, fresh and protected at all times. Such protection shall encompass the entire period which the plants are in transit, being handled, or are in temporary storage.

D. All plant material shall not remain on the work site longer than two (2) days prior to being installed.

E. As specified herein for transplanting.

1.03 MAINTENANCE

A. Commence to maintain plant life immediately after planting and maintain for a minimum of one growing season, and until plants are well established and exhibit a vigorous growing condition.

B. In Accordance with Accepted Submittal on Care and Maintenance of Plants and as Follows:

1. Maintain by watering, pruning, cultivating, and weeding as required for healthy growth. Restore planting saucers.

2. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required.

3. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

4. Remove guys, stakes, and other supports at end of maintenance service.

5. Maintenance includes temporary protection fences, barriers, and signs as required for protection.

6. Coordinate watering to provide deep root watering to newly installed trees.

1.04 SCHEDULING AND SEQUENCING

A. Plant Deliveries: Notify the Engineer at least 3 days in advance of each delivery.

B. Planting Season: Conduct planting during times of year that are normal for such work as determined by accepted local practice.

C. Plant trees and shrubs after final grades are established and before planting of lawns or grasses.

PART 2 – MATERIALS

2.01 PLANT MATERIALS

A. Provide quantity, size, genus, species, and variety of trees and shrubs indicated; comply with applicable requirements of ANSI Z60.1.

B. Nomenclature (Names of Plants): In accordance with “Hortus Third”.

C. Quality and Size:

1. Nursery-grown, habit of growth normal for species.

2. Sound, healthy, vigorous, and free from insects, diseases, and injuries - Florida #1 quality or better.

3. Equal to or exceeding measurements specified in plant list. Measure plants before pruning with branches in normal position.

4. Root System of Container-Grown Plants: Well developed and well distributed throughout the container, such that the roots visibly extend to the inside face of the growing container.

5. Perform NAA Class I Fine Pruning at time of planting.

6. Sizes: Dimensional relationship requirements of ANSI Z60.1 for kind and type of plants required.

7. Balled and Burlapped Plants: Firm, intact ball of earth encompassing enough of the fibrous and feeding root system to enable full plant recovery.

   a. Ball Size: ANSI Z60.1.

8. Container-Grown Plants: Self-established root systems, sufficient to hold earth together after removal from container, without being rootbound.

   a. Stock: Grown in delivery containers for at least 6 months, but not over 2 years.

9. Label each tree and shrub of each variety with securely attached waterproof tag, bearing legible designation of botanical and common name.

10. All trees must have a fully developed fibrous root system, be heavily branched, or in palms, heavily leafed, free from all insects, fungus, and other diseases.

11. Palms: Wrap the roots of all plants of the palm species before transporting, except if they are container grown plants and ensure that they have an adequate root ball structure, and mass for healthy transplantation as defined in “Florida Grades and Standards for Nursery Plants.”

12. The CONSULTANT will not require burlapping, if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24 hours, cover the root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

13. Move sabal and coconut palms in accordance with the “Florida Grades and Standards for Nursery Plants.”

D. Replacement Shrubs and Trees: Same species, size, and quality as specified for plant being replaced, except existing trees larger than 4-inch caliper, may be replaced with 4-inch caliper trees to satisfy the caliper inches lost.

2.02 ANTIDESICCANT

A. Provide transpiration retarding material to be used where any plant material is moved during the growing season.

2.03 GUYING, STAKING, AND WRAPPING MATERIALS

A. Wood Stake: 2 inches by 2 inches by 8 feet.

B. Guy Wires: Galvanized, 12-gauge, ductile steel.

C. Flags:

1. Wood: 1/2-inch by 3 inches by 12 inches, with 3/8-inch hole centered 1-1/2 inches from each end, painted white.

2. Sheet Metal: 1-1/2-inch with clipped corners and both ends punched, painted white.

D. Hose: Two-ply, reinforced rubber garden hose, not less than 1/2-inch diameter, new or used.

E. Burlap: Of first quality, minimum 8 ounces in weight, not less than 6 inches nor more than 10 inches in width.

2.04 MULCH

A. Mulch shall be free from noxious weed seed and foreign material harmful to plant growth and shall be an approved non-native tree bark mulch. It must be uniformly shredded and be free from large pieces of bark, foreign matter, weed seeds and any other organic or inorganic material.

B. Grade A Melaleuca mulch or Australian Pine mulch as supplied by Advanced Mulch, Inc., Boynton Beach, Florida, 1-877-256-9685, or approved equal; and shall be free of sand, seed and inorganic materials.

C. Barkdust: Medium grind, pine; maximum 3/4-inch particle size.

2.05 PLANTING SOIL MIX

A. Proportion by Weight: 75% approved good quality top soil mixed with 25% approved organic matter as approved by CONSULTANT. The soil must be taken from ground that has never been stripped, with a slight acid reaction (5.5 to 6.5 ph) and without an excess of calcium or carbonate. Soil shall have a loose friable condition.

B. Special Type: Planting soil for palms shall be a good grade of salt free sand, which is free of all weeds.

2.06 TOPSOIL

A. General: Uniform mixture of 75 percent good grade of clean, salt free, weed free sand and 25 percent organic material in a loose friable condition, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.

B. Textural Amendments: Amend as necessary to conform to required composition.

C. Source: Import topsoil if onsite material fails to meet specified requirements or is insufficient in quantity.

D. 95% of topsoil shall pass a ¼ inch sieve.

E. Organic matter content shall be 4% to 12% of total dry weight.

2.07 SOURCE QUALITY CONTROL

A. Topsoil Analysis/Testing: Performed by county or state soil testing service or approved certified independent testing laboratory.

B. Should soil tests prove the topsoil to alkaline or above the accepted minimum for salt content, the topsoil shall be removed and replaced by acceptable material at Contractor's expense.

PART 3 - EXECUTION

3.01 TRANSPLANTING

A. Remove existing plantings identified for transplant prior to beginning Work in area in accordance with standard nursery practices and as specified herein.

B. Nondormant Plants: Prior to digging, spray foliage with antidesiccant, as recommended by manufacturer.

C. Cover balls and containers of plants that cannot be planted immediately, with moist soil or mulch.

D. Water plants as often as necessary to prevent drying until planted.

E. Do not remove container-grown stock from containers before time of planting.

F. Bare-Root Plants:

1. Dig up with least possible injury to fibrous root system.

2. Immediately upon removal from ground, cover roots with thick coating of mud or wrap in wet straw, moss, or other suitable packing material for protection from drying until planted.

3. Plant or heel-in immediately upon relocation to temporary storage. Open and separate bundles of bare-root plants, and eliminate air pockets among roots as they are covered.

G. Replant each temporarily removed tree, shrub, or other plant only after construction activities are completed and applicable grading and topsoil replacement is completed in its vicinity. Replant trees, shrubs, and other plants in their original positions unless otherwise shown or approved. Plant as specified for new plants.

H. Maintain transplanted materials in same manner as new trees and shrubs.

3.02 LOCATION OF PLANTS

A. Locate new planting or stake positions as shown unless obstructions are encountered, in which case notify CONSULTANT.

B. Locate no planting, except ground cover, closer than 18 inches to pavements, pedestrian pathways, and structures.

C. Request CONSULTANT observe locations, and adjust as necessary before planting begins.

3.03 PREPARATION

A. Subsoil Drainage: Furnish for plant pits and beds.

B. Planting Soil: Delay mixing of amendments and fertilizer if planting will not follow preparation of planting soil within 2 days. For pit and trench type backfill, mix planting soil prior to backfilling and stockpile at site.

C. Plants: Place on undisturbed existing soil or well-compacted backfill.

D. Trees and Shrubs:

1. Pits, Beds, and Trenches: Excavate with vertical and scarified sides.

2. B & B Trees and Shrubs: Make excavations at least twice as wide as root ball.

3. Container-Grown Stock: Excavate as specified for B & B stock, adjust for size of container width and depth.

4. Bare-Root Trees: Excavate pits to a width to just accommodate roots fully extended and depth to allow uppermost roots to be below original grade.

5. Fill excavations with water and allow to percolate out prior to planting.

E. Ground Cover Beds:

1. Mix amendments and fertilizer with top soil prior to placing or apply on surface of top soil and mix thoroughly before planting.

2. Scarify top soil to a depth of 4 to 6 inches.

3. Establish finish grading of soil. Rake areas to smooth and create uniform texture and fill depressions.

4. Moisten.

3.04 PLANTING

A. Plant trees before planting surrounding smaller shrubs and ground covers. Adjust plants with most desirable side facing toward the prominent view (sidewalk, building, street).

B. B & B Plants: Place in pit by lifting and carrying by its ball (do not lift by branches or trunk). Lower into pit. Set straight and in pit center with tip of rootball 1 to 2 inches above adjacent finish grade.

C. Bare-Root Plants: Spread roots and set stock on cushion of planting soil mixture. Set straight in the pit center so that roots, when fully extended, will not touch walls of the planting pit and the uppermost root is just below finish grade. Cover roots of bare-root plants to the crown.

D. Container-Grown Plants: Remove containers, slash edges of rootballs from top to bottom at least 1-inch deep. Plant as for B & B plants.

E. Ground Covers: Dig planting holes through mulch with one of the following: hand trowel, shovel, bulb planter, or hoe. Split biodegradable pots or remove nonbiodegradable pots. Root systems of all potted plants shall be split or crumbled. Plant so roots are surrounded by soil below the mulch. Set potted plants so pot top is even with existing grade.

3.05 BACKFILLING

A. Backfill with planting soil, except where existing soil is suitable according to top soil analysis.

B. B & B Plants:

1. Partially backfill pit to support plant. Remove burlap and binding from sides and tops of B & B plants, do not pull burlap from under balls.

2. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill to eliminate air pockets even if it is raining. Finish backfilling pit sides.

3. Never cover top of rootball with soil. Form a saucer above existing grade, completely around the outer rim of the plant pit.

C. Bare-Root Plants:

1. Plumb before backfilling and maintain plumb while working backfill around roots and placing layers above roots.

2. Set original soil line of plant 1-inch to 2 inches above adjacent finish landscape grades. Spread out roots without tangling or turning up to surface. Cut injured roots cleanly; do not break.

3. Carefully work backfill around roots by hand; puddle with water until backfill layers are completely saturated.

3.06 GUYING AND STAKING

A. Support trees immediately after planting to maintain plumb position.

B. Guying: Support all trees over 4 inches in caliper with 3 guys equally.

C. Special Requirements for Palm Trees: Brace palms which are to be staked with three 2-inch by 4-inch wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2- by 4- by 12-inch stake pads.

3.07 SUBGRADE PREPARATION

A. The subgrade shall be 4 inches lower than finished grade with 2 inches of topsoil added to sod areas.

B. Scarify subgrade to minimum depth of 6 inches where topsoil is to be placed.

C. Remove stones over 2-1/2 inches in any dimension, sticks, roots, rubbish, and other extraneous material.

D. Limit preparation to areas which will receive topsoil within 2 days after preparation.

3.08 TOPSOIL PLACEMENT

A. Topsoil Thickness:

1. Sodded Areas: 2 inches.

2. Planting Beds: 6 inches.

3. Planting Beds in Roadways and Parking Lots: All planting areas shall be excavated to a minimum depth of 24” or greater as needed to remove all road base/rock down to native soil prior to backfilling with approved planting soil.

B. Do not place topsoil when subsoil or topsoil is excessively wet or otherwise detrimental to the Work.

C. Mix soil amendments with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding.

D. Uniformly distribute to within 1/2-inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade.

E. Remove stones exceeding 1-1/2 inches, roots, sticks, debris, and foreign matter during and after topsoil placement.

F. Remove surplus subsoil and topsoil from site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

3.09 MULCHING

A. Cover planting beds and area of saucer around each plant with 3-inch thick layer of mulch within 2 days after planting. Saturate planting area with water.

3.10 PRUNING AND REPAIR

A. Prune only after planting and in accordance with ANSI A300 standard to preserve natural character of the plant. Perform in presence of CONSULTANT or OWNER's representative. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools. Do not cut lead shoot. B. For Existing Trees Impacted by Construction Activities:

1. Maintain a minimum 6-foot clearance from the trunk of all trees except palm trees. Existing trees to remain shall be protected during all construction phases. Protective barriers shall be provided at the drip line of existing trees adjacent to construction operations. Replacement of any trees that are damaged or destroyed due to the CONTRACTOR'S operations shall be the CONTRACTOR'S responsibility and shall be replaced at the CONTRACTOR'S expense

2. Where roots of trees are encountered in the excavation area, use a 24-inch deep saw cut prior to excavation. Roots shall not be torn by excavating equipment. Hand dig around roots. Cut roots do not require coating.

3. Overhead branches not trimmed prior to construction and interfering with construction activities will be pruned and cut as approved by the CITY Forester and not torn or broken off with excavating equipment.

3.11 WEED CONTROL

A. Maintain a weed-free condition within planting areas. Apply pre-emergent selective herbicide to mulched beds at manufacturer's recommended rate of application.

3.12 PROTECTION OF INSTALLED WORK

A. Protect planting areas and plants against damage for duration of maintenance period.

3.13 ROOT BARRIERS

A. Root barriers shall be installed parallel to all trees (except palms) when there is a sidewalks, roadway or utility adjacent to the planting area. Root barriers will be installed as directed by CITY.

- END OF SECTION -

DIVISION 3

CONCRETE

PROJECT NO. 12337

SECTION 03100

CONCRETE FORMWORK

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall design and furnish all materials for concrete formwork, bracing, and supports and shall design and construct all falsework, all in accordance with the provisions of the Contract Documents.

1.02 RESPONSIBILITY

A. The design and engineering of the formwork as well as safety considerations are the responsibility of the Contractor.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 03200 - Concrete Reinforcement

C. Section 03300 - Cast in Place Concrete

D. Section 03315 - Grout

1.04 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

1. Codes and Standards

   a. The Building Code, as referenced herein, is the Florida Building Code (FBC).

2. Government Standards

   a. PS 1U.S. Product Standard for Concrete Forms, Class I.

3. Commercial Standards

   a. ACI 347 Recommended Practice for Concrete Formwork.

   b. ACI 318R Building Code Requirements for Reinforced Concrete.

c. ACI 350Code Requirements for Environmental Engineering Concrete Structures

1.05 QUALITY ASSURANCE

A. The variation from established grade or lines shall not exceed 1/4 inch in 10 feet and there shall be no offsets or visible bulges or waviness in the finished surface. All tolerances shall be within the "Suggested Tolerances" specified in ACI 347. The Contractor shall grind smooth all fins and projections between formwork panels as directed by the Engineer.

B. Curved forms shall be used for curved and circular structures that are cast-in-place. Straight panels will not be acceptable for forming curved structures.

PART 2 – PRODUCTS

2.01 FORM MATERIALS

A. Except as otherwise expressly accepted by the Engineer, all lumber brought on the job site for use as forms, shoring, or bracing shall be new material. All forms shall be smooth surface forms and shall be of the following materials:

1. Footing sides - Construction grade Hem Fir or Douglas Fir

2. Walls - Steel or plywood panel

3. Columns - Steel, plywood or fiber glass

4. Roof and floor Slabs - Plywood

5. All other work - Steel panels, plywood or tongue and groove lumber

B. Materials for concrete forms, formwork, and falsework shall conform to the following requirements:

1. Lumber shall be Southern Pine, construction grade or better, in conformance with U.S. Product Standard PS20.

2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork and shall conform to the requirements of PS I for Concrete Forms, Class I, and shall be edge sealed. Thickness shall be as required to support concrete at the rate it is placed, but not less than 5/8 inch thick.

2.02 PREFABRICATED FORMS

A. Form materials shall be metal, wood, plywood, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade indicated. Metal forms shall be an acceptable type that will accomplish

such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.

2.03 FORMWORK ACCESSORIES

A. Exterior corners in concrete members shall be provided with 3/4 inch chamfers. Re entrant corners in concrete members shall not have fillets unless otherwise shown.

B. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form tie fasteners having a circular cross section, shall not exceed 1 1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming.

C. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when acceptable to the Engineer. At locations where removable taper ties are acceptable, a preformed mechanical EPDM rubber plug shall be used to seal the hole left after the removal of the taper tie. Plug shall be X-Plug by the Greenstreak Group, Inc., or approved equal. Friction fit plugs shall not be used.

D. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "Bug Holes" in cast-in-place concrete.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed from the Work and replaced at the Contractor's expense. A sufficient number of forms of each kind shall be provided to permit the required rate of progress to be maintained. The design and inspection of concrete forms and falsework, shall comply with applicable local, state and Federal regulations. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

B. Concrete forms shall conform to the shape, lines, and dimensions of members as called for on the Drawings, and shall be substantially, free from surface defects, and sufficiently tight to prevent leakage. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly placed concrete.

C. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on all forms for 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 in the finished concrete. Plywood, 5/8 inch and greater in thickness, may be fastened directly to studding if the studs are spaced close enough to prevent visible deflection marks in the concrete. The forms shall be tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1 to 1 1/2-inch diameter polyethylene rod held in position to the underside of the wall form. Adequate clean out holes shall be provided at the bottom of each lift of forms. The size, number, and location of such clean outs shall be as acceptable to the Engineer.

D. Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory affect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the forms where required.

3.02 EARTH FORMS

A. All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for on the Drawings. Not less than 1 inch of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

3.03 FOOTINGS, SLAB EDGES AND GRADE BEAMS

A. Provide wood side forms for all footings, slab edges and grade beams.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.05 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Embedded Form Ties: Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar as specified for in Section 03350 entitled "Concrete Finishes". Wire ties for holding forms will not be permitted. No form tying device or part thereof, other

than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

3.06 FORM CLEANING

A. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view. Unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

3.07 FORMWORK TOLERANCES

A. Formwork shall be constructed to insure that finished concrete surfaces will be in accordance with the tolerances listed in ACI 347.

1. The following construction tolerances are hereby established and apply to finished walls and slab unless otherwise shown in the Drawings:

Item	Tolerance
Variation of the constructed linear outline from the established position in plan	In 10 feet: 1/4 inch; In 20 feet or more: 1/2 inch
Variation from the level or from the grades shown on the Drawings	In 10 feet: 1/4 inch; In 20 feet or more: 1/2 inch
Variation from the plum	In 10 feet: 1/4 inch; In 20 feet or more: 1/2 inch
Variation in the thickness of slabs and walls	Minus 1/4 inch; Plus 1/2 inch

Variation in the locations and sizes of slab and wall openings	Plus or minus 1/4 inch

3.08 FORM REMOVAL

A. Remove top forms on sloping surfaces of concrete as soon as removal operations will not allow the concrete to sag. Perform any needed repairs or treatments required on sloping surfaces at once, and follow immediately with the specified curing.

B. The Contractor shall be responsible for the removal of forms and shores. Forms or shores shall not be removed before test cylinders have reached the specified minimum 28 day compressive strength for the class of concrete specified in Section 03300 entitled "Castin-Place Concrete", nor sooner than listed below:

1. Grade beam side forms 3 days
2. Wall forms 3 days
3. Column forms 3 days
4. Beam and girder side forms 3 days
5. Beam bottoms and slab forms/shores 14 days

3.09 MAINTENANCE OF FORMS

A. Forms shall be maintained at all times in good condition, particularly as to size, shape, strength, rigidity, tightness, and smoothness of surface. Forms, when in place, shall conform to the established alignment and grades. Before concrete is placed, the forms shall be thoroughly cleaned. The form surfaces shall be treated with a nonstaining mineral oil or other lubricant acceptable to the Engineer. Any excess lubricant shall be satisfactorily removed before placing the concrete. Where field oiling of forms is required, the Contractor shall perform the oiling at least two weeks in advance of their use. Care shall be exercised to keep oil off the surfaces of steel reinforcement and other metal items to be embedded in concrete.

- END OF SECTION -

PROJECT NO. 12337

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish, fabricate and place all concrete reinforcing steel, welded wire fabric, couplers, and concrete inserts for use in reinforced concrete and shall perform all appurtenant work, including all the wires, clips, supports, chairs, spacers, and other accessories and special work necessary to hold the reinforcing steel in place and protect it from injury and corrosion, all in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 03100 - Concrete Formwork

C. Section 03300 - Cast in Place Concrete

D. Section 03315 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these specifications, all Work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

1. Codes and Standards

   a. The Building Code, as referenced herein, is the Florida Building Code (FBC).

2. Commercial Standards

   a. ACI 315 Details and Detailing of Concrete Reinforcement.

   b. CRSI Concrete Reinforcing Steel Institute Manual of Standard Practice

   c. ACI SP66 ACI Detailing Manual

   d. ACI 305 Hot Weather Concreting

   e. ACI 318 Building Code Requirements for Reinforced Concrete.

f.	ACI 350 Code	Requirements for Environmental Engineering Concrete Structures
g.	WRI	Manual of Standard Practice for Welded Wire Fabric.
h.	ASTM A 1064	Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
i.	ASTM A 615	Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

1.04 SUBMITTALS

A. The Contractor shall furnish shop bending diagrams, placing lists, and Drawings of all reinforcing steel prior to fabrication in accordance with the requirements of the Section 01300 entitled, "Submittals." The Contractor shall submit detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66) for all reinforcing steel. These drawings shall be made to such a scale as to clearly show joint locations, openings, the arrangement, spacing and splicing of the bars. Where opening sizes are dependent on equipment selection the Contractor shall indicate all necessary dimensions to define steel lengths and placing details.

B. Details of the concrete reinforcing steel and concrete inserts shall be submitted by the Contractor at the earliest possible date after receipt by the Contractor of the Notice to Proceed. Said details of reinforcing steel for fabrication and erection shall conform to ACI 315 and the requirements specified and shown. The shop bending diagrams shall show the actual lengths of bars, to the nearest inch measured to the intersection of the extensions (tangents for bars of circular cross section) of the outside surface. The shop Drawings shall include bar placement diagrams which clearly indicate the dimensions of each bar splice.

C. Where mechanical couplers are shown on the Drawings to be used to splice reinforcing steel, the Contractor shall submit manufacturer's literature which contains instructions and recommendations for installation for each type of coupler used; certified test reports which verify the load capacity of each type and size of coupler used; and shop Drawings which show the location of each coupler with details of how they are to be installed in the formwork.

D. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.

E. Requests to use splices not shown on the Drawings.

F. Requests to use mechanical couplers along with manufacturer’s literature on the mechanical couplers with instructions for installation, and certified test reports on the coupler’s capacity.

G. Proposed supports for each type of reinforcing.

H. Certification that all installers of dowel adhesives are certified as Adhesive Anchor Installers in accordance with the ACI-CRSI Anchor Installer Certification Program.

I. International Code Council-Evaluation Services Evaluation Services Report (ICC-ES ESR) for dowel adhesives.

J. Adhesive dowel testing plan.

1.05 QUALITY ASSURANCE

A. Installer Qualifications for Drilled-In Rebar: Drilled-in rebar shall be installed by an Installer with at least three years of experience performing similar installations. Installer shall be certified as an Adhesive Anchor Installer in accordance with ACI-CRSI Adhesive Anchor Installation Certification Program.

B. Installer Training: Conduct a thorough training with the manufacturer or the manufacturer's representative for the Installer on the project. Training shall consist of a review of the complete installation process for drilled-in anchors, to include but not be limited to the following:

1. Hole drilling procedure.

2. Hole preparation and cleaning technique.

3. Adhesive injection technique and dispenser training/maintenance.

4. Rebar doweling preparation and installation.

5. Proof loading/torquing.

C. Provide a copy of the current ACI/CRSI "Adhesive Anchor Installer" certification cards for all installers who will be installing adhesive anchors in the horizontal to vertically overhead orientation.

D. Inspections of the adhesive dowel system may be made by the Engineer or other representatives of the City in accordance with the requirements of the ESR published by the manufacturer. Provide adequate time and access for inspection of products and anchor holes prior to injection, installation, and proof testing.

PART 2 – PRODUCTS

2.01 REINFORCEMENT

A. All reinforcing steel for all reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement, and shall be manufactured in the United States. All reinforcing steel shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type and grade. All reinforcing bars shall be deformed bars. Smooth reinforcing bars shall not be used unless specifically called for on the Drawings.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 1064 and the details shown on the Drawings; provided, that welded wire fabric with longitudinal wire of W9.5 size wire shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches; and provided further, that welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only. All welded wire fabric reinforcement shall be galvanized. B. Field welding of reinforcing steel will not be allowed.

C. Use of coiled reinforcing steel will not be allowed.

2.02 ACCESSORY MATERIALS

A. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers and other devices to position reinforcing during concrete placement. Wire bar supports shall be plastic protected (CRSI Class 1). B. Tie Wire: Galvanized 16 gauge annealed type.

C. Concrete blocks (dobies), used to support and position reinforcing steel, shall have the same or higher compressive strength as specified for the concrete in which it is located. Concrete blocks shall only be used bottom mat of reinforcing steel for slabs on grade.

2.03 MECHANICAL COUPLERS

A. Mechanical couplers shall develop a tensile strength which exceeds 100 percent of the ultimate tensile strength and 125 percent of the yield strength of the reinforcing bars being spliced. The reinforcing steel and coupler used shall be compatible for obtaining the required strength of the connection.

B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied.

C. Hot forged sleeve type couplers shall not be used. Acceptable mechanical couplers are Dayton Superior Dowel Bar Splicer System by Dayton Superior, Dayton, Ohio, or approved equal. Mechanical couplers shall only be used where shown on the Drawings or where specifically approved by the Engineer.

D. Where the threaded rebar to be inserted into the coupler reduces the diameter of the bar, the threaded rebar piece shall be provided by the coupler manufacturer.

2.04 DOWEL ADHESIVE SYSTEM

A. Where shown on the Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions.

B. All holes shall be drilled in accordance with the manufacturer’s instructions except that core drilled holes shall not be permitted unless specifically allowed by the Engineer. Cored holes ,if allowed by the manufacturer and approved by the Engineer, shall be roughened in accordance with manufacturer requirements.

C. Thoroughly clean drill holes of all debris, drill dust, and water in accordance with manufacturer's instructions prior to installation of adhesive and reinforcing bar.

D. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Installation conditions shall be either dry or water-saturated. Water filled or submerged holes shall not be permitted unless specifically approved by the Engineer.

E. Injection of adhesive into the hole shall be performed in a manner to minimize the formation of air pockets in accordance with the manufacturer's instructions.

F. Embedment Depth:

1. The embedment depth of the bar shall be as show on the Drawings. Although all manufacturers listed below are permitted, the embedment depth shown on the Drawings is based on "SET-XP" by Simpson Strong-Tie Co. If the Contractor submits one of the other named dowel adhesives from the list below, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.

2. Where the embedment depth is not shown on the Drawings, the embedment depth shall be determined to provide the minimum allowable bond strength equal to the tensile strength of the rebar according to the manufacturer's ICC-ES ESR.

3. The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long term temperature of 110 degrees F, and maximum short term temperature of 140 degrees F. In no case shall the embedment depth be less than the minimum, or more than the maximum, embedment depths stated in the manufacturer's ICC-ES ESR.

G. Engineer's approval is required for use of this system in locations other than those shown on the Drawings.

H. The adhesive system shall be IBC compliant for use in both cracked and uncracked concrete, must comply with the latest revision of ICC-ES Acceptance Criteria AC308, and shall have a valid ICC-ES report. The adhesive system shall be "Epcon System C6+ Adhesive Anchoring System" as manufactured by ITW Redhead, " HIT-HY 200 Injection Adhesive Anchor System" as manufactured by Hilti, Inc. "SET-XP" as manufactured by Simpson Strong-Tie Co. or "Pure 110+ Epoxy Adhesive Anchor System" by DeWalt. Fastset epoxy formulations shall not be acceptable.

I. All individuals installing dowel adhesive system shall be certified as an Adhesive Anchor Installer in accordance with the ACI-CRSI Anchor Installation Certification Program.

2.05 FABRICATION

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and

ACII 318, except as modified by the Drawings. Stirrups and tie bars shall be bent around a pin having a diameter not less than 1 1/2 inch for No. 3 bars, 2 inch for No. 4 bars, and 2 1/2 inch for No. 5 bars. Bends for other bars shall be made around a pin having a diameter not less than 6 times the minimum thickness, except for bars larger than 1 inch, in which case the bends shall be made around a pin of 8 bar diameters. Bars shall be bent cold.

B. The Contractor shall fabricate reinforcing bars for structures in accordance with bending diagrams, placing lists, and placing Drawings. Said Drawings, diagrams, and lists shall be prepared by the Contractor as specified under Section entitled "Submittals," herein.

C. Fabricating Tolerances: Bars used for concrete reinforcing shall meet the following requirements for fabricating tolerances: 1. Sheared length: + 1 inch

2. Depth of truss bars: + 0, 1/2 inch

3. Stirrups and ties: + 1/2 inch

4. All other bends: + 1 inch

2.06 MINIMUM REINFORCEMENT

A. Unless otherwise shown on the Drawings or in the absence of the steel being shown, the minimum cross sectional area of reinforcing steel in the direction of principal reinforcement shall be 0.0033 times the gross concrete area of all concrete members.

B. Unless otherwise shown on the Drawings or in the absence of the steel being shown, the minimum cross sectional area of temperature reinforcing steel (reinforcing steel perpendicular to the principal reinforcing steel) shall be as follows:

1. 0.0020 times the gross concrete area in slabs of non-water-bearing structures.

2. 0.0015 times the gross concrete area vertically in walls of non-water-bearing structures.

3. 0.0025 times the gross concrete area horizontally in walls of non-water-bearing structures.

4. 0.0050 times the gross concrete area in slabs of water-bearing structures

5. 0.0030 times the gross concrete area vertically in walls of water-bearing structures.

6. 0.0050 times the gross concrete area horizontally in walls of water-bearing structures.

7. Temperature steel shall not be spaced further apart than five times the slab or wall thickness, nor more than 18 inches.

PART 3 – EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.

B. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.

C. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

D. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and if necessary recleaned.

3.02 PLACEMENT

A. Reinforcing steel shall be accurately positioned as shown on the Drawings, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the Contractor shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

B. The portions of all accessories in contact with the formwork shall be made of plastic or steel coated with a 1/8 inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Bars additional to those shown on the Drawings which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at its own expense.

E. Unless otherwise specified, reinforcement placing tolerances shall be within the limits specified in Section 7.5 of ACI 318 except where in conflict with the requirements of the Building Code.

F. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough

to exceed the above tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer. Reinforcing bars shall not be cut to place electrical, plumbing or mechanical conduits, piping, ducts, etc. without the expressed written approval of the Engineer of Record.

G. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters spaced not less than 30 inches on centers, extending continuously across the entire width of the reinforcing mat, and supporting the reinforcing mat in the plane shown on the Drawings.

H. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

I. The clear distance between parallel bars (except in columns and between multiple layers of bars in beams) shall be not less than the nominal diameter of the bars nor less than 1 1/3 times the maximum size of the coarse aggregate, nor less than one inch.

J. Where reinforcement in beams or girders is placed in 2 or more layers, the clear distance between layers shall be not less than one inch.

K. In columns, the clear distance between longitudinal bars shall be not less than 1 1/2 times the bar diameter, nor less than 1 1/2 times the maximum size of the coarse aggregate, nor less than 1 1/2 inches.

L. The clear distance between bars shall also apply to the distance between a contact splice and adjacent splices or bars.

M. Reinforcing bar splices shall only be used at locations shown on the Drawings. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to the Engineer.

N. The length of lap for reinforcing bars, unless otherwise shown on the Drawings shall be in accordance with ACI 318, Section 12.15.1 for a class B splice.

O. Laps of welded wire fabric shall be in accordance with the ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

P. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Drawings. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

Q. Reinforcing shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. All bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in

concrete shall be field bent except as shown on the Drawings or specifically permitted by the Engineer.

R. Dowel Adhesive System shall be installed in strict conformance with the manufacturer's recommendations and as required in Article 2.04 above. A representative of the manufacturer must be on site prior to adhesive dowel installation to provide instruction on proper installation procedures for all adhesive dowel installers. Testing of adhesive dowels shall be as indicated below. If the dowels have a hook at the end to be embedded in subsequent work, an approved mechanical coupler shall be provided at a convenient distance from the face of existing concrete to facilitate adhesive dowel testing while maintaining required hook embedment in subsequent work.

S. All adhesive dowel installations in the horizontal or overhead orientation shall be conducted by a certified Adhesive Anchor Installer as certified by ACI/CRSI per ACI 31811 9.2.2. Current AAI Certificates must be submitted to the Engineer of Record for approval prior to commencement of any adhesive anchor installations.

T. Adhesive Dowel Testing

1. At all locations where adhesive dowels are shown on the Drawings, at least 5 percent of all adhesive dowels installed shall be tested to the value indicated on the Drawings, with a minimum of one tested dowel per group. If no test value is indicated on the Drawings but the installed dowel is under direct tension, the Contractor shall notify the Engineer to verify the required test value.

2. Contractor shall submit a plan and schedule indicating locations of dowels to be tested, load test values and proposed dowel testing procedure (including a diagram of the testing equipment proposed for use) prior to conducting any testing. The testing equipment shall have a minimum of three support points and shall be of sufficient size to locate the edge of supports no closer than two times the anchor embedment depth from the center of the anchor.

3. Where Contract Documents indicate adhesive dowel design is the Contractor's responsibility, the Contractor shall submit a plan and schedule indicating locations of dowels to be tested and load test values, sealed by a Professional Engineer currently registered in the State of Florida. The Contractor shall also submit documentation indicating the Contractor's testing procedures have been reviewed and the proposed procedures are acceptable.

4. Adhesive Dowel shall have no visible indications of displacement or damage during or after the proof test. Concrete cracking in the vicinity of the dowel after loading shall be considered a failure. Dowels exhibiting damage shall be removed and replaced. If more than 5 percent of tested dowels fail, then 100 percent of dowels shall be proof tested.

5. Proof testing of adhesive dowels shall be performed by an independent testing laboratory hired directly by the Contractor. The Contractor shall be responsible for costs of all testing, including additional testing required due to previously failed tests.

3.03 CLEANING AND PROTECTION

A. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

B. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and, if necessary recleaned.

- END OF SECTION -

PROJECT NO. 12337

SECTION 03290

JOINTS IN CONCRETE

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall construct all joints in concrete at the locations shown on the Drawings. Joints required in concrete structures are of various types and will be permitted only where shown on the Drawings, unless specifically accepted by the Engineer.

B. Construction joints, expansion joints, contraction joints and control joints shall be provided at the locations shown and formed in accordance with the details shown on the Drawings.

C. Waterstops shall be provided where shown on the Drawings, and in all waterbearing joints in hydraulic structures.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork B.

Section 03200 - Concrete Reinforcement

C. Section 03300 - Cast in Place Concrete.

D. Section 03315 - Grout

E. Section 03350 - Concrete Finishes

F. Section 03370 - Concrete Curing

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the applicable requirements of the following documents to the extent that the provisions therein are not in conflict with the requirements of this Section.

1. Federal Specifications:

   a. TT S 00227E(3) Sealing Compound, Elastomeric Type, Multi component (For Caulking, Sealing, And Glazing Buildings And Other Structures).

2. U.S. Army Corps of Engineers Standard Specifications

   a. CRD C572

3. Commercial Standards:

   a. ASTM C 920Specification for Elastomeric Joint Sealants.

   b. ASTM D 624Test Method for Rubber Property Tear Resistance.

   c. ASTM D 638Test Method for Tensile Properties of Plastics.

   d. ASTM D 746Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.

   e. ASTM D 747Test Method for Apparent Bending Modules of Plastics by Means of a Cantilever Beam.

   f. ASTM D 1752 Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

   g. ASTM D 2240 Test Method for Rubber Property Durometer Hardness.

1.04 TYPES OF JOINTS

A. Construction Joints: When fresh concrete is placed against a hardened concrete surface, the joint between the two pours is called construction joint. Unless noted otherwise, all joints in water bearing structures shall be provided with a waterstop of the shape specified herein or shown on the Drawings.

B. Contraction Joints: Contraction joints are similar to construction joints except that the fresh concrete shall not bond to the hardened surface of the first pour, which shall be coated with a bond breaker. The slab reinforcement shall be stopped 4 1/2 inches from the joint; which is provided with a sleeve type dowel, to allow shrinkage of the concrete of the second pour. Waterstop and/or sealant groove shall also be provided when specified on the Drawings.

C. Expansion Joints: To allow the concrete to expand freely, a space is provided between the two pours, the joint shall be formed as detailed on the Drawings. This space is obtained by placing a preformed joint filler against the first pour, which acts as a form for the second pour. Unless noted otherwise, all expansion joints in water bearing members shall be provided with a 9-inch wide waterstop. Preformed joint filler shall be installed with the edge at the indicated distance below or back from finished concrete surface, and shall have a slightly tapered, dressed, and oiled wood strip secured to or placed at the edge thereof during concrete placement, which shall later be removed to form space for sealing material. The space so formed shall be filled with a joint sealant material as specified herein. The joint sealant shall be isolated from the filler using a bond breaker.

D. Control Joints: The function of the control joint is to provide a weaker plane in the concrete, where shrinkage cracks will probably occur. A groove, of the shape and dimensions shown on the Drawing, is formed or saw cut in the concrete. This groove shall be filled with a joint sealant.

1.05 SUBMITTALS

A. Waterstops: Prior to production of the material required under this contract, qualification samples shall be submitted. Such samples shall consist of extruded or molded sections of each size or shape to be used, and shall be accomplished so that the material and workmanship represents in all respects the material to be furnished under this contract. The balance of the material to be used under this contract shall not be produced until after

the Engineer has reviewed the qualification samples. The samples shall be delivered to a location on site indicated by the Engineer.

B. Joint Sealant: Prior to ordering the sealant material, the Contractor shall submit to the Engineer for the Engineer's review, sufficient data to show general compliance with the requirements of the Contract Documents.

C. Contractor shall submit product data sheets of all materials proposed under this section.

D. Shipping Certification: The Contractor shall provide written certification from the manufacturer as an integral part of the shipping form, to show that all of the material shipped to this project meets or exceeds the physical property requirements of the Contract Documents. Contractor certificates are not acceptable.

E. The Contractor shall submit placement Shop Drawings showing the location and type of all joints for each structure.

F. For sawcut contraction joints submit documentation indicating the following:

1. Proposed method of sawcutting indicating early entry or conventional sawing.

2. Description of how work is to be performed including equipment to be utilized, and curing methods.

3. Description of alternate method in case of time constraint issues or failure of equipment.

1.06 QUALITY ASSURANCE

A. Waterstop

1. Review: It is required that all waterstop field joints shall be subject to review inspection, and no such work shall be scheduled or started without having made prior arrangements with the Engineer to provide for the required reviews. Not less than 24 hours' notice shall be provided to the Engineer for scheduling such reviews.

2. All field joints in waterstops will be subject to rigid review for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects which would reduce the potential resistance of the material to water pressure at any point. All defective joints shall be replaced with material which will pass said review, and all faulty material shall be removed from the site and disposed of by the Contractor at its own expense.

3. The following defects represent a partial list of defects which shall be grounds for rejection:

   a. Offsets at joints greater than 1/16 inch or 15 percent material thickness, at any point, whichever is less.

   b. Exterior crack at joint, due to incomplete bond, deeper than 1/16 inch or 15 percent of material thickness, at any point, whichever is less.

   c. Any combination of offset or exterior crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16 inch or 15 percent of material thickness at any point, whichever is less.

   d. Misalignment of joint which result in misalignment of the waterstop in excess of 1/2 inch in 10 feet.

   e. Porosity in the welded joint as evidenced by visual inspection.

   f. Bubbles or inadequate bonding which can be detected with pen knife test. (If, while prodding the entire joint with the point of a pen knife, the knife breaks through the outer portion of the weld into a bubble, the joint shall be considered defective.)

1.07 GUARANTEE

A. The Contractor shall provide a two year written guarantee of the entire sealant installation against faulty and/or incompatible materials and workmanship, together with a statement that it agrees to repair or replace, to the satisfaction of the City, at no additional cost to the City, any such defective areas which become evident within said two year guarantee period.

PART 2 – PRODUCTS

2.01 PVC WATERSTOPS

A. General: Waterstops shall be extruded from an elastomeric polyvinylchloride compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements of these Specifications. No reclaimed or scrap material shall be used. The Contractor shall obtain from the waterstop manufacturer and shall furnish to the Engineer for review, current test reports and a written certification of the manufacturer that the material to be shipped to the job meets the physical requirements as outlined in the U.S. Army Corps of Engineers Specification CRD C572 and listed in Paragraph C. below.

B. Multi Rib Waterstops: All PVC waterstops shall be of Multi rib construction of the following types:

   1. Expansion Joints and Control Joints: 9-inches by 3/8-inch minimum thickness, ribbed center bulb. Waterstops for expansion joints and control joints shall be Style 738 by Greenstreak or equal .

2. All other Construction Joints: 6-inches by 3/8-inch minimum thickness, flat ribbed. Waterstops for all construction joints shall be serrated style 732 by Greenstreak or equal .

3. Install Waterstops as shown as manufactured structures .

4. T-type Waterstops installed against existing concrete shall be Style 609 by Greenstreak, or equal. Compatible batten bars and anchor bolts shall be supplied by the same manufacturer .

5. Provide factory made waterstop fabrications for all changes of direction, intersections, and transitions leaving only straight butt joint splices for the field .

6. Provide hog rings or grommets spaced at 12 inches on center along length of waterstop.

C. Waterstop Testing Requirements: When tested in accordance with the specified test standards, the waterstop material shall meet or exceed the following requirements:

	Value	**ASTM Std.**
Tensile Strength-min (psi)	1750	D 638, Type IV
Ultimate Elongation-min (percent)	350	D 638, Type IV
Low Temp. Brittleness-Max (degrees F)	-35	D 746
Stiffness in Flexure-min (psi)	400	D 747
Accelerated Extraction (CRD-C572)		
Tensile Strength-min (psi)	1500	D 638, Type IV
Ultimate Elongation-min (percent)	300	D 638, Type IV
Effect of Alkalies (CRD-C572)		
Ultimate Elongation-min (percent)	300	D 638, Type IV
Change in Weight (percent)	+0.25/-0.10	----
Change in Durometer, Shore A	+5	D 2240
Finish Waterstop		
Tensile Strength-min (psi)	1400	D 638, Type IV
Ultimate Elongation-min (percent)	280	D 638, Type IV

2.02 CHEMICAL RESISTANT WATERSTOPS

A. General: Waterstops shall be manufactured from thermoplastic elastomeric rubber material. The synthetic rubber shall be provide a high resistance to acids, bases, alcohols, oils, solvents or chemicals. No reclaimed material shall be used. The Contractor shall obtain from the waterstop manufacturer and furnish to the Engineer for review, current test reports and a written certification of the manufacturer that the material to be shipped to the job meets the physical requirements outlined herein. Waterstop connections shall be heat welded. All waterstop corners, intersections, and directional changes shall be miter cut, heat welded, factory fabricated. Only straight butt splices shall be allowed in the field.

B. Multi-Rib Waterstops: All chemical resistant waterstops shall be of multi-rib construction. Waterstops for expansion joints shall be 9”x3/16” ribbed with a center bulb. Waterstops for construction joints shall be 6”x3/16” ribbed with a center bulb. Chemical resistant waterstops shall be Westec Type TPE-R synthetic rubber, manufactured by Westec Barrier Technologies, St. Louis, MO, or equal.

C. Waterstop Physical Properties: When tested in accordance with the specified test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property	**Value**	**ASTM Std.**
Tensile Strength	1800 psi	D-412
Ultimate Elongation	450%	D-412
100% Modulus	1000 psi	D-412
Shore A Hardness	85 units ± 5 units	D-2240
Brittle Point	-70ºF	D-746
Ozone Resistance	450 pphm passed	D-1171

D. Weathering Performance: When tested in accordance with the specified test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property	**Value**	**ASTM Std.**
Tensile Strength (% Retention)	87%	D-412
Ultimate Elongation (% Retention)	84%	D-412
Shore A Hardness (units change)	7 units	D-2240

E. Chemical Resistance Properties: When tested in accordance with ASTM D-471 after 166 hours of full immersion at 73.4oF (23oC), the waterstop material shall meet or exceed the following requirements:

(Continued on Next Page)

Fluid	**Physical Property**	**Value**
Sulfuric Acid 98%	Ultimate Elongation	77% Retention
	Ultimate Tensile	82% Retention
	100% Modulus	108% Retention

	Hardness Change Shore A	-1 Unit
	Weight Change	2.1%
Sodium Hydroxide 50%	Ultimate Elongation	101% Retention
	Ultimate Tensile	107% Retention
	100% Modulus	104% Retention
	Hardness Change Shore A	-4 Unit
	Weight Change	-0.1%

2.03 HYDROPHILIC WATERSTOPS

A. Hydrophilic waterstops shall be designed to expand and seal under hydrostatic conditions. At construction joints, the waterstops shall be Adeka Ultraseal MC 2010 M for wall/slab thickness greater than 9 inches, and Adeka Ultraseal KBA-1510FF for wall/slab thickness less than 9 inches or equal. At expansion joints, the waterstops shall be Adeka Ultraseal KM-3030M or equal.

B. Plate fabrications used to plug flow channels for future expansion or otherwise to close wall openings shall be caulked using hydrophilic waterstops designed for the application. Caulking agents shall be Adeka Ultraseal P201 or equal.

2.04 JOINT SEALANT

A. Joint sealant shall comply with Section 07920 entitled “Sealants and Caulking”.

2.05 EXPANSION JOINT MATERIAL

A. Preformed expansion joint material shall be non-extruding, and shall be one of the following types:

1. Type I – Sponge rubber, conforming to ASTM D1752, Type I
2. Type II – Cork, conforming to ASTM D1752, Type II
3. Type III – Self-expanding cork, conforming to ASTM D1752, Type III
4. Type IV – Bituminous fiber, conforming to ASTM Designation D1752

2.06 BACKER ROD

A. Backer rod shall comply with Section 07920 entitled “Sealants and Caulking”.

2.07 BOND BREAKER

A. Bond breaker shall be Super Bond Breaker as manufactured by Burke Company, San Mateo, California; Hunt Process 225 TU as manufactured by Hunt Process Co., Santa Fe

Springs, CA; Select Cure CRB as manufactured by Select Products Co., Upland, CA; or equal. It shall contain a fugitive dye so that areas of application will be readily distinguishable.

2.08 CONTRACTION JOINT INSERTS

A. Contraction joint inserts shall be Transverse-Control Joints by Greenstreak Plastic Products or equal.

PART 3 – EXECUTION

3.01 GENERAL

A. Unless otherwise shown on the Drawings, waterstops of the type specified herein shall be embedded in the concrete across joints as shown. All waterstops shall be fully continuous for the extent of the joint. Splices necessary to provide such continuity shall be accomplished in conformance to printed instructions of manufacturer of the waterstops. The Contractor shall take suitable precautions and means to support and protect the waterstops during the progress of the Work and shall repair or replace at its own expense any waterstops damaged during the progress of the Work. All waterstops shall be stored so as to permit free circulation of air around the waterstop material.

B. When any waterstop is installed in the concrete on 1 side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 14 days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of the sun during the entire exposure and until the exposed portion of the waterstop is embedded in concrete.

3.02 CONSTRUCTION JOINTS

A. Construction joints shall be as shown on the Drawings. Otherwise, Contractor shall submit description of the joint and its location to Engineer for approval.

B. Unless noted otherwise on the Drawings, construction joints shall be located near the middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point. In this case, the joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and the top of footings or floor slabs unless noted otherwise on Drawings. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

C. Unless noted otherwise on the Drawings, maximum Maximum1 distance between horizontal joints in slabs and vertical joints in walls shall be 45' 0". For exposed walls with fluid or earth on the opposite side, the spacing between vertical and horizontal joints shall be a maximum of 25’-0” unless noted otherwise on the Drawings1.

D. All corners shall be part of a continuous placement, and should a construction joint be required, the joint shall not be located closer than five feet from a corner.

E. All reinforcing steel and welded wire fabric shall be continued across construction joints. Keys and inclined dowels shall be provided as shown on the Drawings or as directed by the Engineer. Longitudinal keys shall be provided in all joints in walls and between walls and slabs or footings, except as specifically noted otherwise on the Drawings. Size of keys shall be as shown on the Drawings.

F. All joints in water bearing structures shall have a waterstop. All joints below grade in walls or slabs which enclose an accessible area shall have a waterstop.

3.03 EXPANSION JOINTS

A. Size and location of expansion joints shall be as shown on the Drawings.

B. All expansion joints in water-bearing structures shall have a center-bulb type waterstop. All expansion joints below grade in walls or slabs which enclose an accessible area shall have a center-bulb type waterstop.

3.04 CONTRACTION JOINTS

A. Location of contraction joints shall be as shown on the Drawings.

B. Contraction joints shall be formed either by sawcutting or with contraction joint inserts as specified in paragraph 2.08, A. Sawcutting of joints will not be permitted unless specifically approved by the Engineer.

C. If approved by the Engineer, sawcutting of contraction joints in lieu of forming shall conform to the following requirements:

1. Joints shall be sawed as soon as the concrete can support foot traffic without leaving any impression, normally the same day as concrete is placed and in no case longer than 24 hours after concrete is placed.

2. Curing shall be performed using wet curing methods as indicated in Section 03370 – Concrete Curing. Curing mats, fabrics or sheeting materials shall remain in place to the extent possible while cutting of joint is being performed. Curing materials shall only be removed as required and shall be immediately reinstalled once cutting of the joint has been completed.

3. Depth of joint shall be as shown on the drawings or noted in these specifications. At locations where the joint cannot be installed to full depth due to curbs or other stopping points hand tools shall be used to complete joints.

4. Saw cut joints shall meet the requirements of ACI 224.3, Section 2.8, Jointing Practice.

3.05 SPLICES IN PVC WATERSTOPS

A. Splices in waterstops shall be performed by heat sealing the adjacent waterstop sections in accordance with the manufacturer's printed recommendations. It is essential that:

1. The material not be damaged by heat sealing.

2. The splices have a tensile strength of not less than 60 percent of the unspliced materials tensile strength.

3. The continuity of the waterstop ribs and of its tubular center axis be maintained.

B. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms.

C. All joints in waterstop involving more than 2 ends to be joined together, and all joints which involve an angle cut, alignment change, or the joining of 2 dissimilar waterstop sections shall be factory fabricated with not less than 24-inch long strips of material beyond the joint. Upon being inspected and accepted, such prefabricated waterstop joint assemblies shall be installed in the forms and the ends of the 24 inch strips shall be butt welded to the straight run portions of waterstop in place in the forms.

3.06 JOINT CONSTRUCTION

A. Setting PVC Waterstops: In order to eliminate faulty installation that may result in joint leakage, particular care shall be taken of the correct positioning of the waterstops during installation. Adequate provisions must be made to support the waterstops during the progress of the Work and to insure the proper imbedment in the concrete. The symmetrical halves of the waterstops shall be equally divided between the concrete pours at the joints. The center axis of the waterstops shall be coincident with the joint openings. Maximum density and imperviousness of the concrete shall be insured by thoroughly working it in the vicinity of all joints.

B. In placing PVC waterstops in the forms, means shall be provided to prevent them from being folded over by the concrete as it is placed. Unless otherwise shown, all waterstops shall be held in place with light wire ties on 12 inch centers which shall be passed through the hog rings or grommets, and tied to the curtain of reinforcing steel. Horizontal waterstops, with their flat face in a vertical plane, shall be held in place with continuous supports to which the top edge of the waterstop shall be tacked. In placing concrete around horizontal waterstops, with their flat face in a horizontal plane, concrete shall be worked under the waterstops by hand so as to avoid the formation of air and rock pockets.

C. Joint Location: Construction joints, and other types of joints, shall be provided where shown on the Drawings. When not shown on the Drawings, maximum distance between horizontal joints in slabs and vertical joints in walls shall be 45-feet, and maximum distance between vertical and horizontal joints for earth or water retaining walls shall be 25-feet, unless noted otherwise. The location of all joints, of any type, shall be submitted for review by the Engineer.

D. Joint Preparation: Special care shall be used in preparing concrete surfaces at joints where bonding between two sections of concrete is required. Unless otherwise shown on the Drawings, such bonding will be required at all horizontal joints in walls. Surfaces shall

be prepared in accordance with the requirements of Section 03300 entitled "Cast in Place Concrete."

E. Adequate means shall be provided for anchoring the waterstop in concrete. Waterstops shall be positioned so that they are equally embedded in the concrete on each side of the joint.

F. Sealant application shall be in accordance with the manufacturer's printed instructions. The surfaces of the groove for the sealant shall not be coated. Concrete next to waterstops shall be placed in accordance with the requirements of Section entitled, "Cast in Place Concrete."

G. The primer and sealant shall be placed strictly in accordance with the printed recommendations of the manufacturer, taking special care to properly mix the sealant prior to application. All sealant shall cure at least 7 days before the structure is filled with water.

H. All sealant shall be installed by a competent waterproofing specialty contractor who has a successful record of performance in similar installations. Before work is commenced, the crew doing the Work shall be instructed as to the proper method of application by a representative of the sealant manufacturer.

I. Thorough, uniform mixing of 2 part, catalyst cured materials is essential; special care shall be taken to properly mix the sealer before its application. Before any sealer is placed, the Contractor shall arrange to have the crew doing the Work carefully instructed as to the proper method of mixing and application by a representative of the sealant manufacturer.

J. Any joint sealant which, after the manufacturer's recommended curing time for the job conditions of the Work hereunder, fails to fully and properly cure shall be completely removed; the groove shall be thoroughly sandblasted to remove all traces of the uncured or partially cured sealant and primer, and shall be re sealed with the specified joint sealant. All costs of such removal, joint treatment, re sealing, and appurtenant work shall be at the expense of the Contractor.

3.07 INSTALLATION OF EXPANSION JOINT MATERIAL AND SEALANTS

A. Type I, II, or III shall be used in all expansion joints in structures and concrete pavements unless specifically shown otherwise on the Drawings. Type IV shall be used in sidewalk and curbing and other locations specifically shown on the Drawings.

B. All expansion joints exposed in the finish work, exterior and interior, shall be sealed with the specified joint sealant. Expansion joint material and sealants shall be installed in accordance with manufacturer's recommended procedures and as shown on the Drawings.

C. Expansion joint material that will be exposed after removal of forms shall be cut and trimmed to ensure a neat appearance and shall completely fill the joint except for the space required for the sealant. The material shall be held securely in place and no concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.

D. A bond breaker shall be used between expansion joint material and sealant. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant

are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surfaces shall present a clean and even appearance.

E. Type 1 joint sealant shall be used in all expansion and contraction joints in concrete, except where Type 7 or Type 8 is required as stated below, and wherever else specified or shown on the Drawings. It shall be furnished in pour grade or gun grade depending on installation requirements. Primers shall be used as required by the manufacturer. The sealant shall be furnished in colors as directed by the Engineer.

F. Type 8 joint sealant shall be used in all concrete pavements and floors subject to heavy traffic and wherever else specified or shown on the Drawings.

G. Type 7 joint sealant shall be used for all joints in chlorine contact tanks and wherever specified or shown on the Drawings.

- END OF SECTION -

PROJECT NO. 12337

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, all in accordance with the requirements of the Contract Documents.

B. The requirements in this section shall apply to the following types of concrete:

1. Class A1 Concrete: Normal weight concrete used at all structures, unless otherwise noted.

2. Class B Concrete: Normal weight concrete with pea-rock aggregate. Class B concrete shall be used only at locations indicated on the Drawings or approved on a case by case basis by the Engineer.

3. Class C Concrete: Normal weight concrete used in electrical/instrumentation ductbanks, catch basins, fence and guard post embedment, concrete fill, pipe encasements and sidewalks.

4. Flowable Fill: Lean concrete proportioned without the use of coarse aggregate primarily for use as pipe backfill. Flowable fill shall be utilized only at locations indicated on the Drawings.

5. Tremie Concrete: Concrete indicated to be placed underwater.

6. Grout is specified in Section 03315 entitled "Grout".

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 01400 - Quality Control

C. Section 03100 - Concrete Formwork

D. Section 03200 - Concrete Reinforcement

E. Section 03400 - Precast Concrete, General

F. Section 03315 - Grout

G. Section 05500 - Metal Fabrications

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to or exceed the requirements of the Florida Building Code (FBC) and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

B. Codes and Standards

1. The Building Code, as referenced herein, shall be the Florida Building Code.

C. Federal Specifications

1. UU B 790A (Int.Amd. 1) Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant).

D. Commercial Standards

1. ACI 214 Recommended Practice for Evaluation of Strength Test Results of Concrete.
2. ACI 301 Specifications for Structural Concrete for Buildings.
3. ACI 305 Hot Weather Concreting.
4. ACI 306 Cold Weather Concreting.
5. ACI 309 Recommended Practice for Consolidation of Concrete
6. ACI 315 Details and Detailing of Concrete Reinforcement.
7. ACI 318 Building Code Requirements for Reinforced Concrete.
8. ACI 347 Recommended Practice for Concrete Formwork.
9. ACI 350 Environmental Engineering Concrete Structures.
10. ASTM C 31 Methods of Making and Curing Concrete Test Specimens in the Field.
11. ASTM C 33 Specification for Concrete Aggregates.
12. ASTM C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens.
13. ASTM C 88 Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate.
14. ASTM C 94 Specification for Ready-Mixed Concrete.
15. ASTM C 114 Method for Chemical Analysis of Hydraulic Cement.
16. ASTM C 136 Method for Sieve Analysis of Fine and Coarse Aggregate.

17. ASTM C 143 Test Method for Slump of Portland Cement Concrete.
18. ASTM C 150 Specification for Portland Cement.
19. ASTM C 156 Test Method for Water Retention by concrete Curing Materials.
20. ASTM C 157 Test Method for length Change of Hardened Cement Mortar and Concrete.
21. ASTM C 192 Method of Making and Curing concrete Test Specimens in the Laboratory.
22. ASTM C 227 Standard Test Method for Potential Alkali Reactivity of Cement Aggregate Combinations (Mortar-Bar Method).
23. ASTM C 260 Specification for Air-Entraining Admixtures for Concrete.
24. ASTM C 289 Standard Test Method for Potential Reactivity of Aggregates (Chemical Method).
25. ASTM C 494 Specification for Chemical Admixtures For Concrete.
26. ASTM C 586 Standard Test Method for Potential Alkali Reactivity of Carbonate Rocks for Concrete Aggregates (Rock Cylinder Method).
27. ASTM C 618 Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
28. ASTM D 1751 Specification for preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
29. ASTM D 6103 Standard Test Method for Flow Consistency of Controlled Low Strength Material
30. ASTM E11 Specification for Wire-Cloth Sieves for Testing Purposes.
31. ASTM E 119 Method for Fire Tests of Building Construction and Materials.

E. Any procedure, materials or operation specified by reference to the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), Building Code or other references shall comply with the requirements of the current and most recent specifications or standards. In conflicts between listed standards and this specification, the more stringent requirements shall govern.

F. The Contractor is expected to obtain the most recent issue of all standards, recommendations, codes or specifications referred to within this specification.

1.04 SUBMITTALS

A. The design mixes to be used shall be prepared by qualified persons and submitted for review. The design of the mix is the responsibility of the Contractor subject to the

limitations of the specifications. Review processing of this submission will be required only as evidence the mix has been designed by qualified persons and that the minimum requirements of the specifications have been met. Such review will in no way alter the responsibility of the Contractor to furnish concrete meeting the requirements of the specifications. If in the progress of the work the sources of materials change in characteristics or the Contractor requests a new source in writing, the Contractor shall, at his expense submit new test data and information for the establishment of a new design mix. Submit mix designs for all classes of concrete to be used under this Contract. Mix design submittals shall include the following:

1. Sources of all materials and certifications of compliance with specifications for all sources of each material.

2. Certified current (less than one year old) chemical analysis of Portland Cement or Blended Cement to be used.

3. Certified current (less than one year old) chemical analysis of fly ash to be used.

4. Aggregate test results showing compliance with required standards, i.e. sieve analysis, aggregate soundness tests, etc.

5. Manufacturer's data on all admixtures stating compliance with required standards and are compatible with one another. Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to Mix design review by the Engineer.

6. Field experience records and/or trial mix data for the proposed concrete mixes.

B. Where ready-mix concrete is used, the Contractor shall provide delivery tickets at the time of delivery of each load of concrete. In addition to the information required by ASTM C94, each ticket shall show the mix number, cement content, water/cementitious ratio, and amount of water allowed to be added to truck without exceeding required water/cementitious ratio.

C. A schedule of all concrete placement with volume of concrete planned to be placed each day.

D. A layout of all structures with all planned construction joint locations.

1.05 QUALITY ASSURANCE

A. Plant equipment and facilities shall meet all requirements of the Check List for Certification of Ready Mixed Concrete Production facilities of the National Ready Mixed Concrete Association and ASTM C 94.

B. Tests for compressive strength and slump of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.

C. The cost of initial trial mixes and initial laboratory tests to design the mixes including compression tests, sieve analysis, and tests on trial mixes shall be included in the Contract Price.

D. The cost of all tests during construction will be borne by the City. However, the Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the Specifications. All test results shall be sent directly to the Engineer. All testing invoices shall be sent directly to the City. The Contractor shall be responsible for coordination of all tests with the testing laboratory.

E. Concrete for testing shall be supplied by the Contractor at no cost to the City City1, and the Contractor shall provide assistance to the Engineer in obtaining samples. The Contractor shall dispose of and clean up all excess material.

F. Construction Tolerances

1. The Contractor shall set and maintain concrete forms and perform finishing operations so as to ensure that the completed work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades, or dimensions shown. Where tolerances are not stated in the Specifications, permissible deviations will be in accordance with ACI 347 and Section 03100 entitled "Concrete Formwork".

1.06 QUALITY CONTROL A.

Compressive Strength

1. Compression test specimens shall be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the Engineer to insure continued compliance with these Specifications. At least one set of test specimens shall be made for each placement in excess of five cubic yards, or for each fifty (50) cubic yards of concrete placed, or for each 5000 square feet of surface area for slabs or walls, whichever is greater.

2. Samples of freshly mixed concrete shall be obtained in accordance with ASTM C 172, and compression test specimens for concrete shall be made in accordance with ASTM C 31. Specimens shall consist of at least five 6-inch diameter by 12-inch high cylinders, or eight 4-inch diameter by 8-inch high cylinders. Each cylinder shall be identified by a tag attached to the side of the cylinder.

3. The Contractor shall provide approved curing boxes for storage of cylinders on site. The insulated curing box shall be of sufficient size and strength to contain all the specimens made in any four consecutive working days and to protect the specimens from falling over, being jarred or otherwise disturbed during the period of initial curing. The box shall be erected, furnished and maintained by the Contractor. Such box shall be equipped to provide the moisture and to regulate the temperature necessary to maintain the proper curing conditions required by ASTM C31. Such box shall be located in an area free from vibration such as pile driving and traffic of

all kinds. No concrete requiring inspection shall be delivered to the site until such storage curing box has been provided. Specimens shall remain undisturbed in the curing box until ready for delivery to the testing laboratory but not less than sixteen hours

4. Compression test shall be performed in accordance with ASTM C 39. For 6x12 cylinders, two test cylinders will be tested at 7 days and 2 at 28 days. For 4x8 cylinders, three test cylinders will be tested at 7 days and three at 28 days. The remaining cylinders will be held to verify test results, if needed.

B. Consistency

1. Consistency of the concrete will be checked by the Engineer by standard slump cone tests. The Contractor shall make any necessary adjustments in the mix as the Engineer may direct and shall upon written order suspend all placing operations in the event the consistency does not meet the intent of the specifications. No payment shall be made for delays, material or labor costs due to such eventualities.

2. Slump tests shall be made in accordance with ASTM C 143. Slump tests shall be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

C. Air Content

1. Samples of freshly mixed concrete will be tested for entrained air content by the Engineer in accordance with ASTM C 231.

2. Air content tests will be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

D. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 215 and ACI 318, Chapter 5 "Concrete Quality Mixing and Placing", and as specified herein.

2. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.

3. All concrete which fails to meet the ACI requirements and these specifications, is subject to removal and replacement at the cost of the Contractor. Additional testing may also be required to verify compressive strength of concrete. Additional testing shall involve extraction and testing of concrete cores in accordance with ASTM C 42. Engineer shall determine locations where concrete cores shall be taken. Nondestructive test methods shall not be used to verify strength of in-place concrete.

1.07 PRE-CONCRETE CONFERENCE

A. At least 35 days prior to start of the Concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction. The Contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.

B. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:

1. Contractor's superintendent

2. For the concrete design mix – Laboratory retained for trial batching and tests

3. For field quality control – Concrete subcontractor, Concrete producer, Admixture Manufacturer(s), Concrete pumping Contractor

C. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall also be transmitted to the Engineer.

D. The minutes shall include a statement by the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these Specifications.

E. The Engineer will be present at the conference. The Contractor shall notify the Engineer at least 20 days prior to the scheduled date of the conference.

PART 2 – MATERIALS

2.01 CONCRETE MATERIALS

A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.

B. All materials furnished and stored for the work shall comply with the requirements of ACI 301, as applicable.

C. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 for Type II. Inclusion of fly ash or slag cement is mandatory in Type A1, B and C concrete. Portland cement shall contain no more than 0.60 percent alkalies. The term "alkalies" referred to herein is defined as the sum of the percentage of sodium oxide and 0.658 times the percentage of potassium oxide (Na20 + 0.658 K20). These oxides shall be determined in accordance with ASTM C 114. A single brand of cement shall be used throughout the Work, and prior to its use, the brand shall be acceptable to the Engineer. The cement shall be suitably protected from exposure

to moisture until used. Cement that has become lumpy shall not be used. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling. Certified mill test reports for each shipment of cement to be used shall be submitted to the Engineer if requested regarding compliance with these Specifications.

2. Fly ash shall meet the requirements of ASTM C 618 for Class F, except the loss on ignition shall not exceed 4%. Inclusion of fly ash or slag cement in Type A1, B and C concrete is mandatory. If used, fly ash shall constitute between 15% and 30% of the cementitious material by weight.

3. Slag cement shall meet the requirements of ASTM C 989 including tests for effectiveness of slag in preventing excessive expansion due to alkali-aggregate reactivity as described in Appendix X-3 of ASTM C 989. Inclusion of slag cement or fly ash in Type A1, B and C concrete is mandatory. If used, slag cement shall constitute between 20% and 30% of the cementitious material by weight.

4. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies.

5. Aggregates shall be obtained from pits acceptable to the Engineer, shall be non reactive, and shall conform to the FBC and ASTM C 33. Maximum size of coarse aggregate shall be as specified in Article 2.04, Paragraph B of this Section. Lightweight sand for fine aggregate will not be permitted.

   a. Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock or a combination thereof. The coarse aggregates shall be prepared and handled in two or more size groups for combined aggregates with a maximum size not greater than 1 inch. When the aggregates are proportioned for each batch of concrete the two size groups shall be combined.

   b. Fine aggregates shall be manufactured sand that is hard and durable.

   c. Combined aggregates shall be well graded from coarse to fine sizes, and shall be uniformly graded between screen sizes to produce a concrete that has optimum workability and consolidation characteristics. Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.

   d. When tested in accordance with "Potential Reactivity of Aggregates (Chemical Method)" (ASTM C 289), the ratio of silica released to reduction in alkalinity shall not exceed 1.0.

   e. When tested in accordance with "Organic Impurities in Sands for Concrete" (ASTM C 40), the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.

f. When tested in accordance with "Resistance to Abrasion of Small size Coarse Aggregate by Use of the Los Angeles Machine" (ASTM C 131), the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions, or 10.5 percent after 100 revolutions.

g. When tested in accordance with "Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate" (ASTM C 88), the loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using sodium sulfate.

2.02 ADMIXTURES

A. Air-entraining agent meeting the requirements of ASTM C 260, shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. Airentraining agent shall be Sika AER by Sika Corp., MB-VR by Master Builders, Darex AEA by Grace, AEA-92S by Euclid Chemical Company, or equal.

B. Admixtures shall be required at the Engineer's discretion or, if not required, may be added at the Contractor's option to control the set, effect water reduction, and increase workability. In either case, the addition of an admixture shall be at the Contractor's expense. The use of an admixture shall be subject to acceptance by the Engineer. Concrete containing an admixture shall be first placed at a location determined by the Engineer. If the use of an admixture is producing an inferior end result, the Contractor shall discontinue use of the admixture. Admixtures specified herein shall conform to the requirements of ASTM C 494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used. Admixtures shall contain no free chloride ions, be non toxic after 30 days, and shall be compatible with and made by the same manufacturer as the air entraining admixture.

1. Water reducing admixture shall conform to ASTM C 494, Type A and shall contain no more than 0.05% chloride ions. Acceptable products are “Eucon Series” by the Euclid Chemical Company, “Pozzolith Series” by BASF, and “Plastocrete Series” by Sika Corporation.

2. High range water reducer shall be sulfonated polymer conforming to ASTM C 494, Type F or G. The use of high range water reducer is mandatory for Class A2 A3 1 concrete. The high range water reducer shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day’s operation of the job site system. Concrete shall be mixed at mixing speed for a minimum of 100 mixer revolutions after the addition of the high range water reducer. Acceptable products are “Eucon 37” or Plastol 5000 by the Euclid Chemical Company, “Rheobuild 1000 or Glenium Series” by BASF, and “Daracem 100 or Advaflow Series” by W.R. Grace.

3. A non-chloride, non-corrosive accelerating admixture shall be used when air temperature at time of placement is expected to be consistently below 40 degrees Fahrenheit as specifically approved by the Engineer. The admixture shall conform to ASTM C 494, Type C or E, and shall not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have

longterm non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Acceptable products are "Accelguard 80/90 or NCA" by the Euclid Chemical Company and "Daraset" by W.R. Grace.

4. A water reducing retarding admixture shall be used when air temperature at time of placement is expected to be consistently above 90 degrees Fahrenheit as specifically approved by the Engineer. The admixture shall conform to ASTM, Type D and shall not contain more than 0.05% chloride ions. Acceptable products are "Eucon NR or Eucon Retarder 100" by the Euclid Chemical Company, "Pozzolith Retarder" by BASF, and "Plastiment" by Sika Corporation.

5. The Contractor shall submit certification from each admixture manufacturer that all admixtures utilized in the design mix are compatible with one another and properly proportioned.

6. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.

7. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to Mix design review by the Engineer.

2.03 ACCESSORIES

A. Epoxy adhesives shall be the following products for the applications specified to be used in strict accordance with manufacturer's recommendations.

1. For bonding freshly mixed, plastic concrete to hardened concrete, Sikadur 32 Hi Mod, LPL Epoxy Adhesive, as manufactured by Sika Chemical Corporation; Concresive 1001 LPL, as manufactured by Adhesive Engineering Company; or equal.

2. For bonding hardened concrete or masonry to steel, Colma Dur Gel, Sikadur Hi Mod Gel, or equal.

2.04 CONCRETE MIX

A. Concrete shall be composed of cement, admixtures, aggregates and water. These materials shall be of the qualities specified. The exact proportions in which these materials are to be used for different parts of the work will be determined by the Contractor. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. Mix designs with more than 41 percent of sand of the total weight of fine and coarse aggregate shall not be used for Class A Concrete. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever

necessary or desirable to meet the required results at no additional cost to the City. All changes shall be subject to review by the Engineer.

B. The proportions of cement, aggregates, admixtures and water used in the concrete shall be based on tests of grading and moisture content of materials, slump of concrete mixture, strength of concrete and the following factors:

1. Class A1 Concrete (Normal weight concrete used at all structures, unless noted otherwise).

Minimum cementitious materials content, per cubic yard	611 lbs.
Fly Ash or Slag Cement (required)	15%-30% Fly Ash or 20%-30% Slag Cement (cementitious content by weight)
Water-cementitious materials ratio, by weight	Maximum 0.45 Minimum 0.39
Slump range	3 inches to 7 inches with water reducing admixture
Coarse Aggregate	#57 per ASTM C33
Compressive strength at 28 days – F'c	4,000 psi
Air Content	3% ± 1%

2. Class B Concrete (At locations shown on the Drawings or approved on a case by case basis by the Engineer).

Minimum cementitious materials content, per cubic yard	517 lbs.
Fly Ash or Slag Cement (required)	15%-30% Fly Ash or 20%-30% Slag Cement (cementitious content by weight)
Water-cementitious materials ratio, by weight	Maximum 0.50 Minimum 0.39
Slump, maximum	7 inches
Compressive strength at 28 days - F'c	4,000 psi
Coarse Aggregate	Pearock
Air Content	3% ± 1%

3. Class C Concrete (Normal weight structural concrete used in duct bank encasements, catch basins, fence and guard post embedment, concrete fill, sidewalks, and other areas where specifically noted on the Contract Drawings)

Minimum cementitious materials content, per cubic yard	500 lbs.
Fly Ash or Slag Cement (required)	15%-30% Fly Ash or 20%-30% Slag Cement (cementitious content by weight)
Water-cementitious materials ratio, by weight	Maximum 0.60
Slump, maximum	7 inches
Compressive strength at 28 days - F'c	3,000 psi
Coarse Aggregate	#57 per ASTM C33
Air Content	3% ± 1%

4. Flowable Fill (In lieu of pipe bedding, select backfill)

Minimum cementitious materials content, per cubic yard	100 lbs.
Water-cementitious materials ratio, by weight	Maximum 5.0
Flowability, minimum	8 inches
Compressive strength at 28 days - F'c	50-150 psi
Coarse aggregate	none
Fine aggregate	limestone screenings

5. Tremie Concrete (Concrete placed under water)

Minimum cement content, per cubic	700 lbs. yard
Water-cementitious materials ratio, by	Maximum 0.45 weight
Slump, maximum	9 inches
Compressive strength lbs. per sq. inch 28 days - F'c	4,500 at

C. All Class A1 concrete, unless noted otherwise on the Drawings, shall be air entrained concrete. A water reducing admixture may be added to the mix at the Contractor's option.

D. The mix proportions used shall be changed subject to the limitation specified herein, whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish and the Contractor shall be entitled to no additional compensation because of such changes.

2.05 CONSISTENCY

A. The quantity of water entering into a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete which can be worked properly into place without segregation, and which can be compacted by the vibratory methods herein specified to give the desired density, impermeability and smoothness of surface. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143.

2.06 READY MIXED CONCRETE

A. Ready mixed concrete shall be used meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.

B. Ready mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one and one half hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. Upon delivery from the truck concrete temperature shall not exceed 90 degrees Fahrenheit.

C. Truck mixers shall be equipped with electrically actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type. The counters shall be actuated at the time of starting mixers at mixing speeds.

D. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolution of mixing.

PART 3 – EXECUTION

3.01 PROPORTIONING AND MIXING

A. Proportioning of the concrete mix shall be based on the results of field experience or laboratory trial mixes in conformance with Section 5.3, “Proportioning on the Basis of Field Experience and/or Trial Mixtures” of ACI 318. When trial mixes are used they shall conform to the requirements of Chapter 3 "Proportioning" of ACI 301; provided, that the maximum slump for any concrete shall not exceed the limits specified in this Section of the Specifications.

B. When field experience records are inadequate to confirm the quality of a proposed concrete mix in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318, or when required by the Engineer, an independent testing laboratory designated by the Contractor and acceptable to the Engineer shall test a trial batch of each of the preliminary concrete mixes submitted by

the Contractor. The trial batches shall be prepared using the aggregates, cement and admixtures proposed for the project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain enough samples to satisfy requirements stated below. Tests on individual materials stated in PRODUCTS should already be performed before any trial mix is done. The cost of laboratory trial batch tests for each specified concrete mix will be borne by the Contractor and the Contractor shall furnish and deliver the materials to the testing laboratory at no cost to the City.

C. An independent testing laboratory shall observe the preparation of the trial batch, and they shall prepare a minimum of fifteen (15) standard test cylinders in accordance with ASTM C 31 in addition to conducting slump (ASTM C 143), air content (C 231) and unit weight (C 138) tests. Compressive strength test on the cylinders shall subsequently be performed by the same laboratory in accordance with ASTM C 39 as follows: Test 3 cylinders at age 7 days; test 3 cylinders at age 21 days; test 3 cylinders at age 28 days and test 3 cylinders at 56 days. The cylinders shall be carefully identified as "Trial Mix, Contract No._____, Product_____." If the average 28-day compressive strength of the trial mix is less than that specified, or if any single cylinder falls below the required strength by more than 500 psi, the mix shall be corrected, another trial batch prepared, test cylinders taken, and new tests performed as before. Any such additional trial batch testing required shall be performed at no additional cost to the City. Adjustments to the mix shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor.

D. Mixing of concrete shall conform to the requirements of Chapter 7 of ACI 301 Specifications.

E. Retempering of concrete or mortar which has partially hardened will not be permitted.

3.02 PREPARATION

A. Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. A vapor barrier specified in Section 07190 entitled "Vapor Barrier" shall be placed. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the Engineer. The Contractor shall notify the Engineer not less than two working days prior to Concrete Placement, allowing one day for review and any corrective measures which are required.

C. Joints in Concrete

1. Concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond and a bonding agent shall be placed. Contractor shall use an epoxy bonding agent for bonding fresh concrete to existing concrete where shown on the drawings.

2. After the surfaces have been prepared all horizontal construction joints shall be covered with a layer of mortar approximately one inch thick. The mortar shall have the same proportions of cement and sand as the regular concrete mixture. 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 in the manner hereinafter specified. The mortar shall be spread uniformly and shall be worked thoroughly into all irregularities of the surface. Wire brooms shall be used where possible to scrub the mortar into the surface. Concrete shall be placed immediately upon the fresh mortar.

D. Placing Interruptions

1. When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent work; provided that construction joints shall be made only where acceptable to the Engineer. Cold joints will be sufficient cause for rejection of the work.

E. Embedded Items

1. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcing steel, and preparation of surfaces involved in the placing have been completed and accepted by the Engineer at least four hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

2. All inserts or other embedded items shall conform to the requirements herein.

F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the Engineer before any concrete is placed. Accuracy of placement is the responsibility of the Contractor.

G. All anchor bolts called for on the drawings shall be cast in place in the concrete. Drilled, impact, adhesive or other types of anchors shall not be substituted for anchor bolts unless otherwise shown on the Drawings. Anchor bolts shall conform to the requirements set forth in Section 05050 entitled "Metal Fastening".

H. Casting New Concrete Against Old

1. Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by sand blasting (exposing aggregate) prior to the application of an epoxy bonding agent.

I. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited underwater, except where shown on the Drawings to be placed by the tremie method,

nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the Engineer.

J. Corrosion Protection

1. Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

2. Openings for pipes, inserts for pipe hangers and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.

3. Anchor bolts shall be accurately set, and shall be maintained in position by templates while being embedded in concrete.

4. The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.03 PLACING CONCRETE

A. Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section.

B. Non Conforming Work or Materials

1. Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the Contractor.

C. Unauthorized Placement

1. No concrete shall be placed except in the presence of duly authorized representative of the Engineer. The Contractor shall notify the Engineer at least 24 hours in advance of placement of any concrete.

D. Placement in Wall Forms

1. Concrete shall not be dropped through reinforcement steel or into any deep form, whether reinforcement is present or not, causing separation of the coarse aggregate from the mortar on account of repeatedly hitting rods or the sides of the form as it falls, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such

cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies.

2. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour.

E. Casting New Concrete Against Old

1. An epoxy adhesive bonding agent shall be applied to set surfaces of construction joints according to the manufacturer's written recommendations.

F. Conveyor Belts and Chutes

1. All ends of chutes, hopper gates, and all other points of concrete discharge throughout the Contractor's conveying, hoisting and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the Engineer. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the specified consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered. Sufficient illumination shall be provided in the interior of all forms so that the concrete at the places of deposit is visible from the deck or runway.

G. Placement in Slabs

1. Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the pour. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up slope direction.

H. Temperature of Concrete

1. The temperature of concrete when it is being placed shall be not more than 90 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees Fahrenheit, the Contractor shall employ effective means, such as precooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees F. The Contractor shall be entitled

to no additional compensation on account of the foregoing requirements. During summer months concrete pours shall be scheduled in the morning or early part of the day when temperatures are cooler.

I. Pumping Equipment

1. Pumping equipment and procedures if used shall conform to the recommendations contained in the report of ACI Committee 304 on Placing Concrete by Pumping Methods, ACI 304.2R. The specified slump shall be measured at the point of discharge. The loss of slump in pumping shall not exceed 1-1/2 inches.

J. The order of placing concrete in all parts of the work shall be acceptable to the Engineer. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown on the Drawings. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 7 days before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the 2 adjacent wall panels have cured at least 14 days.

K. The surface of the concrete shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4-inch thick shall be tacked to the forms on these surfaces. The concrete shall be carried about 1/2-inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel and all laitance shall be removed.

L. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be high speed power vibrators (8000 to 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.

M. Care shall be used in placing concrete around waterstops. The concrete shall be carefully worked by rodding and vibrating to make sure that all air and rock pockets have been eliminated. Where flat strip type waterstops are placed horizontally, the concrete shall be worked under the waterstops by hand, making sure that all air and rock pockets have been eliminated. Concrete surrounding the waterstops shall be given additional vibration, over and above that used for adjacent concrete placement to assure complete embedment of the waterstops in the concrete.

N. Concrete in walls shall be internally vibrated and at the same time, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified within 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from

contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.04 CONCRETE FINISHING

A. Concrete finishes are specified in Section 03350 entitled "Concrete Finishes".

3.05 CURING AND PROTECTION

A. Curing is specified in Section 03370 entitled "Concrete Curing".

3.06 CONCRETE IN COLD WEATHER

A. Cold weather concreting procedures shall be in accordance with the requirements of ACI 306.

3.07 CONCRETE IN HOT WEATHER

A. Hot weather concreting procedures shall conform to the requirement of ACI 305 except that concrete temperature shall not exceed 90 degrees F when it is being placed.

3.08 PLACING CONCRETE UNDERWATER (TREMIE CONCRETE)

A. Placing concrete underwater will be permitted only when shown on the Drawings. Concrete deposited under water shall be carefully placed in a compacted mass in final position by means of a tremie, a closed bottom dump bucket or other approved method. Care must be exercised to maintain still water at the point of deposit. Concrete shall not

be placed in running water. The consistency of the concrete shall be regulated to prevent segregation of materials. The method of depositing concrete shall be regulated such that the concrete enters the mass of the previously place concrete from within, displacing water with a minimum disturbance to the surface of the concrete.

B. Tremie shall consist of a tube having a diameter of not less than 10 inches and constructed in sections having flanged couplings fitted with gaskets. The tremie shall be supported to permit free movement of the discharge and over the entire top surface of the work and shall permit rapid lowering when necessary to choke off or retard the flow. The discharge end shall be entirely sealed at all times and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised, but not out of the concrete at the bottom, until the batch discharges to the bottom of the hopper. The flow shall then be stopped by lowering the tremie. The flow shall be continuous until the placement has been completed.

3.09 PLACING CONCRETE UNDER PRESSURE (PUMPING)

A. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall have the capacity for the operation. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. To obtain the least line resistance, the layout of the pipeline system shall contain a minimum number

of bends with no change in pipe size. If two sizes of pipe must be used, the smaller diameter should be used at the pump end and the larger at the discharge end. When pumping is completed, the concrete remaining in the pipelines, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients.

B. No aluminum parts shall be in contact with the concrete during the entire placing of concrete under pressure at any time.

C. Prior to placing concrete under pressure, the Contractor shall submit the concrete mix design together with test results from a recognized testing laboratory proving the proposed mix meets all requirements. In addition, at the Contractor's option, an actual pumping test under field conditions may be performed prior to use of the accepted mix. This test requires a duplication of anticipated site conditions from beginning to end. The batching and truck mixing shall be the same as will be used; the same pump and operator shall be present and the pipe and pipe layouts will reflect the maximum height and distance contemplated.

D. If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the Pumping operation and proceed with the placing of concrete using conventional methods.

E. The pumping equipment must have two cylinders and be designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor may have a standby pump on the site during pumping.

F. The minimum diameter of the hose (conduits) shall be four inches.

G. Pumping equipment and hoses (conduits) that are not functioning properly shall be replaced.

3.10 ORDER OF PLACING CONCRETE

A. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown on the Drawings and maximum lengths as indicated on Drawings. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall be have cured at least seven days before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the two adjacent wall panels have cured at least 14 days.

B. The surface of the concrete shall be level whenever a run of concrete is stopped.

3.11 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final

acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete at the Contractor's expense.

B. As soon as forms are removed, all exposed surfaces shall be carefully examined and Contractor shall immediately notify the Engineer. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until reviewed by the Engineer. In no case will extensive patching of honeycombed concrete be permitted.

C. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as directed. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and replacements herein specified shall be promptly executed by the Contractor at its own expense.

D. Holes left by tie-rod cones shall be repaired in an acceptable manner with dry-packed cement grout or premixed patching material as accepted by the Engineer.

E. Areas of concrete in which cracking, spalling, or other signs of deterioration develop prior to final acceptance shall be removed and replaced, or repaired as directed. This stipulation includes concrete that has experienced cracking due to drying or thermal shrinkage of the concrete. Structural cracks shall be repaired using an approved epoxy injection system. Non-structural cracks shall be repaired using an approved hydrophilic resin pressure injected grout system, unless other means of repair are deemed necessary and approved. All repair work shall be performed at no additional cost to the Owner.

A. F. Concrete which fails to meet the strength requirements as outlined in Article 2.04, paragraph B, will be analyzed as to its adequacy based upon loading conditions, resultant stresses and exposure conditions for the particular area of concrete in question. If the concrete in question is found unacceptable based upon this analysis, that portion of the structure shall be strengthened or replaced by the Contractor at no additional cost to the Owner. The method of strengthening or extent of replacement shall be as directed by the Engineer.

3.12 CONCRETE SEALER

A. Contractor shall apply a sealer to the top surface of all finished concrete floor slabs and equipment pads which are to remain unpainted and not intended to be immersed unless stated otherwise. Sealer shall be as specified in Specification Section 03350 entitled “Concrete Finishes”.

- END OF SECTION –

PROJECT NO. 12337

SECTION 03315

GROUT

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials for grout in accordance with the provisions of this Section and shall form, mix place, cure, repair, finish, and do all other Work as required to produce finished grout, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 03300 - Cast in Place Concrete

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Specifications, codes, and standards shall be as specified in Section 03300 - Cast in Place Concrete, and as referred to herein.

B. Additional Commercial Standards

1. CRD C 621Corps of Engineers Specification for Nonshrink Grout

1.04 SUBMITTALS

A. The Contractor shall submit certified test results verifying the compressive strength, shrinkage, and expansion requirements specified herein; and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

PART 2 – PRODUCTS

2.01 PREPACKAGED NON-SHRINK CEMENTITIOUS GROUT

A. Nonshrink grout shall be a prepackaged, inorganic, non gas liberating, nonmetallic, cement based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of nonshrink grout specified herein shall be that recommended by the manufacturer for the particular application.

B. Nonshrink grouts shall have a minimum 28 day compressive strength of 5000 psi (ASTM C109, restrained), shall have no shrinkage (0.0 percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827, and shall have no shrinkage (0.0 percent) and a maximum of 0.2 percent expansion in the hardened state when tested in accordance with CRD C 621.

C. Cement based grout shall be Five Star Grout as manufactured by Five Star Products, Inc., Fairfield, Connecticut, or equal.

D. Cementitious non-shrink grout shall be used at locations where there are no dynamic loads, the grout will not come in contact with wastewater or wastewater gases, and where non-shrink grout is identified on the Drawings. Applications include, but are not limited to, structural steel column base plates, gate frames and guides, and precast concrete to cast-in-place concrete joints.

2.02 PREPACKAGED NON-SHRINK EPOXY GROUT

A. Epoxy-based non-shrink grout shall be a three component, 100 percent solids, solventfree system designed for machinery grouting. Applications include, but are not limited to, anchoring, pump and motor bases, and any other equipment imparting dynamic loads to the support system.

B. When non-shrink grout is identified on the Drawings in submerged (water or wastewater) or under wastewater gas environment, epoxy-based non-shrink grouts shall be used.

C. The epoxy grout shall be delivered to site as prepackaged, three-component systems composing of the resin, hardener, and specially blended aggregates. The components shall be stored as recommended by the manufacturer until use.

D. Non-shrink epoxy grout shall be Five Star DP Epoxy Grout by Five Star Products, Inc., Fairfield, Connecticut, or equal.

2.03 CEMENT GROUT

A. Cement grout shall be composed of Portland cement and sand in the proportion specified in the Contract Documents and the minimum amount of water necessary to obtain the desired consistency. If no proportion is indicated, cement grout shall consist of one part Portland cement to three parts sand. Water amount shall be as required to achieve desired consistency without compromising strength requirements. White Portland cement shall be mixed with Portland cement as required to match color of adjacent concrete.

B. The minimum compressive strength at 28 days shall be 4000 psi.

C. For beds thicker than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added. This stipulation does not apply for grout being swept in by a mechanism. These applications shall use a plain cement grout without coarse aggregate regardless of bed thickness.

D. Sand shall conform to the requirements of ASTM C144.

2.04 DOWEL/ANCHOR BOLT ADHESIVE SYSTEM

A. When rebar or anchor bolts are specified to be drilled in and grouted on the Drawings, an adhesive system specified in Section 03200 - Concrete Reinforcement" shall be used for dowels and an adhesive system specified in Section 05050 entitled "Metal Fastening" shall be used for anchor bolts.

2.05 CURING MATERIALS

A. Curing materials shall be as recommended by the manufacturer.

2.06 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of the above described consistency; the type of grout to be used shall be as specified herein for the particular application.

2.07 MEASUREMENT OF INGREDIENTS

A. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 – EXECUTION

3.01 GENERAL

A. All curing, and protection of cement grout shall be as specified in Section 03370 Concrete Curing (Methods 1 and 2); or as recommended by manufacturer. The finish of the grout surface shall match that of the adjacent concrete.

B. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

3.02 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

- END OF SECTION –

PROJECT NO. 12337

SECTION 03350

CONCRETE FINISHES

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials, labor, and equipment required to provide finishes of all concrete surfaces specified herein and shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03300 - Cast-in-Place Concrete

C. Section 03400 - Precast Concrete, General

D. Section 03315 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 301 -Specifications for Structural Concrete for Buildings

2. ACI 318 - Building Code Requirements for Reinforced Concrete

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 entitled "Submittals".

1. Manufacturer's literature on all products specified herein.

PART 2 – PRODUCTS

2.01 CONCRETE FLOOR SEALER

A. Floor sealer shall be Diamond Clear VOX or Super Diamond VOX by the Euclid Chemical Company, MasterKure CC 300 SB by BASF Master Builder Solutions.

2.02 CONCRETE LIQUID DENSIFIER AND SEALANT

A. Concrete liquid densifier and sealant shall be a high performance, deeply penetrating concrete densifier and sealant. Product shall be odorless, colorless, VOC-compliant, non-yellowing siliconate based solution designed to harden, dustproof and protect concrete floors subjected to heavy vehicular traffic and to resist black rubber tire marks on concrete surfaces. The product must contain a minimum solids content of 20% of which 50% is siliconate. Acceptable products are Diamond Hard by the Euclid Chemical Company, Seal Hard by L&M Construction Chemicals and MasterKure HD 210 by BASF Master Builder Solutions.

2.03 NON-METALLIC FLOOR HARDENER

A. The specified non-metallic mineral aggregate hardener shall be formulated, processed, and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a factory-blended mixture of specifically processed graded mineral aggregate, selected Portland cement, and necessary plasticizing agents. Acceptable products shall be "Surflex" by the Euclid Chemical Company, "Harcol" by Sonneborn, "Maximent" by BASF, and "Mastercon" by BASF.

2.04 NON-OXIDIZING HEAVY DUTY METALLIC FLOOR HARDENER

A. Non-oxidizing heavy duty metallic floor hardener shall be formulated, processed, and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a mixture of specifically processed non-rusting aggregate, selected Portland cement, and necessary plasticizing agents. Product shall be "Diamond-Plate" by the Euclid Chemical Company, or Masterplate by BASF Construction Chemicals.

2.05 NON-SLIP FLOORING ADDITIVE

A. Non-slip flooring additives for slip resistant floors shall be non-metallic. Non-slip flooring additives shall be Frictex NS by BASF Construction Chemicals, A-H Alox by Anti-Hydro, or Euco Grip by the Euclid Chemical Company.

PART 3 – EXECUTION

3.01 FINISHES ON FORMED CONCRETE SURFACES

A. After removal of forms, the finishes described below shall be applied in accordance with Article 3.05 of this Section entitled "Concrete Finish Schedule". Unless the finish schedule specifies otherwise, all surfaces shall receive at least a Type I finish. The Engineer shall be the sole judge of acceptability of all concrete finish work.

1. Type I - Rough: All fins, burrs, offsets, marks and all other projections left by the forms shall be removed. Projections, depressions, etc. below finished grade required to be removed will only be those greater than ¼-inch. All holes left by removal of ends of ties, and all other holes, depressions, bugholes, air/blow holes or voids shall be filled solid with cement grout after first being thoroughly wetted and then struck off flush. The only holes below grade to be filled will be tie holes and any other holes

larger than ¼-inch in any dimension. Honeycombs shall be chipped back to solid concrete and repaired as directed by the Engineer. All holes shall be filled with tools, such as sponge floats and trowels, that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, epoxy bonding agent (for tie holes only) and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface. .

2. Type II - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type I finish. After the concrete has been predampened, a slurry consisting of one part cement (including an appropriate quantity of white cement in order to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Mix proportions shall be submitted to the Engineer after a sample of the work is established and accepted. Any surplus shall be removed by scraping and then rubbing with clean burlap. The finish shall be kept damp for at least 36 hours after application.

3. Type III - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type II finish. No rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities require it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted. A 100 square foot example shall be established at the beginning of the project to establish acceptability.

3.02 SLAB AND FLOOR FINISHES

A. The finishes described below shall be applied to floors, slabs, flow channels and top of walls in accordance with Article 3.05 of this Section entitled "Concrete Finish Schedule". The Engineer shall be the sole judge of acceptability of all such finish work.

1. Type "A" - Screeded: This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required. When a Type "F" finish is subsequently to be applied, the surface of the screeded concrete shall be roughened with a concrete rake to 1/2-inch minimum deep grooves prior to final set.

2. Type "B" - Wood Floated: This finish shall be obtained after completion of a Type "A" finish by working a previously screeded surface with a wood float until the desired texture is reached. Floating shall begin when the water sheen has disappeared and when the concrete has sufficiently hardened so that a person's foot leaves only a slight imprint. If wet spots occur, water shall be removed with a squeegee. Care shall be taken to prevent the formation of laitance and excess water on the finished surface. All edges shall be edged with an 1/8-inch tool as directed by the Engineer. The finished surface shall be true, even, and free from blemishes and other irregularities.

3. Type "C" - Cork Floated: This finish shall be similar to Type "B" but slightly smoother than that obtained with a wood float. It shall be obtained by power or band floating with cork floats.

4. Type "D" - Steel Troweled: This finish shall be obtained after completion of a Type "B" finish. When the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. In areas which are to receive a floor covering such as tile, resilient flooring, or carpeting, the applicable Specification Sections and Contract Drawings shall be reviewed for the required finishes and degree of flatness. In areas that are intermittently wet such as pump rooms, only one troweling operation is required to provide some trowel marks for slip resistance. All edges shall be edged with an 1/8-inch tool as directed by the Engineer. The finish shall be brought to a smooth, dense surface, free from defects and blemishes.

5. Type "E" - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type "B" finish. All edges shall be edged with an 1/8-inch tool as directed by the Engineer.

6. Type "F" - Swept in Grout Topping: This finish shall be applied after a completion of a Type "A" finish. The concrete surface shall be properly cleaned, washed, and coated with a mixture of water and Portland Cement. Cement grout in accordance with Section 03315 shall then be plowed and swept into neat conformance with the blades or arms of the apparatus by turning or rotating the previously positioned mechanical equipment. Special attention shall be paid to true grades, shapes and tolerances as specified by the manufacturer of the equipment. Before beginning this finish, the Contractor shall notify the Engineer and the equipment manufacturer of the details of the operation and obtain approval and recommendations of the equipment manufacturer.

7. Type "G" - Hardened Finish: This finish shall be applied after completion of a Type “B” or Type “C” finish and prior to application of a Type “D” finish. Hardeners shall be applied in strict accordance with the manufacturer’s requirements. Hardeners shall be applied using a mechanical spreader. The hardener shall be applied in two shakes with the first shake comprising of 2/3 of the total amount. Type “D” finish shall be applied following completion of application of hardener.

   a. Non-metallic floor hardener shall be applied where specifically required on the Contract Drawings at the rate of 1.0 pounds/ft2.

   b. Non-oxidizing heavy duty metallic floor hardener shall be applied at the loading docks and where specifically required on the Contract Drawings or specified herein at the rate of 1.5 pounds/ft2.

8. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip flooring additive concurrently with the application of a Type “D” finish and/or installation of floor sealants. Application procedure shall be in accordance with

manufacturer's instructions. Finish shall be applied where specifically required on the Contract Drawings or specified herein.

9. Type "J" - Raked Finish: This finish shall be provided by raking the surface as soon as the condition of the concrete permits by making depressions of +/-1/4 inch.

3.03 CONCRETE SEALERS

A. Concrete sealers shall be applied where specifically required on the Contract Drawings or specified herein.

B. Sealers shall be applied after installation of all equipment, piping, etc. and after completion of any other related construction activities. Application of sealers shall be in strict accordance with manufacturer's requirements.

C. Sealers shall be applied to all floor slabs not painted and not intended to be immersed.

D. Floor slabs subjected to vehicular traffic shall be sealed with the concrete liquid densifier and sealer.

E. All other floor slabs to receive sealer shall be sealed with concrete floor sealer.

3.04 FINISHES ON EQUIPMENT PADS

A. Formed surfaces of equipment pads shall receive a Type III finish.

B. Top surfaces of equipment pads, except those surfaces subsequently required to receive non-shrink grout and support equipment bases, shall receive a Type "D" finish, unless otherwise noted. Surfaces which will later receive grout shall, before the concrete takes its final set, be made rough by removing the sand and cement that accumulates on the top to the extent that the aggregate will be exposed with irregular indentations in the surface up to 1/2 inch deep.

3.05 CONCRETE FINISH SCHEDULE

Item	**Type of Finish**
Concrete surfaces indicated to receive textured coating	I
Inner face of walls of tanks, flow channels, wet wells, perimeter walls, and miscellaneous concrete structures:	
From 3 feet below water surface to bottom of wall	I*
From top of wall to 3 feet below water surface	II*
Exterior concrete walls below grade	I
Exterior exposed concrete walls, ceilings, beams, manholes, hand	II

holes, miscellaneous structures and columns (including top of wall) to one foot below grade. All other exposed concrete surfaces not specified elsewhere	
All interior exposed concrete vertical surfaces in buildings	III
Interior exposed ceiling, including beams	III
Floors of process equipment tanks or basins, and slabs to receive roofing material or waterproof membranes	B

Item	Type of Finish
All interior finish floors of buildings and structures and walking surfaces which will be continuously or intermittently wet	D
All interior finish floors of buildings and structures which are not continuously or intermittently wet	D
Floors to receive tile, resilient flooring, or carpeting	D
Concrete in flow channels	D
Exterior concrete sidewalks, steps, ramps, decks, slabs on grade and landings exposed to weather	E
Floors of process equipment tanks indicated on Drawings to receive grout topping	F
Garage and storage area floors	G
Precast concrete form panels, hollow core planks, double tees	J

** Finish shall be acceptable to the coating applicator and manufacturer. See Section 09900 entitled "Painting"*

- END OF SECTION -

PROJECT NO. 12337

SECTION 03370

CONCRETE CURING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall protect all freshly deposited concrete from premature drying and excessively hot or cold temperatures, and maintain with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete in accordance with requirements specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Framework

B. Section 03300 - Cast-in-Place Concrete

C. Section 03315 - Grout

D. Section 03350 - Concrete Finishes

1.03 SUBMITTALS

A. In accordance with the procedures and requirements set forth in the Section entitled "Submittals", the contractor shall submit the following:

1. Proposed procedures for protection of concrete under wet weather placement conditions.

2. Proposed normal procedures for protection and curing of concrete.

3. Proposed special procedures for protection and curing of concrete under hot and cold weather conditions.

4. Proposed method of measuring concrete surface temperature changes.

5. Manufacturer's literature and material certification for proposed curing compounds.

1.04 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of these specifications all work hereunder shall conform to the applicable requirements of the referenced portions of the following documents, to the extent that the requirements therein are not in conflict with the provisions of this Section.

1. ACI 301 Specifications for Structural Concrete for buildings
2. ACI 304 Guide for Measuring, Mixing, Transporting, and Placing Concrete
3. ACI 305 Hot Weather Concreting
4. ACI 306 Cold Weather Concreting
5. ACI 308 Standard Practice for Curing Concrete
6. ASTM C171 Specifications for Sheet Materials for Curing Concrete
7. ASTM C309 Specification for Liquid Membrane - Forming Compounds for Curing Concrete
8. ASTM C1315 Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete

1.05 QUALITY ASSURANCE

A. Curing compound shall not be used on any surface where concrete, coatings, or other material will be bonded unless the manufacturer certifies that the curing compound will not prevent bond or indicates measures to be taken to completely remove the curing compound from areas to receive bonded applications, and specifically approved by the Engineer.

B. Care shall be taken to ensure that curing compounds are compatible with all finish concrete castings.

C. Curing compounds shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.

PART 2 – PRODUCTS

2.01 LIQUID MEMBRANE-FORMING CURING COMPOUND

A. Clear curing and sealing compound shall be a clear styrene acrylate type complying with ASTM C 1315, Type 1, Class A with a minimum solids content of 30%. Moisture loss shall not be greater than 0.40 kg/m2 when applied at 300 sq.ft./gal. Manufacturer's certification is required. Acceptable products are Super Diamond Clear VOX by the Euclid Chemical Company, MasteKure CC 300 SB by BASF Master Builder Solutions, and Cure & Seal 30 Plus by Symons Corporation.

B. Where specifically approved by Engineer, on slabs to receive subsequent applied finishes, compound shall conform to ASTM C 309. Acceptable products are "Kurez DR VOX" or "Kurez W VOX" by the Euclid Chemical Company. Install in strict accordance with manufacturer's requirements.

2.02 EVAPORATION REDUCER

A. Evaporation reducer shall be BASF, “MasterKure ER 50”, or Euclid Chemical “Euco-Bar”.

2.03 BURLAP MATS

A. Burlap mats shall conform to AASHTO M-182.

PART 3 – EXECUTION

3.01 PROTECTION AND CURING

A. All freshly placed concrete work shall be protected from the elements, flowing water and from defacement of any nature during construction operations.

B. As soon as the concrete has been placed and horizontal top surfaces have received their required finish, provision shall be made for maintaining the concrete in a moist condition for at least a 7-day period thereafter except for high early strength concrete, for which the period shall be at least the first three days after placement. Horizontal surfaces shall be kept covered, and intermittent, localized drying will not be permitted.

C. Walls that will be exposed on one side with either fluid or earth backfill on the opposite side shall be continuously wet cured for a minimum of five days. Use of a curing compound will not be acceptable for applications of this type.

D. After placing and finishing, use one or more of the following methods to preserve moisture in concrete:

1. Ponding or continuous fogging or sprinkling.

2. Application of mats or fabric kept continuously wet.

3. Continuous application of steam (under 150 degrees Fahrenheit).

4. Application of sheet materials conforming to ASTM C171.

5. If approved by the Engineer, application of a curing compound in accordance with Article 3.05. Apply the compound in accordance with the manufacturer's recommendation on after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 200 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.

E. Keep absorbent forms wet until they are removed. After form removal, cure concrete by one of the methods in paragraph D.

F. Any of the curing procedures used in Paragraph 3.01-D may be replaced by one of the other curing procedures listed in Paragraph 3.01-D after the concrete is one-day old. However, the concrete surface shall not be permitted to become dry at any time.

3.02 CURING CONCRETE UNDER COLD WEATHER CONDITIONS

A. Suitable means shall be provided for a minimum of 72 hours after placing concrete to maintain it at or above the minimum as placed temperatures specified in Article 3.02 herein.. During the 72-hour period, the concrete surface shall not be exposed to air more than 20°F above the minimum as placed temperatures.

B. Stripping time for forms and supports shall be increased as necessary to allow for retardation in concrete strength caused by colder temperatures. This retardation is magnified when using concrete made with blended cements or containing fly ash or ground granulated blast furnace slag. Therefore, curing times and stripping times shall be further increased as necessary when using these types of concrete.

C. The methods of protecting the concrete shall be approved by the Engineer and shall be such as will prevent local drying. Equipment and materials approved for this purpose shall be on the site in sufficient quantity before the work begins. The Contractor shall assist the Engineer by providing holes in the forms and the concrete in which thermometers can be placed to determine the adequacy of heating and protection. All such thermometers shall be furnished by the Contractor in quantity and type which the Engineer directs.

D. Curing procedures during cold weather conditions shall conform to the requirements of ACI 306.

3.03 CURING CONCRETE UNDER HOT WEATHER CONDITIONS

A. When air temperatures exceed 85°F, the Contractor shall take extra care in placing and finishing techniques to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sun shades and/or windbreakers shall be erected to guard against such developments, including generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.

B. Immediately after screeding, horizontal surfaces shall receive an application of evaporation reducer. Apply in accordance with manufacturer's instructions. Final finish work shall begin as soon as the mix has stiffened sufficiently to support the workmen.

C. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-curing consisting of method 1 or 2 listed in paragraph 3.01D is mandatory for at least the first 24 hours. Method 2 may be used only if the finished surface is not marred or blemished during contact with the coverings.

D. At the end of the initial 24-hour period, curing and protection of the concrete shall continue for at least four (4) additional days using one of the methods listed in paragraph 3.01D.

E. Curing procedures during hot weather conditions shall conform to the requirements of ACI 305.

3.04 USE OF CURING COMPOUND

A. Curing compound shall be used only where specifically approved by the Engineer. Curing compound shall not be used on surfaces to receive subsequent coatings. Curing compound shall never be used for curing exposed walls with fluid or earth backfill on the

opposite side. A continuous wet cure for a minimum of five days is required for these applications. Curing compound shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.

B. When permitted, the curing compound shall maintain the concrete in a moist condition for the required time period, and the subsequent appearance of the concrete surface shall not be affected.

C. The compound shall be applied in accordance with the manufacturer's recommendations after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 300 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.

3.05 EARLY TERMINATION OF CURING

A. Moisture retention measures may be terminated earlier than the specified times only when at least one of the following conditions is met:

1. The strength of the concrete reaches 85 percent of the specified 28-day compressive strength in laboratory-cured cylinders representative of the concrete in place, and the temperature of the in-place concrete has been constantly maintained at 50 degrees Fahrenheit or higher.

2. The strength of concrete reaches the specified 28-day compressive strength as determined by accepted nondestructive methods or laboratory-cured cylinder test results.

- END OF SECTION -

PROJECT NO. 12337

SECTION 03400

PRECAST CONCRETE, GENERAL

PART 1 – GENERAL

1.01 REQUIREMENTS

A. The Contractor shall construct all precast concrete items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03200 – Concrete Reinforcement

B. Section 03230 – Stressing Tendons

C. Section 03300 – Cast-in-Place Concrete

D. Section 03350 – Concrete Finishes

E. Section 03370 – Concrete Curing

F. Section 03315 – Grout

G. Section 05500 – Metal Fabrications

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the end of the Bid.

1. Florida Building Code
2. ACI 318-Building Code Requirements for Reinforced Concrete
3. PCI Standard MNL-116 - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products
4. PCI Design Handbook

1.04 SUBMITTALS

A. The Contractor shall submit the following for review in accordance with Section 01300 Submittals.

1. Shop drawings for all precast concrete items showing all dimensions, locations, and type of lifting inserts, and details of reinforcement and joints.

2. A list of the design criteria used by the manufacturer for all manufactured, precast items.

3. Design calculations, showing at least the design loads and stresses on the item, shall be submitted. Calculations shall be signed and sealed by a Professional Engineer registered in the State of Florida.

4. Certified reports for all lifting inserts, indicating allowable design loads.

5. Information on lifting and erection procedures.

1.05 QUALITY ASSURANCE

A. All manufactured precast concrete units shall be produced by an experienced manufacturer regularly engaged in the production of such items. All manufactured precast concrete and site-cast units shall be free of defects, checks, and cracks. Care shall be taken in the mixing of materials, casting, curing and shipping to avoid any of the above. The Engineer may elect to examine the units at the casting yard or upon arrival of the same at the site. The Engineer shall have the option of rejecting any or all of the precast work if it does not meet with the requirements specified herein or on the Drawings. All rejected work shall be replaced at no additional cost to the City. B. Manufacturer qualifications:

1. The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, prior to the start of production. Certification is only required for plants providing prestressed structural members such as hollow core planks, double T members, etc.

2. In lieu of such certification, the manufacturer shall, at his expense, meet the following requirements:

   a. Retain independent testing or consulting firm approved by the Architect/Engineer and/or City.

   b. The basis of inspection shall be the Prestressed Concrete Institute Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products, MNL-116.

   c. This firm shall inspect the precast plant at two-week intervals during production and issue a report, certified by a registered engineer verifying that materials, methods, products and quality control meet all the requirements of the specifications, drawings, and MNL-116. If the report indicates to the contrary, the engineer, at the precaster's expense, will inspect and may reject any or all products produced during the period of non-compliance with the above requirements.

C. Plant production and engineering must be under direct supervision and control of an Engineer who possesses a minimum of five (5) years' experience in precast concrete work.

PART 2 – PRODUCTS

2.01 CONCRETE

A. Concrete materials including Portland cement, aggregates, water, and admixtures shall conform to Section 03300 - Cast-in-Place Concrete.

B. For prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 5,000 psi unless otherwise specified. Minimum compressive strength of concrete at transfer of prestressing force shall be 3,500 psi.

C. For non-prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 4,000 psi unless otherwise specified.

2.02 GROUT

A. Grout for joints between panels shall be a non-shrink, non-metallic grout in conformance with Section 03315 - Grout.

B. Minimum compressive strength of grout at 7 days shall be 3,000 psi.

2.03 REINFORCING STEEL

A. Reinforcing steel used for precast concrete construction shall conform to Section 03200 Concrete Reinforcement.

2.04 PRESTRESSING STRANDS

A. Prestressing strands shall be 7-wire, stress-relieved, high-strength strands Grade 250K or 270K.

2.05 STEEL INSERTS

A. Steel inserts shall be in accordance with Section 05500 - Metal Fabrications.

B. All steel inserts protruding from or occurring at the surface of precast units shall be galvanized in accordance with Section 05035 - Galvanizing.

2.06 WELDING

A. Welding shall conform to Section 05500 - Metal Fabrications.

2.07 BEARING PADS

A. Plastic bearing pads shall be multi-monomer plastic strips which are non-leaching and support construction loads with no visible overall expansion, manufactured specifically for the purpose of bearing precast concrete.

PART 3 – EXECUTION

3.01 FABRICATION AND CASTING

A. All precast members shall be fabricated and cast to the shapes, dimensions and lengths shown on the Drawings and in compliance with PCI MNL-116. Precast members shall be straight, true and free from dimensional distortions, except for camber and tolerances permitted later in this clause. All integral appurtenances, reinforcing, openings, etc., shall be accurately located and secured in position with the form work system. Form materials shall be steel and the systems free form leakage during the casting operation. B. All cover of reinforcing shall be the same as detailed on the Drawings.

C. Because of the critical nature of the bond development length in prestressed concrete panel construction, if the transfer of stress is by burning of the fully tensioned strands at the ends of the member, each strand shall first be burned at the ends of the bed and then at each end of each member before proceeding to the next strand in the burning pattern.

D. The Contractor shall coordinate the communication of all necessary information concerning openings, sleeves, or inserts to the manufacturer of the precast members.

E. Concrete shall be finished in accordance with Section 03350 - Concrete Finishes. All recesses due to cut tendons shall be grouted.

F. Curing of precast members shall be in accordance with Section 03370 - Concrete Curing.

G. The manufacturer shall provide lifting inserts.

3.02 HANDLING, TRANSPORTING AND STORING

A. Precast members shall not be transported away from the casting yard until the concrete has reached the minimum required 28 day compressive strength and a period of at least five (5) days has elapsed since casting, unless otherwise permitted by the Engineer.

B. No precast member shall be transported from the plant to the job site prior to approval of that member by the plant inspector. This approval will be stamped on the member by the plant inspector.

C. During handling, transporting, and storing, precast concrete members shall be lifted and supported only at the lifting or supporting points as indicated on the shop drawings.

D. All precast members shall be stored on solid, unyielding, storage blocks in a manner to prevent torsion, objectionable bending, and contact with the ground.

E. Precast concrete members shall not be used as storage areas for other materials or equipment.

F. Precast members damaged while being handled or transported will be rejected or shall be repaired in a manner approved by the Engineer.

3.03 ERECTION

A. Erection shall be carried out by the manufacturer or under his supervision using labor, equipment, tools and materials required for proper execution of the work.

B. Contractor shall prepare all bearing surfaces to a true and level line prior to erection. All supports of the precast members shall be accurately located and of required size and bearing materials.

C. Installation of the precast members shall be made by leveling the top surface of the assembled units keeping the units tight and at right angles to the bearing surface.

D. Connections which require welding shall be properly made in accordance with Section 05050 - Metal Fastening.

E. Grouting between adjacent precast members and along the edges of the assembled precast members shall be accomplished as indicated on the drawings, care being taken to solidly pack such spaces and to prevent leakage or droppings of grout through the assembled precast members. Any grout which seeps through the precast members shall be removed before it hardens.

F. In no case shall concentrated construction loads, or construction loads exceeding the design loads, be placed on the precast members. In no case shall loads be placed on the precast members prior to the welding operations associated with erection, and prior to placing of topping (if required).

G. No Contractor, Subcontractor or any of his employees shall arbitrarily cut, drill, punch or otherwise tamper with the precast members.

H. Precast members damaged while being erected will be rejected or shall be repaired in a manner approved by the Engineer.

- END OF SECTION -

PROJECT NO. 12337

SECTION 03480

PRECAST CONCRETE MANHOLES, HANDHOLES AND VAULTS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall construct all precast concrete items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03400 – Precast Concrete, General

1.03 QUALITY CONTROL

A. Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the Florida Building Code (FBC) and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this section:

1. ASTM C478 Specification for Precast Reinforced Concrete Manhole Sections.

2. ACI 318 Building Code Requirements for Reinforced Concrete.

1.04 SUBMITTALS

A. The Contractor shall submit shop drawings in accordance with Specification Section 01300 – Submittals.

B. In addition to the items listed in Section 03400 – Precast Concrete, General, Shop Drawings shall include, but not be limited to:

1. Piping and conduit sheets

2. Complete layout and installation Drawings and schedules with clearly marked dimensions.

PART 2 – PRODUCTS

2.01 PRECAST CONCRETE MANHOLES, VAULTS, AND METER BOXES

A. Precast concrete manholes, vaults, and meter boxes, shall conform to ASTM C478 except as modified herein, and shall be furnished with waterstops, sleeves and openings as noted on the Drawings. Reinforcement, if shown, shall be as shown on the Drawings. Tapered

top sections shall be supplied where they are shown on the drawings, or where they are otherwise indicated to be necessary.

1. The design and manufacture of the sections shall be based on H-20 traffic loading.

2. Reinforcement shall conform to the requirements of the Section 03200 - Concrete Reinforcement.

3. Minimum wall thickness shall be eight inches.

4. Cement shall be ASTM C150, Type II.

5. The date and name of manufacturer shall be marked inside each precast section.

6. Joints between manhole riser sections and at base slabs shall be groove type. Joints shall be sealed with two (2) individual self sealing butyl rubber gaskets conforming to Federal Specification No. SS-5-00210. The gasket material shall be Kent Seal.

2.02 PIPE CONNECTIONS

A. The precast reinforced concrete manhole base shall be provided with circular openings at the locations and elevations for the proper connection of all pipes. The pipe connections shall be sealed with either a flexible manhole seal assembly or with mortar.

B. When a flexible manhole seal assembly is used to seal the pipe connection, the seal assembly shall be installed in accordance with the recommendations of the seal assembly manufacturer and shall conform to ASTM C923.

C. Flexible manhole seal assemblies shall permit at least an eight (8) degree deflection from the center line of the opening in any direction while maintaining a watertight connection.

D. The flexible manhole seal assembly shall be manufactured by Interpace Corp (Lock Joint Flexible Manhole Sleeve), National Pollution Control Systems, Inc. (Kor-N-Seal) or PressSeal Gasket Corp. Manhole seal assemblies produced by other manufacturers will be considered for use by Engineer if submitted by the Contractor. Such manhole seal assemblies shall be acceptable only if the Shop Drawings are approved.

E. Short lengths of sewer pipe shall be installed entering and leaving the precast manhole base. These short lengths of pipe shall have a maximum length of 3'3". A concrete cradle shall be placed under the short length of pipe in accordance with the dimensions shown on the Drawings.

F. The concrete cradle is not necessary when a flexible manhole seal assembly is used.

2.03 MANHOLE LADDERS

A. Manhole ladders shall conform to Section 06610 - Glass Fiber and Resin Fabrications.

2.04 SITE-CAST ITEMS

A. Where removable concrete slabs are required by the drawings, they shall conform to the requirements set forth in Section 03300 - Cast-in-Place Concrete. All thicknesses, reinforcing, and edge clearances shall be as shown on the drawings.

2.05 MORTAR

A. Mortar used between the sections of precast concrete manholes and vaults shall be as recommended by the section manufacturer, subject to the requirements of Division 4.

2.06 NON-SHRINK GROUT

A. Non-shrink grout shall be as specified in Section 03315 - Grout.

PART 3 – EXECUTION

3.01 MANUFACTURED ITEMS

A. Precast Concrete Manhole Sections

1. Precast concrete manhole sections shall be set so as to be vertical, with sections in true alignment. The joint of the previously set section shall be covered with mortar and preformed joint sealant before the next section is placed. Before the mortar is set, joints shall be pointed, and exterior joints shall be thoroughly tooled so as to be slightly concave with a hard polished surface, free of cracks. Interior joints shall be tooled flush in a similar manner.

B. Miscellaneous Precast Vaults

1. All pull boxes, electrical manholes, vaults, meter boxes and other miscellaneous precast concrete boxes shall be installed in accordance with the manufacturer's recommendations, unless otherwise required by the drawings.

3.02 SITE CAST ITEMS

A. Where removable concrete slabs are required by the drawings, they shall be fabricated in accordance with Section 03300 - Cast-in-Place Concrete.

B. Sealant, as specified in the Section 07920 - Sealants and Caulking shall be provided all around the panels.

- END OF SECTION -

DIVISION 4

MASONRY

(NOT USED)

DIVISION 5

METALS

PROJECT NO. 12337

SECTION 05010

METAL MATERIALS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Metal materials not otherwise specified shall conform to the requirements of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Materials for fasteners are included in Section 05050 - Metal Fastening.

B. Requirements for specific products made from the materials specified herein are included in other sections of the Specifications. See the section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. ASTM A36 Standard Specification for Structural Steel

B. ASTM A47 Standard Specification for Malleable Iron Castings

C. ASTM A48 Standard Specification for Gray Iron Castings

D. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, ZincCoated Welded and Seamless

E. ASTM A167 Standard Specification for Stainless and Heat-Resisting ChromiumNickel Steel Plate, Sheet, and Strip

F. ASTM A276 Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes

G. ASTM A307 Standard Specification for Carbon Steel Externally Threaded Standard Fasteners

H. ASTM A446 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) quality

I. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

J. ASTM A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

K. ASTM A529 Standard Specification for Structural Steel with 42 000 psi (290 Mpa) Minimum Yield Point (1/2 in. (12.7 mm) Maximum Thickness)

L. ASTM A536 Standard Specification for Ductile Iron Castings

M. ASTM A570 Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality

N. ASTM A572/ Standard Specification for High Strength Low-Alloy Columbium- Vanadium Structural Steel Grade 50

O. ASTM A666 Standard Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications

P. ASTM A992 Standard Specification for Structural Steel Shapes

Q. ASTM A1085 Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)

R. ASTM B26 Standard Specification for Aluminum-Alloy Sand Castings

S. ASTM B85 Standard Specification for Aluminum-Alloy Die Castings

T. ASTM B108 Standard Specification for Aluminum-Alloy Permanent Mold Castings

U. ASTM B138 Standard Specification for Manganese Bronze Rod, Bar, and Shapes

V. ASTM B209 Standard Specification for Aluminum-Alloy Sheet and Plate

W. ASTM B221 Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes

X. ASTM B308 Standard Specification for Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded

Y. ASTM B574 Standard Specification for Nickel-Molybdenum-Chromium Alloy Rod

Z. ASTM F468 Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

AA. ASTM F593 Standard Specification for Stainless Steel Fasteners

1.04 SUBMITTALS

A. Material certifications shall be submitted along with any shop drawings for metal products and fabrications required by other sections of the Specifications.

1.05 QUALITY ASSURANCE

A. City may engage the services of a testing agency to test any metal materials for conformance with the material requirements herein. If the material is found to be in conformance with Specifications the cost of testing will be borne by the City. If the material does not conform

to the Specifications, the cost of testing shall be paid by the Contractor and all materials not in conformance as determined by the Engineer shall be replaced by

the Contractor at no additional cost to the City. In lieu of replacing materials the Contractor may request further testing to determine conformance, but any such testing shall be paid for by the Contractor regardless of outcome of such testing.

PART 2 – PRODUCTS

2.01 CARBON AND LOW ALLOY STEEL

A. Material types and ASTM designations shall be as listed below:

1. Steel W Shapes .....ASTM A 992
2. Steel S, M, C, MC Shapes and Angles, Bars, and Plates.....ASTM A 36
3. Steel HP Shapes.....ASTM A 572, Grade 50
4. Rods.....ASTM F 1554 Grade 36
5. Pipe – Structural Use.....ASTM A53 Grade B
6. Hollow Structural Sections.....ASTM A500 Grade C or A1085
7. Cold-Formed Steel Framing.....ASTM A 653

2.02 STAINLESS STEEL

A. All stainless steel fabrications shall be Type 316.

B. Material types and ASTM designations are listed below:

1. Plates and Sheets.....ASTM A167 or A666 Grade A
2. Structural Shapes.....ASTM A276
3. Fasteners (Bolts, etc.).....ASTM F593

2.03 ALUMINUM

A. All aluminum shall be alloy 6061-T6, unless otherwise noted or specified herein.

B. Material types and ASTM designations are listed below:

1. Structural Shapes.....ASTM B308
2. Castings.....ASTM B26, B85, or B108
3. Extruded Bars .....ASTM B221 - Alloy 6061

4. Extruded Rods, Shapes and Tubes.....ASTM B221 - Alloy 6063

5. Plates.....ASTM B209 - Alloy 6061

6. Sheets.....ASTM B221 - Alloy 3003

C. All aluminum structural members shall conform to the requirements of Section 05140 Structural Aluminum.

D. All aluminum shall be provided with mill finish unless otherwise noted.

E. Where bolted connections are indicated, aluminum shall be fastened with Type 316 stainless steel bolts.

F. Aluminum in contact with dissimilar materials shall be insulated with an approved dielectric.

2.04 CAST IRON

A. Material types and ASTM designations are listed below:

1. Gray.....ASTM A48 Class 30B

2. Malleable.....ASTM A47

3. Ductile.....ASTM A536 Grade 60-40-18

2.05 BRONZE

A. Material types and ASTM designations are listed below:

1. Rods, Bars and Sheets .....ASTM B138 - Alloy B Soft

2.06 HASTELLOY

A. All Hastelloy shall be Alloy C-276.

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 12337

SECTION 05035

GALVANIZING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Where galvanizing is called for in the Contract Documents, the galvanizing shall be performed in accordance with the provisions of this Section unless otherwise noted.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Further requirements for galvanizing specific items may be included in other Sections of the Specifications. See section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Building Code
2. ASTM A123 Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
3. ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
4. ASTM A653 Standard Specification for Steel Sheet, Zinc Coated (Galvanized), or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
5. ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
6. ASTM A780 Standard Practice of Repair of Damaged Hot-Dip Galvanized Coatings
7. ASTM F2329 Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 - Submittals.

1. Certification that the item(s) are galvanized in accordance with the applicable ASTM standards specified herein. This certification may be included as part of any material certification that may be required by other Sections of the Specifications.

PART 2 – PRODUCTS

2.01 GALVANIC COATING

A. Material composition of the galvanic coating shall be in accordance with the applicable ASTM standards specified herein.

PART 3 – EXECUTION

3.01 FABRICATED PRODUCTS

A. Products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strips, 1/8-inch thick and heavier which are to be galvanized shall be galvanized in accordance with ASTM A123. Products shall be fabricated into the largest unit which is practicable to galvanize before the galvanizing is done. Fabrication shall include all operations necessary to complete the unit such as shearing, cutting, punching, forming, drilling, milling, bending, and welding. Components of bolted or riveted assemblies shall be galvanized separately before assembly. When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the zinc coating. The galvanizer shall be a member of American Galvanizers Association.

B. Components with partial surface finishes shall be commercial blast cleaned prior to pickling.

C. Sampling and testing of each lot shall be performed prior to shipment from the galvanizer's facility per ASTM A123.

3.02 HARDWARE

A. Iron and steel hardware which is to be galvanized shall be galvanized in accordance with ASTM A153 and ASTM F2329.

3.03 ASSEMBLED PRODUCTS

A. Assembled steel products which are to be galvanized shall be galvanized in accordance with ASTM A123. All edges of tightly contacting surfaces shall be completely sealed by welding before galvanizing.

B. Assemblies shall be provided with vent and drain holes as required by the fabricator. Vent and drain hole sizes and locations shall be included in the structural steel shop drawings required in Specification 05120 – Structural Steel for approval. All vent and drain holes shall be plugged and finished to be flush with and blend in with the surrounding surface.

PROJECT NO. 12337

Where water intrusion can occur, the plug shall be carefully melted into the surrounding zinc coating using appropriate fluxing agent.

3.04 METAL DECK

A. Unless noted otherwise, metal deck shall be galvanized in accordance with ASTM A653 G60 minimum. In moist environments or as indicated on the Contract Drawings, galvanizing shall meet the requirements of ASTM A653 G90.

B. Galvanized metal deck shall meet the requirements of ASTM A924.

3.05 SHEETS

A. Iron or steel sheets which are to be galvanized shall be galvanized in accordance with ASTM A924.

3.06 REPAIR OF GALVANIZING

A. Galvanized surfaces that are abraded or damaged at any time after the application of zinc coating shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 coats of zinc rich paint meeting the requirements of Federal Specification DOD-P-21035A and shall be thoroughly mixed prior to application. Zinc rich paint shall not be tinted. The total thickness of the 2 coats shall not be less than 6 mils. In lieu of repairing by painting with zinc rich paint, other methods of repairing galvanized surfaces in accordance with ASTM A780 may be used provided the proposed method is acceptable to the Engineer.

- END OF SECTION -

PROJECT NO. 12337

SECTION 05050

METAL FASTENING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials, labor, and equipment required to provide all metal welds and fasteners not otherwise specified, in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 05010 - Metal Materials

B. Section 05035 - Galvanizing

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Building Code	
2. AC 193	Acceptance Criteria for Mechanical Anchors in Concrete Elements
3. AC 308	Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements
4. ACI 318	Building Code Requirements for Structural Concrete
5. ACI 355.2	Qualifications of Post-Installed Mechanical Anchors in Concrete
6. ACI 355.4	Qualification of Post-Installed Adhesive Anchors in Concrete
7. ICC-ES AC193	Acceptance Criteria for Expansion and Screw Anchors (Concrete)
8. AISC 348	The 2009 RCSC Specification for Structural Joints
9. AISC	Code of Standard Practice
10. AWS D1.1	Structural Welding Code - Steel
11. AWS D1.2	Structural Welding Code – Aluminum
12. AWS D1.6	Structural Welding Code – Stainless Steel

13. Aluminum Association	Specifications for Aluminum Structures
14. ASTM A572/A572M-94C	Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel Grade 50
15. ASTM A36	Standard Specification for Carbon Structural Steel
16. ASTM A325	Standard Specification for High-Strength Bolts for Structural Steel Joints
17. ASTM A489	Standard Specification for Eyebolts
18. ASTM A490	Standard Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints
19. ASTM A563	Standard Specifications for Carbon and Alloy Steel Nuts
20. ASTM D1785	Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe
21. ASTM E488	Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
22. ASTM F436	Standard Specification for Hardened Steel Washers
23. ASTM F467	Standard Specification for Nonferrous Nuts for General Use
24. ASTM F593	Standard Specification for Stainless Steel Bolts; Hex Cap Screws, and Studs
25. ASTM F594	Standard Specification for Stainless Steel Nuts
26. ASTM F1554	Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

1.04 SUBMITTALS

A. Submit the following items in accordance with Section 01300 - Submittals:

1. Shop Drawings providing the fastener's manufacturer and type and certification of the fastener's material and capacity.

2. Anchor design calculations sealed by a Professional Engineer currently registered in the State of Florida. Only required if design not shown on Contract Drawings.

3. A current ICC-ES Evaluation Service Report shall be submitted for all anchors that will be considered for use on this project.

4. Manufacturer’s installation instructions.

5. Welder certifications for each person who is to perform field welding. Certifications shall be from a recognized testing laboratory.

6. Certified weld inspection reports, when required.

7. Welding procedures.

8. Installer qualifications

9. Certification of Installer Training

10. Inspection Reports

11. Results of Anchor Proof Testing

12. For outdoor equipment, anchorage calculations to resist design wind loads, signed and sealed by a Professional Engineer registered in the State of Florida.

1.05 QUALITY ASSURANCE

A. Fasteners not manufactured in the United States shall be tested and certification provided with respect to specified quality and strength standards. Certifications of origin shall be submitted for all U.S. fasteners supplied on the project.

B. Installer Qualifications: All concrete anchors shall be installed by an Installer with at least three years of experience performing similar installations. Concrete adhesive anchor installer shall be certified as an Adhesive Anchor Installer in accordance with ACI-CRSI Adhesive Anchor Installation Certification Program.

C. Installer Training: For concrete adhesive anchors, conduct a thorough training with the manufacturer or the manufacturer's representative for the Installer on the project. Training shall consist of a review of the complete installation process for drilled-in anchors, to include but not be limited to the following:

1. Hole drilling procedure.

2. Hole preparation and cleaning technique.

3. Adhesive injection technique and dispenser training/maintenance.

4. Rebar doweling preparation and installation.

5. Proof loading/torquing.

6. Provide a list of names of all installers who are trained by the Manufacturer's Field Representative on this jobsite prior to installation of products. Record must include the installer name, date of training, products included in the training and trainer name and contact information.

7. Provide a copy of the current ACI/CRSI "Adhesive Anchor Installer" certification cards for all installers who will be installing adhesive anchors in the horizontal to vertically overhead orientation

D. All steel welding shall be performed by welders certified in accordance with AWS D1.1. All aluminum welding shall be performed by welders certified in accordance with AWS D1.2. All stainless steel welding shall be performed by welders certified in accordance with AWS D1.6. Certifications of field welders shall be submitted prior to performing any field welds.

E. Welds and high strength bolts used in connections of structural steel will be visually inspected in accordance with Article 3.04 of this Section.

F. The City may engage an independent testing agency to perform testing of welded connections and to prepare test reports in accordance with AWS. Inadequate welds shall be corrected or redone and retested to the satisfaction of the Engineer and/or an acceptable independent testing laboratory, at no additional cost to the City.

G. Provide a welding procedure for each type and thickness of weld. For welds that are not prequalified, include a Performance Qualification Report. The welding procedure shall be given to each welder performing the weld. The welding procedure shall follow the format in Annex E of AWS D1.1 with relevant information presented.

H. Inspections of the adhesive dowel system shall be made by the Engineer or other representatives of the City in accordance with the requirements of the ESR published by the manufacturer. Provide adequate time and access for inspections of products and anchor holes prior to injections, installation, and proof testing.

PART 2 – PRODUCTS

2.01 ANCHOR RODS (ANCHOR BOLTS)

A. For all conditions throughout this Contract, all anchor bolts shall be Type 316 stainless steel conforming to ASTM F-593 unless noted otherwise. B. Nuts shall conform to ASTM F-594, alloy 316.

C. Where anchor rods are used to anchor galvanized steel or are otherwise specified to be galvanized, anchor rods and nuts shall be hot-dip galvanized. Galvanized anchor rods shall conform to ASTM F1554 Grade 36, and nuts shall conform to ASTM A563 Grade A.

D. Where pipe sleeves around anchor rods are shown on the Drawings, pipe sleeves shall be cut from Schedule 80 PVC plastic piping meeting the requirements of ASTM D1785, unless noted otherwise.

E. Equipment manufacturers, fabricators, and suppliers shall design and furnish anchor bolts as required to install the supplied units. The anchor bolt layout shall be coordinated with concrete work as specified herein.

F. Drilled in type anchor bolts, either adhesive types or mechanical types shall not be used unless approved in writing by the manufacturer/fabricator of equipment or covers, subject to acceptance by the Engineer. All operating pieces of equipment such as pumps, generators, motors etc. shall not be anchored with wedge anchors or other mechanical anchors. Drilled in type anchor bolts shall be Type 316 stainless steel. Drilled in type anchor bolts are specified under Article 2.04 of this Section entitled "Concrete Anchors".

2.02 HIGH STRENGTH BOLTS

A. High strength bolts and associated nuts and washers shall be in accordance with ASTM F3125, grade A325 or grade A490. Bolts, nuts and washers shall meet the requirements of AISC "Specification for Structural Joints Using High Strength Bolts".

B. Where high strength bolts are used to connect galvanized steel or are otherwise specified to be galvanized, bolts, nuts, and washers shall be hot-dip galvanized in accordance with ASTM A325.

2.03 STAINLESS STEEL BOLTS

A. Stainless steel bolts shall conform to ASTM F-593. All underwater fasteners, fasteners in confined areas containing fluid, and fasteners in corrosive environments shall be Type 316 stainless steel. Unless otherwise specified, fasteners for aluminum and stainless steel members shall be Type 316 stainless steel.

B. Stainless steel bolts shall have hexagonal heads with a raised letter or symbol on the bolts indicating the manufacturer, and shall be supplied with hexagonal nuts meeting the requirements of ASTM F594. Nuts shall be of the same alloy as the bolts.

2.04 CONCRETE ANCHORS

A. General

1. Where concrete anchors are called for on the Drawings, one of the types listed below shall be used; except, where one of the types listed below is specifically called for on the Drawings, only that type shall be used. The determination of anchors equivalent to those listed below shall be on the basis of test data performed by an approved independant testing laboratory. There are two types used:

   a. Expansion anchors shall be mechanical anchors of the wedge, sleeve, drop-in or undercut type.

   b. Adhesive anchors shall consist of threaded rods or bolts anchored with an adhesive system into hardened concrete. Adhesive anchors shall be two part injection type using the manufacturer’s static mixing nozzle and shall be supplied as an entire system.

   c. Concrete screw anchors shall be one piece, heavy duty screw anchor with a finished hex head

2. Expansion anchors shall not be used to hang items from above or in any other situation where direct tension forces are induced in anchor.

3. Unless otherwise noted, all concrete anchors which are submerged or subject to water off-gassing, or are used in hanging items or have direct tension induced upon them, or which are subject to vibration from equipment such as pumps and generators, shall be adhesive anchors.

4. Adhesive anchors shall conform to the requirements of ACI 355.4 or alternately to AC308. Expansion or mechanical anchors shall conform to the requirements of ACI 355.2 or alternately to AC 193.

5. Fire Resistance: All anchors installed within fire resistant construction shall either be enclosed in a fire resistant envelope, be protected by approved fire-resistive materials, be used to resist wind and earthquake loads only, or anchor non-structural elements.

6. Engineer's approval is required for use of concrete anchors in locations other than those shown on the Drawings.

B. Concrete Anchor Design: An anchor design consists of specifying anchor size, quantity, spacing, edge distance and embedment to resist all applicable loads. Where an anchor design is indicated on the Drawings, it shall be considered an engineered design and anchors shall be installed to the prescribed size, spacing, embedment depth and edge distance. If all parts of an anchor design are provided on the Drawings except embedment depth, the anchors will be considered an engineered design and the Contractor shall provide the embedment depth as indicated in Paragraph B.3 unless otherwise directed by the Engineer. Where an anchor design is not indicated by the Engineer on the Drawings, the Contractor shall provide the anchor design per the requirements listed below.

1. Structural Anchors: All concrete anchors shall be considered structural anchors if they transmit load between structural elements; transmit load between non-structural components that make up a portion of the structure and structural elements; or transmit load between life-safety related attachments and structural elements. Examples of structural concrete anchors include but are not limited to column anchor bolts, anchors supporting non-structural walls, sprinkler piping support anchors, anchors supporting heavy, suspended piping or equipment, anchors supporting barrier rails, etc. For structural anchors, the Contractor shall submit an engineered design with signed and sealed calculations performed by an Engineer currently registered in the State of Florida. Structural anchors shall be of a type recommended by the anchor manufacturer for use in cracked concrete and shall be designed by the Contractor in accordance with ACI 318 Appendix D.

2. Non-Structural Anchors: All other concrete anchors may be considered non-structural concrete anchors. The Contractor shall perform an engineered design for nonstructural anchors. The Engineer may request the Contractor provide anchor design details for review, but submission of a signed, sealed design is not required. Nonstructural anchors shall be designed by the contractor for use in uncracked concrete.

3. Embedment Depth

   a. Minimum anchor embedment shall be as indicated on the Drawings or determined by the Contractor's engineered design. Although all manufacturers listed are permitted, the embedment depth indicated on the Drawings is based on "SET XP by Simpson Strong-Tie". If the Contractor submits one of the other concrete adhesives anchors listed, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.

   b. Where the embedment depth is not shown on the Drawings, concrete anchors shall be embedded no less than the manufacturer's standard embedment (expansion or mechanical anchors) or to provide a minimum allowable bond strength equal to the allowable yield capacity of the rod according to the manufacturer (adhesive anchors).

   c. The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long term temperature of 110 degrees F, and maximum short term temperature of 140 degrees F. In no case shall the embedment depth be less than the minimum or more than the maximum stated in the manufacturer's literature. C. Structural Anchors:

1. Mechanical Anchors:

   a. Wedge Anchors: Wedge anchors shall be "Kwik Bolt TZ" by Hilti, Inc., "TruBolt +" by ITW Redhead, "Strong-Bolt 2" by Simpson Strong-Tie Co. or "Powerstud SD-1" or "Powerstud SD-2" by DeWalt.

   b. Screw Anchors: Screw anchors shall be "Kwik HUS-EZ" and "KWIK HUS-EZ-I" by Hilti, Inc., "Titen HD" by Simpson Strong-Tie Co., or "Screw-Bolt+" by DeWalt. Bits specifically provided by manufacturer of chosen system shall be used for installation of anchors.

   c. Sleeve Anchors: Sleeve anchors shall be "HSL-3 Heavy Duty Sleeve Anchor" by Hilti, Inc. or "Power-Bolt +" by DeWalt.

   d. Undercut Anchors: Undercut anchors shall be "HDA Undercut Anchor" by Hilti, Inc., "Torq-Cut Undercut Anchor" by Simpson Strong-Tie Co., "Atomic + Undercut Anchor" by DeWalt.

   e. Shallow Embedment Internally Threaded Insert (3/4" max embedment): "MiniUndercut +Anchor" by Dewalt, "HSC-A" by Hilti, Inc. or equal.

3. Adhesive Anchors:

   a. Adhesive anchors shall be "Epcon C6+ Adhesive Anchoring System" by ITW Redhead, "HIT HY-200 Adhesive Anchoring System" by Hilti, Inc., "SET-XP Epoxy Adhesive Anchors" by Simpson Strong-Tie Co., or "Pure 110+ Epoxy Adhesive Anchor System" by DeWalt.

b. Structural adhesive anchor systems shall be IBC compliant and capable of resisting short term wind and seismic loads (Seismic Design Categories A through F) as well as long term and short term sustained static loads in both cracked and uncracked concrete in all Seismic Design Categories. Structural adhesive anchor systems shall comply with the latest revision of ICC-ES Acceptance Criteria AC308, and shall have a valid ICC-ES report in accordance with the applicable building code. No or equal products will be considered unless prequalified and approved by the Engineer and City.

D. Non-Structural Anchors: In addition to the acceptable non-structural anchors listed below, all structural anchors listed above may also be used as non-structural anchors.

1. Mechanical Anchors:

a. Wedge Anchors: Wedge anchors shall be “Kwik Bolt 3” by Hilti, Inc., “Wedge-All” by Simpson Strong-Tie Co. or “TruBolt” by ITW Redhead.

b. Screw Anchors: Screw anchors shall be “Kwik HUS” by Hilti, Inc., “Wedge-Bolt” by Powers Fasteners “Large Diameter Tapcon (LDT) Anchor” by ITW Redhead, or “Titen HD” by Simpson Strong-Tie Co. Bits specifically provided by manufacturer of chosen system shall be used for installation of anchors.

c. Sleeve Anchors: Sleeve anchors shall be “HSL Heavy Duty Sleeve Anchors” by Hilti, Inc. “Power-Bolt” by Powers Fasteners “Dynabolt Sleeve Anchor” by ITW Redhead, or “Sleeve-All” by Simpson Strong-Tie Co.

d. Drop-In Anchors: Drop-in anchors shall be “Drop-In” by Simpson Strong-Tie Co., “HDI Drop-In Anchor” by Hilti, Inc. or “Multi-Set II Drop-In Anchor” by ITW Redhead.

e. Undercut Anchors: Undercut anchors shall be “HDA Undercut Anchor” by Hilti, Inc., or “Torq-Cut” by Simpson Strong-Tie Co.

2. Adhesive Anchors:

a. Adhesive anchors shall be “Epcon A7” or “Epcon C6+ Adhesive Anchoring System” by ITW Redhead, “HIT HY-200 Adhesive Anchoring System” by Hilti, Inc., “SET Epoxy Tie High Strength Anchoring Adhesive” or “AT High Strength Anchoring Adhesive” by Simpson Strong-Tie Co., or “Powers AC 100+ Gold Vinylester Injection Adhesive Anchoring System” or “T308+ Epoxy Adhesive Injection System” by DeWalt.

b. Non-structural adhesive anchors systems shall be IBC compliant and capable of resisting short term wind and seismic (Seismic Design Categories A and B) as well as long term and short term sustained static loads in uncracked concrete.

c. Non-structural adhesive anchor embedment depth of the rod shall provide a minimum allowable bond strength that is equal to the allowable yield capacity of the rod unless noted otherwise on the Drawings.

d. No or equal products will be considered unless prequalified and approved by the Engineer and City.

E. Concrete Anchor Rod/Bolt Materials:

1. Concrete anchors used to anchor structural steel shall be a threaded steel rod per manufacturer's recommendations for proposed adhesive system, but shall not have a yield strength (fy) less than 58 ksi nor an ultimate strength (fu) less than 72.5 ksi, unless noted otherwise. Where steel to be anchored is galvanized, concrete anchors shall also be galvanized unless otherwise indicated on the Drawings.

2. Concrete anchors used to anchor aluminum, FRP, or stainless steel shall be Type 316 stainless steel unless noted otherwise. All underwater concrete anchors shall be Type 316 stainless steel.

3. Nuts, washers, and other hardware shall be of a material to match the anchors.

2.05 MASONRY ANCHORS

A. Anchors for fastening to solid or grout-filled masonry shall be adhesive anchors as specified above for concrete anchors.

B. Anchors for fastening to hollow masonry or brick shall be adhesive anchors consisting of threaded rods or bolts anchored with an adhesive system dispensed into a screen tube inserted into the masonry. The adhesive system shall use a two-component adhesive mix and shall inject into the screen tube with a static mixing nozzle. Thoroughly clean drill holes of all debris and drill dust with nylon (not wire) brush prior to installation of adhesive and anchor. Contractor shall follow manufacturer's installation instructions. The adhesive system shall be "HIT HY-70 System" as manufactured by Hilti, Inc., or "SET-XP EpoxyTie or "AT-XP Acrylic-Tie" as manufactured by Simpson Strong-Tie Co.

C. Masonry anchors used to anchor steel shall be a threaded steel rod per manufacturer's recommendations for proposed adhesive system, but shall not have a yield strength (fy) less than 58 ksi nor an ultimate strength (fu) less than 72.5 ksi, unless noted otherwise. Where steel to be anchored is galvanized, masonry anchors shall also be galvanized.

D. Masonry anchors used to anchor aluminum, FRP, or stainless steel shall be Type 304 stainless steel unless noted otherwise. All underwater anchors shall be Type 316 stainless steel.

E. Although all manufacturers listed are permitted, the masonry anchor design is based on "SET-XP by Simpson Strong-Tie ER 265 Revised 1-31-2017. If the contractor submits one of the other concrete adhesive anchors listed, the Engineer shall evaluate the proposed product and the Contractor shall provide the conditions stipulated by the Engineer specific to the approved adhesive anchor

2.06 WELDS

A. Electrodes for welding structural steel and all ferrous steel shall comply with AWS Code, using E70 series electrodes for shielded metal arc welding (SMAW), or F7 series electrodes for submerged arc welding (SAW).

B. Electrodes for welding aluminum shall comply with the Aluminum Association Specifications and AWS D1.2.

C. Electrodes for welding stainless steel and other metals shall comply with AWS D1.6.

2.07 WELDED STUD CONNECTORS

A. Welded stud connectors shall conform to the requirements of AWS D1.1 Type C.

2.08 EYEBOLTS

A. Eyebolts shall conform to ASTM A489 unless noted otherwise.

2.09 HASTELLOY FASTENERS

A. Hastelloy fasteners and nuts shall be constructed of Hastelloy C-276.

2.10 ANTISEIZE LUBRICANT

A. Antiseize lubricant shall be Graphite 50 Anti-Seize by Loctite Corporation, 1000 Anti-Seize Paste by Dow Corning, 3M Lube and Anti-Seize by 3M, or equal.

PART 3 – EXECUTION

3.01 MEASUREMENTS

A. The Contractor shall verify all dimensions and review the Drawings and shall report any discrepancies to the Engineer for clarification prior to starting fabrication.

3.02 ANCHOR INSTALLATION

A. Anchor Rods, Concrete Anchors, and Masonry Anchors

1. Anchor rods shall be installed in accordance with AISC "Code of Standard Practice" by setting in concrete while it is being placed and positioned by means of a rigidly held template. Overhead adhesive anchors, and base plates or elements they are anchoring, shall be shored as required and securely held in place during anchor setting to prevent movement during anchor installation. Movement of anchors during curing is prohibited.

2. The Contractor shall verify that all concrete and masonry anchors have been installed in accordance with the manufacturer's recommendations and that the capacity of the installed anchor meets or exceeds the specified safe holding capacity.

3. Concrete anchors shall not be used in place of anchor rods without Engineer's approval.

4. All stainless steel threads shall be coated with antiseize lubricant.

B. High Strength Bolts

1. All bolted connections for structural steel shall use high strength bolts. High strength bolts shall be installed in accordance with AISC 348 "The 2009 RCSC Specification for Structural Joints". All bolted joints shall be Type N, snug-tight, bearing connections in accordance with AISC Specifications unless noted otherwise on the Drawings.

2. All stainless steel bolts shall be coated with antiseize lubricant.

C. Concrete Anchors

1. Concrete at time of anchor installation shall be a minimum age of 21 days, have a minimum compressive strength of 2500 psi, and shall be at least 50 degrees F.

2. Concrete anchors designed by the Contractor shall be classified as structural or nonstructural based on the requirements indicated above.

3. Concrete Anchor Testing:

a. At all locations where concrete anchors meet the requirements for structural anchors at least 5 percent of all concrete anchors installed shall be proof tested to the value indicated on the Drawings, with a minimum of one tested anchor per anchor group. If no test value is indicated on the Drawings but the installed anchor meets the requirements for structural anchors, the Contractor shall notify the Engineer to allow verification of whether anchor load proof testing is required.

b. Contractor shall submit a plan and schedule indicating locations of anchors to be tested, load test values and proposed anchor testing procedure (including a diagram of the testing equipment proposed for use) to the Engineer for review prior to conducting any testing. Testing of anchors shall be in accordance with ASTM E488 for the static tension test. If additional tests are required, inclusion of these tests shall be as stipulated on Contract Drawings.

c. Where Contract Documents indicate anchorage design to be the Contractor's responsibility and the anchors are considered structural per the above criteria, the Contractor shall submit a plan and schedule indicating locations of anchors to be proof tested and load test values, sealed by a Professional Engineer currently registered in the State of Florida. The Contractor's Engineer shall also submit documentation indicating the Contractor's testing procedures have been reviewed and the proposed procedures are acceptable. Testing procedures shall be in accordance with ASTM E488.

d. Concrete Anchors shall have no visible indications of displacement or damage during or after the proof test. Concrete cracking in the vicinity of the anchor after

loading shall be considered a failure. Anchors exhibiting damage shall be removed and replaced. If more than 5 percent of tested anchors fail, then 100 percent of anchors shall be proof tested.

e. Proof testing of concrete anchors shall be performed by an independent testing laboratory hired directly by the Contractor and approved by the Engineer. The Contractor shall be responsible for costs of all testing, including additional testing required due to previously failed tests.

4. All concrete anchors shall be installed in strict conformance with the manufacturer's printed installation instructions. A representative of the manufacturer shall be on site when required by the Engineer.

5. All holes shall be drilled with a carbide bit unless otherwise recommended by the manufacturer. No cored holes shall be allowed unless specifically approved by the Engineer. If coring holes is allowed by the manufacturer and approved by the Engineer, cored holes shall be roughened in accordance with manufacturer requirements. Thoroughly clean drill holes of all debris and drill dust with compressed air followed by a wire brush prior to installation of adhesive and threaded rod/bolt unless otherwise recommended by the manufacturer. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Where depth of hole exceeds the length of the static mixing nozzle, a plastic extension hose shall be used to ensure proper adhesive injection from the back of the hole. Injection of adhesive into the hole shall utilize a piston plug to minimize the formation of air pockets. Wipe rod free from oil that may be present from shipping or handling.

D. Other Bolts

1. All dissimilar metal shall be connected with appropriate fasteners and shall be insulated with a dielectric or approved equal. Unless otherwise specified, where aluminum and steel members are connected together they shall be fastened with Type 316 stainless steel bolts and insulated with micarta, nylon, rubber, or equal.

3.03 WELDING

A. All welding shall comply with AWS Code for procedures, appearance, quality of welds, qualifications of welders and methods used in correcting welded work.

B. Welded stud connectors shall be installed in accordance with AWS D1.1.

3.04 INSPECTION

A. High strength bolting will be visually inspected in accordance with AISC 348 "The 2009 RCSC Specification for Structural Joints". Rejected bolts shall be either replaced or retightened as required. In cases of disputed bolt installation, the bolts in question shall be checked by a calibrated wrench certified by an independent testing laboratory. The certification shall be at the Contractor's expense.

B. Field welds will be visually inspected in accordance with AWS Codes. Inadequate welds shall be corrected or redone as required in accordance with AWS Codes. C. Post installed anchors shall be inspected as required by ACI 318.

3.05 CUTTING OF EMBEDDED REBAR

A. The Contractor shall not cut embedded rebar cast into structural concrete during installation of post-installed fasteners without prior approval of the Engineer.

- END OF SECTION -

PROJECT NO. 12337

SECTION 05540

CASTINGS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials, labor, and equipment required to provide all castings in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03480 - Precast Concrete Manholes, Handholes and Vaults

B. Section 05010 - Metal Materials

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Building Code (FBC)

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 - Submittals.

1. Complete fabrication and erection drawings of all castings specified herein.

2. Other submittals as required in accordance with Section 05010 - Metal Materials, and Section 05050 - Metal Fastening.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

A. Metal materials used for castings shall conform to Section 05010 - Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

A. All welds and fasteners used for castings shall conform to Section 05050 - Metal Fastening, unless noted otherwise.

2.03 IRON CASTINGS

A. General - Iron Castings shall include, but not be limited to frames, covers, and grates for trench drains, catch basins, and inlets; and stop log grooves.

1. Castings shall be of gray iron of uniform quality, free from defects, smooth and well cleaned by shotblasting.

2. Catalog numbers on the Drawings are provided only to show required types and configuration. All covers shall be cast with raised letters as designated on the Drawings.

3. Castings shall be as manufactured by Neenah Foundry Company, US Foundry, or equal.

B. Covers and Grates

1. Covers and grates shall be provided with matching frames. Cover shall fit flush with the surrounding finished surface. The cover shall not rock or rattle when loading is applied.

2. Round covers and frames shall have machined bearing surfaces.

3. Design loadings:

a. Where located within a structure, a minimum design loading of 300 psf shall be used, unless noted otherwise.

b. At all locations not within a structure, the design loading shall be a standard AASHTO H-20 truck loading, unless otherwise noted.

C. Watertight gasketing, bolting, locking devices, patterns, lettering, pickholes, vents, or selfsealing features shall be as detailed on the Drawings.

PART 3 – EXECUTION

3.01 FABRICATION

A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work.

PROJECT NO. 12337

B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.

C. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.

3.02 INSTALLATION

A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.

B. All castings shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.

- END OF SECTION -

DIVISION 6 WOOD AND PLASTICS

(NOT USED)

PROJECT NO. 12337

SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Furnish labor, materials, equipment and appliances required for complete execution of Work shown on the Drawings and specified herein. B. Principal items of work include:

1. Wood blocking, nailers, grounds, furring, ties, centering, etc., necessary or required for attachment or support of work under this Section, and other Sections.
2. Fasteners, including nails, screws, bolts, anchors and other fastenings, required to secure work under this Section.
3. Temporary enclosures and protective boarding.
4. Wood preservative treatment for all wood members in contact with roofing, masonry, concrete, and exposed to the elements.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of these specifications Work shall conform to the applicable requirements of the following documents:

1.	AWPA CA	Preservative Standards, Lumber and Plywood.
2.	AWPA C20	Structural Lumber Fire-Retardant Treatment by Pressure Process.
3.	AWPC C27	Plywood Fire-Retardant Treatment by Pressure Process.
4.	AWPA M4	Standards for Care of Preservative Treated Wood Products.
5.	APAG	Guide to Plywood Grades.
6.	FM 1-49	Perimeter Flashing

1.03 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 - Submittals, submit the following:

1. Certifications of Preservative and Fire Retardant Treatment.
2. Warranty of treatment manufacturer.

3. Certification of type and grade of lumber to be used.

4. Certification of type, rating and conformance to APA Standards.

1.04 DELIVERY AND STORAGE

A. Take all measures necessary to protect products against damage during delivery and storage.

B. Store lumber in enclosed places in such a manner to provide ventilation and protection from the weather.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Blocking, nailers, grounds and the like: Eastern Spruce or Douglas Fir No. 3 Dimension Lumber or Construction Grade, with a moisture content not to exceed 19%.

B. Plates, blocking, and nailers in contact with concrete or masonry: Pressure treated southern yellow pine.

C. Plywood: Identified with APA Grade trademarks of the American Plywood Association, in thickness as shown on the Drawings.

1. Exterior: AC EXT APA where exposed to view or a finish is required, CD-EXT-APA where concealed.

2. Interior: AC INT APA where exposed to view or a finish is required, CD-INT-APA where concealed.

D. Structural Framing Lumber: Douglas Fir No.1 grade with fb = 1,500 pounds per square inch and E = 1,700,000 pounds per square inch, 19 percent moisture content.

E. Fasteners: Provide clamps, connectors, straps, nails, bolts, screws, anchors, ties and other accessories and fasteners shown or required to properly secure all rough carpentry. Fasteners and accessories shall be stainless steel, galvanized, or other noncorrosive metal recommended for use. Fasteners used with pressure treated wood shall be compatible with the wood preservative treatment to prevent corrosion of fasteners.

F. Wood Preservative Treatment: Waterborne pressure treatment in conformance with the American Wood Preservers' Association standard P5. Retention shall be in accordance with AWPA Standards and be a minimum of 0.40 pounds per cubic foot for contact with or below ground, concrete, or masonry and 0.25 pounds per cubic foot for above ground. Stamp each piece of treated wood with a trademark identifying the classification of the treatment or a certificate from the processor for each shipment.

G. Fire Retardant Treatment: Fire-retardant lumber and plywood must have an Underwriters Laboratories stamp signifying a FR-S rating and certifying a 25 or less flame spread and smoke developed value, when tested in accordance to UL 723, ASTM E 84, and NFPA 255 "Tunnel Test", and when the test is extended for 20 additional minutes. Treatment formulation shall contain no halogens, sulfates, chlorides or ammonium phosphate. Smoke toxicity shall be no more than that of untreated wood.

H. Connecting Hardware

1. Nails shall be stainless steel common wire for exterior work.

2. Screws shall be standard domestic manufacture, stainless steel for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials.

3. Bolts shall be machine bolts (or carriage bolts if called for on Drawings) of Series 300 stainless steel with hexagon nuts, of sizes noted on Drawings. Wood fascia fasteners shall be galvanized steel and conform to the requirements of ASTM Designation A 307.

4. Steel plates and angles shall be carbon steel, ASTM A 36, galvanized after fabrication for temporary items and stainless steel for permanent items as shown on the Drawings.

5. Lag screws, shear plates and split ring connectors shall conform to the requirements of the "National Design Specifications for Wood Construction from the National Forest Products Association and shall be stainless steel.

6. Power actuated fasteners shall conform to Federal Specification GGG-D-777a, and shall be installed as per manufacturer's printed directions. Power charge shall be powerful enough to prevent spalling of concrete.

PART 3 – EXECUTION

3.01 COORDINATION

A. Coordinate with all trades as to nailers, blocking, grounds and the like required for the attachment of their work and other items requiring same. Carry out all work as required to cooperate work of other trades.

3.02 INSTALLATION

A. Perform work in conformance manufacturer's recommendations and specifications, industry, national and local standards and codes.

B. Layout, cut, fit and erect rough blocking, nailers, furring and other rough carpentry. Do cutting work in connection with carpentry and finish for other trades. Brace plumb and level all members in true alignment and rigidly secure in place with sufficient nails, spikes,

screws and bolts. Defects which render any piece or part unable to serve its intended purpose shall be discarded or, cut out and replaced.

C. Provide all bracing, supports and shoring required to support construction.

D. Protect all masonry including edges of concrete platforms and similar items. Remove protective covering when directed. Take special precautions at masonry openings and corners of the building.

E. Set all rough hardware, such as plates, spikes, bolts, nails, lag screws, lagging bolts, anchors, etc., as required to hold woodwork together or to anchor or secure it to other materials and construction.

F. Provide wood grounds, nailing strips and similar items wherever necessary or required throughout the project for the support, proper erection or installation of the work and support of mirrors, cabinets, shelf cleats, base and similar items. Thoroughly secure in place by approved means.

G. Secure wood grounds, nailing strips and similar items to metal plugs set in masonry, toggle or expansion bolts. Give the mason all necessary information to enable him to lay out correctly the location for metal wall plugs. Wood plugs will not be accepted.

H. Construct joints to support dead loads, live loads, snow loads, wind loads, or combinations in conformance with "National Design Specifications for Stress Grade Lumber and its Fastenings", recommended by National Forest Products Association.

I. Nailers and Blocking: Provide and secure wood nailers, blocking, for the reception of roof curbs, roofing, etc. in accordance with FM I-49, or as required by the Building Code, whichever is most stringent. Coordinate attachment with roofing system, where roofing system design includes design of nailers provide attachment in accordance with engineered roofing design.

1. Provide nailers of sizes, shapes and profiles indicated on the Drawings. Nailers shall not be less than 2 x6. Build up nailers as required to achieve thickness of insulation or as required to provide proper attachment of roofing and curbs. Provide anchors as required for secure attachment of roofing systems, copings, gravel stops or other edge terminations.

3.03 TEMPORARY PROTECTION

A. Provide and install all temporary protection in accordance with applicable provisions of the Contract Documents, OSHA regulations, and as follows:

1. Temporary protection shall include wood doors, railings, protection of floor or roof openings, temporary partitions, and the like; adequately maintained in good repair during the life of the Contract.

2. Furnish and set temporary partitions with wood doors at all exterior doorways, exterior openings or in locations exposed to weather. Substantially build and hang, with proper hinges, locks and other necessary hardware, and remove and reset whenever required to accommodate the Work and keep in good repair.

3. Provide substantial temporary wood covering or guards for openings left in floor or roof slabs for ducts, shafts, etc., using rough planking at least 2 inch thick, cleated together and otherwise made sufficiently strong and put in place wherever required immediately after the forms have been removed.

3.04 JOB CONDITIONS

A. If the installation of metal frames and glass does not promptly follow the completion of the exterior enclosures, and if the absence of enclosures would cause damage, close in all such openings temporarily by the use of heavy polyethylene plastic sheeting, or canvas stretched over and nailed to frames of 1 inch x 2 inch or heavier strips.

3.05 REMOVAL OF TEMPORARY WORK

A. Remove all temporary protection when so directed, or prior to acceptance of this project.

- END OF SECTION -

DIVISION 7

THERMAL AND MOISTURE PROTECTION

PROJECT NO. 12337

SECTION 07160

BITUMINOUS DAMPPROOFING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Prepare and prime surfaces to receive dampproofing.

B. Apply bituminous dampproofing on exterior concrete wall surfaces below grade of new tanks, precast vaults and manhholes, and structures that enclose interior areas installed under this Contract, unless otherwise indicated to be coated in Specification 09900 – Painting.

C. Seal/caulk joints and protrusions through dampproofing.

D. Place protective cover over applied dampproofing.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Cast-in-Place Concrete

B. Section 03400 - Precast Concrete

C. Section 03315 – Grout

D. Section 09900 – Painting

1.03 REFERENCE STANDARDS

A. ASTM D41 Primer for Use with Asphalt in Dampproofing and Waterproofing.

B. ASTM D449 Asphalt for Dampproofing and Waterproofing.

C. ASTM D1668 Glass Fiber Fabric Impregnated with Bitumen.

1.04 SUBMITTALS

A. Submit product data in accordance with Section 01300 - Submittals.

B. Submit manufacturer's product literature, specification data sheets and instructions for application recommendations.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened containers identified with name, brand, type, grade, class and all other qualifying information.

B. Store materials in dry location to prevent damage or intrusion of foreign matter. Remove damaged materials from the job site.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject with compliance with the Specifications provide products from one of the following:

1. Karnak Corp.
2. W.R. Meadows
3. Koch Materials Co.
4. BASF Master Builders Solutions

2.02 MATERIALS

A. Asphalt Primer: Type recommended by manufacturer.

B. Dampproofing: Non-asbestos, fibrated mastic conforming to ASTM D-1227, Type II, Class 1, compatible with cavity wall insulation.

PART 3 – EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened containers identified with name, brand, type, grade, class and all other qualifying information.

B. Store materials in dry location to prevent damage or intrusion of foreign matter. Remove damaged materials from the job site.

3.02 SURFACE PREPARATION

A. Ensure surfaces are firm, dry and free from loose particles, cracks, pits, rough projections, grease, oil and other foreign matter detrimental to adhesion and monolithic application of dampproofing.

B. Remove loose particles and foreign matter with scraper, wire brush or other effective means. Remove grease or oil with safety solvent, effective alkaline cleaner or detergent. If safety solvents are used, follow with an application of alkaline cleaner or detergent scrub surfaces clean with water.

3.03 APPLICATION

A. Prime surfaces with manufacturers recommended primer. Apply dampproofing at the rate of 6 gallons per 100 square feet.

B. Apply dampproofing to substrates to provide a complete moisture resistant coating. C.

Each coat shall be color coded with red as the base coat and black as the top coat.

3.04 PROTECTION

A. Protect building from damage resulting from spillage, dripping and dropping of materials. Repair work damages during dampproofing operations.

B. Take precautions against fire and other hazards during delivery, storage and installation of flammable materials. Comply with local ordinances and fire regulations in the installation of hazardous materials.

3.05 CLEANING

A. Clean adjacent materials and finishes which have been soiled.

- END OF SECTION -

PROJECT NO. 12337

SECTION 07190

VAPOR BARRIER

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install a vapor barrier to be placed under all reinforced concrete placed against soil as specified herein or shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Cast-in-Place Concrete

PART 2 – PRODUCTS

2.01 VAPOR BARRIER

A. Vapor Barrier: A reinforced laminate membrane with a minimum tensile strength of 75 lbs/in. in accordance with ASTM D-882, vapor transmission rating of 0.02 perms in accordance with E-96, and a puncture resistance of 25 lbs in accordance with ASTM D 4833.

B. Adhesive/Tape: Type approved by the Manufacturer of the vapor material.

C. Penetration sealing: Provide manufacturer's recommended penetration seals at all pipe, conduit, and similar penetrations.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Specifications, provide products from one of the following manufacturers:

1. Viper Vapercheck 10 by Insulation Solutions, Inc.
2. Griffolyn Type-85, by Reef Industries, Inc.
3. Or Equal

PART 3 – EXECUTION

3.01 VAPOR BARRIER

A. Vapor barrier shall be placed on top of 4 inches minimum of compacted structural fill stone, free of debris and protrusions, as shown on the Drawings for structural slabs.

B. Lap edges 12 inches and seal with adhesive tape. Lay with seams perpendicular to and lapped in the direction of placement. Do not penetrate vapor barrier.

C. Protect from damage until concrete is placed. Punctures and tears in vapor barrier shall be repaired using patches of the material which overlaps puncture or tear a minimum of 12 inches; seal with tape or adhesive.

D. Penetrations through vapor barrier, such as pipe, drains, conduits and similar penetrations, shall be sealed in strict accordance with manufacturer's recommended instructions.

- END OF SECTION -

PROJECT NO. 12337

SECTION 07920

SEALANTS AND CAULKING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide sealant and caulking work required for a complete installation as is indicated on the Drawings and specified herein. The required applications of sealants and caulking include, but are not necessarily limited to, the following general locations:

1. Masonry joints, exterior and interior.
2. Joints at penetrations of walls, decks by piping, doors, windows, louvers and other services and equipment.
3. Joints between items of equipment and other construction.
4. Joints in concrete.

1.02 SUBMITTALS

A. Submit shop drawings and color samples of sealant for review in accordance with the Section entitled "Submittals".

B. Submit a two year guarantee on sealant type caulking work against joint failure. Joint failure is defined as leaks of air or water; evidence of loss of cohesion; fading of sealant material; migration of sealant; evidence of loss of adhesion between sealant and joint edge.

1.03 ACCEPTABLE MANUFACTURERS

A. The following list of manufacturer products are acceptable for this Section, subject to conformance with the specified requirements: Tremco, Thiokol, Dymoric or equal.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Primer: Where required by sealant manufacturer, the primer shall be a compound designed to insure the adhesion of sealant. Material shall be provided by the sealant manufacturer and shall be selected for compatibility with substrate.

B. Sealant

1. Type 1: Multi-component, non-sag, low-modulus polyurethane rubber sealant meeting ASTM C-920, Type M, Grade NS, Class 25, use NT, M, A, and O. Capable

of withstanding 50% in extension or compression such as Sikaflex-2C NS/SL, Sika Corporation, or approved equal.

2. Type 2: Single component polyurethane sealant meeting ASTM C-920, Type S, Grade NS, Class 25, Use NT, M, A, and O. Capable of withstanding 25% in extension or compression such as Sikaflex 1A by Sika Corporation or approved equal.

3. Type 3: Single component, low-modulus moisture curing silicone meeting ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G, and A. Capable of withstanding 50% extension and compression. Pecora 890 by Pecora Corporation, or approved equal.

4. Type 4: Single component, mildew resistant, moisture-curing silicone meeting ASTM C-920, Type S, Grade NS, Class 25, Use NT, M, G, and A. Pecora 898 by Pecora Corporation, or approved equal.

5. Type 5: Single component, acrylic latex meeting ASTM C-834. AC-20+ Silicone by Pecora Corporation, or approved equal.

6. Type 6: High grade butyl sealant meeting Federal Specification TT-S-00-1657. BC158 by Pecora Corporation or approved equal.

7. Type 7: Multi-component chemical resistant polysulfide sealant conforming to ASTM C-920, Type M, Grade NS, Class 25 such as Sonolastic Two Part by BASF Construction Chemicals, or approved equal.

8. Type 8: Non-sag, Multi Component, traffic grade polyurethane sealant meeting ASTM C920, Type 19, Grate NS, Class 25, use T, M, A, and O. DynaTread by Pecora Corporation or approved equal.

C. Joint Backing shall be closed cell foam. Material shall be nonreactive with caulking materials and non-oily. Minimum density shall be 3.24 pcf. Use no asphalt or bitumenimpregnated fiber with sealants.

D. Joint cleaner shall be as recommended by sealant or caulking compound manufacturer.

E. Joint Primer shall be as recommended by sealant manufacturer.

F. Bond Breaker tape shall be either polyethylene or plastic as recommended by the sealant manufacturer.

G. Color: Where manufacturer's standard colors do not closely match materials being sealed, provide a custom color.

PART 3 – EXECUTION

3.01 GENERAL

A. Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.

3.02 SHIPPING, HANDLING AND STORAGE

A. Store and handle materials so as to prevent the inclusion of foreign matter or the damage of materials by water or breakage. Procure and store in original containers until ready for use. Material showing evidence of damage will be rejected.

B. Store and handle materials so as to prevent the inclusion of foreign matter or the damage of materials by water or breakage. Procure and store in original containers until ready for use. Material showing evidence of damage shall be rejected.

3.03 INSTALLATION

A. Employ only proven installation techniques, which will insure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surface equally on opposite sides. Except as otherwise indicated, the Contractor shall fill the sealant rabbet to a concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

B. Install sealants to depths as specified, or if not, as recommended by the sealant manufacturer and as follows:

1. Moving Joints: For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but not more than 1/2-inch deep or less than 1/4-inch deep.

2. Sealed Joints: For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.

3. Thresholds: Set thresholds in full bed of caulking compound; remove excess materials.

3.04 SCHEDULE

Schedule of Sealants

Application	Sealant	Color
Vertical and horizontal joints bordered on both sides by concrete, masonry, precast concrete, EIFS, or other porous building material.	Type 2	To closely match adjacent surfaces or mortar and as selected by the City.
Vertical and horizontal joints bordered on both sides by painted metals, anodized aluminum, mill finished aluminum, PVC, glass or other non-porous building material.	Type 3	To closely match adjacent surfaces and as selected by the City.

Masonry expansion and control joints less than 1¼" wide.	Type 2	To closely match adjacent surfaces and as selected by the City.
Masonry expansion and control joints equal or greater than 1¼ inches wide and not to exceed 2”.	Type 1	To closely match adjacent surfaces and as selected by the City.
Application	**Sealant**	**Color**
Interior – wood trim and finish joints.	Type 5	Color to be selected by City
Sanitary areas, joints in ceramic tile, around plumbing fixtures, countertops, and back splashes. See Note 1.	Type 4	To closely match adjacent surfaces and as selected by the City.
Perimeter sealing of doors, windows, louvers, piping, ducts, and electrical conduit. See Note 2.	Type 2 OR Type 3	To closely match adjacent surfaces and as selected by the City.
Below thresholds.	Type 6	Manufacturer's standard
Submerged in liquids. See Note 4.	Type 1	Manufacturer's standard
Submerged in liquids with high concentration of chlorine (> 2 ppm).	Type 7	Manufacturer’s standard
Horizontal Joints exposed to vehicular or pedestrian traffic.	Type 8	To closely match adjacent surfaces.
Other joints indicated on the drawings or customarily sealed but not listed.	Type recommended by manufacturer	To closely match adjacent surfaces and as selected by the City.

Note 1:Sealant for Laboratory Countertop shall be as recommended by countertop manufacturer.
Note 2:Provide UL approved sealants for penetrations thru fire-rated walls and as specified in Section 07270.
Note 3:Sealants which will come in contact with potable water shall meet the requirements of NSF 61.
Note 4:Where sealant will be immersed in liquid chemicals verify compatibility prior to installation of sealant.

3.05 PROTECTION OF ADJOINING SURFACES

A. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

3.06 SEALANT BACKER ROD

A. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

3.07 BOND BREAKER

A. Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to insure that elastomeric sealants will perform properly.

3.08 SPILLAGE

A. Sealants or compounds shall not overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces. Masking tape or other precautionary devices shall be used to prevent staining of adjoining surfaces.

3.09 CURING

A. Sealants and caulking compounds shall be cured in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength, and surface durability.

3.10 CLEANING

A. Excess and spillage of compounds shall be promptly removed as the work progresses. Adjoining surfaces shall be cleaned by whatever means may be necessary to eliminate evidence of spillage. Do not damage the adjoining surfaces or finishes.

- END OF SECTION -

DIVISION 8

DOORS AND WINDOWS

(NOT USED)

DIVISION 9

FINISHES

PROJECT NO. 12337

SECTION 09900

PAINTING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, tools, materials, supervision and equipment necessary to do all the work specified herein and as required for a complete installation, including surface preparation, priming and painting of Contractor furnished equipment, materials, and structures. B. Section includes:

1. Paint Materials
2. Shop Painting
3. Field Painting
    a. Surface Preparation
    b. Piping and Equipment Identification
    c. Schedule of Colors
    d. Work in Confined Spaces
    e. OSHA Safety Colors

1.02 GENERAL INFORMATION AND DESCRIPTION

A. The term "paint," as used herein, includes emulsions, enamels, paints, stains, varnishes, sealers, cement filler, cement epoxy fillers and other coatings, whether used as prime, intermediate, or finish coats.

B. All paint for concrete and metal surfaces shall be especially adapted for use in and around water and wastewater treatment facilities and shall be applied in conformance with the manufacturer's published specifications.

C. All paint for final coats shall be fume resistant, compounded with pigments suitable for exposure to sewage gases, especially to hydrogen sulfide and to carbon dioxide. Pigments shall be materials which do not tend to darken, discolor, or fade due to the action of sewage gases. If a paint manufacturer proposes use of paint which is not designated "fume resistant" in its literature, it shall furnish full information concerning the pigments used in this paint.

D. Provide primers and intermediate coats produced by same manufacturer as finish coat. Use only thinners approved by paint manufacturer, and only within manufacturer’s recommended limits.

E. Coatings used in conjunction with potable water supply systems shall have U.S. Environmental Protection Agency (EPA) and FDA approval for use with potable water and shall not impart a taste or odor to the water.

F. All building, facilities, structures, and appurtenances, as indicated on the Drawings and as specified herein, shall be painted with not less then one shop coat and two field coats, or one prime coat and two finish coats of the appropriate paint. Items to be painted include, but are not limited to, exterior and interior concrete, structural steel, miscellaneous metals, steel and aluminum doors and frames, concrete block, ductwork, sluice gates, operators, pipe fittings, valves, mechanical equipment, motors, conduit, and all other work which is obviously required to be painted unless otherwise specified.

G. Baked on enamel finishes and items with standard shop finishes such as graphic panels, electrical equipment, toilet partitions, lockers, instrumentation, etc., shall not be field painted unless the finish is damaged during shipment or installation. Aluminum, stainless steel, fiberglass and bronze work shall not be painted unless color coding and marking is required or otherwise specified. A list of surfaces not to be coated is included in Article 1.09 of this Section.

H. Ensure compatibility of total paint system for each substrate. Test shop primed equipment delivered to the site for compatibility with final paint system. Provide an acceptable barrier coat or totally remove shop applied paint system when incompatible with system specified, and repaint with specified paint system.

I. The Contractor shall obtain all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

1.03 REFERENCE SPECIFICATION, CODES AND STANDARDS

A. Without limiting the generality of these specifications the Work shall conform to the applicable requirements of the following documents:

1. SSPC - The Society for Protective Coatings Standards
   a. SSPC-Vis 1 — Pictorial Surface Preparation Standardsfor Painting Steel Structures
   b. SSPC-SP2 — Hand Tool Cleaning
   c. SSPC-SP3 — Power Tool Cleaning
   d. SSPC-SP5 — (NACE No. White Metal Blast Cleaning
   e. SSPC-SP6 — (NACE No. Commercial Blast Cleaning
   f. SSPC-SP10 — (NACE No. Near-White Metal Blast
   g. SSPC-SP13 — (NACE No. 6) Surface Preparation of Concrete
2. NACE - National Association of Corrosion Engineers

3. ASTM D1737 - Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus

4. ASTM B117 - Method of Salt Spray (Fog) Testing

5. ASTM D4060 - Test Method for Abrasion Resistance of Organic Coating by the Taber Abraser

6. ASTM D3359 - Method for Measuring Adhesion by Tape Test

1.04 MANUFACTURERS

A. All painting materials shall be as manufactured by Tnemec, Carboline, Sherwin Williams, or equal.

1.05 SUBMITTALS

A. The Contractor shall submit paint manufacturer's data sheets, application instructions, and samples of each finish and color to the Engineer for review, before any work is started in accordance with Section 01300 - Submittals.

B. Submitted samples of each finish and color shall be prepared in a step-down format so that the area of each sample indicates the appearance of the various coats. For example, where a three-coat system is specified, the sample shall be divided into three areas indicating one coat only, two coats and all three coats. The Engineer will provide written authorization constituting a standard, as to color and finish only, for each coating system.

C. The Contractor shall prepare a complete schedule of surfaces to be coated and shall identify the surface preparation and paint system proposed for use. The Paint Schedule shall be in conformance with Article 3.03 of this Section. The schedule shall contain the name of the paint manufacturer, and the name, address and telephone number of the manufacturer's representative that will inspect the Work. The schedule shall be submitted to the Engineer for review as soon as possible following the Notice to Proceed so that the schedule may be used to identify colors and to specify shop painting systems on order for fabricated equipment.

D. Name and detailed qualifications of the protective coating applicator or subcontractor. Qualifications shall include, but not be limited to, five (5) project references which show that the painting applicator or subcontractor has previous successful experience with the specified or comparable coating systems, a list of installations that are currently in service and documentation that applicator or subcontractor is currently a qualified applicator of the proposed coatings by the manufacturer. Include the name, address and telephone number of the owner of each installation for which the coating applicator provided the coating.

1.06 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. The Contractor shall purchase paint from an acceptable manufacturer. The manufacturer shall assign a representative to inspect the application of his product both in the shop and field. The Contractor, through the manufacturer's representative, shall submit his report to the Engineer at the completion of his Work identifying the products used and verifying

that said products were properly applied and that the paint systems were proper for the exposure and service.

B. Services shall also include, but not be limited to, inspecting prior coatings of paint, determination of best means of surface preparation, inspection of complete work, and reinspection of painted work to be performed six months after the job is completed.

1.07 MANUFACTURER'S INSTRUCTIONS

A. The manufacturer's published instructions for use as a guide in specifying and applying the manufacturers proposed paint shall be submitted to the Engineer. Paint shall not be delivered to the job before acceptance of the manufacturer's instructions is given by the Engineer.

B. A manufacturer's paint will not be considered for use unless that manufacturer's published instructions meets the following requirements:

1. The instructions must have been written and published by the manufacturer for the purpose and with the intent of giving complete instruction for the use and application of the proposed paint in the locality and for the conditions for which the paint is specified or shown to be applied under this Contract.

2. All limitations, precautions, and requirements that may adversely affect the paint; that may cause unsatisfactory results after the painting application; or that may cause the paint not to serve the purpose for which it was intended; that is, to protect the covered material from corrosion, shall be clearly and completely stated in the instructions. These limitations and requirements shall, if they exist, include, but not be limited to the following:

a. Methods of application

b. Number of coats

c. Thickness of each coat

d. Total thickness

e. Drying time of each coat, including primer

f. Primer required to be used

g. Primers not permitted

h. Use of a primer

i. Thinner and use of thinner

j. Temperatureand relativehumidity limitations during application and after application

k. Time allowed between coats

l. Protection from sun

m. Physical properties of paint including solids content and ingredient analysis

n. Surface preparation

o. Touch up requirements and limitations

C. Concrete surfaces specified by the paint manufacturer to be acid etched shall be etched in accordance with the manufacturer's instructions. The surface shall then be thoroughly scrubbed with clean water, rinsed, and allowed to dry. The surface shall be tested with a moisture meter to determine when dry before coating. The surface shall also be tested for pH to determine the acid has been properly neutralized.

1.08 QUALITY ASSURANCE

A. The Contractor shall give the Engineer a minimum of three days advance notice of the start of any field surface preparation work of coating application work.

B. All such Work shall be performed only in the presence of the Engineer, unless the Engineer has specifically allowed the performance of such Work in his absence.

C. Review by the Engineer, or the waiver of review of any particular portion of the Work, shall not relieve the Contractor of his responsibility to perform the Work in accordance with these Specifications.

D. The Contractor shall provide references of the coating applicator or subcontractor per article 1.05, D.

1.09 SAFETY AND HEALTH REQUIREMENTS

A. In accordance with requirements of OSHA Safety and Health Standards for Construction (29CFR1926) and the applicable requirements of regulatory agencies having jurisdiction, as well as manufacturer's printed instructions, appropriate technical bulletins, manuals, and material safety data sheets, the Contractor shall provide and require use of personnel protective and safety equipment for persons working in or about the project site.

B. Respirators shall be worn by persons engaged or assisting in spray painting. The Contractor shall provide ventilating equipment and all necessary safety equipment for the protection of the workmen and the work.

C. All paint shall comply with all requirements of the Air Pollution Regulatory Acts concerning the application and formulation of paints and coatings for an area in which the paints are applied. Specifically, paints shall be reformulated as required to meet the local, State and Federal requirements.

1.10 SURFACES NOT TO BE COATED

A. The following items shall not be coated unless otherwise noted:

1. Encased piping or conduit.
2. Stainless steel work.
3. Clear PVC secondary containment piping.
4. Galvanized checkered plate.
5. Aluminum handrails, walkways, windows, louvers, grating and checkered plate.
6. Flexible couplings, lubricated bearing surfaces and insulation.
7. Packing glands and other adjustable parts of mechanical equipment.
8. Finish hardware.
9. Steel encased in concrete or masonry 10. Plastic switch plates and receptacle plates.
11. Signs and nameplates.
12. Any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
13. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.

1.11 QUALITY WORKMANSHIP

A. The Contractor shall be responsible for the cleanliness of his painting operations and shall use covers and masking tape to protect work whenever such covering is necessary, or if so requested by the City. Any unwanted paint shall be carefully removed without damage to any finished paint or surface. If damage occurs, the entire surface, adjacent to and including the damaged area, shall be repainted without visible lapmarks and without additional cost to the City.

B. Painting found defective shall be scraped or sandblasted off and repainted as the City may direct. Before final acceptance of the work, damaged surfaces of paint shall be cleaned and repainted as directed by the City.

1.12 ADDITIONAL PAINT

A. At the end of the project, the Contractor shall turn over to the City a one gallon can (single component material) or small kit (multi component material – minimum of one gallon yield) of each type and color of paint, primer, thinner or other coating used in the field painting. The material shall be delivered in unopened, labeled cans as it comes from the factory. The manufacturer's literature describing the materials and giving directions for their use

shall be furnished in three bound copies. A type-written inventory list shall be furnished at the time of delivery.

1.13 SHIPPING, HANDLING AND STORAGE

A. All painting materials shall be brought to the job site in the original sealed labeled containers of the paint manufacturer and shall be subject to review by the Engineer.

Where thinning is necessary, only the product of the manufacturer furnishing the paint shall be used. All such thinning shall be done strictly in accordance with the manufacturer's instructions, and with the full knowledge of the Engineer.

B. Materials and their storage shall be in full compliance with the requirements of pertinent codes and fire regulations. Receptacles shall be placed outside buildings for paint gates and containers. Paint waste shall not be disposed of in plumbing fixtures, process drains or other plant systems or process units.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Table 09900-1 depicts the coatings referenced in Article 3.03 of this Section entitled, "Paint Schedule". Table 09900-1 lists Tnemec products as a reference. Equivalent products by the Manufacturer's listed in Article 1.04 of this Section may be submitted for review.

TABLE 09900-1
PRODUCT LISTING

Ref. No.	Description	Manufacturer's Reference
		Tnemec
102	Water Based Block Filler	1254 Epoxoblock WB
104	Polyamidoamine Epoxy Primer	N69 – 1211
105	Polyamidoamine Epoxy	N69 – Color
110	Aliphatic Acrylic Polyurethane	1095 – Color
111	Modified Waterborne Acrylate	156 - Envirocrete (Smooth Texture)
114	Acrylic Concrete Primer	6 Tneme-Cryl
115	Aromatic Urethane / Epoxy Zinc Rich	90-97 Tneme-Zinc
138	Modified Polyamine Epoxy	142 Epoxoline

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

A. General

1. Surfaces to be painted shall be clean and dry, and free of dust, rust, scale and all foreign matter. No solvent cleaning, power or hand tool cleaning shall be permitted unless acceptable to the Engineer or specified herein.

2. Threaded portions of valve and gate stems, machined surfaces which are limited for sliding contact, surfaces which are to be assembled against gaskets, surfaces or shafting on which sprockets are to fit, or which are intended to fit into bearings, machined surfaces of bronze trim on slide gates and similar surfaces shall be masked off to protect them from the sandblasting of adjacent surfaces. Cadmium-plated or galvanized items shall not be sandblasted unless hereinafter specified, except that cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment to the sandblasted shall be sandblasted in the same manner as the unprotected metal. All installed equipment, mechanical drives, and adjacent painted equipment shall be protected from sandblasting. Protection shall prevent any sand or dust from entering the mechanical drive units or equipment where damage could be caused.

3. Hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place prior to cleaning and painting, and not intended to be painted, shall be protected or removed during painting operations and repositioned upon completion of painting operations.

4. Examine surfaces to be coated to determine that surfaces are suitable for specified surface preparation and painting. Report to Engineer surfaces found to be unsuitable in writing. Do not start surface preparation until unsuitable surfaces have been corrected. Starting surface preparation precludes subsequent claim that such surfaces were unsuitable for the specified surface preparation or painting.

5. Surface preparation shall be in accordance with specifications and manufacturer's recommendations. Provide additional surface preparation, and fill coats where manufacturer recommends additional surface preparation, in addition to requirements of specification.

6. Touch-up shop or field applied coatings damaged by surface preparation or any other activity, with the same shop or field applied coating; even to the extent of applying an entire coat when required to correct damage prior to application of the next coating. Touch up coats are in addition to the specified applied systems, and not considered a field coat.

7. Protect motors and other equipment during blasting operation to ensure blasting material is not blown into motors or other equipment. Inspect motors and other equipment after blasting operations and certify that no damage occurred, or where damage occurred, the proper remedial action was taken

8. Sand from sandblasting shall be thoroughly removed, using a vacuum cleaner if necessary. No surface which has been sandblasted shall be painted until inspected by the Engineer.

B. Metal Surfaces

1. Except as otherwise provided, all preparation of metal surfaces shall be in accordance with Specifications SP-1 through SP-10 of the Society for Protective Coatings (SSPC). Where the Society for Protective Coatings Specifications are referred to in these Contract Documents, the corresponding Pictorial Surfaces Preparation Standard shall be used to define the minimum final surface conditions to be supplied. Grease and oil shall be removed and the surface prepared by hand tool cleaning, power tool cleaning or blast cleaning in accordance with the appropriate Specification SP-1 through SP-30.

2. Perform blast cleaning operations for metal when following conditions exist:

   a. Moisture is not present on the surface.

   b. Relative humidity is below 80%.

   c. Ambient and surface temperatures are 5°F or greater than the dew point temperature.

   d. Painting or drying of paint is not being performed in the area.

   e. Equipment is in good operating condition.

   f. Proper ventilation, illumination, and other safety procedures and equipment are being provided and followed.

3. Weld flux, weld spatter and excessive rust scale shall be removed by power tool cleaning as per SSPC-SP-3.

4. All ferrous metal surfaces not required to be galvanized shall be cleaned of all oil grease, dirt, rust and tight and loose mill scale by blasting in accordance with the following: SSPC SP 5 White Metal Blast Cleaning and comply with the visual standard NACE No. 1, for shop prepared and shop primed metal to be submerged or in a corrosive environment, SSPC-SP10 Near White Metal Blast Cleaning, and comply with the visual standard NACE No. 2 for field prepared metal to be submerged or in a corrosive environment, SSPC-SP6 and comply with the visual standard NACE No. 3 for metal in all other locations. Pickling, complying with SSPC SP 8, may be substituted for Near White Blast in areas as determined by the Engineer. Priming shall follow sandblasting before any evidence of corrosion occurs, before nightfall and before any moisture is on the surface.

5. Field surface preparation of small, isolated areas such as field welds, repair of scratches, abrasions or other marks to the shop prime or finish shall be cleaned by power tools in accordance with SSPC SP 3, or in difficult and otherwise inaccessible areas by hand cleaning in accordance with SSPC SP 2 and spot primed.

6. All coated surfaces shall be cleaned prior to application of successive coats. All non ferrous metals not to be coated shall be cleaned. This cleaning shall be done in accordance with SSPC SP 1, Solvent Cleaning.

7. All shop coated surfaces shall be protected from damage and corrosion before and after installation by treating damaged areas immediately upon detection. Abraded or corroded spots on shop coated surfaces shall be prepared in accordance with SSPC SP 2, Hand Tool Cleaning and then touched up with the same materials as the shop coat.

8. All shop coated surfaces which are faded, discolored, or which require more than minor touch up, in the opinion of the Engineer, shall be repainted. Cut edges of galvanized sheets, electrical conduit, and metal pipe sleeves, not to be finish painted, shall be cleaned in accordance with SSPC SP 1, Solvent Cleaning and primed with zinc dust zinc oxide metal primer.

C. Concrete Surfaces

1. Concrete surfaces are to be cured for at least 28 days prior to surface preparation, unless coatings are recommended for application over green concrete surfaces.

2. Test concrete for moisture content, pH and salts using test method recommended by the paint manufacturer. Do not begin surface preparation, or painting until moisture content is acceptable to manufacturer.

3. Non-submerged concrete and masonry surfaces to be painted shall be prepared by removing efflorescence, chalk, dust, dirt, grease, oil, form coating, tar and by roughening to remove glaze. All surfaces shall be repaired prior to commencement of the coating operation.

4. Concrete immersion surfaces that are to be coated shall be prepared in accordance to SSPC-SP13/NACE No. 6 to remove all laitance, curing compounds, hardeners, sealers, and other contaminants, and to provide a minimum surface profile. Refer to manufacturer’s recommendation for specific coating being applied and adhere to ICRI Concrete Surface Preparation Profiles (CSP 1-10) when reviewing concrete surface preparation. Areas of concrete which contain bug holes or voids shall be filled with the manufacturer's approved filler material.

D. Masonry

1. Cure for a minimum of 28 days prior to surface preparation or paint application.

2. Clean masonry surfaces free from all dust, dirt, oil, grease, loose mortar, chalky deposits, efflorescence, and other foreign materials.

3. Test masonry for moisture content. Use test method recommended by paint manufacturer. Do not begin painting until moisture content is acceptable to manufacturer.

E. Wood

1. Clean wood surfaces free of all foreign matter, with cracks and nail holes and other defects properly filled and smoothed. Remove sap and resin by scraping and wipe clean with rags dampened with mineral spirits.

2. Saturate end grain, cut wood, knots, and pitch pockets with an appropriate sealer before priming.

3. Prime and backprime wood trim before setting in place.

4. After prime coat has dried, fill nailholes, cracks, open joints, and other small holes with approved spackling putty. Lightly sand wood trim prior to applying second coat of paint.

F. Exposed Pipe, Valves and Pumps

1. Bituminous coated pipe shall not be used in exposed locations. Pipe which shall be exposed after project completion shall be primed in accordance with the requirements herein. Any bituminous coated ferrous pipe which is inadvertently installed in exposed locations shall be sandblasted to SSPC SP 5 White Metal before priming and painting.

2. After installation and prior to finish painting, all exterior, exposed flanged joints shall have the gap between adjoining flanges and gaps between the pipe wall and threaded-on flanges sealed with a single component Thiokol caulking to prevent rust stains.

G. Gypsum Drywall

1. Sand joint compound with sandpaper to provide a smooth flat surface. Avoid sanding of adjacent drywall paper.

2. Remove dust, dirt, and other contaminants.

H. PVC Pipe Surfaces

1. All pipe surfaces shall be cleaned and lightly sanded before painting.

I. Existing Painted Surfaces

1. Totally remove existing paint when: surface is to be submerged in a severe environment, paint is less than 75% intact, brittle, eroded or has underfilm rusting.

2. Surfaces which are greater than 75% intact require removal of failed paints and then spot primed. Spot priming is in addition to coats specified.

3. Remove surface contamination such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, mortar, efflorescence, and sealers.

4. Clean and dull glossy surfaces prior to painting in accordance with the manufacturer's recommendations.

5. Check existing paints for compatibility with new paint system. If incompatible, totally remove existing paint system or apply a barrier coat recommended by the paint manufacturer. Remove existing paints of undetermined origin. Prepare a test patch of approximately 3 square feet over existing paint. Allow test patch to dry thoroughly

and test for adhesion. If proper adhesion is not achieved remove existing paint and repaint.

3.02 SHOP PAINTING

A. All fabricated steel work and equipment shall receive at the factory at least one shop coat of prime paint compatible with the paint system required by these Specifications. The Contractor shall coordinate all shop priming to ensure compatibility with paint system specified. Surface preparation prior to shop painting shall be as specified herein. Finish coats may be applied in the shop if acceptable to the Engineer. All shop painted items shall be properly packaged and stored until they are incorporated in the Work. Any painted surfaces that are damaged during handling, transporting, storage or installation shall be cleaned, scraped, and patched before field painting begins so that Work shall be equal to the original painting received at the shop. Equipment or steel Work that is to be assembled on the site shall likewise receive a minimum of one shop coat of paint at the factory.

Surfaces of exposed members that will be inaccessible after erection shall be prepared and painted before erection.

B. The Contractor shall specify the shop paints to be applied when ordering equipment in order to assure compatibility of shop paints with field paints. The paints and surface preparation used for shop coating shall be identified on shop drawings submitted to the Engineer for review. Shop paint shop drawings will not be reviewed until the final project paint system has been submitted by the Contractor and reviewed by the Engineer.

C. Shop finish coats may be the standard finish as ordinarily applied by the manufacturer if it can be demonstrated to the Engineer that the paint system is equal to and compatible with the paint system specified. However, all pumps, motors and other equipment shall receive at least one field applied finish coat after installation.

3.03 PAINT SCHEDULE

A. The Contractor shall adhere to this paint schedule, providing those paints named or equal. DFT shall mean the minimum dry film thickness per application measured in mils. Products are referenced by numbers listed in table 09900-1 in Article 2.01 of this Section entitled "Product Listing." The paint schedule identifies the minimum DFT required per coat. If the Contractor does not achieve the specified DFT range in a single coat, he shall provide additional coats as necessary at no additional cost to the City.

B. Steel Sheet Piling

1. Steel sheet piling used for seawalls

a. Surface preparation per SSPC-SP 10

b. Apply inorganic zinc primer to all surfaces of sheet piling

c. Apply modified polyamine epoxy to both sides of sheet piling to the top 25-feet, minimum.

Application	No.	Description	DFT
First -1 coat	115	Urethane Zinc Primer	2.5 – 3.5
Second - 1 coat	138	Modified Polyamine Epoxy	13.0 - 18.0
		Min. Total	18.0 Mils

C. Metal Surfaces, Atmospheric (Exterior) Exposure

1. Metal surfaces exposed to the atmosphere that do not come into contact with corrosive atmosphere including the following types of surfaces shall be painted as described below:

   a. Pumps, motors, process equipment, machinery, etc.

   b. Above ground piping, valves and pipe supports.

   c. Miscellaneous steel shapes, angles, etc.

   d. Exposed surfaces of conduit, ductwork, etc.

Ferrous Metal

Application	No.	Description	DFT
First -1 coat	104	Polyamidoamine Epoxy Primer	3.0 - 5.0
Second - 1 coat (*)	105	Polyamidoamine Epoxy	2.0 - 3.0
Finish - 1 coat	110	Aliphatic Acrylic Urethane	3.0 - 4.0
		Min. Total	10.0 Mils

Non-Ferrous Metal

Application	No.	Description	DFT
First - 1 coat	105	Polyamidoamine Epoxy	2.0 - 3.0
Second - 1 coat	110	Aliphatic Acrylic Urethane	3.0 - 4.0
		Min. Total	6.0 Mils

Galvanized

Application	No.	Description	DFT
Spot Repair	115	Aromatic Urethane / Epoxy Zinc-Rich (spot)	2.5 - 3.5
First - 1 coat	105	Polyamidoamine Epoxy	2.0 - 3.0
Second - 1 coat	110	Aliphatic Acrylic Urethane	3.0 - 4.0
		Min. Total	6.0 Mils

D. Ductile Iron Pipe, Exterior or Interior Exposure

1. Ductile iron pipe exterior or interior exposure shall receive the following types of paint:

Application	No.	Description	DFT
First - 1 coat	105	Polyamidoamine Epoxy	6.0 - 10.0
Finish - 1 coat	110	Aliphatic Acrylic Polyurethane	3.0 - 5.0
		Min. Total	12.0 Mils

E. PVC Pipes, Exterior or Interior Exposure

1. PVC pipes, valves, and accessories, shall receive the following types of paint:

Application	No.	Description	DFT
First - 1 coat	105	Polyamidoamine Epoxy	2.0 - 3.0
Finish - 1 coat	110	Aliphatic Acrylic Polyurethane	3.0 - 4.0
		Min. Total	6.0 Mils

F. New Concrete, Masonry and Stucco, Exterior Exposure

1. The exterior above grade concrete, masonry, and stucco surfaces of all new structures shall receive the following:

Surface preparation: Surface shall be clean and dry without efflorescence, chalk, dust, dirt, grease, oil, form coating, and tar. Allow concrete to cure for 28 days.

Application	No.	Description	DFT
Block Filler (*)	102	Water Based Epoxy Block Filler	100-150 SF/Gal
Primer (**)	114	Acrylic Concrete Primer	300-400 SF/Gal
First - 1 coat	111	Modified Waterborne Acrylate	4.0 - 6.0
Finish - 1 coat	111	Modified Waterborne Acrylate	4.0 - 6.0
		Min. Total	10.0 Mils

(*) Block filler only to be used on new CMU
(**) Concrete primer for non-CMU applications

3.04 PAINTING

A. Application: All paint shall be applied by experienced painters with brushes or other applicators acceptable to the Engineer.

1. Paint shall be applied without runs, sags, thin spots, or unacceptable marks. Paints shall be applied at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. Additional coats of paint shall be applied, if necessary, to obtain thickness specified.

2. Paint shall be applied with spraying equipment only on those surfaces approved by the Engineer. If the material has thickened or must be diluted for application by spray gun, each coat shall be built up to the same film thickness achieved with undiluted

brushed on material. Where thinning is necessary, only the products of the particular manufacturer furnishing the paint shall be used; and all such thinning shall be done in strict accordance with the manufacturer's instructions, as well as with the full knowledge of the Engineer.

3. Surfaces not accessible to brushes or rollers may be painted by spray by dauber or sheepskins and paint mitt. If any of these methods is to be used, it shall be done in strict accordance with the manufacturer's instructions, as well as with the full knowledge of the Engineer.

B. Drying Time: A minimum of twenty four hours drying time shall elapse between applications of any two coats of paint on a particular surface unless shorter time periods are a requirement of the manufacturer or specified herein. Longer drying times shall be required for abnormal conditions as defined by the manufacturer.

C. Weather Restrictions: No painting whatsoever shall be accomplished in rainy or excessively damp weather when the relative humidity exceeds 85 percent, or when the general air temperature cannot be maintained at 50 degrees Fahrenheit or above throughout the entire drying period. No paint shall be applied when it is expected that the relative humidity will exceed 85 percent or that the air temperature will drop below 50 degrees Fahrenheit within 18 hours after the application of the paint.

1. Dew or moisture condensation should be anticipated; and if such conditions are prevalent, painting shall be delayed until midmorning to be certain the surfaces are dry. The day's painting shall be completed well in advance of the probable time of day when condensation will occur.

D. Inspection of Surfaces

1. Surface preparation and every field coat of priming and finishing paint shall be inspected by the Engineer or his authorized representative before the succeeding coat is applied. The Contractor shall follow a system of tinting successive paint coats so that no two coats for a given surface are exactly the same color. Areas to receive black protective coatings shall in such cases be tick marked with white or actually gauged as to thickness when finished.

2. Before application of the prime coat and each succeeding coat, any defects or deficiencies in the prime coat or succeeding coat shall be corrected by the Contractor before application of any subsequent coating.

3. Samples of surface preparation and of painting systems shall be furnished by the Contractor to be used as a standard throughout the job, unless omitted by the Engineer.

4. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the Engineer, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of manufacturer's printed instructions shall be adhered to.

5. Coating thickness shall be verified by the use of a dry film thickness digital gauge. Gauge shall be Elcometer 456 or equal and shall be properly calibrated. Coating thickness on non-metal surfaces shall be verified by the use of an ultrasonic gauge. Ultrasonic gauge shall be Positector 200 or equal. Gauges shall include the entire range of coating thicknesses required in this section.

6. The Contractor shall provide free of charge to the Engineer two new digital dry film gauges and two wet film gauges to be used to inspect coating by Engineer and Contractor. One gauge may be used by Contractor and returned each day to the Engineer. Engineer will return gauges to Contractor at completion of job.

7. Coatings shall pass a holiday detector test.

8. Determination of Film Thickness: Randomly selected areas, each of at least 107.5 contiguous square feet, totaling at least 5% of the entire control area shall be tested. Within this area, at least 5 squares, each of 7.75 square inches, shall be randomly selected. Three readings shall be taken in each square, from which the mean film thickness shall be calculated. No more than 20 percent of the mean film thickness measurements shall be below the specified thickness. No single measurement shall be below 80 percent of the specified film thickness. Total dry film thickness greater

   than twice the specified film thickness shall not be acceptable. Areas where the measured dry film thickness exceeds twice that specified shall be completely redone unless otherwise approved by the Engineer. When measured dry film thickness is less than that specified additional coats shall be applied as required.

9. Holiday Testing: Holiday test painted ferrous metal surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures. Mark areas which contain holidays. Repair or repaint in accordance with paint manufacturer's printed instructions and retest.

   a. Dry Film Thickness Exceeding 20 Mils: For surfaces having a total dry film thickness exceeding 20 mils: Pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

   b. Dry Film Thickness of 20 Mils or Less: For surfaces having a total dry film thickness of 20 mils or less: Tinker & Rasor Model M1 non-destructive type holiday detector, K-D Bird Dog, shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flow, shall be added to the water prior to wetting the detector sponge.

E. Special Areas

1. All surfaces which are to be installed against concrete, masonry etc., and will not be accessible for field priming and/or painting shall be back primed and painted as specified herein, before erection. Anchor bolts shall be painted before the erection of

equipment and then the accessible surfaces repainted when the equipment is painted.

F. Special attention shall be given to insure that edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of the adjacent painted surfaces.

G. Safety

1. Respirators shall be worn by persons engaged or assisting in spray painting. The Contractor shall provide ventilating equipment and all necessary safety equipment for the protection of the workmen and the Work.

H. Quality Workmanship

1. The Contractor shall be responsible for the cleanliness of his painting operations and shall use covers and masking tape to protect the Work whenever such covering is necessary, or if so requested by the City. Any unwanted paint shall be carefully removed without damage to any finished paint or surface. If damage does occur, the entire surface, adjacent to and including the damaged area, shall be repainted without visible lap marks and without additional cost to the City.

I. Painting found defective shall be scraped or sandblasted off and repainted as the Engineer may direct. Before final acceptance of the Work, damaged surfaces of paint shall be cleaned and repainted as directed by the Engineer.

J. Any pipe scheduled to be painted and having received a coating of a tar or asphalt compound shall be painted with two coats or "Intertol Tar Stop", "Tnemec Tar Bar" or equal before successive coats are applied in accordance with the paint schedule.

3.05 SCHEDULE OF COLORS

A. All colors shall be as designated by the Engineer at the shop drawing review. The Contractor shall submit color samples including custom color choices as required to the Engineer as specified in Article 1.05 of this Section. The Contractor shall submit suitable samples of all colors and finishes for the surfaces to be painted, or on portable surfaces when required by the Engineer. The Engineer shall decide upon the choice of colors and other finishes when alternates exist. No variation shall be made in colors without the acceptance from the City. Color names and/or numbers shall be identified according to the appropriate color chart issued by the manufacturer of the particular product in question.

B. All above ground water main piping shall be painted white with blue longitudinal striping.

C. All underground water main piping shall have continuous 4” blue longitudinal stripe.

D. All above ground force main piping shall be painted green.

3.06 COLOR CODING AND LETTERING OF PIPING

A. The Contractor shall paint all piping, valves, equipment, exposed conduits and all appurtenances which are integral to a complete functional mechanical pipe and electrical

conduit system. Where colors are not designated for piping and conduit systems they will be selected during the shop drawing review from the paint manufacturer's standard color charts.

B. In general, the pumps and equipment shall be painted the same color as the piping system to which it is connected unless otherwise directed by the Engineer. Where colors are not designated for piping and conduit systems they will be selected during the shop drawing review from the paint manufacturer's standard color charts.

C. Lettering of Piping

1. The Contractor shall apply identification titles and arrows indicating the direction of flow of liquids to all types and sections of all new and existing plant piping. Titles shall be as directed by the Engineer. Identification titles shall be located midway between color coding bands where possible. Identification lettering and arrows shall be placed as directed by the Engineer, but shall generally be located each fifteen feet in pipe length and shall be properly inclined to the pipe axis to facilitate easy reading. Titles shall also appear directly adjacent to each side of any wall or slab the pipeline passes through.

D. The titles shall be painted by use of stencils and shall identify the contents by complete names at least once in each area through which it passes and thereafter be abbreviated. Stencils shall be provided for titles.

E. Title color shall be black or white as directed and shall have an overall height in inches in accordance with Table 09900-2. Letter type shall be Helvetica Medium upper case. The manufacturer's instructions shall be followed in respect to storage, surface preparation and application. For piping less than 3/4-inch diameter, the Contractor shall furnish and attach corrosion resistant color tags with the required lettering.

F. Banding

1. Where bands are indicated in the Pipe Color Coding Schedule, the pipe is to be painted for its full circumference with a band of the color indicated. The bands shall be six inches wide, neatly made by masking, and spaced eight feet apart. The Contractor may substitute precut prefinished bands on piping subject to acceptance by the Engineer. Where banded pipes are running concurrently in a space, bands shall be located so that on adjacently located pipes, bands will be grouped beside each other.

3.07 OSHA SAFETY COLORS

A. Items listed in ANSI Z53.1-1971, Section 2.1 shall be painted ANSI Red. In general, these items shall include fire protection equipment and apparatus; wall mounted breathing apparatus, danger signs and locations; and stop bars, buttons or switches. In addition all hose valves and riser pipes, fire protection piping and sprinkler systems, and electrical stop switches shall be painted ANSI Red.

B. Items listed in ANSI Z53.1-1971, Section 2.3 shall be painted ANSI Yellow. Yellow shall be the basic color for designating caution and for marking physical hazards such as striking

against, stumbling, falling, tripping, and "caught in between". In addition, an 8inch wide strip on the top and bottom tread of stairways shall be coated.

3.08 WORK IN CONFINED SPACES

A. The Contractor shall provide and maintain safe working conditions for all employees. Fresh air shall be supplied continuously to confined spaces through the combined use of existing openings, forced draft fans, or by direct air supply to individual workers. Paint fumes shall be exhausted to the outside from the lowest level in the contained space.

B. Electrical fan motors shall be explosion proof if in contact with fumes. No smoking or open fires will be permitted in, or near, confined spaces where painting is being done.

3.09 CLEANING

A. The buildings and all other Work area shall be at all times kept free from accumulation of waste material and rubbish caused by the Work. At the completion of the painting, all tools, equipment, scaffolding, surplus materials, and all rubbish around the inside the buildings shall be removed and the Work left broom clean unless otherwise specified.

TABLE 09900-2
HEIGHT OF PIPING LETTERING

Diameter of Pipe or Pipe Covering	Height of Lettering
3/4 to 1-1/4 inches	1/2 inch
1-1/2 to 2 inches	3/4 inch
2-1/2 to 6 inches	1-1/4 inches
8 to 10 inches	2-1/2 inches
Over 10 inches	3-1/2 inches

Notes:

1. Letter type shall be Helvetica Medium upper case. The manufacturer's instructions shall be followed in respect to storage, surface preparation and application.

- END OF SECTION -

DIVISION 10

SPECIALTIES

(NOT USED)

DIVISION 11

EQUIPMENT

(NOT USED)

DIVISION 12

FURNISHINGS

(NOT USED) DIVISION 13

SPECIAL CONSTRUCTION

(NOT USED)

DIVISION 14

CONVEYING SYSTEMS

(NOT USED)

DIVISION 15

MECHANICAL CONSTRUCTION

PROJECT NO. 12337

SECTION 15030

PIPING AND EQUIPMENT IDENTIFICATION SYSTEMS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install all components of the system for identification of piping and equipment as specified hereinafter. The system shall include the application of color coding to all new and altered plant piping. The Contractor shall paint the equipment and piping of all Contracts in the colors herein specified, and in accordance with the requirements of the Section 09900 - Painting.

B. In addition to the identification systems specified herein the Engineer may order the Contractor to furnish and install additional identification legends and arrows at no additional cost to the City. Such additional signs may be requested near completion of the work and shall be limited to no more than five (5) signs for each type specified herein. The lettering and color combinations for additional signs shall conform to the requirements specified herein.

1.02 SUBMITTALS

A. The Contractor shall submit shop drawings and manufacturer's product literature in accordance with the Section 01300 - Submittals and Section 01600 - Materials and Equipment. In addition, the Contractor shall submit with the shop drawings a schedule of the colors and designations proposed for each service.

B. A minimum of four (4) color charts with cross-references to the colors and services listed herein shall be included with the Submittal. The City shall select the final color for each service during shop drawing review.

PART 2 - PRODUCTS

2.01 PIPING BANDS AND STRIPES

A. All new and altered piping shall receive identification bands. Such bands shall be 6 inches wide, neatly made by masking, and spaced at intervals of 30 inches on centers regardless of the diameter of the pipe being painted.

B. The Contractor may use approved precut and prefinished metal bands on piping, in lieu of the masked and painted bands, where approved by the Engineer. Banding colors shall be as indicated in Article 2.03 of this Section.

C. Buried potable water piping shall be identified by continuous blue stripes in accordance with FDEP 62-555.

2.02 PIPING IDENTIFICATION LETTERING AND ARROWS

A. The Contractor shall apply identification lettering in the form of plain upper-case block lettering giving the name of the pipe contents and arrows indicating the direction of flow of liquids to all types and sections of piping.

B. All lettering and arrows shall be of the vinyl, self-adhesive tape type or the plastic snapon/strap-on type with self-gripping fasteners. Pipe-marking devices (i.e., tape or snapon/strap-on type) shall be suitable for a 5 to 8 year outdoor life without discoloration. Pipe marking devices shall be as manufactured by Lab Safety Supply, or equal.

C. Identification lettering and arrows shall be placed as directed by the Engineer, but shall generally be located every ten feet and shall be properly inclined to the pipe axis to facilitate easy reading. Lettering shall also appear directly adjacent to each side of any wall or slab the pipeline passes through, with a minimum of two titles on each pipe in one structure. Identification lettering shall be located midway between color coding bands where possible.

D. Lettering, background and arrow colors shall be the manufacturer's standard colors unless otherwise directed by the Engineer.

E. All lettering and arrows shall have an overall height in inches in accordance with Table 15030-1.

Table 15030-1
Height of Pipe Lettering

Diameter of Pipe or Pipe Covering	Height of Lettering
3/4 to 1 1/4 inches	1/2 inch
1 1/2 to 2 inches	3/4 inches
2 1/2 to 6 inches	1 1/4 inches
8 to 10 inches	2 1/2 inches
Over 10 inches	3 1/2 inches

F. The manufacturer's instructions shall be followed in respect to storage, surface preparation and application.

G. For piping less than ¾ inch diameter, the Contractor shall furnish and attach corrosion resistant color tags with the required lettering.

H. Pipe lettering for each service type shall be as indicated in Article 2.03 of this Section.

2.03 PIPING AND EQUIPMENT IDENTIFICATION SCHEDULE

A. Pipe lettering, pipe base color and band color shall match existing services. The Contractor shall provide the colors selected by the City from the painting manufacturer's color charts during shop drawing review.

- END OF SECTION -

PROJECT NO. 12337

SECTION 15177

INLINE CHECK VALVE

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install inline check valves, complete and operable, as shown and specified herein, including appurtenances and accessories, all in accordance with the requirements of the Contract Documents.

1.02 SUBMITTALS

A. Shop Drawings: Submit shop drawings in accordance with the Section 01300 - Submittals. The shop drawings shall include but not limited to:

1. Manufacturer's standard literature.
2. Dimension drawings for all valves to be supplied.
3. Valve manufacture's recommended installation instructions.

B. Operation and Maintenance Manuals: Submit operation and maintenance manuals in accordance with the Section 01300 - Submittals.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL INLINE CHECK VALVE

A. Stainless steel inline check valves shall be used at all stormwater catch basins installations as shown in the Contract Document and be made of 316 Stainless Steel AISI 316L (EN1.4404). Valve shall be installed within the upstream end of each outfall (at catch basin) to allow for easier access for maintenance purposes. B. Membrane shall be Polyurethane.

C. Fasteners shall be marine grade stainless steel (AISI 316).

D. Flanged valves shall be provided for flows above 6.5 fps.

E. Manufacturers: Inline check valves shall be WASTOP by WAPRO Inc., no substitutions.

PROJECT NO. 12337

PART 3 - EXECUTION

3.01 GENERAL

A. All valves shall be installed in accordance with valve manufacturer instructions as as shown in the Drawings.

- END OF SECTION -

PROJECT NO. 12337

SECTION 16000

BASIC ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, materials, tools, and equipment, and perform all work and services necessary for, or incidental, to the furnishing and installation of all electrical work as shown on the Drawings, and as specified in accordance with the provisions of the Contract Documents and completely coordinate with the work of other trades involved in the general construction. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation shall be furnished and installed as part of this work. The Contractor shall obtain approved Shop Drawings showing wiring diagrams, connection diagrams, roughing-in and hook up details for all equipment and comply therewith. All electrical work shall be complete and left in operating condition in accordance with the intent of the Drawings and the Specifications for the electrical work.

B. Reference Section 17000, Control and Information System Scope and General Requirements for scope of work details as they relate to the Division 17 Subcontractor.

C. The electrical scope of work for this project primarily includes, but is not limited to, the following:

1. Furnish and installation new automatic transfer switches.

2. Furnish and install new natural gas engine Standby Generator.

3. Provide new 480/277V utility service for Merle Fogg Pump Station.

4. Furnish and install low voltage motor control equipment including reduced voltage motor starters.

5. Furnish and install power panelboards, lighting panelboards, dry-type transformers, and other low voltage electrical power distribution equipment.

6. Furnish and install all aboveground raceway systems including conduit, fittings, boxes, supports, and other pertinent components.

7. Furnish and install all underground raceway systems including conduit, fittings, manholes, handholes and other pertinent components.

8. Furnish and install all low voltage wire and cable resulting in a complete and operable electrical system.

9. Furnish and install new lighting systems and wiring devices.

10. Furnish and install lighting protection systems as indicated on the Drawings.

11. Other electrical work as specified herein and indicated on the Drawings.

D. All material and equipment must be the product of an established, reputable, and approved manufacturer; must be new and of first class construction; must be designed and guaranteed to perform the service required; and must bear the label of approval of the Underwriters Laboratories, Inc., where such approval is available for the product of the listed manufacturer as approved by the Engineer.

E. When a specified or indicated item has been superseded or is no longer available, the manufacturer's latest equivalent type or model of material or equipment as approved by the Engineer shall be furnished and installed at no additional cost to the City.

F. Where the Contractor's selection of equipment of specified manufacturers or additionally approved manufacturers requires changes or additions to the system design, the Contractor shall be responsible in all respects for the modifications to all system designs, subject to approval of the Engineer. The Contractor's bid shall include all costs for all work of the Contract for all trades made necessary by such changes, additions or modifications or resulting from any approved substitution.

G. Furnish and install all stands, racks, brackets, supports, and similar equipment required to properly serve the equipment which is furnished under this Contract, or equipment otherwise specified or indicated on the Drawings.

1.02 EQUIPMENT LOCATION

A. The Drawings show the general location of feeders, transformers, outlets, conduits, and circuit arrangements. Because of the small scale of the Drawings, it is not possible to indicate all of the details involved. The Contractor shall carefully investigate the structural and finish conditions affecting all of his work and shall arrange such work accordingly; furnishing such fittings, junction boxes, and accessories as may be required to meet such conditions. The Contractor shall refer to the entire Drawing set to verify openings, special surfaces, and location of other equipment, or other special equipment prior to roughing-in for panels, switches, and other outlets. The Contractor shall verify all equipment dimensions to ensure that proposed equipment will fit properly in spaces indicated.

B. Where outlets are shown near identified equipment furnished by this or other Contractors, it is the intent of the Specifications and Drawings that the outlet be located at the equipment to be served. The Contractor shall coordinate the location of these outlets to be near the final location of the equipment served whether placed correctly or incorrectly on the Drawings.

1.03 LOCAL CONDITIONS

A. The Contractor shall examine the site and become familiar with conditions affecting the work. The Contractor shall investigate, determine, and verify locations of any overhead or buried utilities on or near the site, and shall determine such locations in conjunction

with all public and/or private utility companies and with all authorities having jurisdiction. All fees charged by the serving utility for installation of new permanent services, or upgrades to existing permanent services, shall be paid for by the City.

B. For the Lido Drive pump station, the Contractor shall relocate all duct banks, lighting fixtures, receptacles, switches, boxes, and other electrical equipment as necessary to facilitate the Work included in this project. Costs for such work shall be included in the Bid.

C. For the Merle Fogg Park pump station, the Contractor is responsible for coordinating all electric utility equipment installations with the serving electric utility. The Contractor shall furnish and install all electric utility equipment required by the electric utility to be installed by the Contractor whether specifically shown on the Drawings or not. The Contractor shall furnish and install the following electrical utility equipment as a minimum:

1. Service conductor ductbank.

3. Metering equipment cabinets and/or bases.

4. Conduit and wire, where required, from metering cabinet to metering current transformers and potential transformers.
5. Service conductors.

6. Service conductor terminations at service entrance equipment. D. The electric

utility will furnish and install the following equipment:

1. Primary conductors and terminations.

2. Service conductor terminations at utility power pole.

The Contractor is responsible for ensuring that all electric utility equipment installed by, and construction work performed by the Contractor is completed in accordance with the electric utility's design specifications and requirements. The Contractor is fully responsible for coordinating his scope of work with the electric utility. Any additional required electric utility construction or equipment not specified herein or shown on the Drawings shall be supplied by the Contractor at no additional cost to the City.

The contact person at the serving electrical utility is:

Mateo Tangarife
Florida Power & Light (FPL)
Wingate Service Center
3020 NW 19th Street,
Ft. Lauderdale, FL 33311 954-717-
2138 mateo.tangarife@fpl.com

1.04 SUBMITTALS

A. In accordance with the procedures and requirements set forth in the General Conditions, Section 01300 – Submittals, and the requirements of the individual specification sections, the Contractor shall obtain from the equipment manufacturer and submit the following:

1. Shop Drawings

2. Operation and Maintenance Manuals

3. Spare Parts List

4. Proposed Testing Methods and Reports of Certified Shop Tests.

5. Reports of Certified Field Tests.

6. Manufacturer's Representative's Certification.

B. Submittals shall be sufficiently complete in detail to enable the Engineer to determine compliance with Contract requirements.

C. Submittals will be approved only to the extent of the information shown. Approval of an item of equipment shall not be construed to mean approval for components of that item for which the Contractor has provided no information.

D. Some individual Division 16 specification sections may require a Compliance, Deviations, and Exceptions (CD&E) letter to be submitted. If the CD&E letter is required and shop drawings are submitted without the letter, the submittal will be rejected. The letter shall include all comments, deviations and exceptions taken to the Drawings and Specifications by the Contractor AND Equipment Manufacturer/Supplier. This letter shall include a copy of this specification section. In the left margin beside each and every paragraph/item, a letter "C", "D", or "E" shall be typed or written in. The letter "C" shall be for full compliance with the requirement. The letter "D" shall be for a deviation from the requirement. The letter "E" shall be for taking exception to a requirement. Any requirements with the letter "D" or "E" beside them shall be provided with a full typewritten explanation of the deviation/exception. Handwritten explanation of the deviations/exceptions is not acceptable. The CD&E letter shall also address deviations, and exceptions taken to each Drawing related to this Specification Section.

1.05 APPLICABLE CODES AND REQUIREMENTS

A. Conformance

1. All work, equipment and materials furnished shall conform with the existing rules, requirements and specifications of the following:

a. Insurance Rating Organization having jurisdiction

b. The serving electrical utility company

c. The currently adopted edition of the National Electrical Code (NEC)

d. The National Electric Manufacturers Association (NEMA)

e. The Institute of Electrical and Electronic Engineers (IEEE)

f. The Insulated Cable Engineers Association (ICEA)

g. The American Society of Testing Materials (ASTM)

h. The American National Standards Institute (ANSI)

i. The requirements of the Occupational Safety Hazards Act (OSHA)

j. The National Electrical Contractors Association (NECA) Standard of Installation

k. National Fire Protection Association (NFPA)

l. International Electrical Testing Association (NETA)

m. All other applicable Federal, State and local laws and/or ordinances.

2. All material and equipment shall bear the inspection labels of Underwriters Laboratories, Inc., if the material and equipment is of the class inspected by said laboratories.

B. Nonconformance 1

1. Any paragraph of requirements in these Specifications, or Drawings, deviating from the rules, requirements and Specifications of the above organizations shall be invalid and their (the above organizations) requirements shall hold precedent thereto. The Contractor shall be held responsible for adherence to all rules, requirements and specifications as set forth above. Any additional work or material necessary for adherence will not be allowed as an extra, but shall be included in the Bid. Ignorance of any rule, requirement, or Specification shall not be allowed as an excuse for nonconformity. Acceptance by the Engineer does not relieve the Contractor from the expense involved for the correction of any errors which may exist in the drawings submitted or in the satisfactory operation of any equipment.

C. Certification

1. Upon completion of the work, the Contractor shall obtain certificate(s) of inspection and approval from the National Board of Fire Underwriters or similar inspection organization having jurisdiction and shall deliver same to the Engineer and the City.

1.06 PERMITS AND INSPECTIONS

A. The Contractor shall reference the General Conditions and Section 01010, Summary of Work.

1.07 TEMPORARY LIGHTING AND POWER

A. The Contractor shall reference the General Conditions and Section 01500, Construction Facilities and Temporary Controls.

1.08 TESTS

A. Upon completion of the installation, the Contractor shall perform tests for operation, load (Phase) balance, overloads, and short circuits. Tests shall be made with and to the satisfaction of the City and Engineer.

B. The Contractor shall perform all field tests and shall provide all labor, equipment, and incidentals required for testing and shall pay for electric power required for the tests. All defective material and workmanship disclosed shall be corrected by the Contractor at no cost to the City. The Contractor shall show by demonstration in service that all circuits and devices are in good operating condition. Test shall be such that each item of control equipment will function not less than five (5) times.

C. Refer to each individual specification section for detailed test requirements.

D. The Contractor shall complete the installation and field testing of the electrical installation at least two (2) weeks prior to the start-up and testing of all other equipment. During the period between the completion of electrical installation and the start-up and testing of all other equipment, the Contractor shall make all components of the Work available as it is completed for their use in performing Preliminary and Final Field Tests.

E. Before each test commences, the Contractor shall submit a detailed test procedure, and also provide test engineer resume, manpower and scheduling information for the approval by the Engineer. In addition, the Contractor shall furnish detailed test procedures for any of his equipment required as part of the field tests of other systems.

1.09 INFRARED INSPECTION

A. Just prior to the final acceptance of a piece of equipment, the Contractor shall perform an infrared inspection to locate and correct all heating problems associated with electrical equipment terminations. The infrared inspection shall be performed by a third party, independent testing agency, not the Electrical Contractor.

B. The infrared inspection shall apply to all new equipment and existing equipment that is in any way modified under this Contract. All heating problems detected with new equipment furnished and installed under the Scope of this Contract shall be corrected by the Contractor. All problems detected with portions of existing equipment modified under this Contract shall also be corrected by the Contractor.

C. Any issues detected with portions of existing equipment that were not modified under this Contract are not the responsibility of the Contractor. Despite the Contractor not being held responsible for these problems, the Contractor shall report them to the City and Engineer immediately for resolution.

D. The infrared inspection report shall include both digital and IR pictures positioned side by side. Both the digital and IR pictures shall be clear and high quality. Fuzzy, grainy, or poorly illuminated pictures are not acceptable. The IR picture shall be provided with a temperature scale beside it, and an indication of the hot spot temperature in each picture. Reports shall be furnished in a 3-ring binder, with all pages printed in full color, with equipment assemblies separated by tabs.

1.10 PROTECTIVE DEVICE SETTING AND TESTING

A. The Contractor shall provide the services of a field services organization to adjust, set, calibrate and test all protective devices in the electrical system. The organization shall be a subsidiary of or have a franchise service agreement with the electrical equipment manufacturer. The qualifications of the organization and resumes of the technicians as well as all data forms to be used for the field testing shall be submitted.

B. All protective devices in the electrical equipment shall be set, adjusted, calibrated and tested in accordance with the manufacturers' recommendations, the coordination study, and best industry practice.

C. Proper operation of all equipment associated with the device under test and its compartment shall be verified, as well as complete resistance, continuity and polarity tests of power, protective and metering circuits. Any minor adjustments, repairs and/or lubrication necessary to achieve proper operation shall be considered part of this Contract.

D. All solid state trip devices shall be checked and tested for setting and operation using manufacturers recommended test devices and procedures.

E. Circuit breakers and/or contactors associated with the above devices shall be tested for trip and close functions with their protective device.

F. When completed, the Contractor shall provide a comprehensive report for all equipment tested indicating condition, readings, faults and/or deficiencies in same. Inoperative or defective equipment shall be brought immediately to the attention of the Engineer.

G. Prior to placing any equipment in service, correct operation of all protective devices associated with this equipment shall be demonstrated by field testing under simulated load conditions.

1.11 POWER SYSTEM STUDIES

A. General

1. The Contractor shall provide short circuit studies, protective device evaluation studies, protective device coordination studies, and arc flash studies performed by a professional engineer, registered in the state of Florida, in accordance with Section 16055 – Power System Studies.

1.12 SCHEDULES AND FACILITY OPERATIONS

A. All testing procedures and schedules must be submitted to the Engineer for review and approval one (1) month prior to any work beginning. When testing has been scheduled, the Engineer must be notified 48 hours prior to any work.

1.13 MATERIALS HANDLING

A. Materials arriving on the job site shall be stored in such a manner as to keep material free of rust and dirt and so as to keep material properly aligned and true to shape. Rusty, dirty, or misaligned material will be rejected. Electrical conduit shall be stored to provide protection from the weather and accidental damage. Rigid non-metallic conduit shall be stored on even supports and in locations not subject to direct sun rays or excessive heat. Cables shall be sealed, stored, and handled carefully to avoid damage to the outer covering or insulation and damage from moisture and weather. Adequate protection shall be required at all times for electrical equipment and accessories until installed and accepted. Materials damaged during shipment, storage, installation, or testing shall be replaced or repaired in a manner meeting with the approval of the Engineer. If space heaters are provided in a piece of electrical equipment, they shall be connected to a power source during storage. The Contractor shall store equipment and materials in accordance with Contract Documents.

1.14 WARRANTIES

A. Unless otherwise specified in an individual specification section, all equipment and electrical construction materials furnished and installed under Division 16 shall be provided with a warranty in accordance with the requirements of Section 11000 - Equipment General Provisions, and the General Conditions.

1.15 TRAINING

A. Unless otherwise specified in an individual specification section, all training for equipment furnished and installed under Division 16 shall be provided in accordance with the requirements of Section 11000, Equipment General Provisions.

PART 2 – PRODUCTS

2.01 PRODUCT REQUIREMENTS

A. Unless otherwise indicated, the materials to be provided under this Specification shall be the products of manufacturers regularly engaged in the production of all such items and shall be the manufacturer's latest design. The products shall conform to the applicable standards of UL and NEMA, unless specified otherwise. International Electrotechnical Commission (IEC) standards are not recognized. Equipment designed, manufactured, and labeled in compliance with IEC standards is not acceptable.

B. All items of the same type or ratings shall be identical. This shall be further understood to include products with the accessories indicated.

C. All equipment and materials shall be new, unless indicated or specified otherwise.

D. The Contractor shall submit proof if requested by the Engineer that the materials, appliances, equipment, or devices that are provided under this Contract meet the requirements of Underwriters Laboratories, Inc., in regard to fire and casualty hazards. The label of or listing by the Underwriters Laboratories, Inc., will be accepted as conforming to this requirement.

2.02 SUBSTITUTIONS

A. Unless specifically noted otherwise, any reference in the Specifications or on the Drawings to any article, service, product, material, fixture, or item of equipment by name, make, or catalog number shall be interpreted as establishing the type, function, and standard of quality and shall not be construed as limiting competition. The Contractor, in such cases may, at his option use any article, device, product, material, fixture, or item of equipment which in the judgment of the Engineer, expressed in writing, is equal to that specified.

2.03 CONCRETE

A. The Contractor shall furnish all concrete required for the installation of all electrical work, Concrete shall be Class A unless otherwise specified. Concrete and reinforcing steel shall meet the appropriate requirements of Division 3 of the Specifications.

B. The Contractor shall provide concrete equipment pads for all free standing electrical apparatus and equipment located on new or existing floors or slabs. The Contractor shall provide all necessary anchor bolts, channel iron sills, and other materials as required. The exact location and dimensions shall be coordinated for each piece of equipment well in advance of the scheduled placing of these pads. Equipment pads shall be 4 inches high unless otherwise indicated on the Drawings and shall conform to standard detail for equipment pads shown on the Contract Drawings. Equipment pads shall extend 3” beyond the sides of the equipment.

C. The Contractor shall provide concrete foundations for all free standing electrical apparatus and equipment located outdoors or where floors or slabs do not exist and/or are not or provided by others under this Contract. The Contractor shall provide all necessary anchor bolts, channel iron sills, and other materials as required. The location and dimensions shall be coordinated for each piece of equipment well in advance of the scheduled placing of the foundations. Equipment foundations shall be constructed as detailed on the Drawings or if not detailed on the Drawings shall be 6 inches thick minimum reinforced with #4 bars at 12-inch centers each way placed mid-depth. Concrete shall extend 6 inches minimum beyond the extreme of the equipment base and be placed on a compacted stone bed (#57 stone or ABC) 6 inches thick minimum.

2.04 RUBBER INSULATING MATTING

A. Rubber insulating matting shall be furnished and installed on the floor and in front of each piece of electrical equipment that is located indoors and installed under this Contract. Rubber insulating matting shall not be installed outdoors. The mat shall be long enough to cover the full length of the equipment. The mat shall be 1/4 inch thick with beveled edges, canvas back, solid type with corrugations running the entire length of the mat. The

matting shall meet OSHA requirements and the requirements of ASTM D-178 for Type 2, Class 2 insulating matting. Matting shall be 36 inches wide, minimum. However, matting width shall be no less than the NEC working clearance for the equipment with which it is associated.

B. Matting shall be provided for the following equipment:

- PLC/RTU Enclosures
- Reduced Voltage Starters
- Panelboards
- Automatic Transfer Switches
- Generator Output Circuit Breakers

- Enclosed Circuit Breakers Generator Control Panels

PART 3 – EXECUTION

3.01 CUTTING AND PATCHING

A. Coordination

1. The Work shall be coordinated between all trades to avoid delays and unnecessary cutting, channeling and drilling. Sleeves shall be placed in concrete for passage of conduit wherever possible.

B. Damage

1. The Contractor shall perform all chasing, channeling, drilling and patching necessary to the proper execution of his Contract. Any damage to the building, structure, or any equipment shall be repaired by qualified mechanics of the trades involved at the Contractor's expense. If, in the Engineer's judgment, the repair of damaged equipment is unsatisfactory, then the Contractor shall replace damaged equipment at his own expense.

C. Existing Equipment

1. Provide a suitable cover or plug for openings created in existing equipment as the result of work under this contract. For example, provide round plugs in equipment enclosures where the removal of a conduit creates a hole. Covers and plugs shall maintain the NEMA rating of the equipment enclosure. Covers and plugs shall be watertight when installed in equipment located outdoors.

3.02 EXCAVATION AND BACKFILLING

A. The Contractor shall perform all excavation and backfill required for the installation of all electrical work. All excavation and backfilling shall be in complete accordance with the applicable requirements of Division 2.

3.03 CORROSION PROTECTION

A. Wherever dissimilar metals, except conduit and conduit fittings, come into contact, the Contractor shall isolate these metals as required with neoprene washers, nine (9) mil polyethylene tape, or gaskets.

- END OF SECTION -

DIVISION 16

ELECTRICAL

DIVISION 17

INSTRUMENTATION

(NOT USED)

DRAWING INDEX

CITY OF FORT LAUDERDALE

PROJECT #12337
CORDOVA ROAD
SEAWALL REPLACEMENT

SEAWALL 29

FORT LAUDERDALE, FLORIDA

NORTH

LOCATION SKETCH

PROJECT #12337
CORDOVA ROAD
SEAWALL REPLACEMENT
SEAWALL 29

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

PROJECT MANAGER	JOB TITLE	PHONE NO.
JUAN CARLOS SAMUEL	PROJECT MANAGER II	954-828-6323

DATE: 02/21/19
CAD FILE: 12337-GG-GN00
DRAWING FILE No.: 4-141-55

BID SET

ABBREVIATIONS

VALVE AND FITTING ABBREVIATIONS:

ARV	AIR RELIEF VALVE
BF	BLIND FLANGE
BFV	BUTTERFLY VALVE
BV	BALL VALVE
CO	CLEAN OUT
CPLG	COUPLING
CV	CHECK VALVE
DV	DIAPHRAGM VALVE
EXP JT	EXPANSION JOINT
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FH	FIRE HYDRANT
FLG	FLANGE
FS	FLOOR SINK
GV	GATE VALVE
HB	HOSE BIBB
HD	HUB DRAIN
ICV	IRRIGATION CONTROL VALVE
LR	LONG RADIUS
MJ	MECHANICAL JOINT
NPT	NATIONAL PIPE THREAD
PE	PLAIN END
PV	PLUG VALVE
PRV	PRESSURE RELIEF VALVE
RED	REDUCER
SOV	SOLENOID OPERATED VALVE
THD	THREADED
VAC	VACUUM

PIPING:

CIP	CAST IRON PIPE
CMP	CORRUGATED METAL PIPE
CU	COPPER OR CUBIC
DIP	DUCTILE IRON PIPE
GIP	GALVANIZED PIPE
GSP	GALVANIZED STEEL PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
IP	IRON PIPE
PCCP	PRECAST CONCRETE CYLINDER PIPE
PVC	POLYVINYLCHLORIDE
RCP	REINFORCED CONCRETE PIPE
SCP	SECONDARY CONTAINMENT PIPE
SS	STAINLESS STEEL PIPE

GENERAL

A	ARC DISTANCE
AB	ANCHOR BOLT
A/C	AIR CONDITIONER
ACU	AIR CONDENSATE UNIT
AL, ALUM	ALUMINUM
∠	ANGLE
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
BLDG	BUILDING
BLK	BLOCK
BM	BENCHMARK
BOTT	BOTTOM
BOW	BACK OF WALK
BP	BID PACKAGE
CA	CENTRAL ANGLE
CB	CATCH BASIN
CC	CENTER TO CENTER
CHK'D	CHECKERED
C.I.	CURB INLET
CJ	CONSTRUCTION JOINT
CL, ℄	CENTER LINE
CLF	CHAIN LINK FENCE
CLR	CLEAR
COL	COLUMN
CO	COMPANY
CONC, C	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CP	CONCRETE POST
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DISDIR	DIRECTION
CH	DISCHARGE
DMH	DRAIN MANHOLE
DN	DOWN
DR	DRAIN
DWL	DOWEL
DWG	DRAWING
EA	EACH
ECC	ECCENTRIC
EE	EACH END
EF	EACH FACE
EL, ELEV	ELEVATION
ELEC	ELECTRIC
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EQUIP	EQUIPMENT

GENERAL CONT.

ES	ELECTRICAL SERVICE
ESC	EROSION AND SEDIMENT CONTROL
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FDOT	FLORIDA DEPARTMENT OF TRANSPORTATION
FDR	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FF	FINISH FLOOR
FG	FINISH GRADE
FIN	FINISH
FL	FLOOR
FM	FORCE MAIN
FND	FOUND
FP	FLAG POLE
FT	FOOT OR FEET
FTG	FOOTING OR FITTING
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GR	GRADE
H	HIGH
HORIZ	HORIZONTAL
HP	HIGH POINT
HS	HIGH SERVICE
HWL	HIGH WATER LEVEL
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IF	INSIDE FACE
IN	INCH
INFL	INFLUENT
INJ	INJECTION
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
IP	IRON PIPE
IRRIG	IRRIGATION
IR	IRON ROD
ISO	ISOLATION
JCT	JUNCTION
JT	JOINT
LBS/FT	POUNDS PER FOOT
LG	LONG
LN	LINE
LP	LOW POINT OR LIGHT POLE
LR	LONG RADIUS
LWL	LOW WATER LEVEL
MANUF	MANUFACTURER
MAX	MAXIMUM
MECH	MECHANICAL
MGD	MILLION GALLONS PER DAY

GENERAL CONT.

MH	MANHOLE
MIN	MINIMUM
MO	MASONRY OPENING
MOV	MOTOR OPERATED VALVE
NAVD	NORTH AMERICAN VERTICAL DATUM
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NIC	NOT IN CONTRACT
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OHW	OVERHEAD WIRES
OPNG	OPENING
P/L	PROPERTY LINE
PRB	POLLUTION RETARDANT BAFFLE
PS	PUMP STATION
PT	PRESSURE TREATED
R	RIM
RAD, R	RADIUS
RECIR	RECIRCULATION
RE	RIM ELEVATION
REHAB	REHABILITATION
REINF	REINFORCING
REQ'D	REQUIRED
R/W,	ROW RIGHT OF WAY
SECT	SECTION
SHT	SHEET
SLB	SIGNAL LIGHT BOX
SMH	STORMWATER MANHOLE
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STIN	STORM INLET
STMH	STORM MANHOLE
STL	STEEL
STRUC	STRUCTURAL
SYMM	SYMMETRICAL
TBD	TO BE DETERMINED
TEMP	TEMPORARY
THK	THICK
TI	TEMPERATURE INDICATOR
TO	THROUGHOUT
TOB	TOP OF BANK
TOC	TOP OF CONCRETE
TOE	TOE OF SLOPE
TOP	TOP OF PIPE
TOS	TOP OF SLAB
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UNK	UNKNOWN

GENERAL CONT.

V	VENT
VERT	VERTICAL
VP	VENT PIPE
VTR	VENT THROUGH ROOF
W	WIDE
W/	WITH
WATR	WATER
WGR	WOOD GUARDRAIL
W/L	WATER LEVEL
W/O	WITH OUT
WWF	WELDED WIRE FABRIC
WUP	WOOD UTILITY POLE

FLOWSTREAM IDENTIFICATION:

ED	EQUIPMENT DRAIN
FM	FORCE MAIN
FR	FUEL RETURN
FS	FUEL SUPPLY
OF	OVERFLOW
PW	POTABLE WATER
RD	ROOF DRAIN
SA	SAMPLE
SAN	SANITARY SEWER
SPD	SUMP PUMP DISCHARGE
STRM	STORMWATER
WM	WATER MAIN

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC	DATE: 02/21/19	
DESIGNED BY: LEFR	SCALE: AS NOTED	
CHECKED BY: RBT		
FIELD BOOK:		

CAM 19-0646
Exhibit 3 (Part 3 of 3)
Page 575 of 660

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHKD	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
ABBREVIATIONS

BID SET

SHEET NO.
GG-GN-01
TOTAL: 43
CAD FILE: 12337-GG-GN01
DRAWING FILE NO. 4-141-55

LINETYPES

COMMUNICATION, CABLE TV, TELEPHONE:

- COM(CT) — COMCAST LINES
- COM OH — COMMUNICATIONS
- COM(CC) — CROWN CASTLE LINES
- COM(FD) — FIBERNET DIRECT LINES
- COM(L3) — LEVEL 3 LINES
- GPS OH — GPG LINES
- UGT — UNDERGROUND TELEPHONE LINES
- OHT — OVERHEAD TELEPHONE LINES

ELECTRIC LINES:

- X-X ELEC — ELECTRIC DUCT (X-X = WIRES/GUAGE)
- UGE — UNDERGROUND ELECTRIC LINES
- OHE — OVERHEAD ELECTRIC LINES

OTHERS LINES:

- GAS — GAS MAIN (SIZE UNKNOWN)
- X" GAS — GAS MAIN (SIZE)
- AIR — UNDERGROUND AIR LINE
- FM — SANITARY FORCE MAIN (SIZE UNKNOWN)
- X" FM — SANITARY FORCE MAIN (SIZE)
- X" PVC FM — SANITARY FORCEMAIN (SIZE/MATERIAL)
- SAN — SANITARY GRAVITY (SIZE UNKNOWN)
- X" SAN — SANITARY GRAVITY MAIN (SIZE)
- X" PVC SAN — SANITARY GRAVITY (SIZE/MATERIAL)
- SD — STORM DRAINAGE (SIZE UNKNOWN)
- X" SD — STORM DRAINAGE (SIZE)
- X" PVC SD — STORM DRAINAGE (SIZE/MATERIAL)
- WM — WATER MAIN (SIZE UNKNOWN)
- X" WM — WATER MAIN (SIZE)
- X" DIP WM — WATER MAIN (SIZE/MATERIAL)
- OHW — OVER HEAD WIRES (TYPE UNKNOWN)
- UNK UG — UNDERGROUND LINE (TYPE UNKNOWN)
- -/-/-/-/- ABANDONED
- EXISTING
- PROPOSED
- PROPOSED PIPELINE (DOUBLE LINE IF SCALE OF DRAWING PERMITS)
- PLASTIC FENCE
- WOODEN FENCE
- WROUGHT IRON FENCE
- CHAIN LINK FENCE
- BOARD FENCE
- PROPERTY LINE
- EASEMENT LINE

SYMBOLS

LANSCAPING SYMBOLS:

- PALM TREE
- SHADE TREE
- PINE TREE
- CACTUS
- HEDGE
- VEGETATION
- BUSH
- UNKNOWN TREE

LEGEND:

- A/C — AIR CONDITIONING UNIT
- AIR RELEASE VALVE
- AR — AIR VALVE MANHOLE
- ANCHOR
- BFP — BACK FLOW PREVENTER
- BASKET BALL HOOP
- BBQ GRILL
- BLOW-OFF VALVE
- BOAT ANCHOR CLEAT
- BOLLARD
- BUILDING COLUMN/PILE
- CATV PEDESTAL
- CATCH BASIN
- CATCH BASIN INLET
- CLEAN OUT
- COMMUNICATION MANHOLE
- COMMUNICATION VAULT
- CONCRETE LIGHT POLE
- CONCRETE POST
- CONCRETE POWER POLE
- 10.00 — CONTOUR LINE ELEVATION
- CROSS FITTING
- CURB INLET
- DECORATIVE/YARD LIGHT POLE
- DETECTOR CHECK VALVE
- DCCV — DOUBLE DETECTOR CHECK VALVE
- ELECTRIC BOX
- ELECTRIC MANHOLE
- ELECTRICAL METER
- ELECTRIC METER/SERVICE
- ELECTRICAL OUTLET
- ELECTRICAL PEDESTAL
- ELECTRICAL PULL BOX
- ELECTRICAL VAULT
- × 10.00 — EXISTING SPOT ELEVATION

LEGEND CONT:

- FIRE HYDRANT
- FIBER OPTIC PEDESTAL
- FLAG — FLAG POLE
- FM — FORCE MAIN VALVE
- FC — GAS FUEL CAP
- GAS MARKER
- GAS METER
- GAS — GAS VALVE
- GAS WELL
- GATE CONTROL BOX
- GREASE TRAP MH
- GUY ANCHOR AND WIRE
- HOSE BIBB
- IRR — IRRIGATION CONTROL VALVE
- LIFT STATION
- LIFT STATION CAN
- LP — LIGHT POLE
- LP GAS TANK
- MAILBOX
- MAIL DROP BOX
- MANHOLE
- MARKER POST
- METAL LIGHT POLE
- MONITORING WELL
- OUTFALL
- PARK BENCH
- PEDESTRIAN SIGNAL
- PILE
- PIN FLAG
- PIPE MATERIAL CHANGE
- PARKING LIGHT 1 BULB
- PARKING LIGHT 1 BULB
- PARKING LIGHT 2 BULBS
- PARKING LIGHT 2 BULBS
- PARKING LIGHT 3 BULBS
- PARKING LIGHT 3 BULBS
- PARKING LIGHT 4 BULBS
- PARKING LIGHT 4 BULBS
- PARKING METER
- PARKING METER (DOUBLE)
- E — PLUG
- POST INDICATOR VALVE
- REDUCER
- RD — ROOF DRAIN

LEGEND CONT:

- RAILROAD CROSSING GATE
- REDUCER FITTING
- CO — SANITARY CLEAN OUT
- SANITARY MANHOLE
- SANITARY WYE LATERAL
- SIAMESE VALVE
- SIGN
- SIGN DOUBLE POST
- SPOT-FLOOD LIGHT
- SPK — SPRINKLER HEAD
- SOIL BORING
- SQUARE COLUMN
- STEEL I-BEAM
- CO — STORM CLEAN OUT
- D — STORM MANHOLE
- STORM DRAINAGE VAULT
- TEE FITTING
- TELEPHONE BOOTH — TELEPHONE BOOTH
- TELEPHONE JUNCTION BOX
- T — TELEPHONE MANHOLE
- PAY PHONE — TELEPHONE ON PEDESTAL
- TELEPHONE PEDESTAL
- TELEPHONE PULL BOX
- TELEPHONE VAULT
- TE-1 — TEST EXCAVATION LOCATION
- TEST HOLES
- TOWER — TOWER
- TRAFFIC CAMERA
- TRAFFIC CONTROL
- TRAFFIC POLE
- TRAFFIC PULL BOX
- TSB — TRAFFIC SIGNAL BOX
- TSP — TRAFFIC SIGNAL POLE
- TRANS — TRANSFORMER PAD
- TRASH CAN
- TRASH CAN
- MH — UNKNOWN MANHOLE
- VALLEY CURB INLET
- VALVE BOX
- VALVE PIPE
- W — WATER MANHOLE
- WATER METER
- WATER METER
- WATER METER (DOUBLE)
- WATER PUMP

LEGEND CONT.

- WV — WATER VALVE
- WATER VAULT
- WATER WELL
- WOOD POST
- WOOD LIGHT POLE
- WOOD TELEPHONE POLE
- WOOD POWER POLE
- YD — YARD DRAIN

CONTROL LEGEND:

- AERIAL TARGET
- BENCH MARK
- D•H — DRILL HOLE
- HUB & TACK
- IP — IRON PIPE
- IR — IRON ROD
- NAIL&TAB
- PERMANENT REFERENCE MONUMENT
- PERMANENT REFERENCE MONUMENT NAIL&TAB
- PKNAIL.SPIKE
- QUARTER SECTION CORNER
- SECTION CORNER

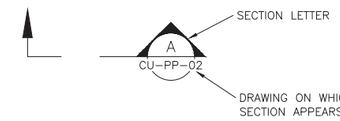
HATCH LEGEND:

- PERMEABLE PAVEMENT
- GRASSY SWALE
- EXFILTRATION TRENCH
- POROUS PAVEMENT
- CONTRACTOR STAGING AREA
- DEMOLITION
- GRADING DIRECTION

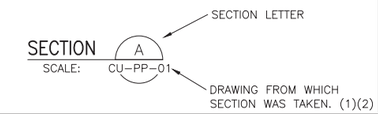
SECTION AND DETAIL IDENTIFICATION

SECTION IDENTIFICATION

A. SECTION CUT ON DRAWING G-1:

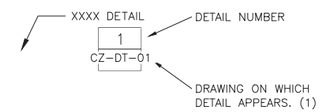


B. ON DRAWING G-2 THIS SECTION IS IDENTIFIED AS:

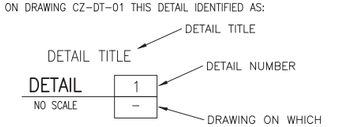


DETAIL IDENTIFICATION

A. DETAIL CALL-OUT ON DRAWING:

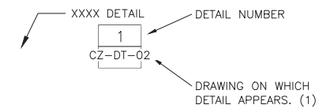


B. ON DRAWING CZ-DT-01 THIS DETAIL IDENTIFIED AS:

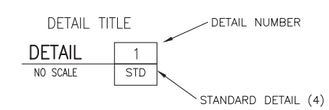


STANDARD DETAIL IDENTIFICATION

A. STANDARD DETAIL CALL-OUT ON DRAWING:



B. STANDARD DETAIL ON DRAWING CZ-DT-02 THIS DETAIL IDENTIFIED AS:



NOTES:

(1) IF PLAN AND SECTION (OR DETAIL CALL-OUT AND DETAIL) ARE SHOWN ON SAME DRAWING, DRAWING NUMBER IS REPLACE BY A DASH (–).

(2) IF SECTION IS SHOWN IN TWO OR MORE LOCATIONS, THE FIRST DRAWING NUMBER WHERE THE SECTION IS SHOWN IS DISPLAYED IN THE SECTION TITLE.

(3) IF A DETAIL IS SHOWN IN TWO OR MORE LOCATIONS, THE DRAWING NUMBER IN THE DETAIL TITLE IS REPLACED WITH A DASH (–).

(4) IF THE DETAIL TITLE REFERS TO A STANDARD DETAIL, THE DRAWING NUMBER IN THE DETAIL TITLE IS REPLACED WITH THE ABBREVIATION STD.

GENERAL NOTES:

(1) ELECTRICAL SYMBOLS SHOWN ON ELECTRICAL SHEETS.

(2) FOR WELDING SYMBOLS USE AMERICAN WELDING SOCIETY STANDARD SYMBOLS.

* DENOTES DIMENSIONS OR ELEVATIONS DEPENDENT ON EQUIPMENT SUPPLIED.

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUBERTE
REG. No: 54866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: LEFR	SCALE: AS NOTED
CHECKED BY: RBT	FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
SYMBOLS

SHEET NO.
GG-GN-02
TOTAL: 43
CAD FILE: 12337-GG-GN02
DRAWING FILE NO. 4-141-55

BID SET

GENERAL NOTES:

1. CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTY AT ALL TIMES.
2. REFER TO SPECIFICATION SECTION 01001 AND 01520 FOR DETAILED REQUIREMENTS FOR SEQUENCE OF CONSTRUCTION AND CONSTRUCTION CONSTRAINTS.
3. SITE INFORMATION HAS BEEN PROVIDED BY SITE SURVEY PREPARED BY LONGITUDE SURVEYORS, LLC.
4. HORIZONTAL CONTROL IS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD 83). VERTICAL CONTROL IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
5. RECORD DRAWINGS MAY BE OBTAINED FROM THE OWNER UPON REQUEST.
6. CONTRACTOR SHALL VERIFY FIELD CONDITIONS BEFORE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY EXISTING ELEVATIONS AND DIMENSIONS WHERE NEW WORK WILL MATCH EXISTING. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION PRIOR TO THE COMMENCEMENT OF WORK.
7. CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FROM THE APPROPRIATE AUTHORITIES, DEPARTMENTS, AND/OR AGENCIES HAVING JURISDICTION PRIOR TO COMMENCING WORK.
8. ALL PRACTICAL AND NECESSARY EFFORTS SHALL BE TAKEN DURING CONSTRUCTION TO PREVENT UNNECESSARY TREE REMOVAL AND/OR DAMAGE.
9. THE LOCATION OF EXISTING UTILITIES HAS BEEN PREPARED FROM THE MOST RELIABLE INFORMATION AVAILABLE TO THE ENGINEER. THE INFORMATION IS NOT GUARANTEED. THEREFORE THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES IN THE FIELD PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.
10. UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEY INFORMATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE TO THEM. THE CONTRACTOR SHALL CONTACT SUNSHINE 811 AT PHONE NUMBER 811 OR 1-800-432-4770 TO REQUEST UNDERGROUND UTILITY LOCATION MARK-OUT AT LEAST TWO (2) WORKING DAYS BUT NO MORE THAN TEN (10) WORKING DAYS PRIOR TO BEGINNING EXCAVATION, INCLUDING SOIL DRILLING. THE CONTRACTOR SHALL ALSO CONTACT AND REQUEST UTILITY LOCATION MARK-OUT FROM BURIED UTILITY OWNERS WITH UTILITIES ON THE PROJECT SITE THAT ARE NOT PARTICIPANTS OF SUNSHINE 811.
11. CONTRACTOR SHALL REPLACE SURROUNDING LAND COVER AFFECTED BY CONSTRUCTION ACTIVITIES, INCLUDING, BUT NOT LIMITED TO, PAVERS, SIDEWALK, SOD, AND LANDSCAPING, TO EXISTING OR BETTER CONDITIONS.
12. CONTRACTOR SHALL TAKE CARE TO AVOID DAMAGE TO EXISTING PAVEMENT, STRUCTURES, AND UTILITIES THAT ARE NOT INDICATED TO BE DEMOLISHED OR REMOVED. ANY DAMAGE TO EXISTING PAVEMENT, STRUCTURES, AND UTILITIES NOT INDICATED TO BE DEMOLISHED OR REMOVED SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
13. WHERE PROPOSED WORK IS IN THE VICINITY OF UTILITY POLES, SUCH THAT SUPPORT OF THE POLE(S) WILL BE REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE UTILITY OF THE WORK. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE UTILITY FOR SUPPORT OF THE POLE.
14. DURING EXCAVATION AND PLACEMENT OF UTILITIES THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY REGULATIONS AND SHALL SUBMIT TO THE ENGINEER FOR APPROVAL SHEET PILING, SHORING AND/OR BRACING DESIGNS AS MAY BE NECESSARY TO COMPLY WITH THESE REGULATIONS.
15. GROUNDWATER FROM ALL DEWATERING OPERATIONS SHALL BE DISCHARGED TO AN ENVIRONMENTALLY ACCEPTABLE LOCATION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, OR AS DIRECTED BY THE ENGINEER.
16. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEBRIS GENERATED DURING THE PROJECT OFF SITE AT A PROPERLY PERMITTED DISPOSAL FACILITY.
17. THE CONTRACTOR IS REQUIRED TO OBTAIN WRITTEN APPROVAL FROM THE ENGINEER FOR ANY DEVIATIONS FROM THE PLANS AND/OR SPECIFICATIONS.
18. THE UNDERGROUND CONTRACTOR SHALL MINIMIZE THE WORK AREA AND WIDTH OF TRENCHES TO AVOID DISTURBANCES OF NATURAL VEGETATION. SPOIL FROM TRENCHES SHALL BE PLACED ONLY ON PREVIOUSLY CLEARED AREAS, EXISTING RIGHT-OF-WAY OR APPROVED EASEMENT. THE CONTRACTOR SHALL NOT REMOVE OR DISTURB ANY TREES OR SHRUBS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
19. ALL RESTORATION SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION OVER THE RIGHT-OF-WAY WHERE THE PROJECT IS CONSTRUCTED.
20. ALL LOOP DETECTORS, COMMUNICATION CABLES AND CONDUITS, IF DAMAGED BY THE CONTRACTOR'S ACTIVITIES, SHALL BE REPAIRED AND/OR REPLACED IN ACCORDANCE WITH BCTED AND FDOT REQUIREMENTS.
21. PIPING, FITTINGS, AND APPURTENANCES FOR DUCTILE IRON PIPE SHALL BE RESTRAINED JOINT WHERE SHOWN ON THE PLANS OR AS OTHERWISE SPECIFICALLY SPECIFIED IN THE CONTRACT DRAWINGS.
22. RESILIENT SEATED GATE VALVES WITH BEVEL TYPE GEAR SHALL BE INSTALLED IN HORIZONTAL ORIENTATION WHEN LESS THAN 7-FEET OF COVER FROM TOP OF PIPE IS PRESENT OR AS OTHERWISE SPECIFICALLY SPECIFIED IN THE CONTRACT DRAWINGS.
23. NO CONNECTIONS FOR THE PURPOSE OF OBTAINING WATER SUPPLY DURING CONSTRUCTION SHALL BE MADE TO ANY FIRE HYDRANT OR BLOW-OFF STRUCTURE WITHOUT FIRST OBTAINING PERMISSION AND A CONSTRUCTION METER FROM THE CITY OF FORT LAUDERDALE.
24. THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING, MOVING AND RELOCATING OR REPLACING ALL WATER SERVICES OR SEWER LATERALS WHICH ARE ENCOUNTERED DURING EXCAVATION. THE CONTRACTOR SHALL SUBMIT A WRITTEN PLAN FOR WATER SERVICE AND WASTEWATER SERVICE DISRUPTION FOR APPROVAL 7 (SEVEN) CALENDAR DAYS PRIOR TO THE ANTICIPATED DISRUPTION. THE CONTRACTOR SHALL NOTIFY THE PROPERTY OWNERS 48 HOURS IN ADVANCE OF ANY WORK ON THEIR SERVICES. THIS WORK SHALL BE CONSIDERED INCIDENTAL.
25. THE CONTRACTOR MUST INFORM THE CITY AT LEAST 48-HOURS IN ADVANCE OF CONSTRUCTION, IN WRITING IF ANY CONFLICT IS DISCOVERED DURING POT HOLE OPERATIONS FOR CLARIFICATION BY THE CITY.
26. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE UTILITIES DEPARTMENT OF THE CITY OF FORT LAUDERDALE AT LEAST TWO (2) BUSINESS DAYS IN ADVANCE TO COORDINATE ANY ACTIVITY TO BE PERFORMED BY THE CITY'S UTILITIES DEPARTMENT.
27. CONTRACTOR SHALL NOT DISTURB AREAS OUTSIDE EXISTING RIGHTS-OF-WAY.
28. ALL WORK WITHIN STATE DEPARTMENT OF TRANSPORTATION (FDOT) RIGHT-OF-WAYS SHALL BE IN CONFORMANCE WITH FDOT SPECIFICATIONS AND PERMIT REQUIREMENTS.
29. ALL WORK WITHIN BROWARD COUNTY RIGHT-OF-WAYS SHALL BE IN CONFORMANCE WITH THE BROWARD COUNTY MINIMUM STANDARDS AND/OR REQUIREMENTS.
30. CONTRACTOR SHALL COMPLY WITH ALL LOCAL CITY, COUNTY AND STATE REGULATIONS PERTAINING TO THE CLOSING OF PUBLIC STREETS FOR USE OF TRAFFIC DURING CONSTRUCTION.
31. CONTRACTOR SHALL PREPARE AND SUBMIT MAINTENANCE OF TRAFFIC (MOT) PLANS TO FDOT, CITY OF FORT LAUDERDALE, BROWARD COUNTY AS REQUIRED FOR WORK TO BE DONE WITHIN THEIR R/W PRIOR TO COMMENCEMENT OF WORK. SPECIFIC AGENCY MOT REQUIREMENTS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
32. STATIONS SHOWN ON THE DRAWINGS ARE BASED ON THE ESTABLISHED BASELINE AND SHALL NOT BE CONSIDERED AS DISTANCES OR AS A MEASURE OF THE LINEAR FOOTAGE OF PIPE TO BE INSTALLED.
33. ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAY OR WALKWAY SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.
34. TRENCHES OR HOLES NEAR WALKWAYS, IN ROADWAYS OR THEIR SHOULDERS SHALL NOT BE LEFT OPEN DURING NIGHT TIME HOURS WITHOUT ADEQUATE PROTECTION.
35. CONTRACTOR SHALL PROMPTLY REPAIR AND RESTORE EXISTING PAVEMENT, SIDEWALKS, CURBS, DRIVEWAYS, PIPES, RESIDENTIAL AND COMMERCIAL SPRINKLER LINES, CONDUIT, CABLES, ETC. AND LANDSCAPE AREAS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES.
36. CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AS REQUIRED BY AGENCIES HAVING JURISDICTION OVER THE PROJECT AND/OR WHEN REQUIRED FOR PUBLIC SAFETY.
37. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION AND UNTIL ACCEPTANCE OF WORK, FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES FROM DAMAGE OR DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.
38. CONTRACTOR SHALL ADJUST TO GRADE ALL EXISTING UTILITY CASTINGS INCLUDING VALVE BOXES, MANHOLES, HAND HOLES, PULL BOXES, INLETS AND SIMILAR STRUCTURES IN CONSTRUCTION AREA TO BE OVERLAYED WITH ASPHALT.
39. EXISTING TRAFFIC SIGNS SHALL BE RESET UPON COMPLETION PER BROWARD COUNTY TRAFFIC ENGINEERING STANDARDS. COST SHALL BE CONSIDERED INCIDENTAL. CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED TRAFFIC SIGNAL LOOPS PER BROWARD COUNTY TRAFFIC ENGINEERING SPECIFICATIONS; COST SHALL BE INCIDENTAL.
40. CONTRACTOR SHALL RESTORE EXISTING PAVEMENT AND PAVEMENT MARKINGS/SIGNAGE TO ORIGINAL PRE-CONSTRUCTION CONDITION OR AS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. THIS WORK SHALL BE CONSIDERED INCIDENTAL.
41. ALL CONSTRUCTION WITHIN FDOT R/W MUST CONFORM WITH FDOT SPECIFICATIONS, STANDARDS, AND PERMIT REQUIREMENTS. NO WORK SHALL COMMENCE WITHIN FDOT R/W'S WITHOUT AN FDOT PERMIT. FULL LANE WIDTH RESTORATION TO MATCH EXISTING PAVEMENT SECTION IS REQUIRED IN ACCORDANCE WITH FDOT STANDARDS FOR PROPOSED WORK WITHIN FDOT R/W.
42. CONTRACTOR SHALL REFER TO APPENDIX A OF CONTRACT DOCUMENTS FOR SOIL BORING INFORMATION AND DIVISION 2 SPECIFICATIONS.

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

BID SET

ENGINEER:
LEZ. E. FELIBERTY-RUBERTE
LEZ. No. 64686
DATE: 02/01/2017

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: LEFR	SCALE: AS NOTED
CHECKED BY: RBT	
FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
954-297-3646
954-987-0066
FAX 954-987-2949

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
GENERAL NOTES

SHEET NO.
GG-GN-03
TOTAL: 43
CAD FILE: 12337-GG-GN03
DRAWING FILE NO. 4-141-55

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ID	SEAWALL	EXISTING DRAWINGS	STAGING AREA	PROPOSED DRAWINGS	PAVEMENT RESTORATION DRAWINGS	TREE LOCATION DRAWINGS
1	SEAWALL 29	CS-GN-01	CS-SG-01	CS-ST-01	CS-PV-01	CS-TL-01
2	SEAWALL 29	CS-GN-02	CS-SG-01	CS-ST-02	CS-PV-01	CS-TL-01
3	SEAWALL 29	CS-GN-03	CS-SG-02	CS-ST-03	CS-PV-02	CS-TL-02
4	SEAWALL 29	CS-GN-04	CS-SG-02	CS-ST-04	CS-PV-02	CS-TL-02
5	SEAWALL 29	CS-GN-05	CS-SG-03	CS-ST-05	CS-PV-03	CS-TL-03
6	SEAWALL 29	CS-GN-06	CS-SG-03	CS-ST-06	CS-PV-03	CS-TL-03

0 30' 60'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTH
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
PH: 954-987-0066
FAX: 954-987-2949

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
KEY MAP

SHEET NO.
CS-KY-01
TOTAL: 43
CAD FILE: 12337-CS-KY01
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM

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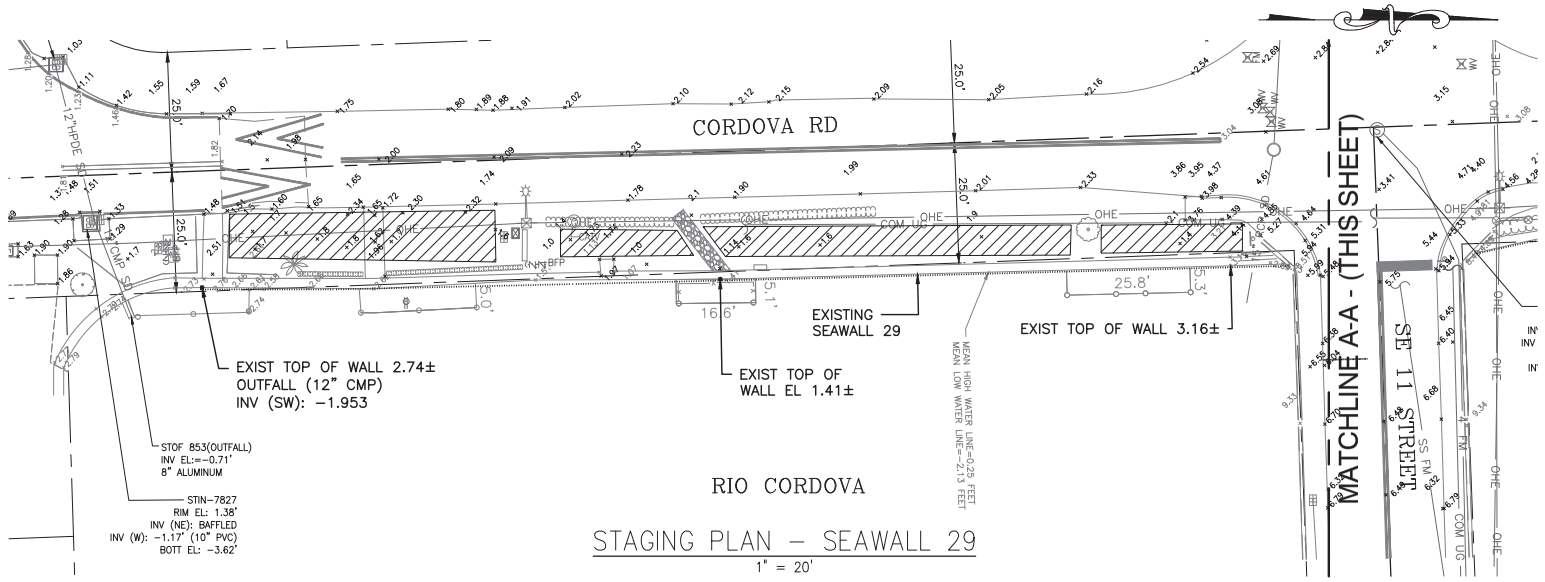
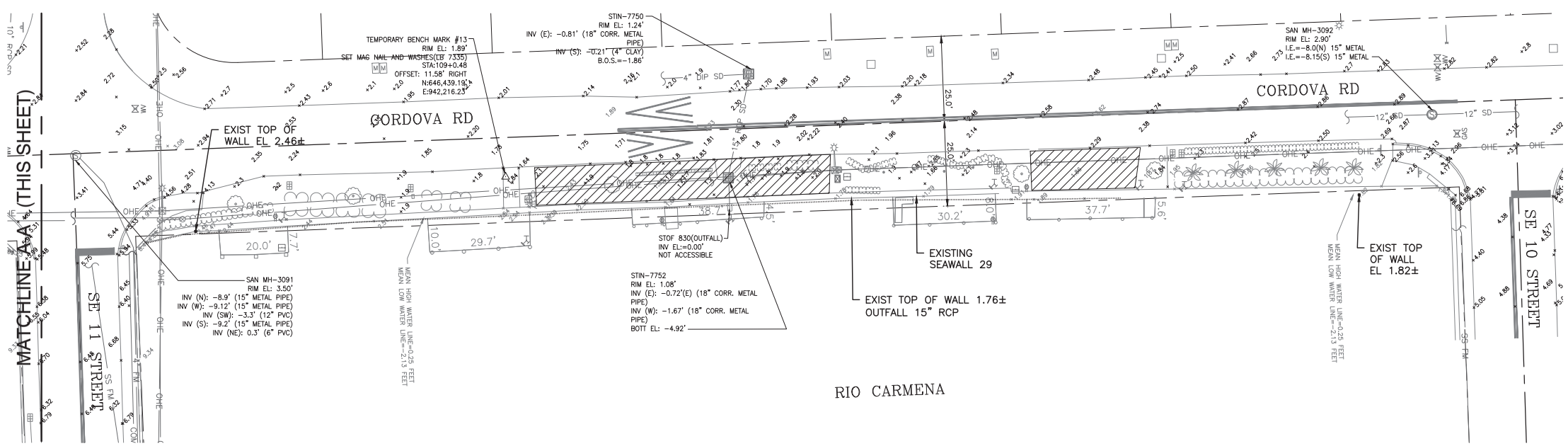


STAGING PLAN – SEAWALL 29

1" = 20'

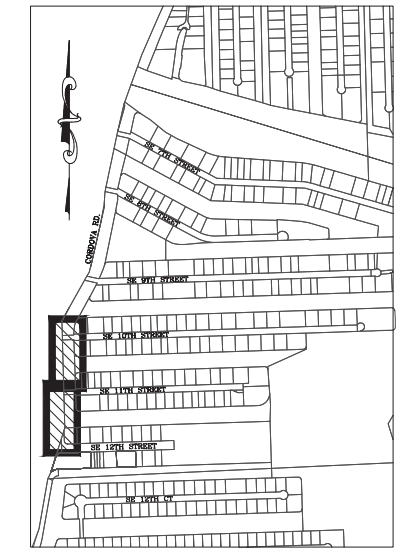


STAGING PLAN – SEAWALL 29

1" = 20'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP

NTS

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF ITS EQUIPMENT AND FACILITIES.
2. THE CONTRACTOR SHALL REFER TO DIVISION 1 FOR CONTRACTOR USE OF THE STAGING AREA.
3. LIMITS OF STAGING AREA ARE APPROXIMATE. THE CONTRACTOR SHALL RESTORE SITE TO EQUAL OR BETTER CONDITIONS AT CONCLUSION OF PROJECT OR AS OTHERWISE SHOWN IN THE DRAWINGS.
4. IF ADDITIONAL STAGING AREA IS REQUIRED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE THE PROPER OFF PREMISES AREA IN WHICH TO STAGE EQUIPMENT AND MATERIAL FOR CONSTRUCTION. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM CITY FOR ANY DEVIATION FROM LIMITS OF STAGING AREA.
5. CONTRACTOR SHALL PROVIDE BEST EROSION AND SEDIMENT CONTROL PRACTICES IN ACCORDANCE WITH STANDARD DETAILS AND NOTES. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND GOVERNMENT REGULATORY AGENCIES.
6. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.

Always call 811 two full business days before you dig to have underground utilities located and marked.

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LEGEND

CONTRACTOR STAGING AREA

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTS
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
PH: 954-987-0066
FAX: 954-987-2949

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STAGING PLAN - SHEET 1

SHEET NO.
CS-SG-01
TOTAL: 43
CAD FILE: 12337-CS-SG01
DRAWING FILE NO. 4-141-55

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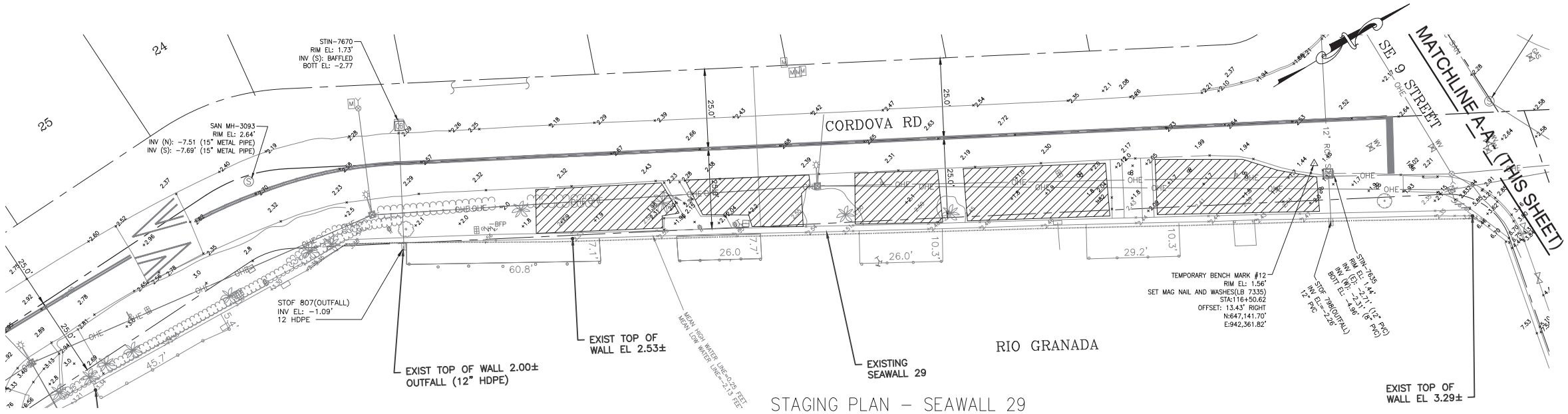
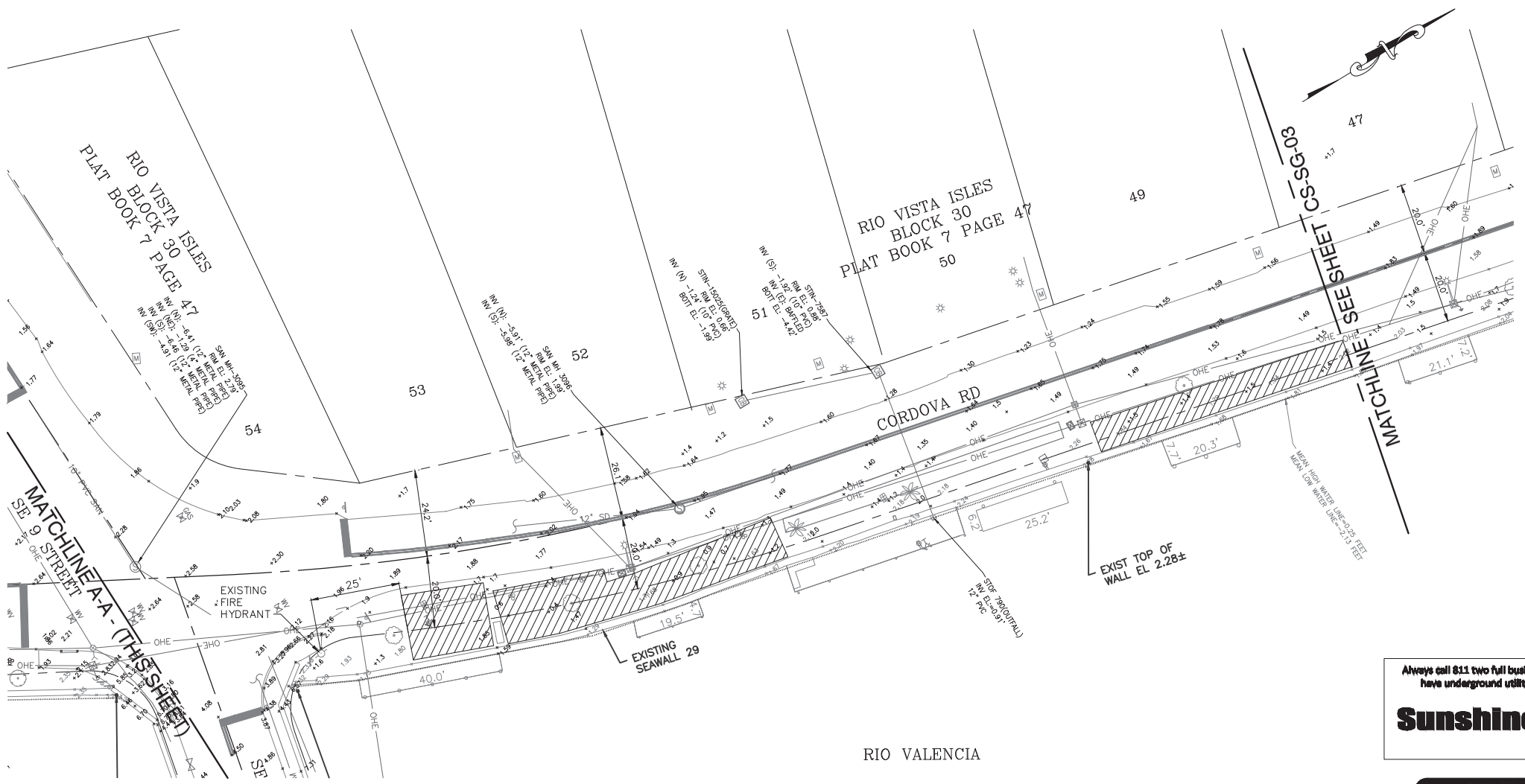


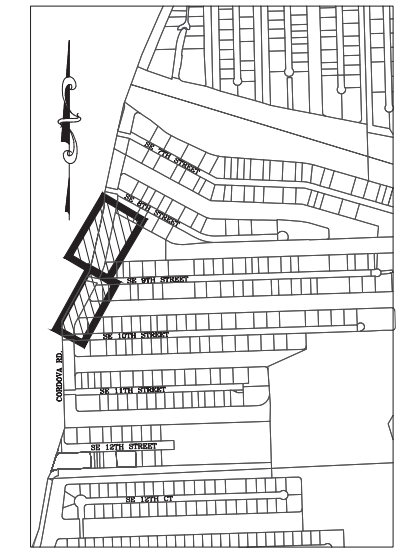
STAGING PLAN – SEAWALL 29

1" = 20'



Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP

NTS

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF ITS EQUIPMENT AND FACILITIES.
2. THE CONTRACTOR SHALL REFER TO DIVISION 1 FOR CONTRACTOR USE OF THE STAGING AREA.
3. LIMITS OF STAGING AREA ARE APPROXIMATE. THE CONTRACTOR SHALL RESTORE SITE AND LANDSCAPING TO EQUAL OR BETTER CONDITIONS AT CONCLUSION OF PROJECT OR AS OTHERWISE SHOWN IN THE DRAWINGS.
4. IF ADDITIONAL STAGING AREA IS REQUIRED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE THE PROPER OFF PREMISES AREA IN WHICH TO STAGE EQUIPMENT AND MATERIAL FOR CONSTRUCTION. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM CITY FOR ANY DEVIATION FROM LIMITS OF STAGING AREA.
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LEGEND

CONTRACTOR STAGING AREA

Always call 811 two full business days before you dig to have underground utilities located and marked.

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ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. # 64866
DATE 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: 1434

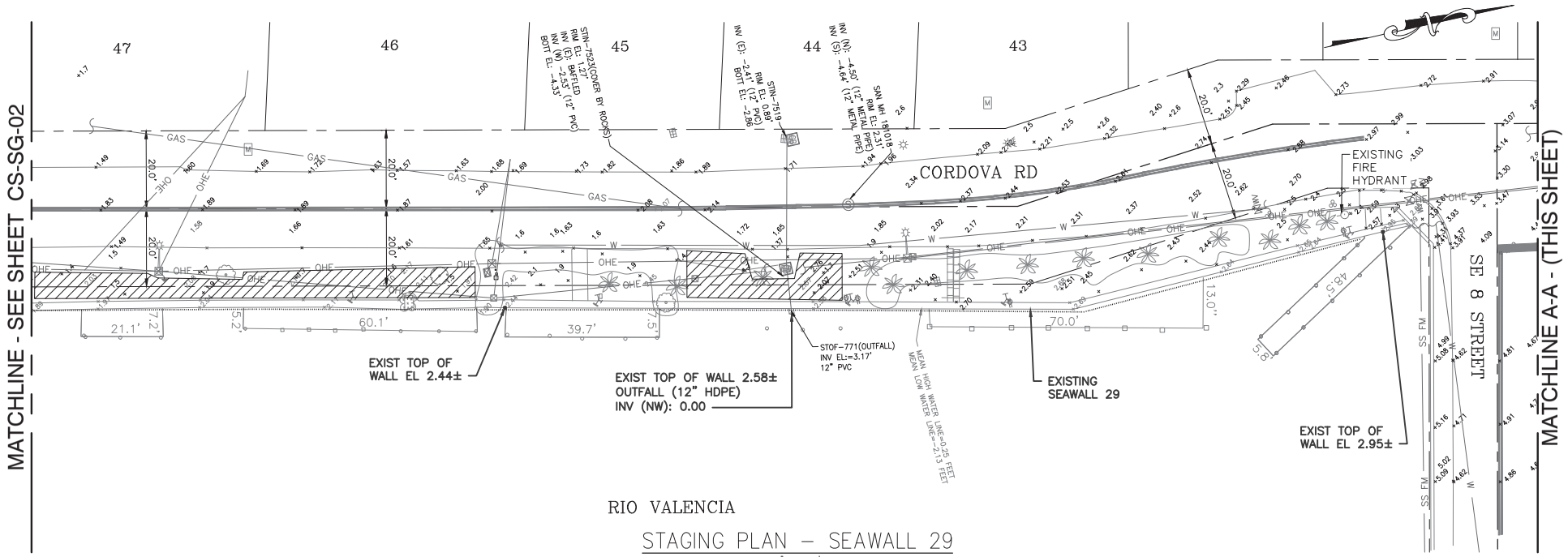
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

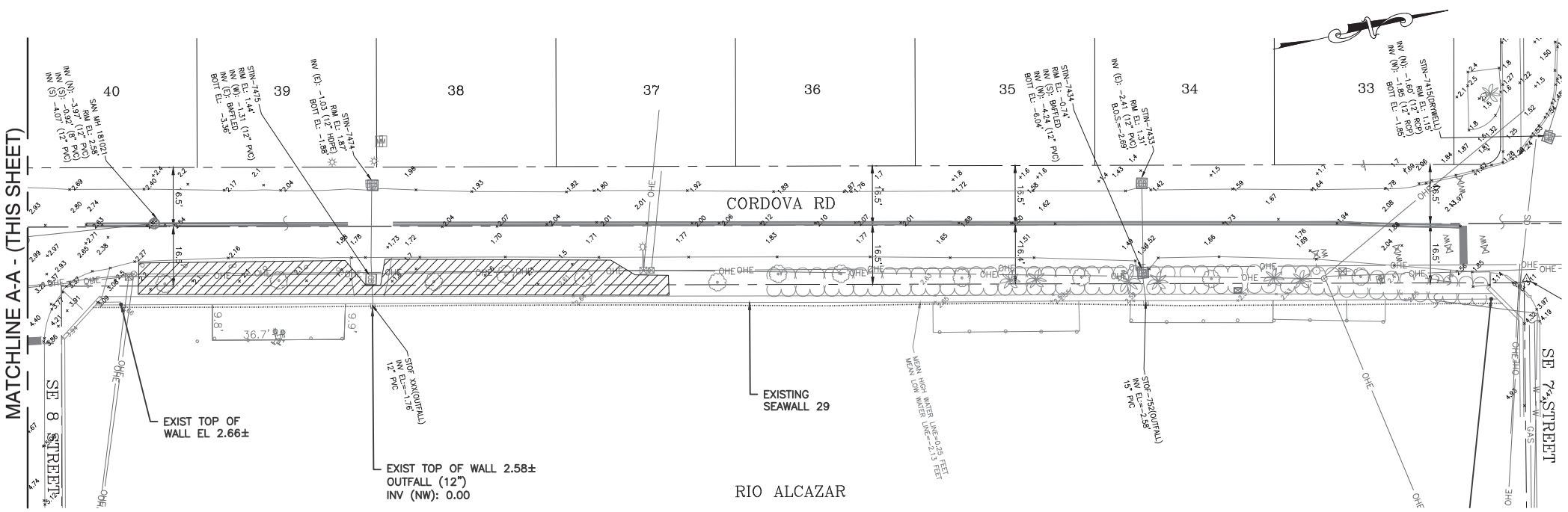
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STAGING PLAN - SHEET 2

SHEET NO.
CS-SG-02
TOTAL: 43
CAD FILE: 12337-CS-SG02
DRAWING FILE NO. 4-141-55



STAGING PLAN – SEAWALL 29
1" = 20'



STAGING PLAN – SEAWALL 29
1" = 20'

NOTES:

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4. IF ADDITIONAL STAGING AREA IS REQUIRED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE THE PROPER OFF PREMISES AREA IN WHICH TO STAGE EQUIPMENT AND MATERIAL FOR CONSTRUCTION. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM CITY FOR ANY DEVIATION FROM LIMITS OF STAGING AREA.
5. CONTRACTOR SHALL PROVIDE BEST EROSION AND SEDIMENT CONTROL PRACTICES IN ACCORDANCE WITH STANDARD DETAILS AND NOTES. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND GOVERNMENT REGULATORY AGENCIES.
6. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

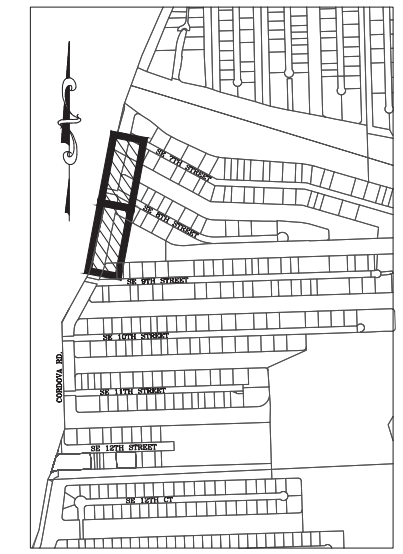
LEGEND

CONTRACTOR STAGING AREA

0 20' 40'

BID SET

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP
NTS

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

ENGINEER: ERIC B. FELIBERTY-RUDERTE
REG. No: 44866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: 4-141-55

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STAGING PLAN - SHEET 3

SHEET NO.
CS-SG-03
TOTAL: 43
CAD FILE: 12337-CS-SG03
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM

PLOT DATE: 2/21/2019 5:24 PM BY: GDIAZ XREFs= ..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074SURV,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02STRM
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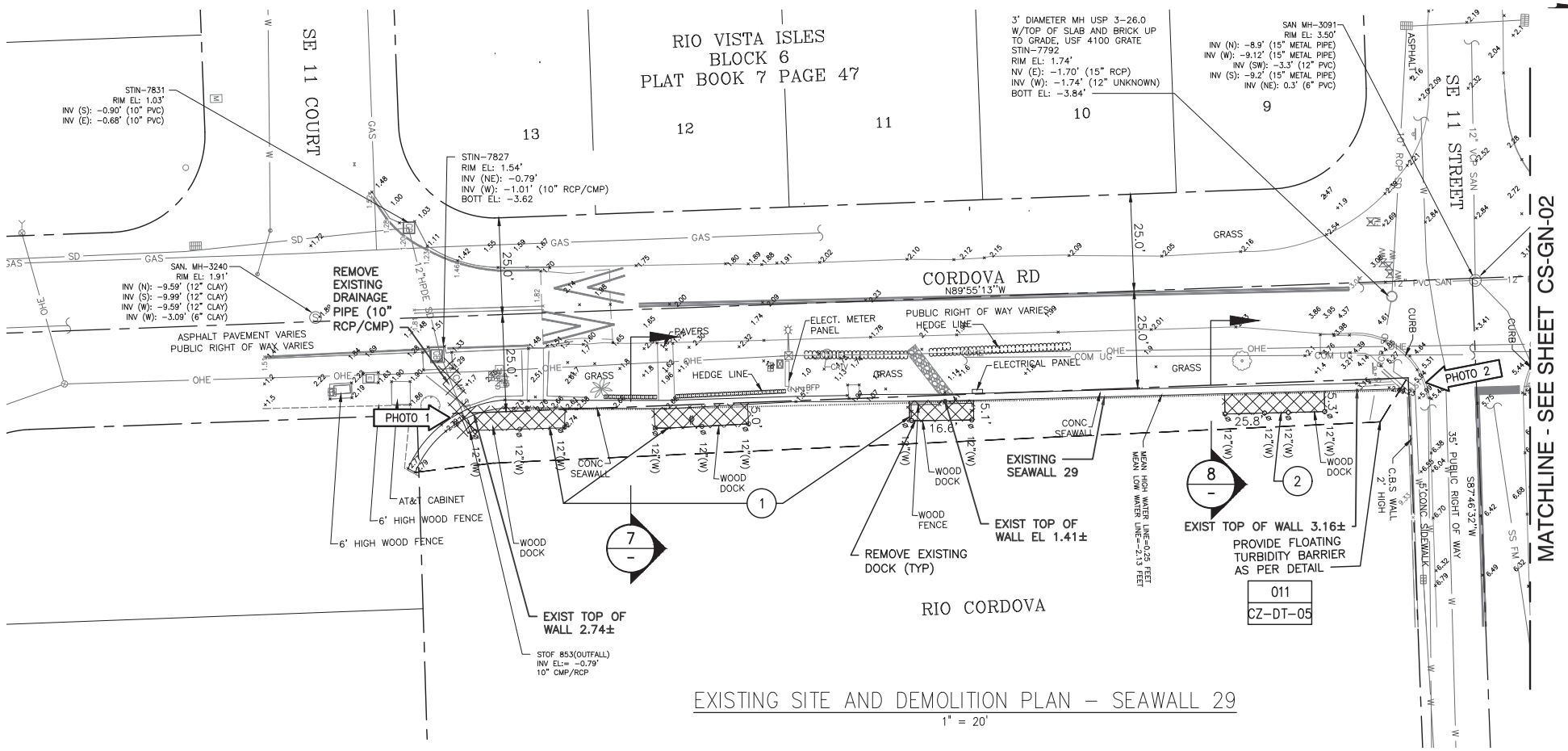
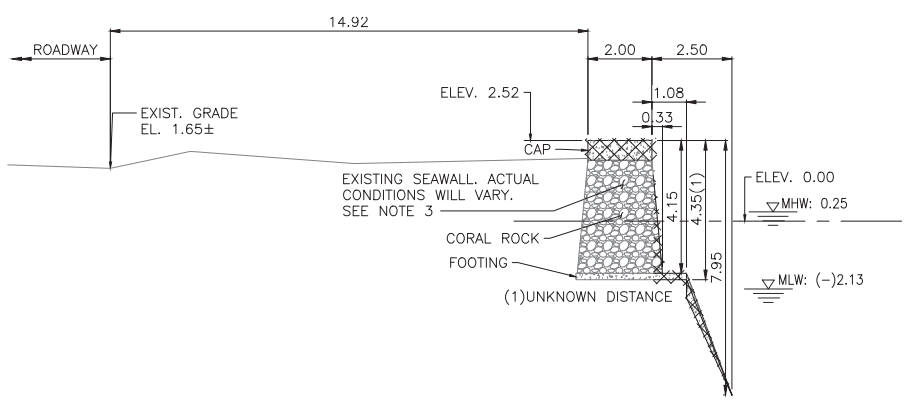


EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29

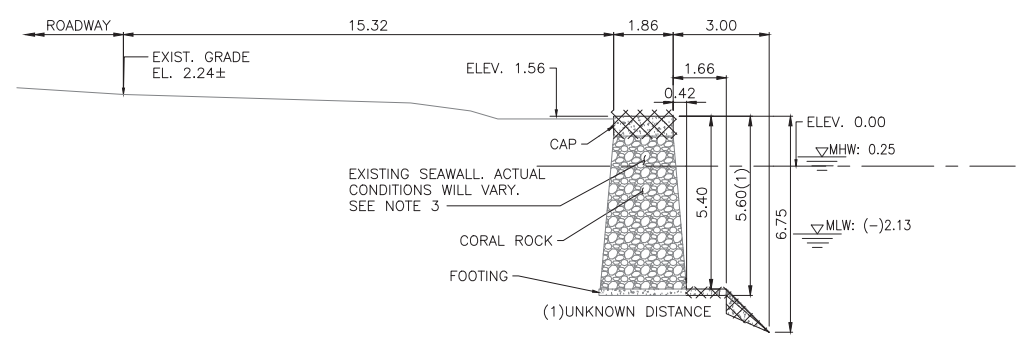
1" = 20'



EXISTING AND DEMOLITION SECTION

SECTION 7 / –

1"=3'-0"



EXISTING AND DEMOLITION SECTION

SECTION 8 / –

1"=3'-0"

REMOVE EXISTING DOCK (TYP)

PHOTO 1 (1)

NTS

PHOTO 2

NTS

NOTES:

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2. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CS-TL-01, CS-TL-02 & CS-TL-03 FOR TREE DISPOSITION PLAN.
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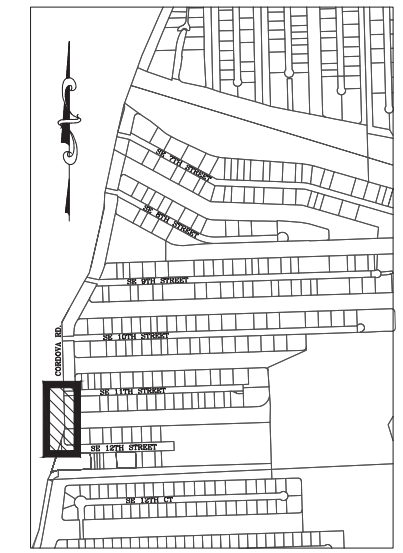
Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP

NTS

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Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE

0 3' 6'

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTH
REG. No: 64866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

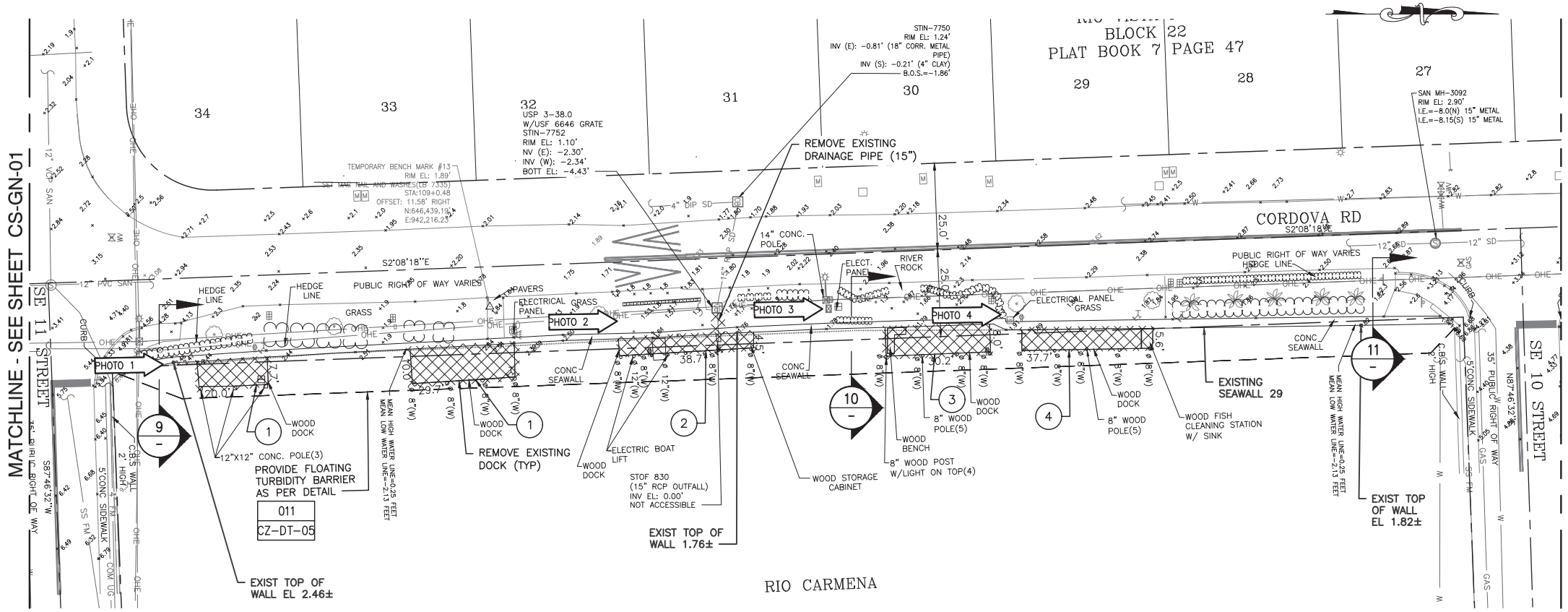
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 1

SHEET NO. CS-GN-01

TOTAL: 43

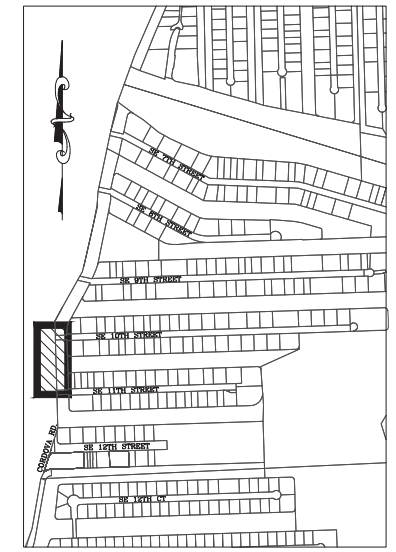
CAD FILE: 12337-CS-GN01

DRAWING FILE NO. 4-141-55



EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29

1" = 20'



SEAWALL–KEY MAP

NTS

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

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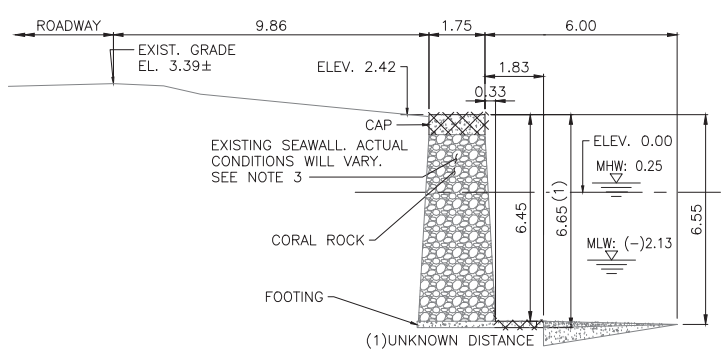
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

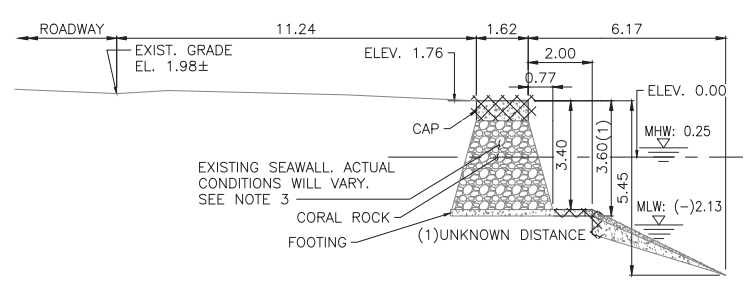
LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE



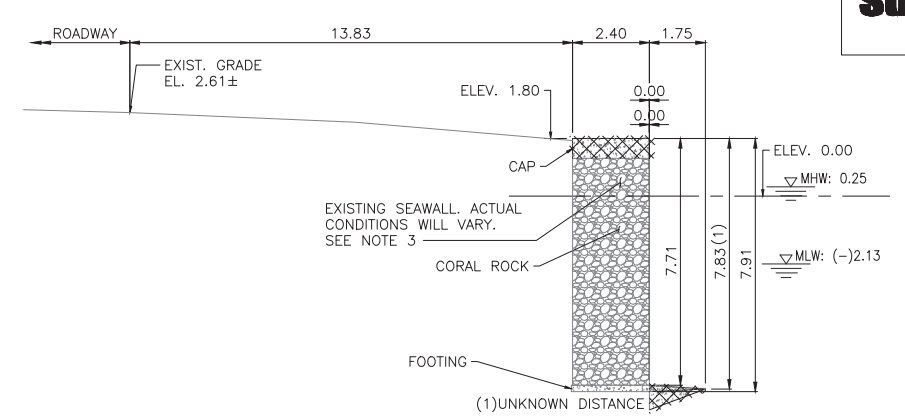
EXISTING AND DEMOLITION SECTION

SECTION 9 / 1"=3'-0"



EXISTING AND DEMOLITION SECTION

SECTION 10 / 1"=3'-0"



EXISTING AND DEMOLITION SECTION

SECTION 11 / 1"=3'-0"

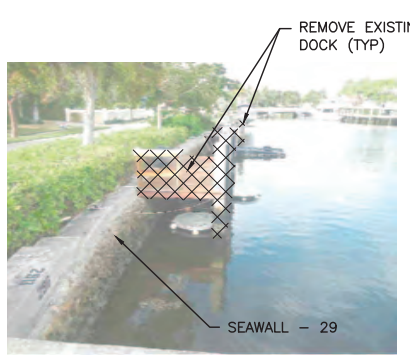


PHOTO 1 (1)
NTS

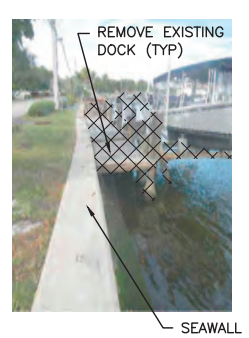


PHOTO 2 (2)
NTS

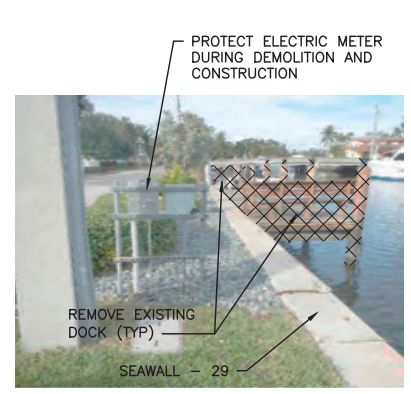


PHOTO 3 (3)
NTS

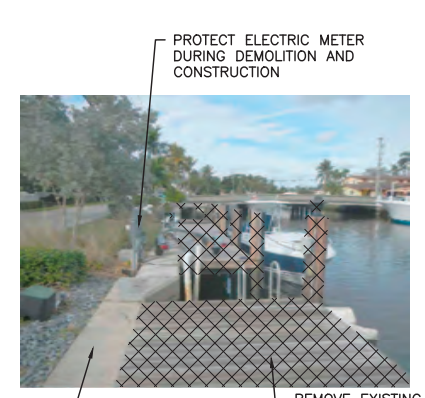


PHOTO 4 (4)
NTS

NOTES:

1. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CZ–DT–01 AND CZ–DT–02 FOR DEMOLITION REQUIREMENTS.
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0 3' 6'
0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. No: 46866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: 1337

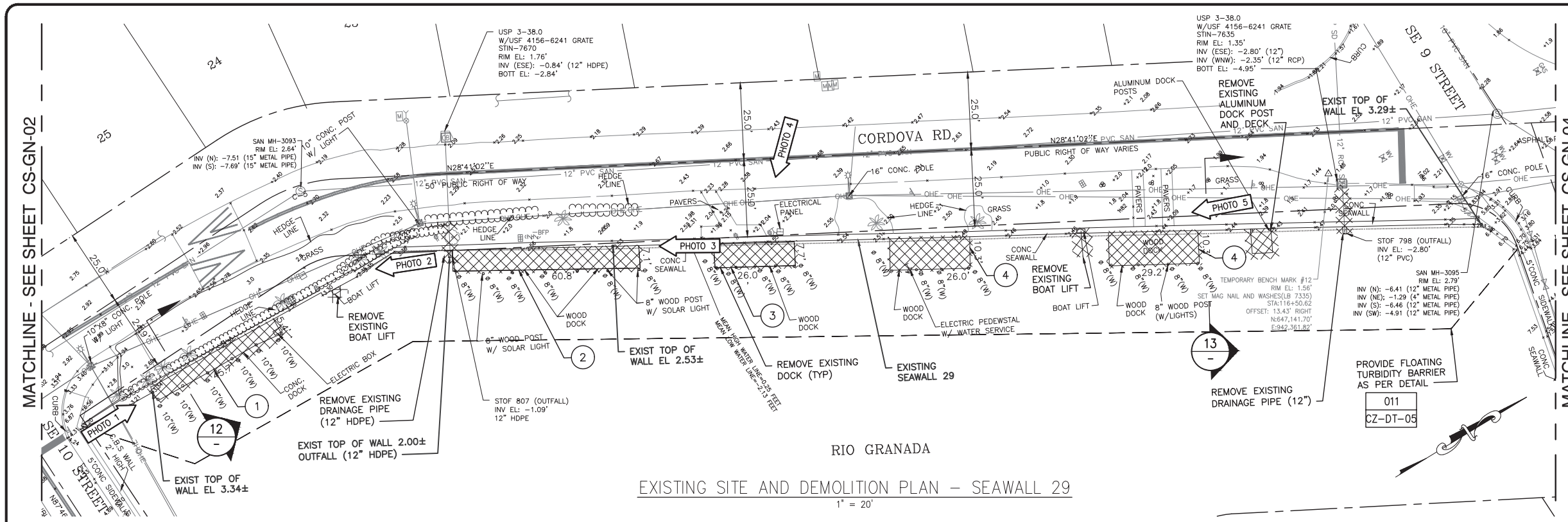
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
TEL 954-987-0066
FAX 954-987-2949

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

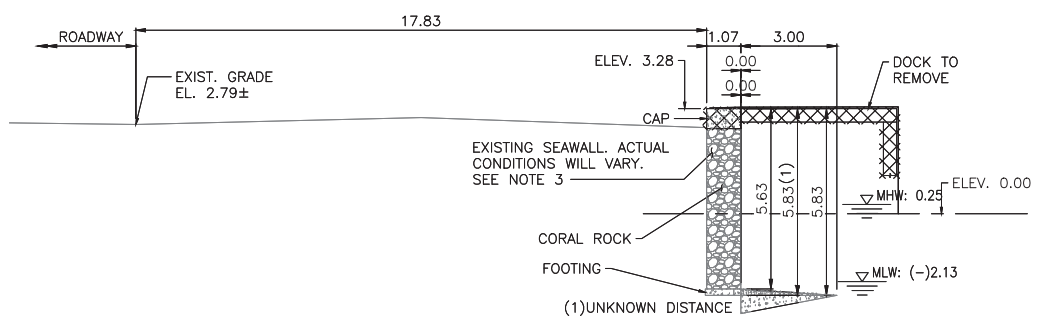
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 2

SHEET NO. CS-GN-02
TOTAL: 43
CAD FILE: 12337-CS-GN02
DRAWING FILE NO. 4-141-55



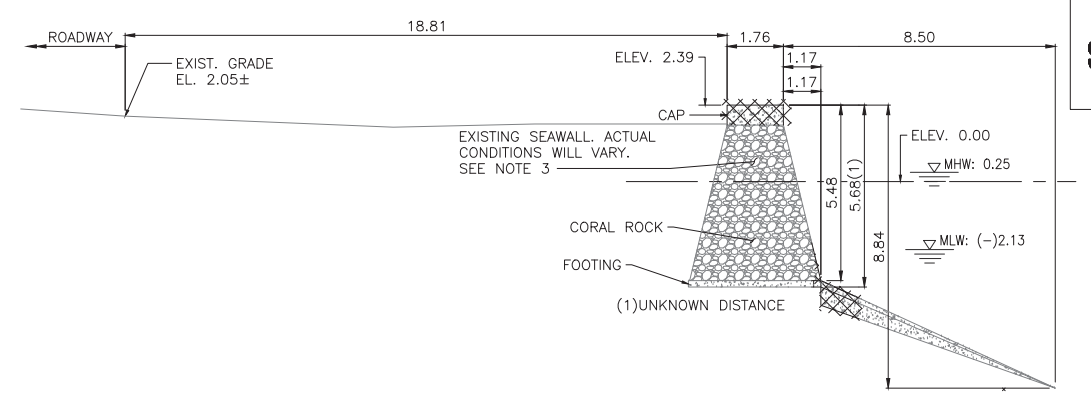
EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29

1" = 20'



EXISTING AND DEMOLITION SECTION

SECTION 12 / – 1"=3'-0"



EXISTING AND DEMOLITION SECTION

SECTION 13 / – 1"=3'-0"

PHOTO 1 (THIS SHEET)

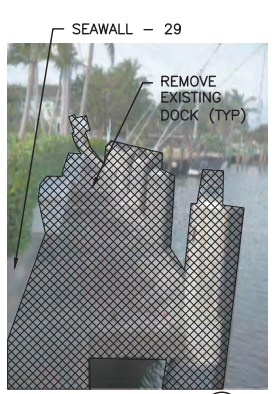


PHOTO 1 (1) NTS

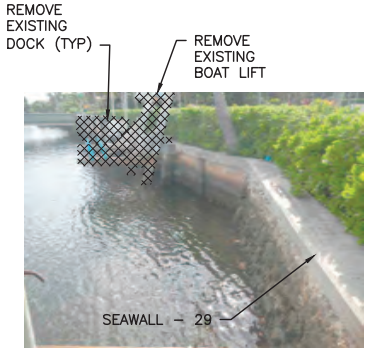


PHOTO 2 (1) NTS

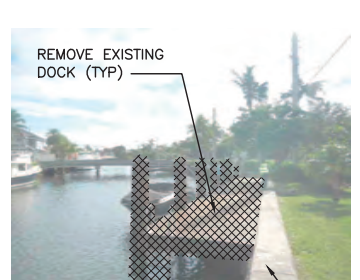


PHOTO 3 (2) NTS — SEAWALL – 29

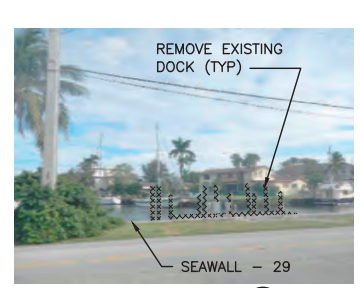


PHOTO 4 (3) NTS

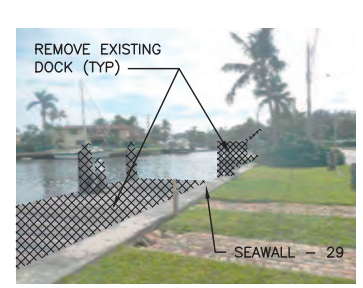


PHOTO 5 (4) NTS

NOTES:

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0 3' 6'
0 20' 40'

Always call 811 two full business days before you dig to have underground utilities located and marked.

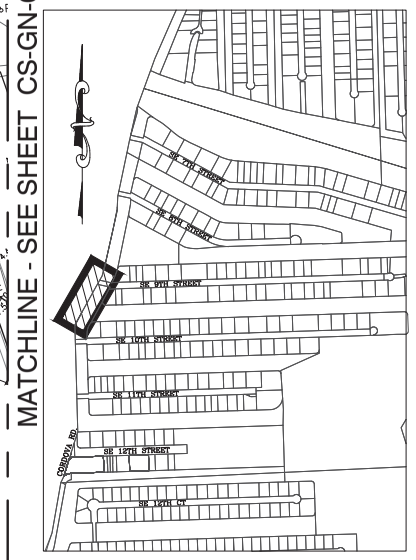
Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP

NTS

ENGINEER: ERIC B. FELIBERTY-RUBERTE REG. No: 64866 DATE: 02/01/2017

DRAWN BY: OLC | DATE: 02/21/19
DESIGNED BY: LEFR | SCALE: AS NOTED
CHECKED BY: AH | FIELD BOOK: 1337-CS-GN03

CAM 19-0646 Exhibit 3 (Part 3 of 3) p. 584

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

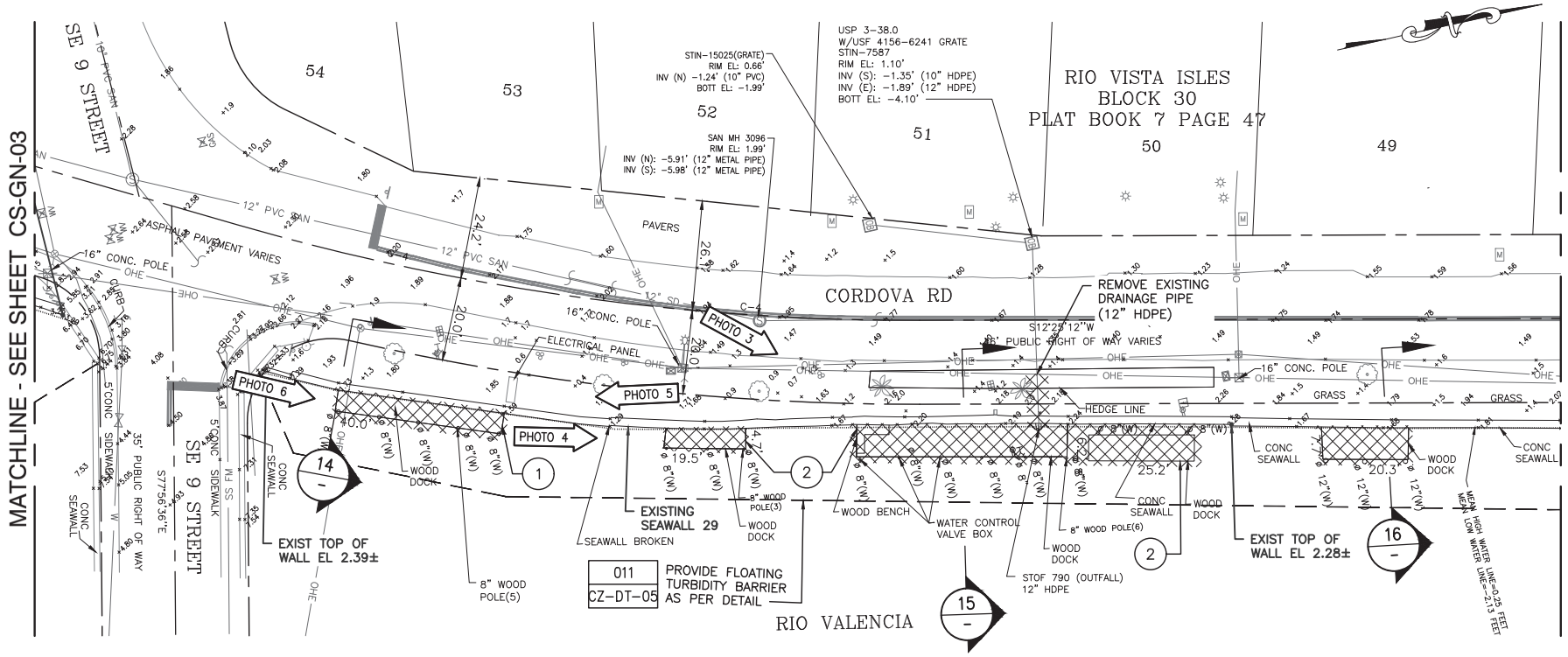
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 3

BID SET

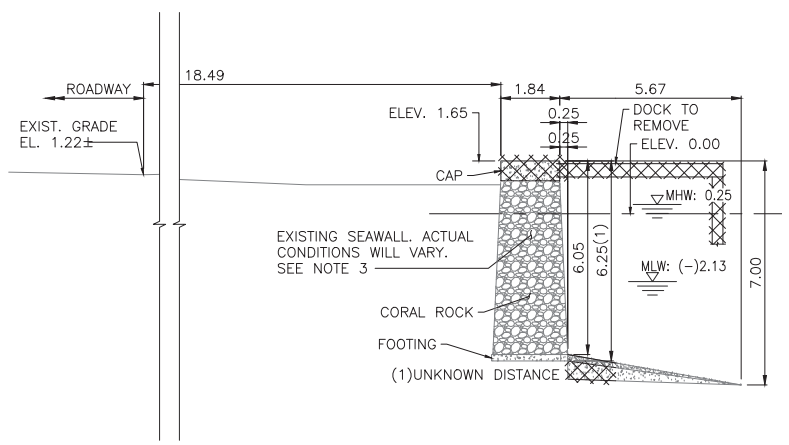
SHEET NO. CS-GN-03
TOTAL: 43
CAD FILE: 12337-CS-GN03
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM



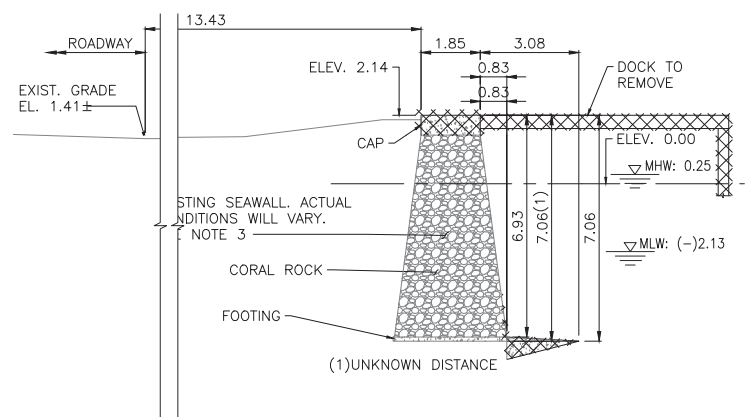
EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29

1" = 20'



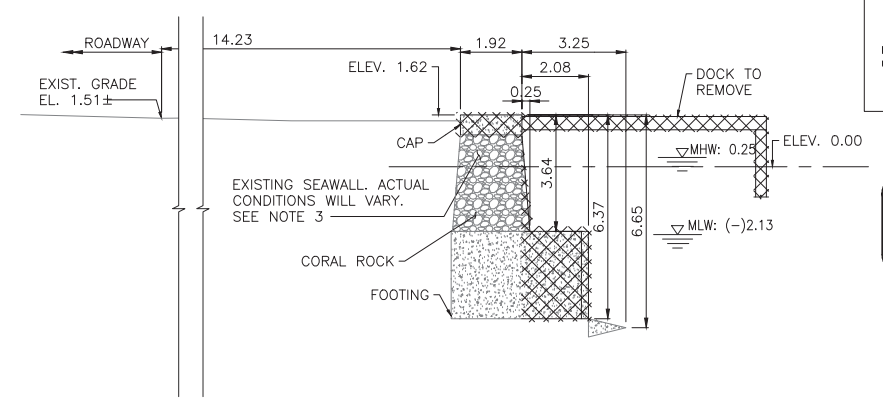
EXISTING AND DEMOLITION SECTION

SECTION 14 / 1"=3'-0"



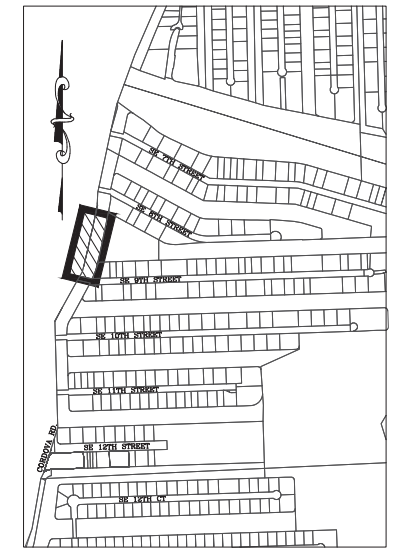
EXISTING AND DEMOLITION SECTION

SECTION 15 / 1"=3'-0"



EXISTING AND DEMOLITION SECTION

SECTION 16 / 1"=3'-0"



SEAWALL–KEY MAP

NTS

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Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE

NOTES:

1. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CZ–DT–01 AND CZ–DT–02 FOR DEMOLITION REQUIREMENTS.
2. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CS–TL–01, CS–TL–02 & CS–TL–03 FOR TREE DISPOSITION PLAN.
3. THIS DRAWING IS ONLY TO ASSIST IN SHOWING THE SCOPE OF DEMOLITION WORK AND IT IS NOT INTENDED TO INDICATE ALL DEMOLITION WORK. CONTRACTOR SHALL REMOVE ALL EXISTING ITEMS AS REQUIRED TO COMPLETE THE WORK IN ACCORDANCE WITH MEASUREMENT AND PAYMENT SPECIFICATION SECTION.
4. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY STRUCTURAL BRACING AS REQUIRED DURING DEMOLITION AND CONSTRUCTION.
5. SECTIONS DO NOT SHOW EXISTING UTILITIES AND/OR LANDSCAPE.
6. CONTRACTOR SHALL IDENTIFY AND VERIFY LOCATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO WATER, SEWER AND ELECTRIC LINES WHICH ARE TO REMAIN AND TO BE PROTECTED FROM DAMAGE DURING DEMOLITION AND/OR CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL PROTECT EXISTING LANDSCAPE, ELECTRICAL PANELS, WATER METERS, UTILITY POLES, SIGNS, ETC. DURING DEMOLITION AND CONSTRUCTION.
7. THE CONTRACTOR SHALL COORDINATE AND ARRANGE THE REMOVAL OF ANY DOCKS WITHIN THE CONSTRUCTION SITE WITH THE CITY AND THE ENGINEER. THE CONTRACTOR SHALL REMOVE, DISCONNECT AND DISPOSE ALL MECHANICAL, STRUCTURAL, ARCHITECTURAL, ELECTRICAL, INSTRUMENTATION AND CONTROLS, AND ANY MISCELLANEOUS EQUIPMENT FROM EACH DOCK.
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.

PHOTO 3 (2)
NTS

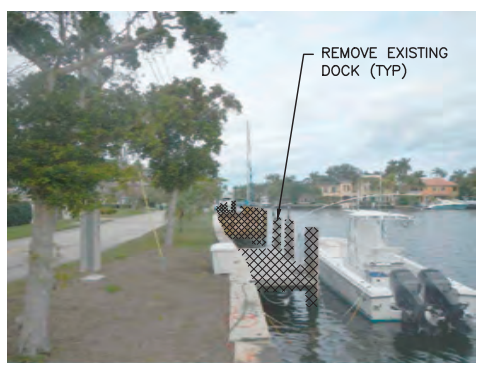


PHOTO 4 (2)
NTS

PHOTO 5 (1)
NTS

PHOTO 6 (1)
NTS

BID SET

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC B. FELIBERTY-RUDERTH
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: CAM 19-0646

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
KKK
954-987-0066
FAX 954-987-2949

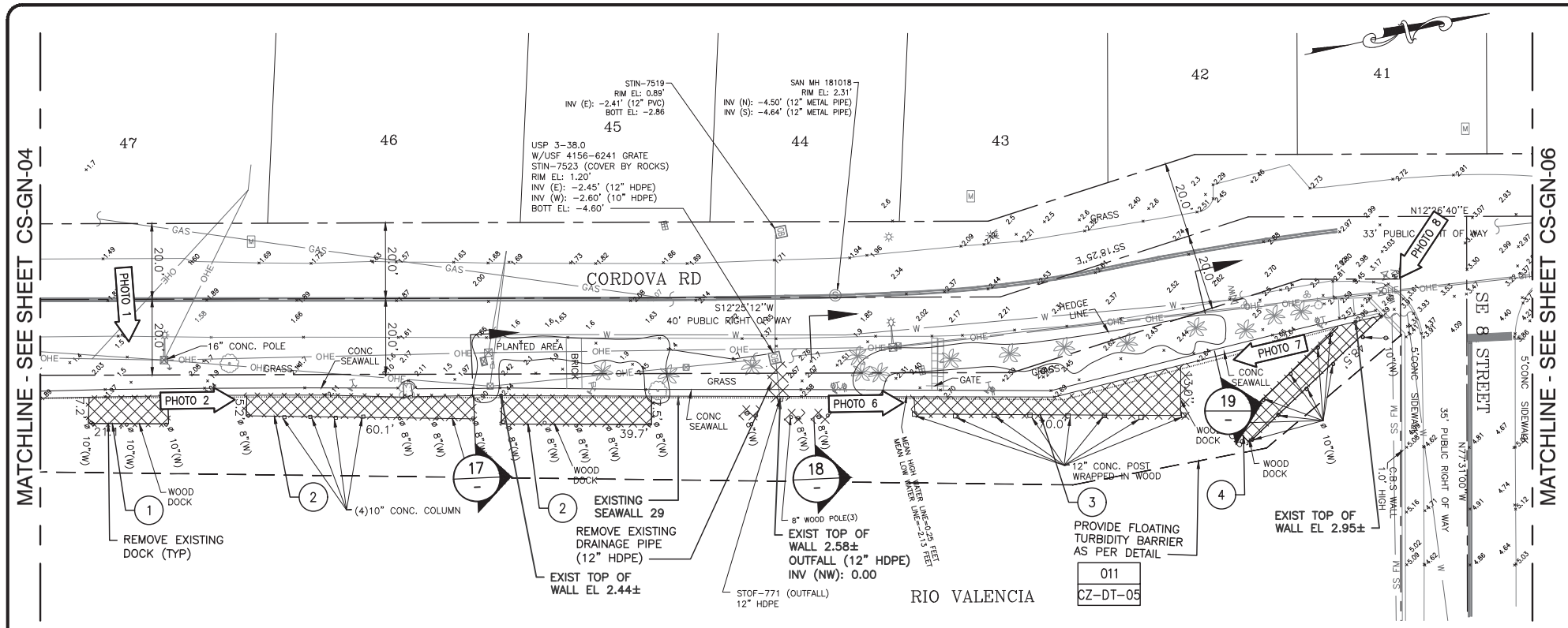
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

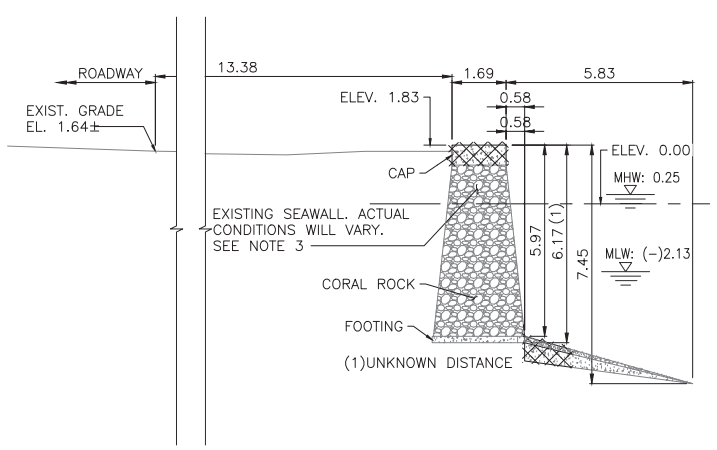
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 4

SHEET NO. CS-GN-04
TOTAL: 43
CAD FILE: 12337-CS-GN04
DRAWING FILE NO. 4-141-55

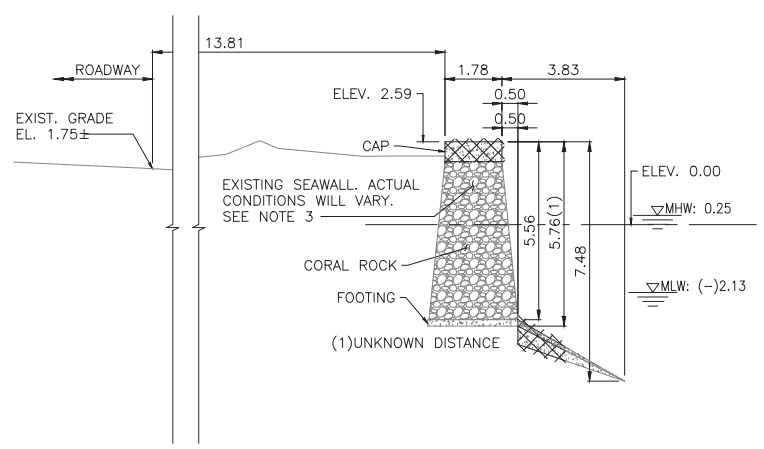
6/4/2019 2:31 PM



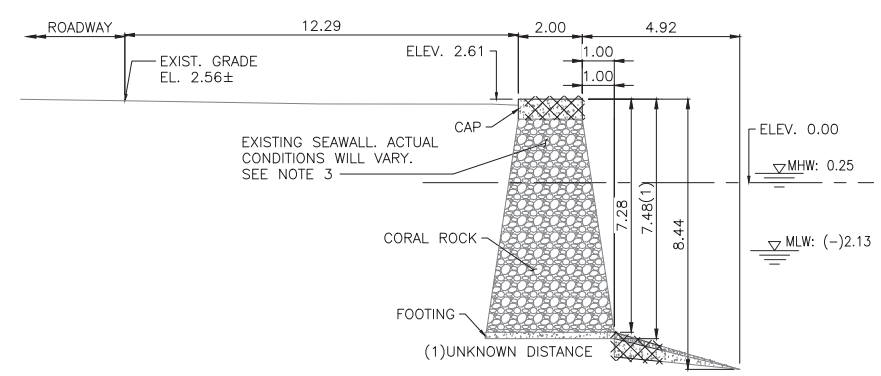
EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29
1" = 20'



EXISTING AND DEMOLITION SECTION
SECTION 17 / 1"=3'-0"

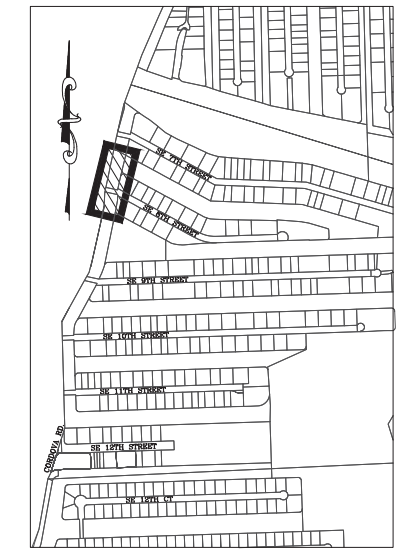


EXISTING AND DEMOLITION SECTION
SECTION 18 / 1"=3'-0"



EXISTING AND DEMOLITION SECTION
SECTION 19 / 1"=3'-0"

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP
NTS

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE

NOTES:

1. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CZ–DT–01 AND CZ–DT–02 FOR DEMOLITION REQUIREMENTS.
2. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CS–TL–01, CS–TL–02 & CS–TL–03 FOR TREE DISPOSITION PLAN.
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4. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY STRUCTURAL BRACING AS REQUIRED DURING DEMOLITION AND CONSTRUCTION.
5. SECTIONS DO NOT SHOW EXISTING UTILITIES AND/OR LANDSCAPE.
6. CONTRACTOR SHALL IDENTIFY AND VERIFY LOCATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO WATER, SEWER AND ELECTRIC LINES WHICH ARE TO REMAIN AND TO BE PROTECTED FROM DAMAGE DURING DEMOLITION AND/OR CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL PROTECT EXISTING LANDSCAPE, ELECTRICAL PANELS, WATER METERS, UTILITY POLES, SIGNS, ETC. DURING DEMOLITION AND CONSTRUCTION.
7. THE CONTRACTOR SHALL COORDINATE AND ARRANGE THE REMOVAL OF ANY DOCKS WITHIN THE CONSTRUCTION SITE WITH THE CITY AND THE ENGINEER. THE CONTRACTOR SHALL REMOVE, DISCONNECT AND DISPOSE ALL MECHANICAL, STRUCTURAL, ARCHITECTURAL, ELECTRICAL, INSTRUMENTATION AND CONTROLS, AND ANY MISCELLANEOUS EQUIPMENT FROM EACH DOCK.
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.

PHOTO 1 (1)
NTS

PHOTO 2 (2)
NTS

PHOTO 6 (3)
NTS

PHOTO 7 (3)
NTS

PHOTO 8 (4)
NTS

ENGINEER:
LUZ E. FELIBERTY–RUBERTE
REG. No: 44866
DATE: 02/01/2017
Tel: 954-987-0066
Fax: 954-987-2949

DRAWN BY:	DATE:
OLC	02/21/19
DESIGNED BY:	SCALE:
LEFR	AS NOTED
CHECKED BY:	
AH	
FIELD BOOK:	

CAM 19-0240

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 5

BID SET

SHEET NO.
CS-GN-05
TOTAL: 43
CAD FILE: 12337-CS-GN05
DRAWING FILE NO. 4-141-55

0 3' 6'
0 20' 40'

PLOT DATE: 2/21/2019 5:28 PM BY: GDIAZ XREFs= ..\dms84593\12074-XREF03UTIL,..\dms84593\12074-XREF02UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02STRM,..\dms84593\12074XREF01SECT,..\dms84593\12074XREFBASE

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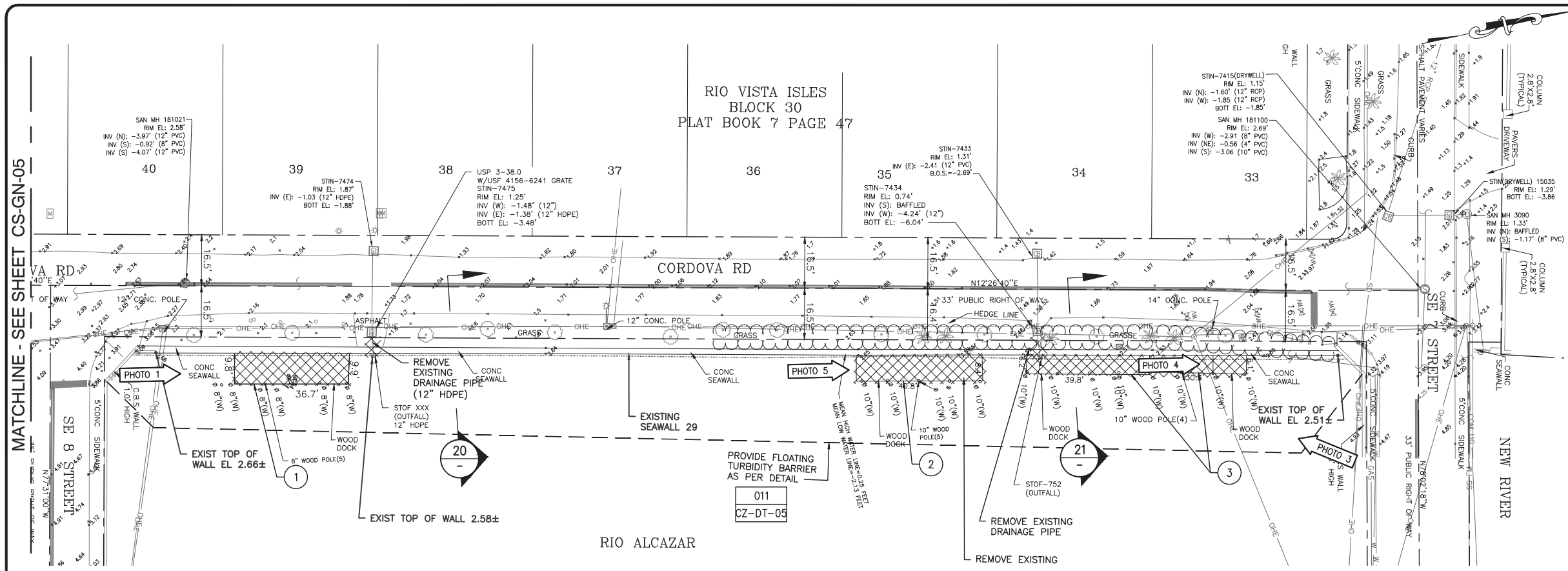
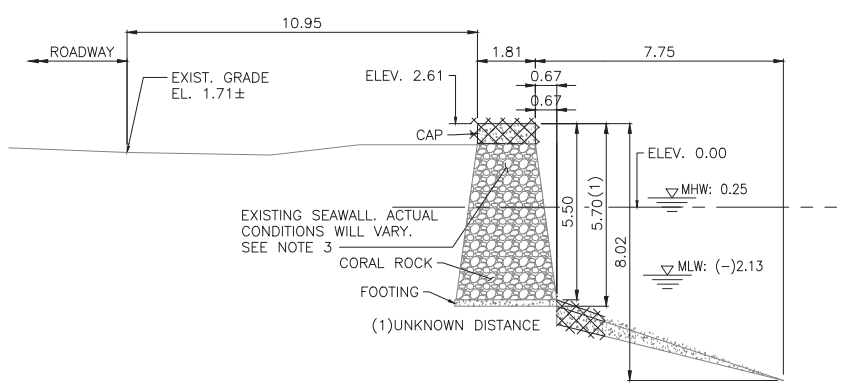
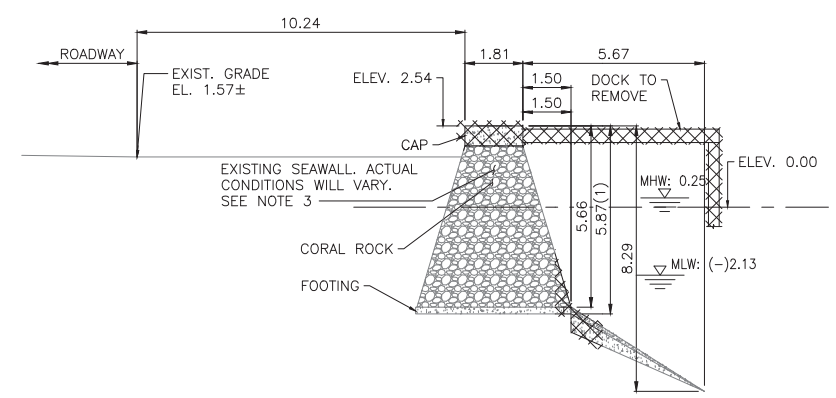
6/4/2019 2:31 PM



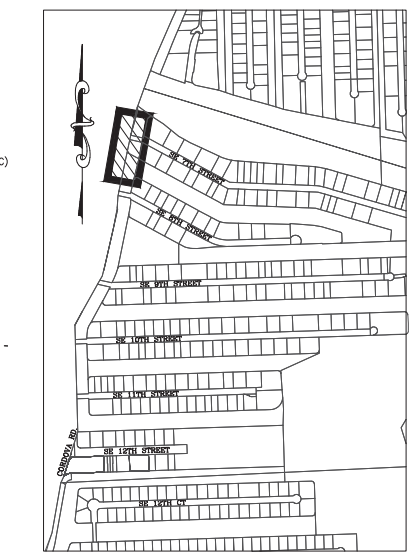
EXISTING SITE AND DEMOLITION PLAN – SEAWALL 29
1" = 20'



EXISTING AND DEMOLITION SECTION
SECTION 20 / –
1"=3'-0"



EXISTING AND DEMOLITION SECTION
SECTION 21 / –
1"=3'-0"



SEAWALL-KEY MAP
NTS

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. No: 54866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: XXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
P: 954-987-0066
FAX: 954-987-2949

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Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- PHOTO X — PHOTO'S DIRECTION
- DEMOLITION
- EXISTING CORAL ROCK'S BASE

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EXISTING SITE, DEMOLITION AND SECTIONS - SHEET 6

SHEET NO. CS-GN-06
TOTAL: 43
CAD FILE: 12337-CS-GN06
DRAWING FILE NO. 4-141-55

BID SET

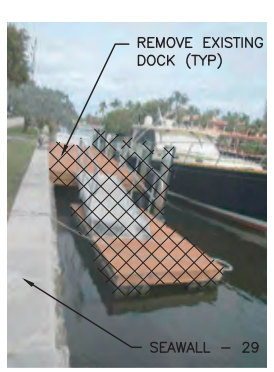

PHOTO 1 (1)
NTS

PHOTO 3 (3)
NTS

PHOTO 4 (3)
NTS

PHOTO 5 (2)
NTS

NOTES:

1. THE CONTRACTOR SHALL REFER TO DRAWING SHEET CZ-DT-01 AND CZ-DT-02 FOR DEMOLITION REQUIREMENTS.
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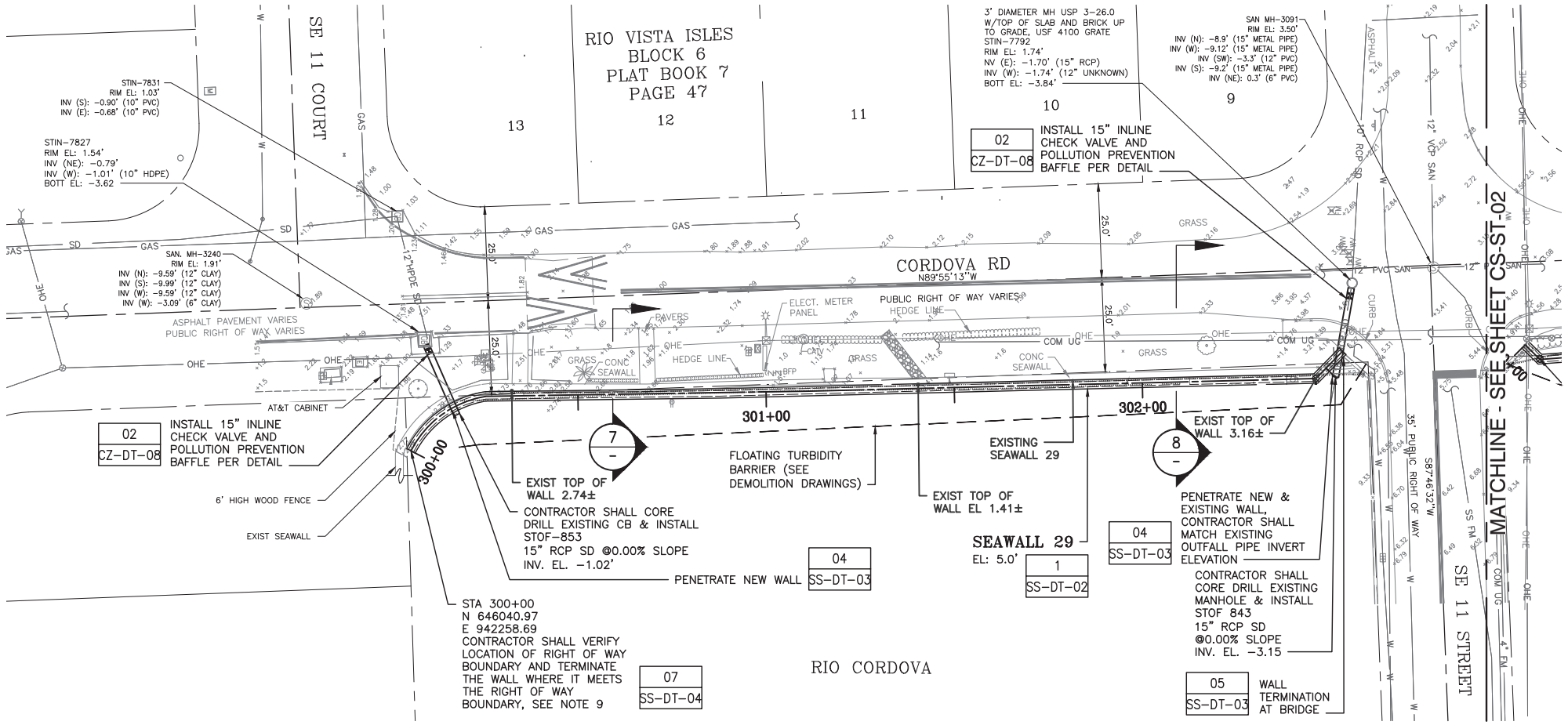
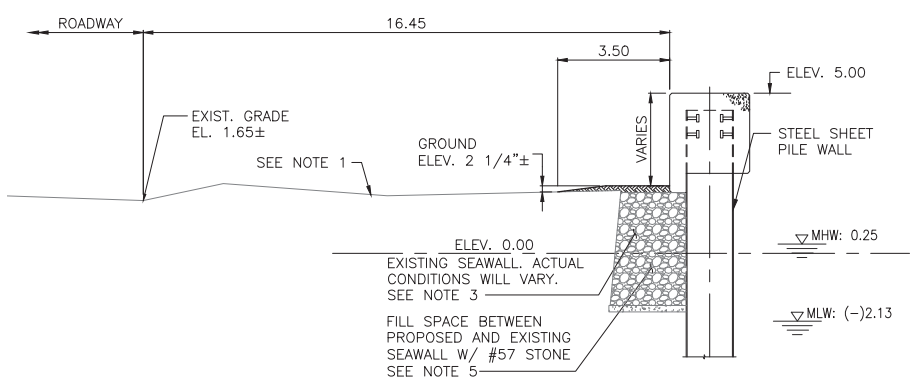
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.

0 3' 6'
0 20' 40'

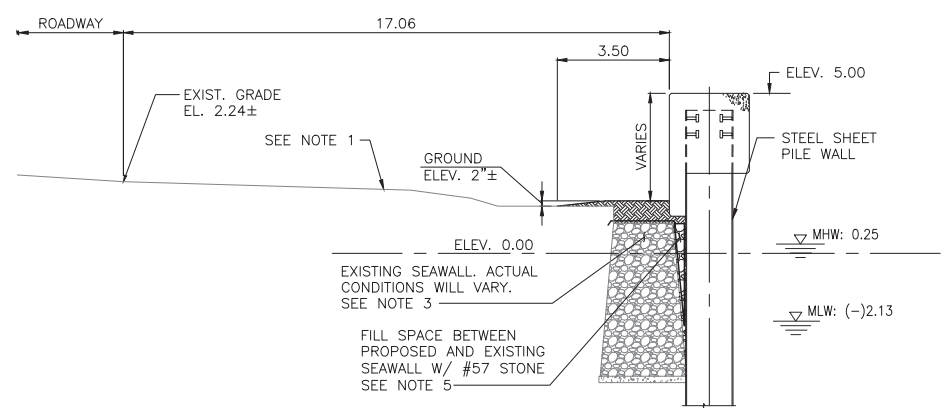
6/4/2019 2:31 PM



PLAN – SEAWALL 29
1" = 20'



PROPOSED SEAWALL
SECTION 7 (1"=3'-0")

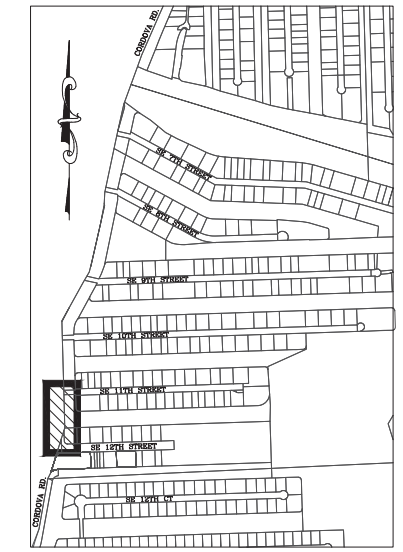


PROPOSED SEAWALL
SECTION 8 (1"=3'-0")

NOTES :

1. CONTRACTOR SHALL ADJUST EXISTING GRADE ELEVATION AND REGRADE TOWARD PROPOSED CATCH BASIN TO OBTAIN POSITIVE FLOW.
2. CONTRACTOR SHALL REPLACE SURROUNDING GROUND AFFECTED INCLUDING BUT NOT LIMITED TO PAVERS, SIDEWALK, SOD, TREES, LANDSCAPE, FENCES, SIGNS AND BRING IT TO EXISTING OR BETTER CONDITIONS IN ACCORDANCE WITH MEASUREMENT AND PAYMENT SPECIFICATION SECTION.
3. SECTIONS DO NOT SHOW EXISTING UTILITIES AND/OR LANDSCAPE. SECTIONS ARE INCLUDED TO ASSIST IN SHOWING THE SCOPE OF PROPOSED WORK AND ARE NOT INTENDED TO INDICATE ALL WORK REQUIRED FOR SITE GRADING AND SEAWALL INSTALLATION. CONTRACTOR SHALL VERY FIELD CONDITIONS PRIOR TO COMMENCE WORK AND INCLUDE ALL WORK REQUIRED IN THE BID PRICE.
4. CONTRACTOR SHALL LOCATE PROPOSED SEAWALL AT A MAXIMUM OF 18 INCHES WET FACE TO WET FACE FROM EXISTING SEAWALL THROUGH OUT THE ENTIRE LENGTH OF THE SEAWALL. WET FACE OF EXISTING SEAWALL IS MEASURED FROM THE BOTTOM OF THE DOWNWARD SLOPING WALL AT THE POINT WHERE THE RUBBLE WALL MEETS THE FOOTING. NO EXCEPTIONS SHALL BE MADE TO THIS MAXIMUM DISTANCE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE THE SEAWALL TO MEET THE PERMIT REQUIREMENTS.
5. CONTRACTOR SHALL REFER TO STRUCTURAL DRAWINGS FOR SEAWALL STRUCTURAL REQUIREMENTS.
6. EXISTING STORMWATER OUTFALL PIPES SHALL BE REPLACED OR EXTENDED THROUGH PROPOSED WALL PER STRUCTURAL DETAILS AND AS SHOWN ON PLANS. ADDITIONAL OUTFALLS FOUND BUT NOT SHOWN SHALL BE EXTENDED PER STRUCTURAL DETAILS.
7. THE CONTRACTOR SHALL CLEAN AND DESILT STORM STRUCTURES OUTFALL PIPES AND EXISTING DRAINAGE STRUCTURES. CONTRACTOR SHALL REMOVE BARNACLE FROM INTERIOR OF OUTFALL PIPE FROM DRAINAGE STRUCTURE TO WATER BODY.
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.
9. STATIONS SHOWN ON THIS SHEET ARE APPROXIMATE ONLY AND ARE ORIENTED ON THE CENTER LINE (CL) OF THE PROPOSED WALL. THE CONTRACTOR SHALL INSTALL THE SEAWALL STRAIGHT WITH MINIMAL CHANGES IN ALIGNMENT AND SHALL REMOVE PARTS OF EXISTING SEAWALL IF REQUIRED TO MEET THE MINIMAL CHANGES IN ALIGNMENT. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO SHOW PROPOSED LAYOUT OF THE WALL FOR ENGINEER'S APPROVAL. WALL ALIGNMENT SHALL ALSO COMPLY WITH THE 18 INCHES MAXIMUM DISTANCE FROM "WET FACE TO WET FACE", ALONG ITS ENTIRE LENGTH.
10. THE LOCATIONS OF THE EXISTING SEAWALL, CATCH BASINS, OUTFALL PIPES, AND UTILITIES HAVE BEEN PREPARED FROM THE MOST RELIABLE INFORMATION AVAILABLE TO THE ENGINEER. THE INFORMATION IS NOT GUARANTEED, THEREFORE, THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING SEAWALL, CATCH BASINS, OUTFALL PIPES, AND UTILITIES IN THE FIELD PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES.
11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, SEQUENCE, TECHNIQUES, AND JOB SAFETY IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS.
12. NO WORK SHALL OCCUR WITHOUT A REPRESENTATIVE OF THE ENGINEER ON-SITE.
13. ALL EXISTING INLINE CHECK VALVES WHICH ARE TO BE REMOVED AND NOT INDICATED ON THE DRAWINGS AS TO BE REINSTALLED SHALL BE RETURNED TO THE CITY.
14. CONTRACTOR SHALL COORDINATE WITH PUBLIC WORKS DEPARTMENT LOCATION OF WATER MAIN STUB-OUTS. WATER MAIN PROJECT WILL BE COMPLETED UNDER A SEPERATE CITY PROJECT.

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP
NTS

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Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTH
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: XXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

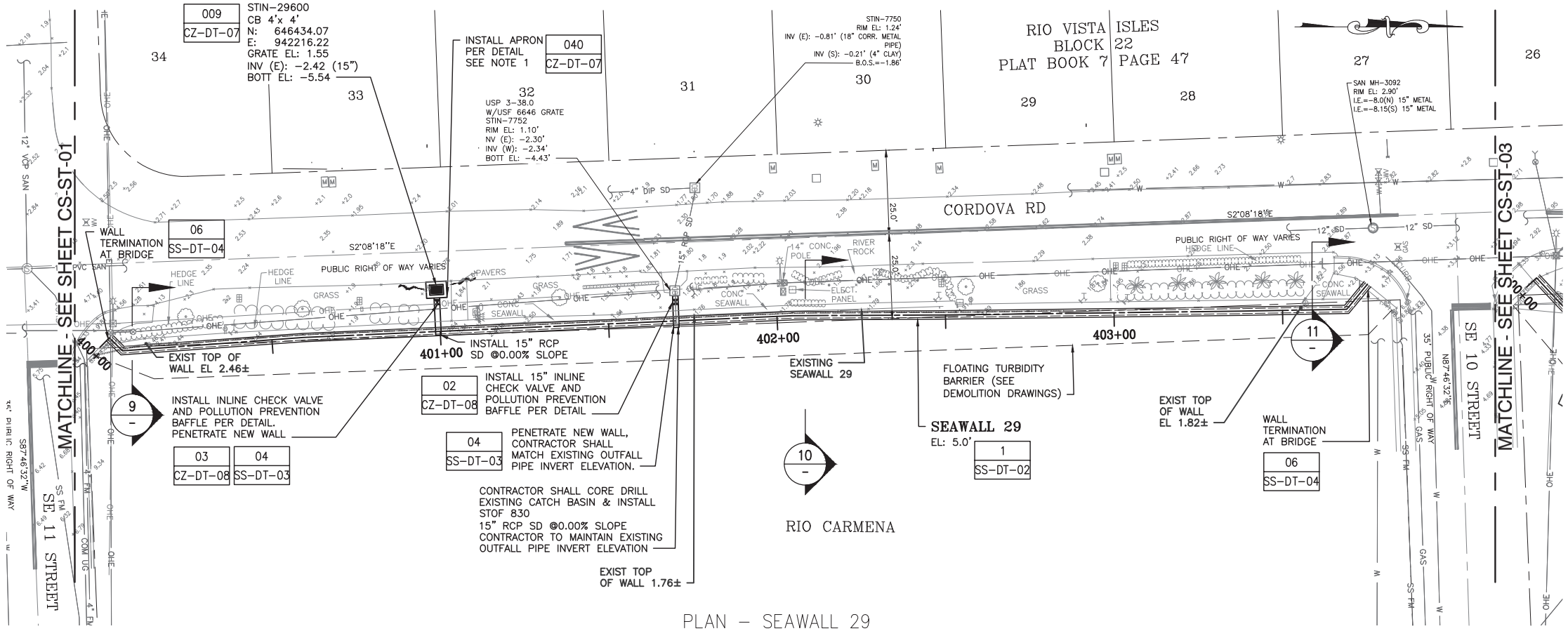
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

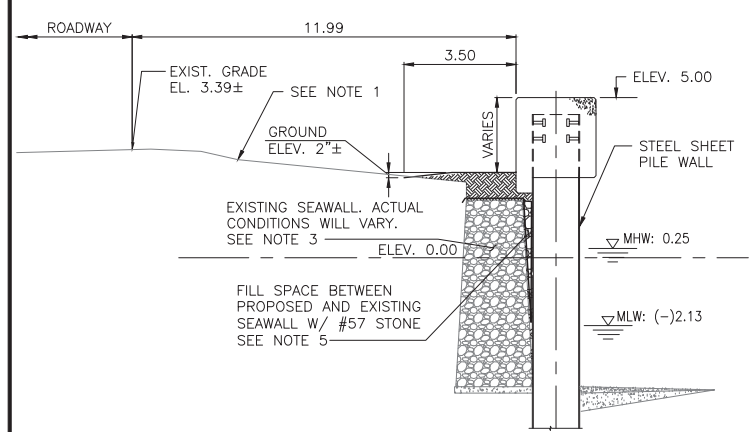
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 1

SHEET NO.
CS-ST-01
TOTAL: 43
CAD FILE: 12337-CS-ST01
DRAWING FILE NO. 4-141-55

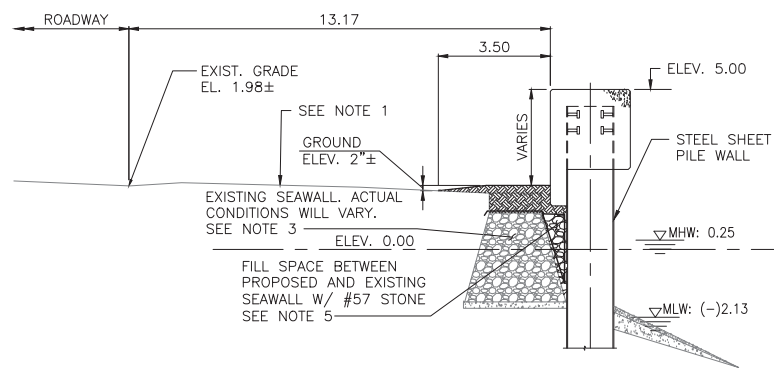
6/4/2019 2:31 PM



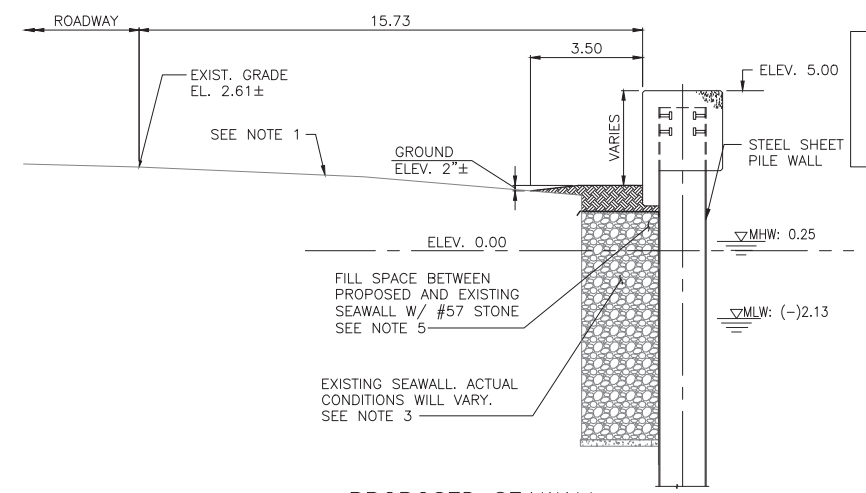
PLAN – SEAWALL 29
1" = 20'



PROPOSED SEAWALL
SECTION 9
1"=3'-0"



PROPOSED SEAWALL
SECTION 10
1"=3'-0"



PROPOSED SEAWALL
SECTION 11
1"=3'-0"

NOTES :

1. CONTRACTOR SHALL ADJUST EXISTING GRADE ELEVATION AND REGRADE TOWARD PROPOSED CATCH BASIN TO OBTAIN POSITIVE FLOW.
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5. CONTRACTOR SHALL REFER TO STRUCTURAL DRAWINGS FOR SEAWALL STRUCTURAL REQUIREMENTS.
6. EXISTING STORMWATER OUTFALL PIPES SHALL BE REPLACED OR EXTENDED THROUGH PROPOSED WALL PER STRUCTURAL DETAILS AND AS SHOWN ON PLANS. ADDITIONAL OUTFALLS FOUND BUT NOT SHOWN SHALL BE EXTENDED PER STRUCTURAL DETAILS.
7. THE CONTRACTOR SHALL CLEAN AND DESILT STORM STRUCTURES OUTFALL PIPES AND EXISTING DRAINAGE STRUCTURES. CONTRACTOR SHALL REMOVE BARNACLE FROM INTERIOR OF OUTFALL PIPE FROM DRAINAGE STRUCTURE TO WATER BODY.
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.
9. STATIONS SHOWN ON THIS SHEET ARE APPROXIMATE ONLY AND ARE ORIENTED ON THE CENTER LINE (CL) OF THE PROPOSED WALL. THE CONTRACTOR SHALL INSTALL THE SEAWALL STRAIGHT WITH MINIMAL CHANGES IN ALIGNMENT AND SHALL REMOVE PARTS OF EXISTING SEAWALL IF REQUIRED TO MEET THE MINIMAL CHANGES IN ALIGNMENT. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO SHOW PROPOSED LAYOUT OF THE WALL FOR ENGINEER'S APPROVAL. WALL ALIGNMENT SHALL ALSO COMPLY WITH THE 18 INCHES MAXIMUM DISTANCE FROM "WET FACE TO WET FACE", ALONG ITS ENTIRE LENGTH.
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13. ALL EXISTING INLINE CHECK VALVES WHICH ARE TO BE REMOVED AND NOT INDICATED ON THE DRAWINGS AS TO BE REINSTALLED SHALL BE RETURNED TO THE CITY.
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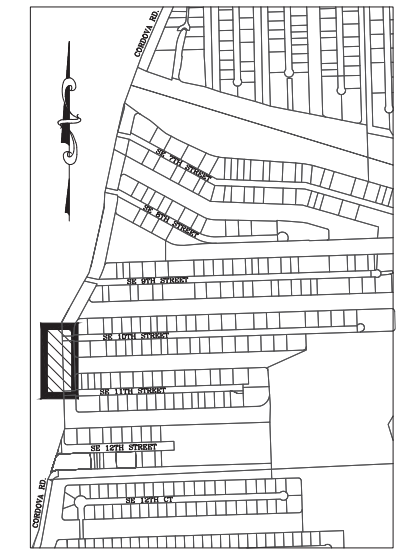
Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP
NTS

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

BID SET

ENGINEER: ERIC E. FELIBERTY-RUBERTE
REG. NO. 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: XXXX

CAM 19-0646
Exhibit 3 (Part 3 of 3)
Page 589 of 660

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

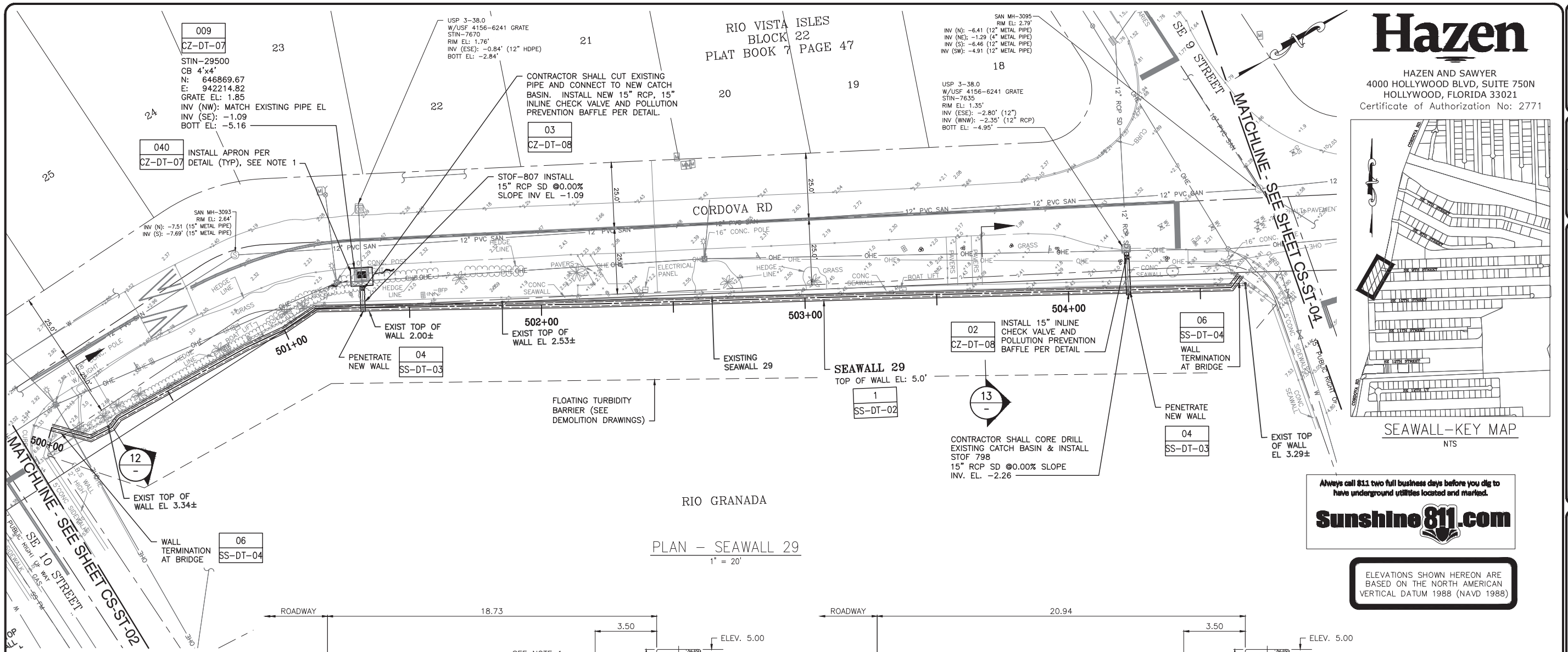
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 2

SHEET NO.
CS-ST-02
TOTAL: 43
CAD FILE: 12337-CS-ST02
DRAWING FILE NO. 4-141-55

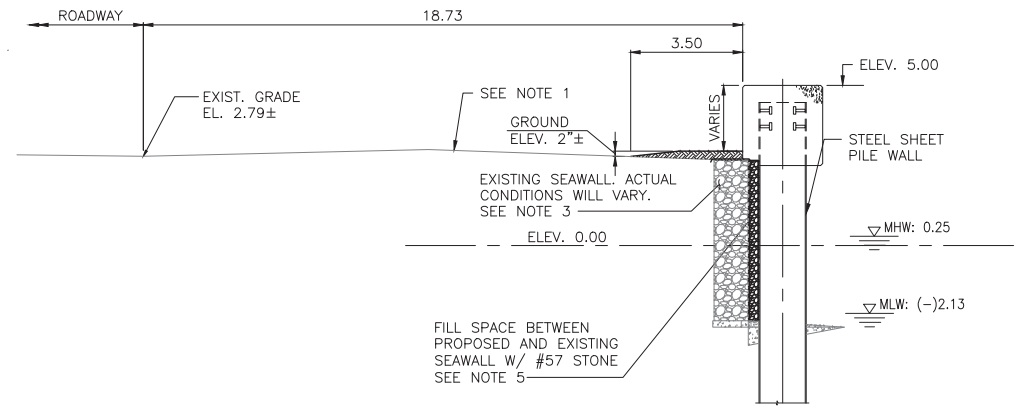
6/4/2019 2:31 PM

PLOT DATE: 2/21/2019 5:31 PM BY: GDIAZ XREFs= ..\dms84593\12074XREF03PROP,..\dms84593\12074SURV,..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074XREF04PROP,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074-XREF02STRM,..\dms84593\12074XREF05ELEC,..\dms84593\12074XREF06ELEC 12337-CS-ST02 Saved by gdiaz Save date = 2/21/2019 7:10 AM

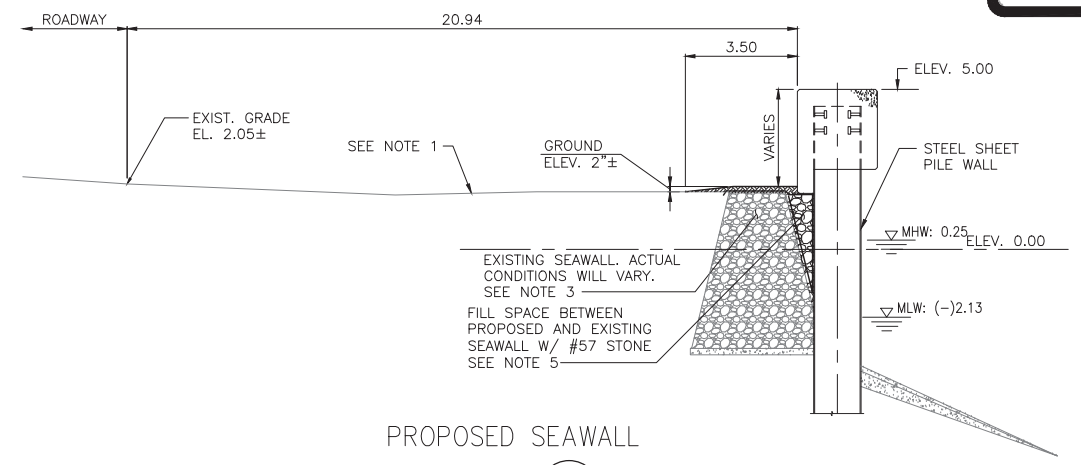


PLAN – SEAWALL 29
1" = 20'

SEAWALL-KEY MAP
NTS



PROPOSED SEAWALL
SECTION 12
1"=3'-0"



PROPOSED SEAWALL
SECTION 13
1"=3'-0"

NOTES :

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LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 — PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

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HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: 1101

CAM 19-0646
Exhibit 3 (Part 3 of 3) p. 590

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 3

BID SET

SHEET NO.
CS-ST-03
TOTAL: 43
CAD FILE: 12337-CS-ST03
DRAWING FILE NO. 4-141-55

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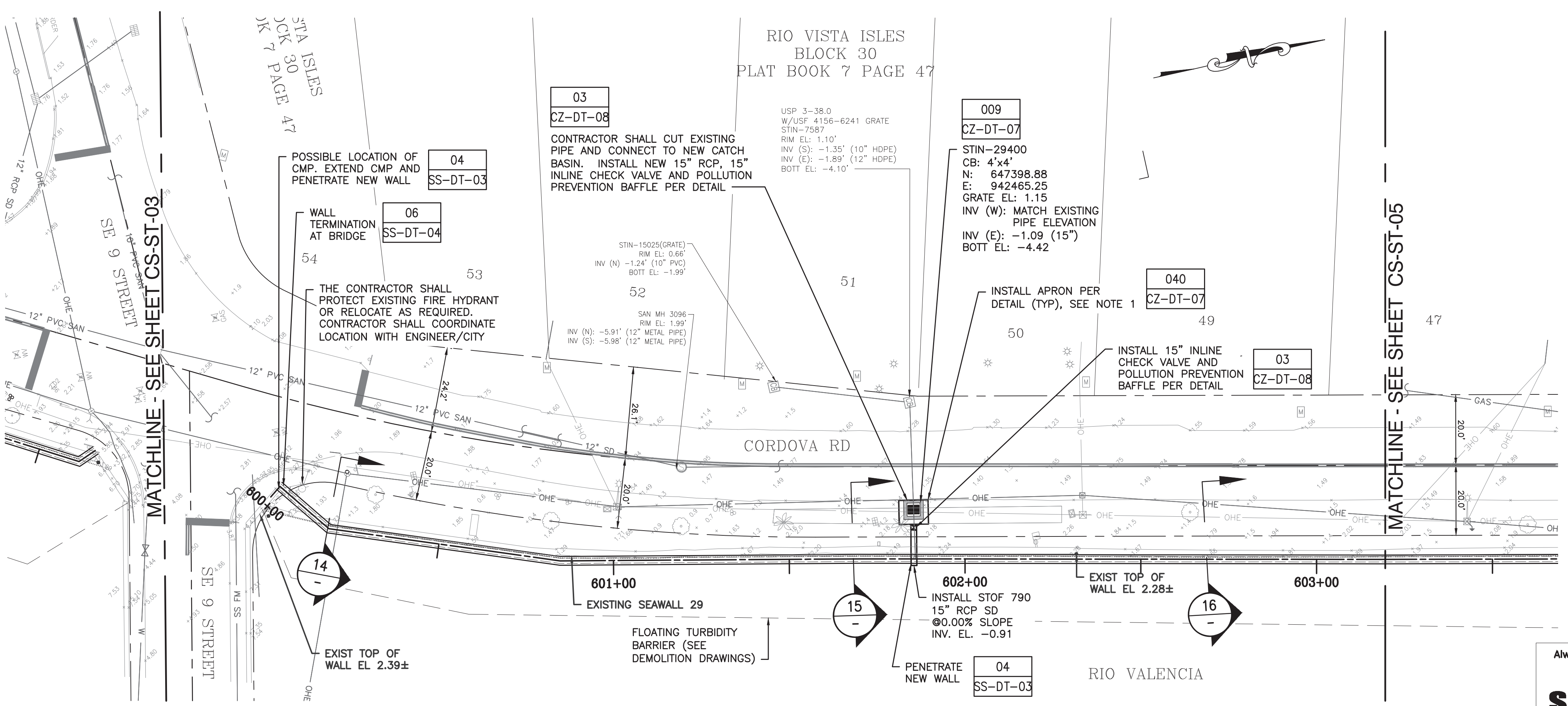
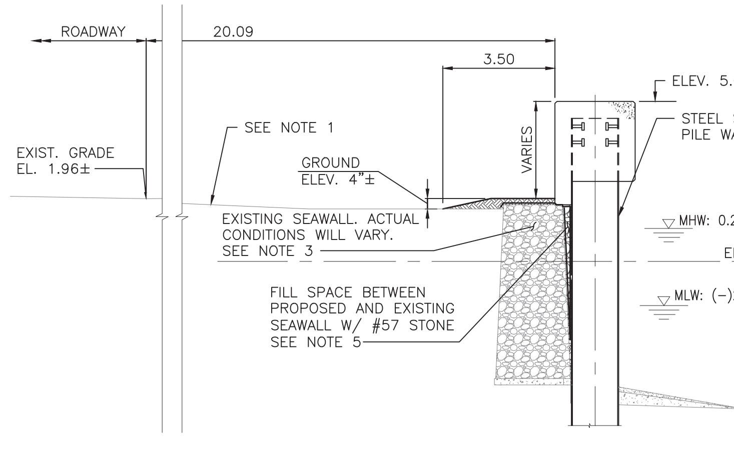
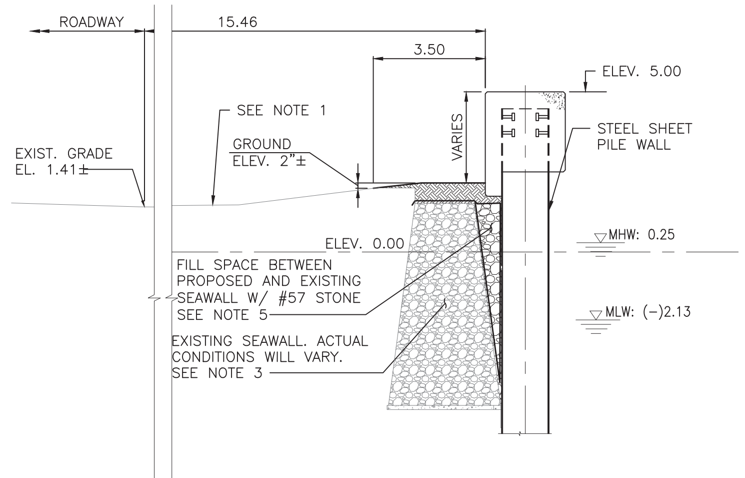


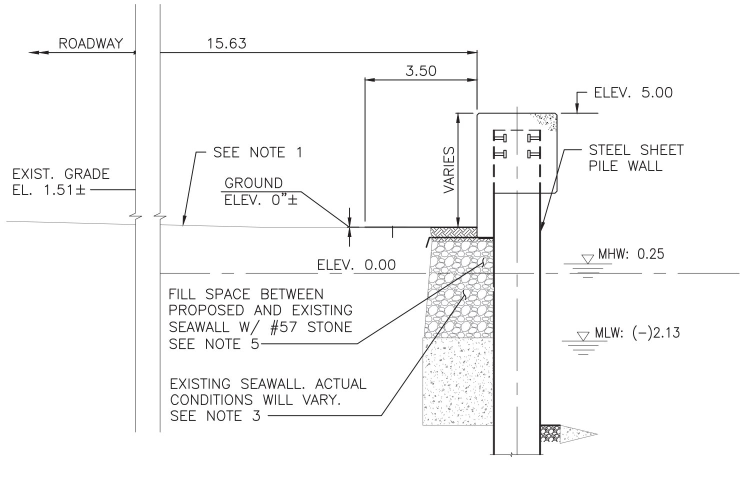
PLAN – SEAWALL 29
1" = 20'



PROPOSED SEAWALL
SECTION 14 / –
1"=3'-0"



PROPOSED SEAWALL
SECTION 15 / –
1"=3'-0"



PROPOSED SEAWALL
SECTION 16 / –
1"=3'-0"

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Hazen

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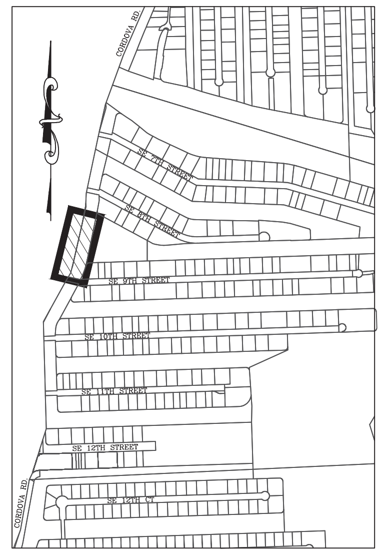
Certificate of Authorization No: 2771



SEAWALL-KEY MAP
NTS

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

─ ─ ─	EXISTING
───	PROPOSED
┈┈┈	EXISTING CORAL ROCK'S BASE
═══	PROPOSED SEAWALL
∼	GRADING DIRECTION
× 0.00	PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

BID SET

SHEET NO.
CS-ST-04
TOTAL: 43
CAD FILE: 12337-CS-ST04
DRAWING FILE NO. 4-141-55

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 4

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: LEFR	SCALE: AS NOTED
CHECKED BY: AH	
FIELD BOOK: XXXX	

ENGINEER:
LIZ E. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

PLOT DATE: 2/21/2019 5:33 PM BY: GDIAZ XREFs= ..\dms84593\12074XREF03PROP,..\dms84593\12074SURV,..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074-XREF02STRM,..\dms84593\12074XREF01SECT,..\dms84593\12074XREF02SECT\dms89466\12337-CS-ST04 Saved by gdiaz Save date = 2/21/2019 7:09 AM

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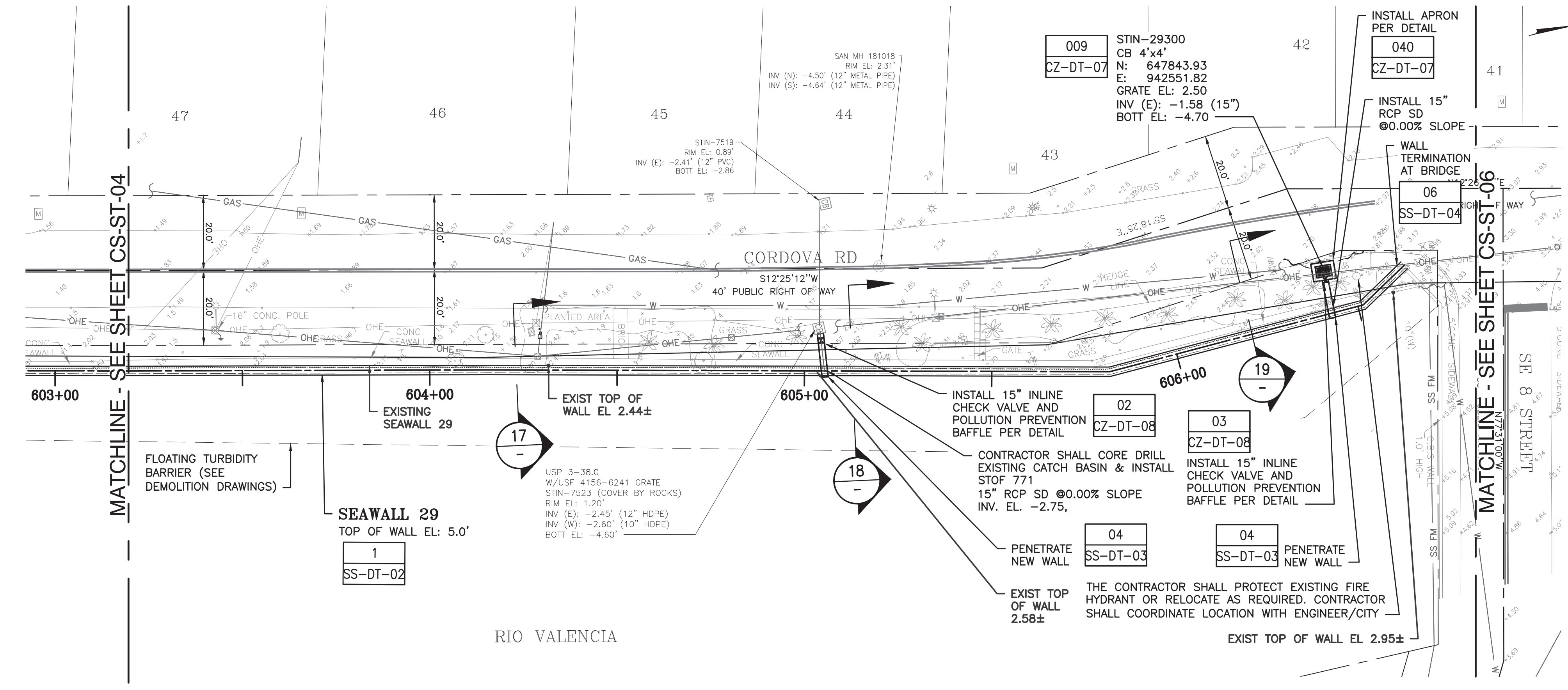
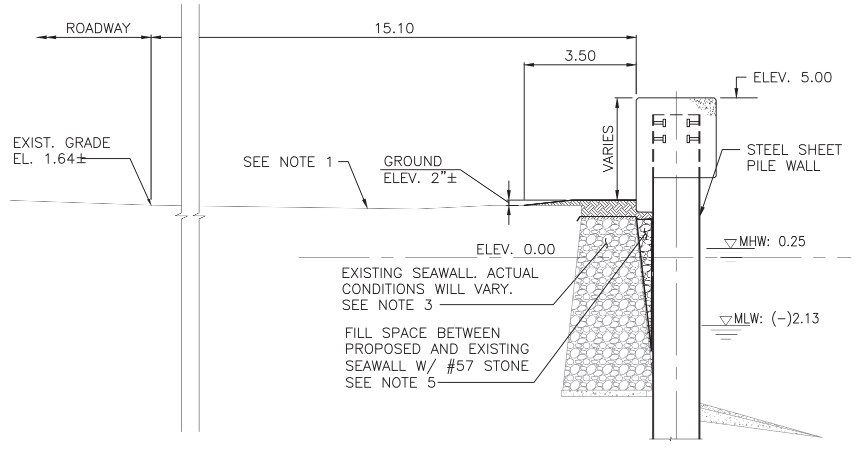
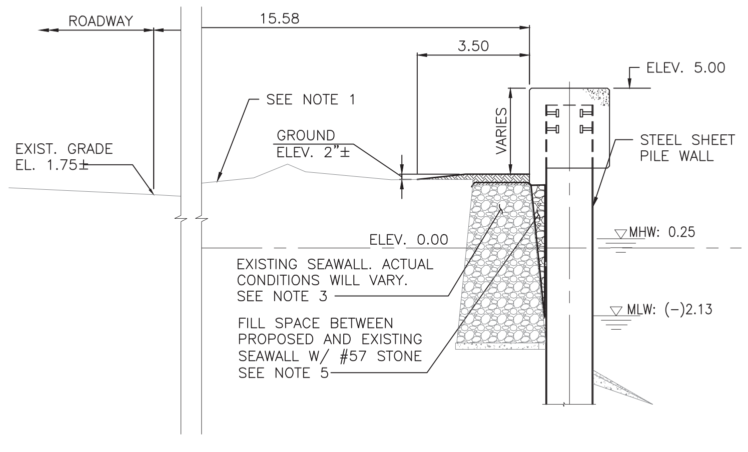


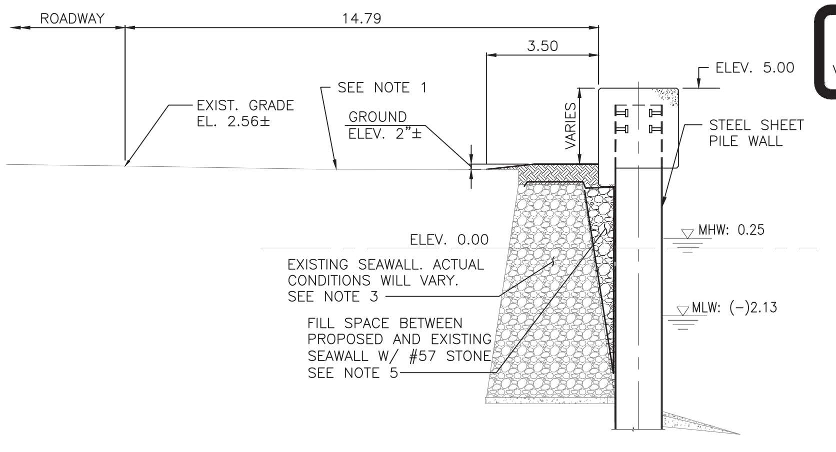
PLAN – SEAWALL 29
1" = 20'



PROPOSED SEAWALL
SECTION 17 –
1"=3'-0"



PROPOSED SEAWALL
SECTION 18 –
1"=3'-0"



PROPOSED SEAWALL
SECTION 19 –
1"=3'-0"

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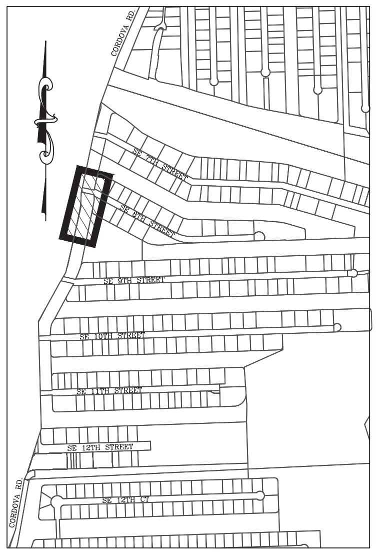

SEAWALL–KEY MAP
NTS

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Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

─ ─ ─	EXISTING
───	PROPOSED
┄┄┄	EXISTING CORAL ROCK'S BASE
═══	PROPOSED SEAWALL
∼	GRADING DIRECTION
× 0.00	PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 5

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

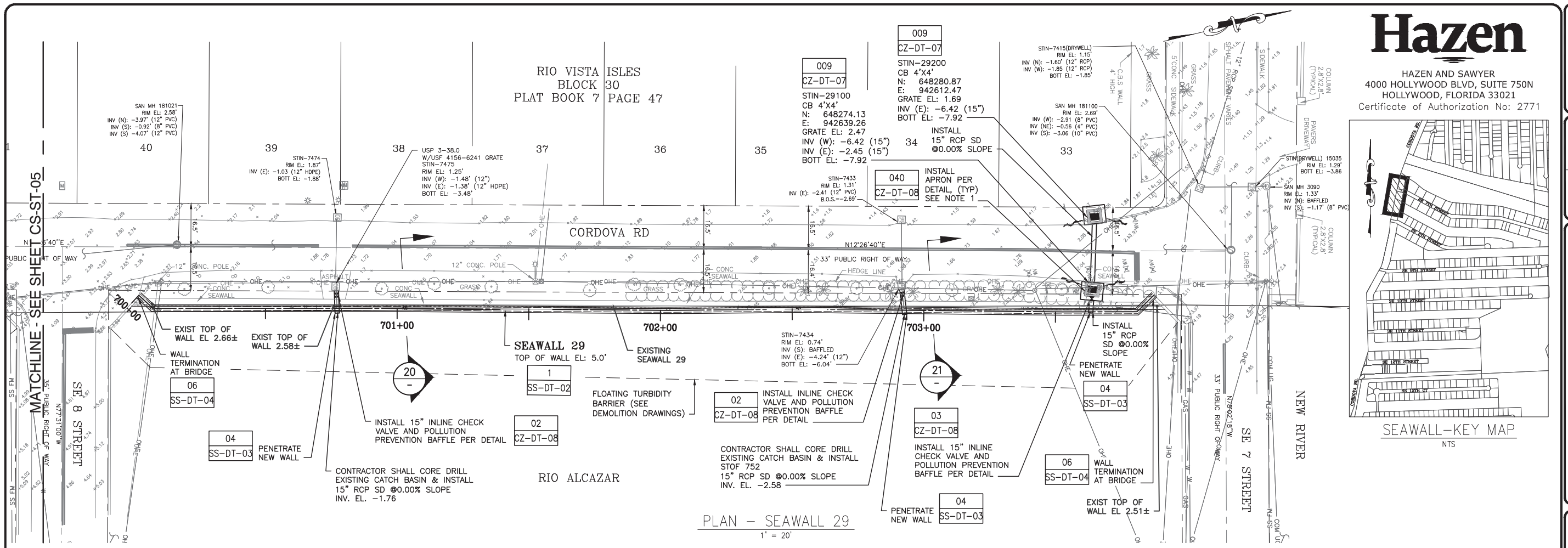
DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: LEFR	SCALE: AS NOTED
CHECKED BY: AH	
FIELD BOOK: XXXX	

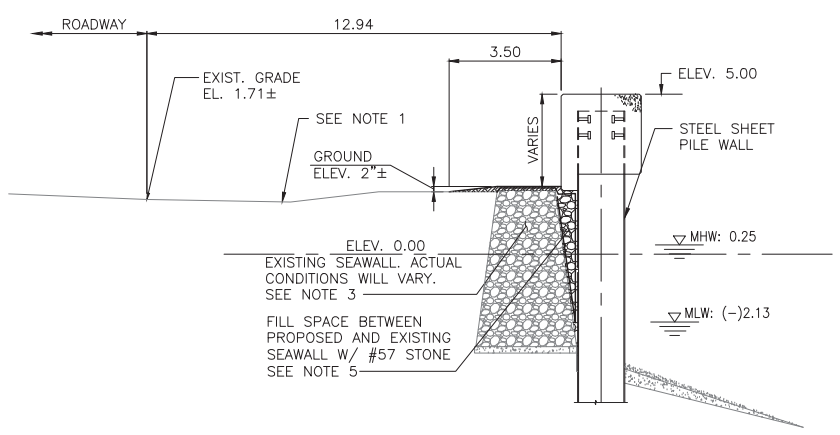
ENGINEER:
LIZ E. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017
PH: 954-987-0066
FAX: 954-987-2949

SHEET NO.
CS-ST-05
TOTAL: 43
CAD FILE: 12337-CS-ST05
DRAWING FILE NO. 4-141-55

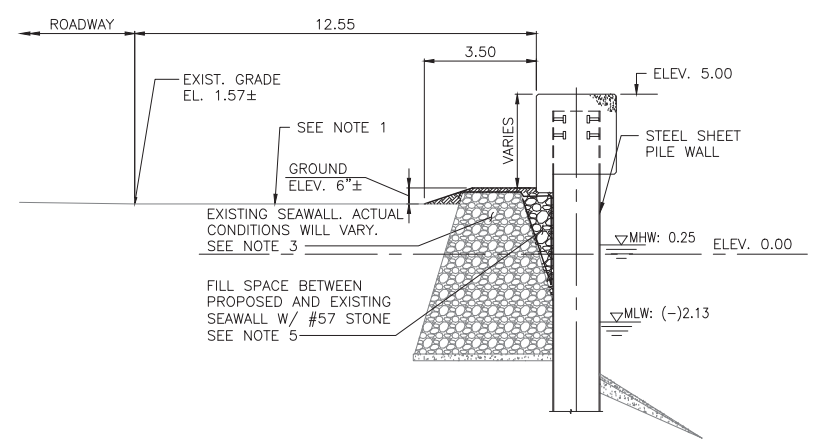
PLOT DATE: 2/21/2019 5:34 PM BY: GDIAZ XREFs= ..\dms84593\12074XREF03PROP,..\dms84593\12074SURV,..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074-XREF02STRM,..\dms84593\12074XREF01SECT, [illegible] 9466\12337-CS-ST05 Saved by gdiaz Save date = 2/21/2019 7:09 AM

6/4/2019 2:31 PM





PROPOSED SEAWALL
SECTION 20
1"=3'-0"



PROPOSED SEAWALL
SECTION 21
1"=3'-0"

SEAWALL-KEY MAP
NTS

NOTES :

1. CONTRACTOR SHALL ADJUST EXISTING GRADE ELEVATION AND REGRADE TOWARD PROPOSED CATCH BASIN TO OBTAIN POSITIVE FLOW.
2. CONTRACTOR SHALL REPLACE SURROUNDING GROUND AFFECTED INCLUDING BUT NOT LIMITED TO PAVERS, SIDEWALK, SOD, TREES, LANDSCAPE, FENCES, SIGNS AND BRING IT TO EXISTING OR BETTER CONDITIONS IN ACCORDANCE WITH MEASUREMENT AND PAYMENT SPECIFICATION SECTION.
3. SECTIONS DO NOT SHOW EXISTING UTILITIES AND/OR LANDSCAPE. SECTIONS ARE INCLUDED TO ASSIST IN SHOWING THE SCOPE OF PROPOSED WORK AND ARE NOT INTENDED TO INDICATE ALL WORK REQUIRED FOR SITE GRADING AND SEAWALL INSTALLATION. CONTRACTOR SHALL VERY FIELD CONDITIONS PRIOR TO COMMENCE WORK AND INCLUDE ALL WORK REQUIRED IN THE BID PRICE.
4. CONTRACTOR SHALL LOCATE PROPOSED SEAWALL AT A MAXIMUM OF 18 INCHES WET FACE TO WET FACE FROM EXISTING SEAWALL THROUGH OUT THE ENTIRE LENGTH OF THE SEAWALL. WET FACE OF EXISTING SEAWALL IS MEASURED FROM THE BOTTOM OF THE DOWNWARD SLOPING WALL AT THE POINT WHERE THE RUBBLE WALL MEETS THE FOOTING. NO EXCEPTIONS SHALL BE MADE TO THIS MAXIMUM DISTANCE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE THE SEAWALL TO MEET THE PERMIT REQUIREMENTS.
5. CONTRACTOR SHALL REFER TO STRUCTURAL DRAWINGS FOR SEAWALL STRUCTURAL REQUIREMENTS.
6. EXISTING STORMWATER OUTFALL PIPES SHALL BE REPLACED OR EXTENDED THROUGH PROPOSED WALL PER STRUCTURAL DETAILS AND AS SHOWN ON PLANS. ADDITIONAL OUTFALLS FOUND BUT NOT SHOWN SHALL BE EXTENDED PER STRUCTURAL DETAILS.
7. THE CONTRACTOR SHALL CLEAN AND DESILT STORM STRUCTURES OUTFALL PIPES AND EXISTING DRAINAGE STRUCTURES. CONTRACTOR SHALL REMOVE BARNACLE FROM INTERIOR OF OUTFALL PIPE FROM DRAINAGE STRUCTURE TO WATER BODY.
8. CONTRACTOR SHALL INSTALL TURBIDITY BARRIERS IN ALL PERMANENT BODIES OF WATER THROUGHOUT ALL PHASES OF CONSTRUCTION REGARDLESS OF WATER DEPTH TO MEET REGULATORY STANDARDS.
9. STATIONS SHOWN ON THIS SHEET ARE APPROXIMATE ONLY AND ARE ORIENTED ON THE CENTER LINE (CL) OF THE PROPOSED WALL. THE CONTRACTOR SHALL INSTALL THE SEAWALL STRAIGHT WITH MINIMAL CHANGES IN ALIGNMENT AND SHALL REMOVE PARTS OF EXISTING SEAWALL IF REQUIRED TO MEET THE MINIMAL CHANGES IN ALIGNMENT. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO SHOW PROPOSED LAYOUT OF THE WALL FOR ENGINEER'S APPROVAL. WALL ALIGNMENT SHALL ALSO COMPLY WITH THE 18 INCHES MAXIMUM DISTANCE FROM "WET FACE TO WET FACE", ALONG ITS ENTIRE LENGTH.
10. THE LOCATIONS OF THE EXISTING SEAWALL, CATCH BASINS, OUTFALL PIPES, AND UTILITIES HAVE BEEN PREPARED FROM THE MOST RELIABLE INFORMATION AVAILABLE TO THE ENGINEER. THE INFORMATION IS NOT GUARANTEED, THEREFORE, THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING SEAWALL, CATCH BASINS, OUTFALL PIPES, AND UTILITIES IN THE FIELD PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES.
11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, SEQUENCE, TECHNIQUES, AND JOB SAFETY IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS.
12. NO WORK SHALL OCCUR WITHOUT A REPRESENTATIVE OF THE ENGINEER ON-SITE.
13. ALL EXISTING INLINE CHECK VALVES WHICH ARE TO BE REMOVED AND NOT INDICATED ON THE DRAWINGS AS TO BE REINSTALLED SHALL BE RETURNED TO THE CITY.
14. CONTRACTOR SHALL COORDINATE WITH PUBLIC WORKS DEPARTMENT LOCATION OF WATER MAIN STUB-OUTS. WATER MAIN PROJECT WILL BE COMPLETED UNDER A SEPERATE CITY PROJECT.

Always call 811 two full business days before you dig to have underground utilities located and marked.
Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 PROPOSED SPOT ELEVATION

0 3' 6'
0 20' 40'

BID SET

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC B. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: N/A
CHECKED BY: RBT
FIELD BOOK: CAM 19-0646

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

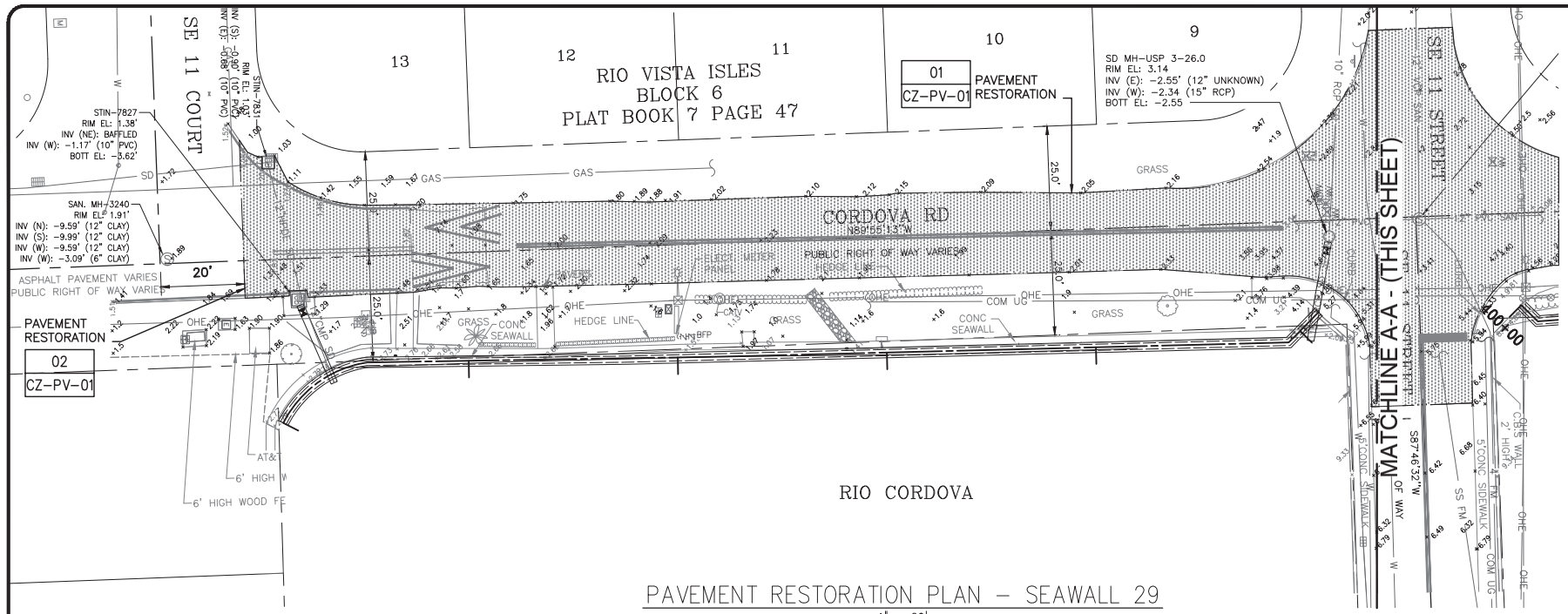
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PROPOSED SITE PLAN AND
SECTIONS - SHEET 6

SHEET NO.
CS-ST-06
TOTAL: 43
CAD FILE: 12337-CS-ST06
DRAWING FILE NO. 4-141-55

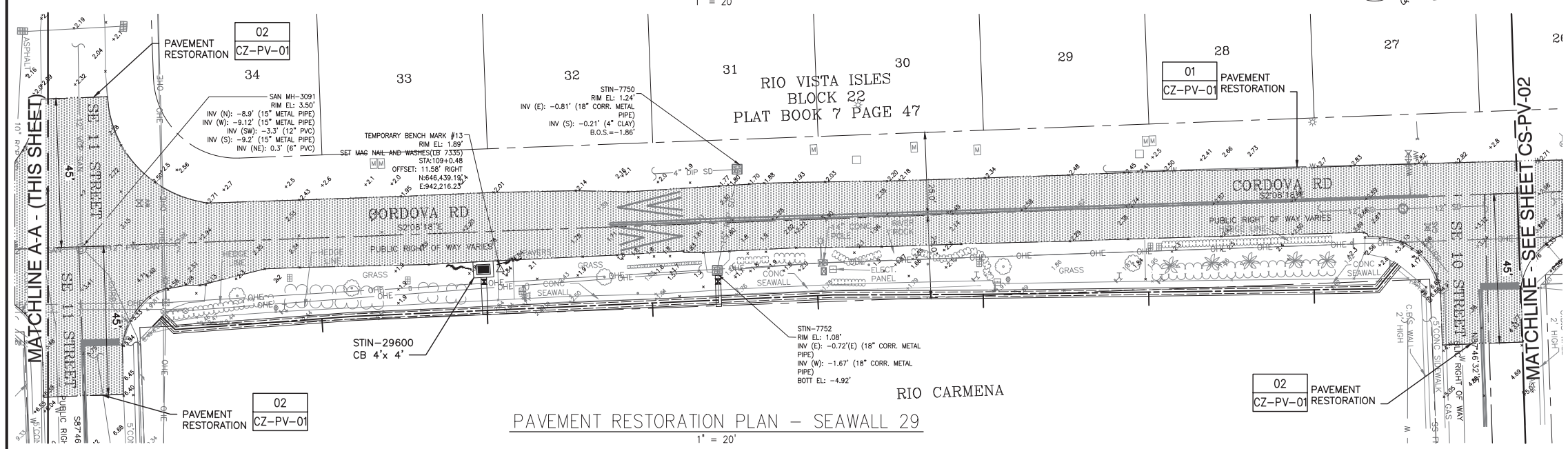
6/4/2019 2:31 PM

PLOT DATE: 2/21/2019 5:35 PM BY: GDIAZ XREFs= ..\dms84593\12074XREF03PROP,..\dms84593\12074SURV,..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074-XREFUTIL,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074-XREF02STRM,..\dms84593\12074XREF01SECT,..\dms84593\12074XREF04PROP,..\dms84593\12074XREF01PROP,..\dms84593\12074XREF01PROP,..\dms84593\12337-CS-ST06 Saved by gdiaz Save date = 2/21/2019 7:08 AM



PAVEMENT RESTORATION PLAN – SEAWALL 29

1" = 20'

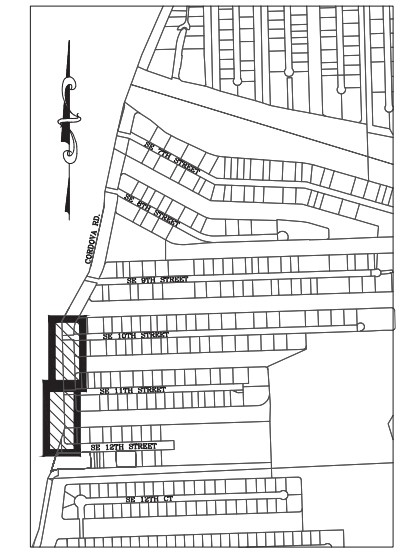


PAVEMENT RESTORATION PLAN – SEAWALL 29

1" = 20'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

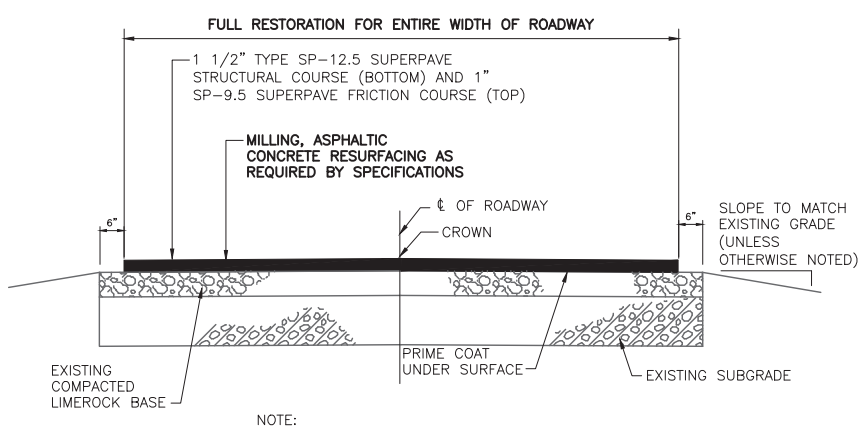


SEAWALL–KEY MAP

NTS

NOTES:

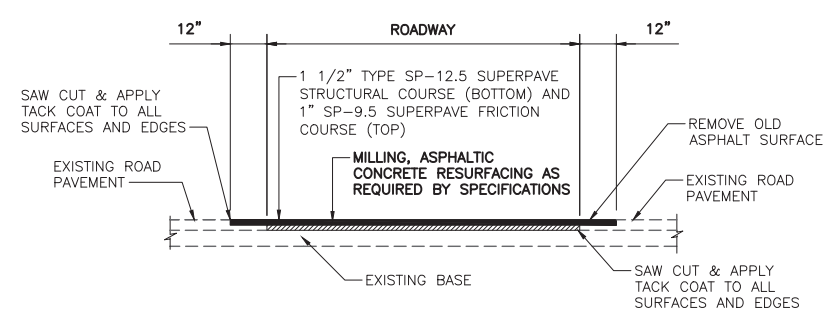
1. CONTRACTOR SHALL MATCH EXISTING GRADE AND CONTOURS.
2. CONTRACTOR TO RESTORE ALL AFFECTED PAVEMENT MARKINGS. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH FDOT STANDARDS AND BROWARD COUNTY TRAFFIC ENGINEERING DIVISION. REFER TO SPECIFICATION SECTION 02761–PAVEMENT MARKING.
3. CONTRACTOR SHALL RESTORE CURB TO MATCH EXISTING AND IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
4. CONTRACTOR SHALL RESTORE SITE, INCLUDING DRIVEWAY APPROACHES, SIDEWALKS, PAVERS, SOD, LANDSCAPING AND IRRIGATION IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
5. REFER TO CITY STANDARD DETAIL NO. "ROAD–001" ON SHEET NO. CZ–DT–10 FOR TYPICAL TRENCH AND PAVEMENT RESTORATION FOR TRAVERSE PIPE CROSSINGS.



NOTE:
SLOPE ASPHALT TO ELEVATIONS SHOWN ON DRAWINGS.

TYPICAL ASPHALT PAVEMENT RESTORATION DETAIL

DETAIL	1
NTS	–



NOTE:
SLOPE ASPHALT TO ELEVATIONS SHOWN ON DRAWINGS.

TYPICAL ASPHALT PAVEMENT EDGE RESTORATION DETAIL

DETAIL	2
NTS	–

Always call 811 two full business days before you dig to have underground utilities located and marked.

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LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 — PROPOSED SPOT ELEVATION
- PAVEMENT RESTORATION

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

0 20' 40'

BID SET

ENGINEER:
ERIC E. FELIBERTY–RUBERTE
REG. # 64866
DATE: 02/01/2017

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: LEFR	SCALE: AS NOTED
CHECKED BY: AH	
FIELD BOOK:	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVEMENT RESTORATION
AND STRIPING - SHEET 1

SHEET NO.
CS-PV-01
TOTAL: 43
CAD FILE: 12337–CS–PV01
DRAWING FILE NO. 4–141–55

PLOT DATE: 2/21/2019 5:36 PM BY: GDIAZ XREFs= ..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074SURV,..\dms84593\12074XREF03PROP,..\dms84593\12074–XREF02STRM,..\dms84593\12074–XREF02UTIL,..\dms84593\12074–XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074XREF04PROP

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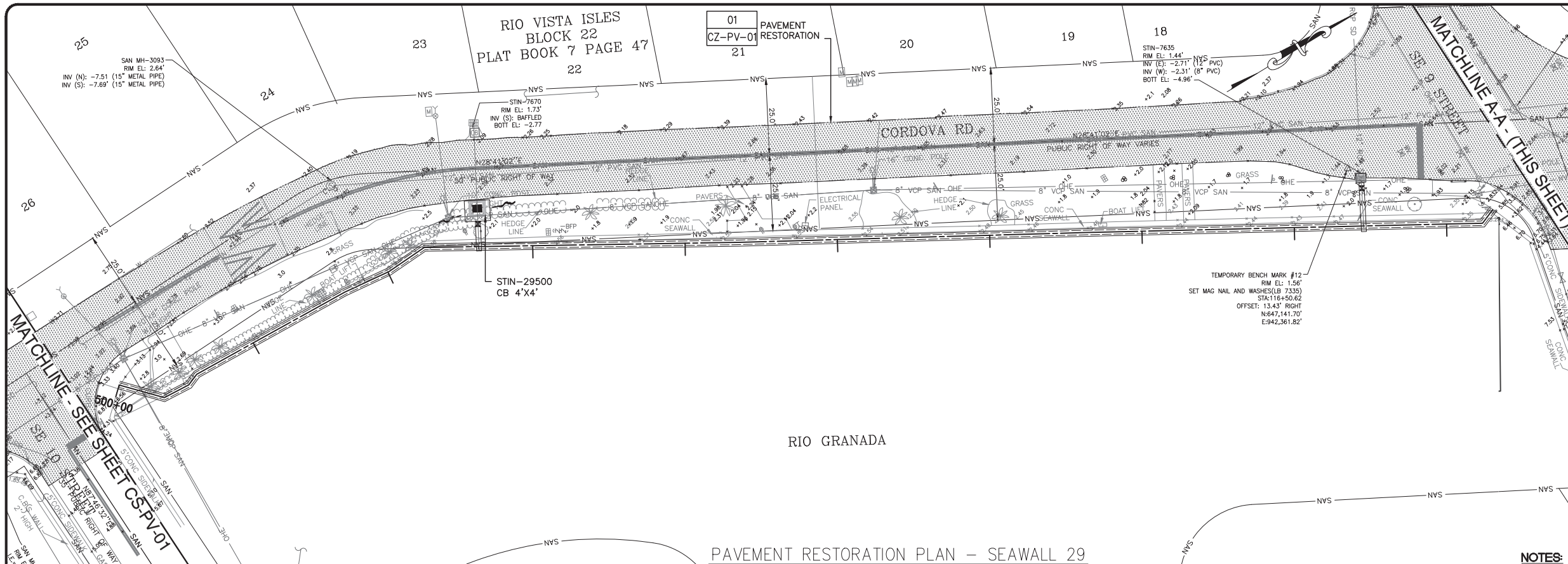
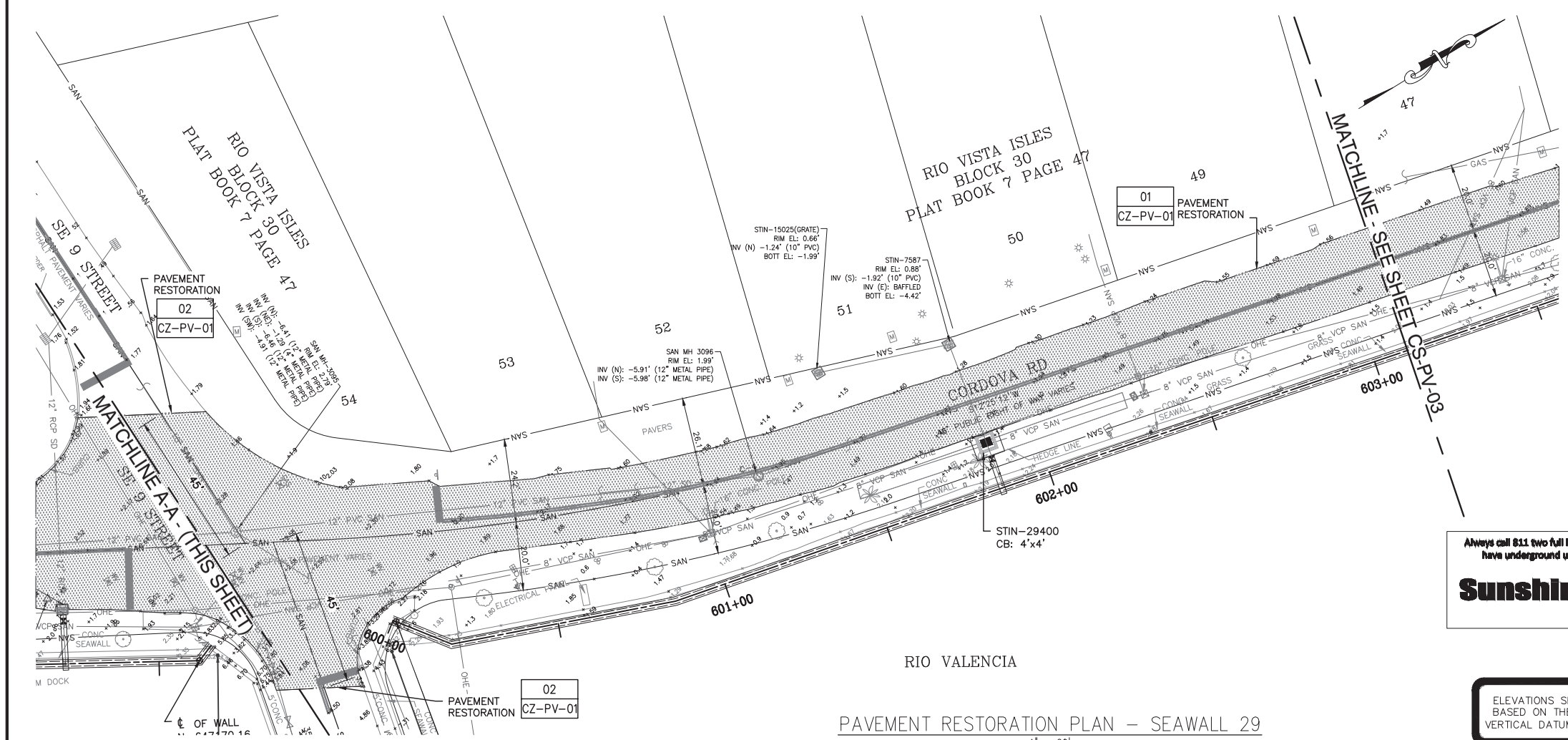


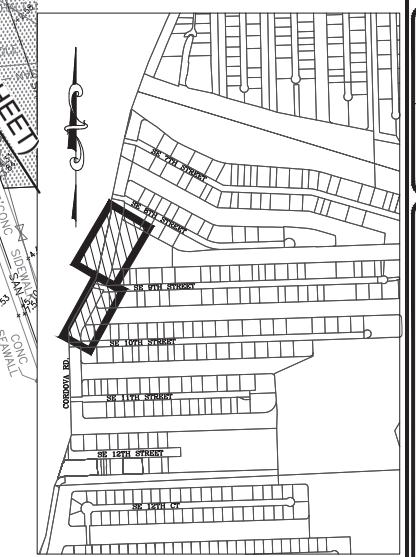
PAVEMENT RESTORATION PLAN – SEAWALL 29
1" = 20'



PAVEMENT RESTORATION PLAN – SEAWALL 29
1" = 20'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP
NTS

NOTES:

1. CONTRACTOR SHALL MATCH EXISTING GRADE AND CONTOURS.
2. CONTRACTOR TO RESTORE ALL AFFECTED PAVEMENT MARKINGS. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH FDOT STANDARDS AND BROWARD COUNTY TRAFFIC ENGINEERING DIVISION. REFER TO SPECIFICATION SECTION 02761–PAVEMENT MARKING.
3. CONTRACTOR SHALL RESTORE CURB TO MATCH EXISTING AND IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
4. CONTRACTOR SHALL RESTORE SITE, INCLUDING DRIVEWAY APPROACHES, SIDEWALKS, PAVERS, SOD, LANDSCAPING AND IRRIGATION IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
5. REFER TO CITY STANDARD DETAIL NO. "ROAD–001" ON SHEET NO. CZ–DT–10 FOR TYPICAL TRENCH AND PAVEMENT RESTORATION FOR TRAVERSE PIPE CROSSINGS.

Always call 811 two full business days before you dig to have underground utilities located and marked.
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LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 PROPOSED SPOT ELEVATION
- PAVEMENT RESTORATION

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY–RUDERTS
REG. NO: 64866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY:	DATE:
OLC	02/21/19
DESIGNED BY:	SCALE:
LEFR	AS NOTED
CHECKED BY:	
AH	
FIELD BOOK:	

CAM 19-0646
Exhibit 3 (Part 3 of 3)
p. 595
Page 595 of 660

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVEMENT RESTORATION
AND STRIPING - SHEET 2

SHEET NO.
CS-PV-02
TOTAL: 43
CAD FILE: 12337–CS–PV02
DRAWING FILE NO. 4–141–55

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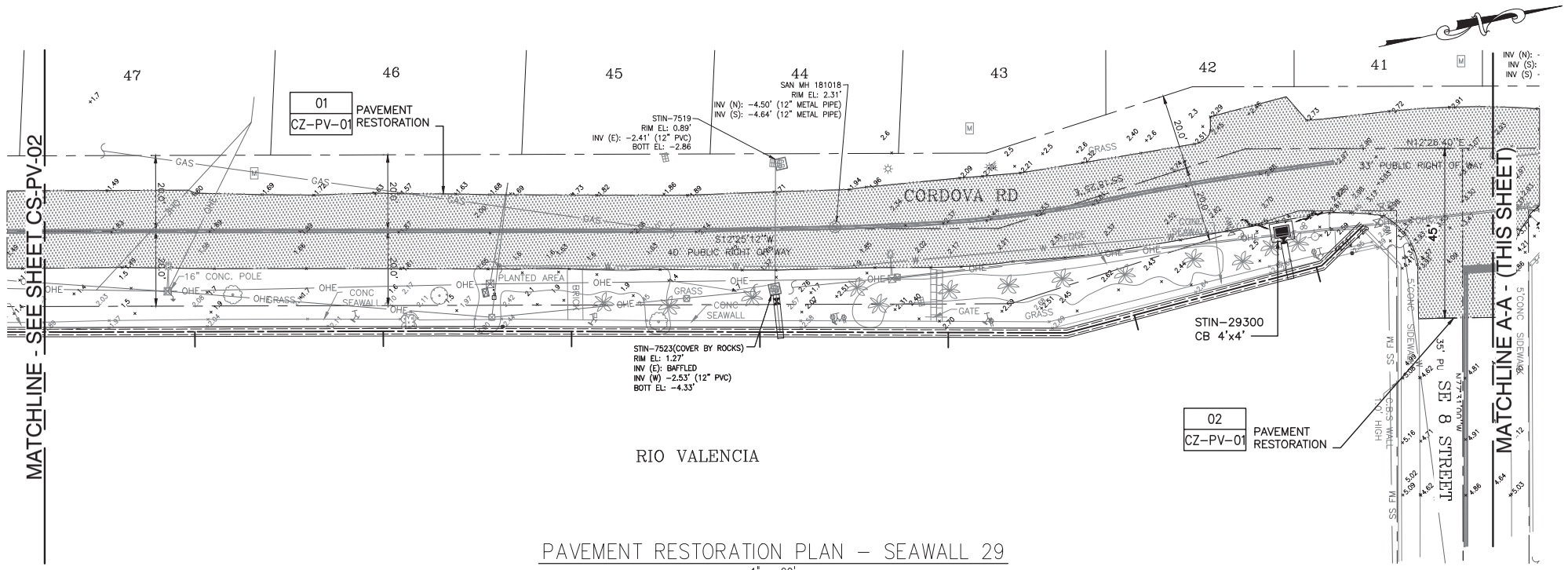
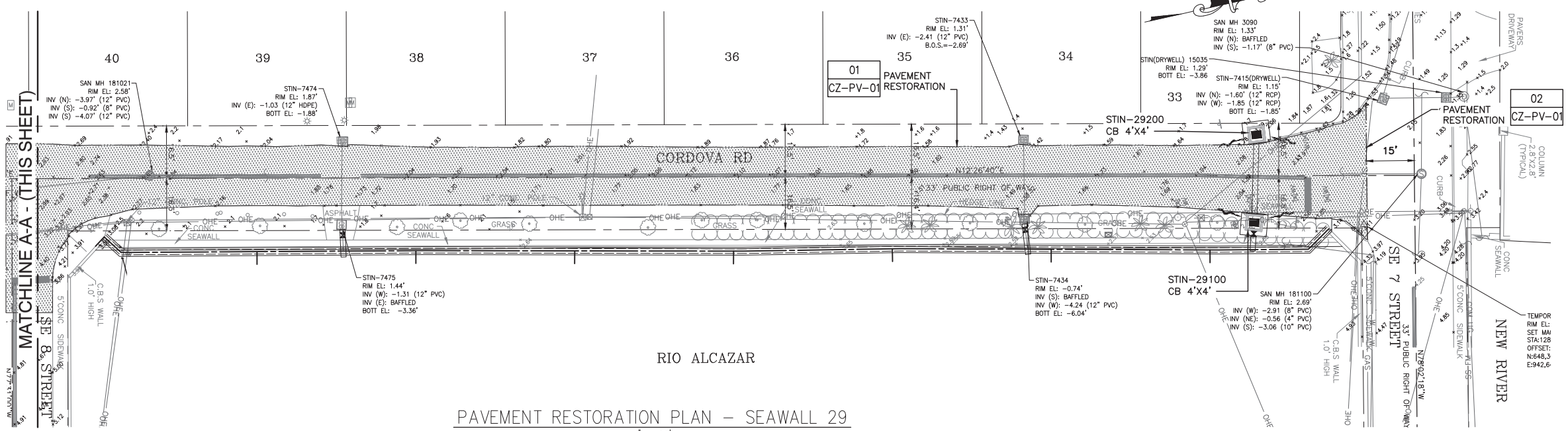


PAVEMENT RESTORATION PLAN – SEAWALL 29

1" = 20'

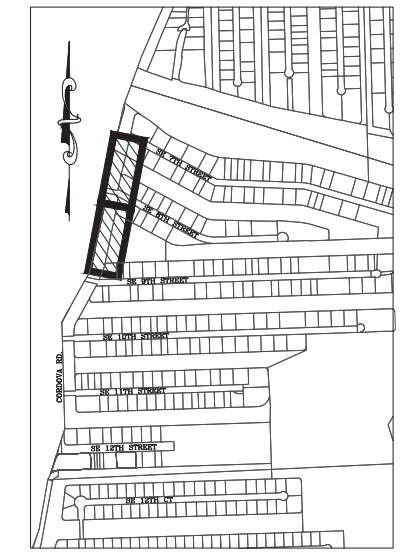


PAVEMENT RESTORATION PLAN – SEAWALL 29

1" = 20'

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP

NTS

NOTES:

1. CONTRACTOR SHALL MATCH EXISTING GRADE AND CONTOURS.
2. CONTRACTOR TO RESTORE ALL AFFECTED PAVEMENT MARKINGS. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH FDOT STANDARDS AND BROWARD COUNTY TRAFFIC ENGINEERING DIVISION. REFER TO SPECIFICATION SECTION 02761–PAVEMENT MARKING.
3. CONTRACTOR SHALL RESTORE CURB TO MATCH EXISTING AND IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
4. CONTRACTOR SHALL RESTORE SITE, INCLUDING DRIVEWAY APPROACHES, SIDEWALKS, PAVERS, SOD, LANDSCAPING AND IRRIGATION IN ACCORDANCE WITH THE CITY'S STANDARD DETAILS.
5. REFER TO CITY STANDARD DETAIL NO. "ROAD–001" ON SHEET NO. CZ–DT–10 FOR TYPICAL TRENCH AND PAVEMENT RESTORATION FOR TRAVERSE PIPE CROSSINGS.

Always call 811 two full business days before you dig to have underground utilities located and marked.

Sunshine811.com

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- EXISTING
- PROPOSED
- EXISTING CORAL ROCK'S BASE
- PROPOSED SEAWALL
- GRADING DIRECTION
- × 0.00 PROPOSED SPOT ELEVATION
- PAVEMENT RESTORATION

0 20' 40'

BID SET

ENGINEER:
EDU. E. FELIBERTY–RUBERTE
LIC. NO. 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK:

CAM 19-0646
Exhibit 3 (Part 3 of 3)
Page 596 of 660

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

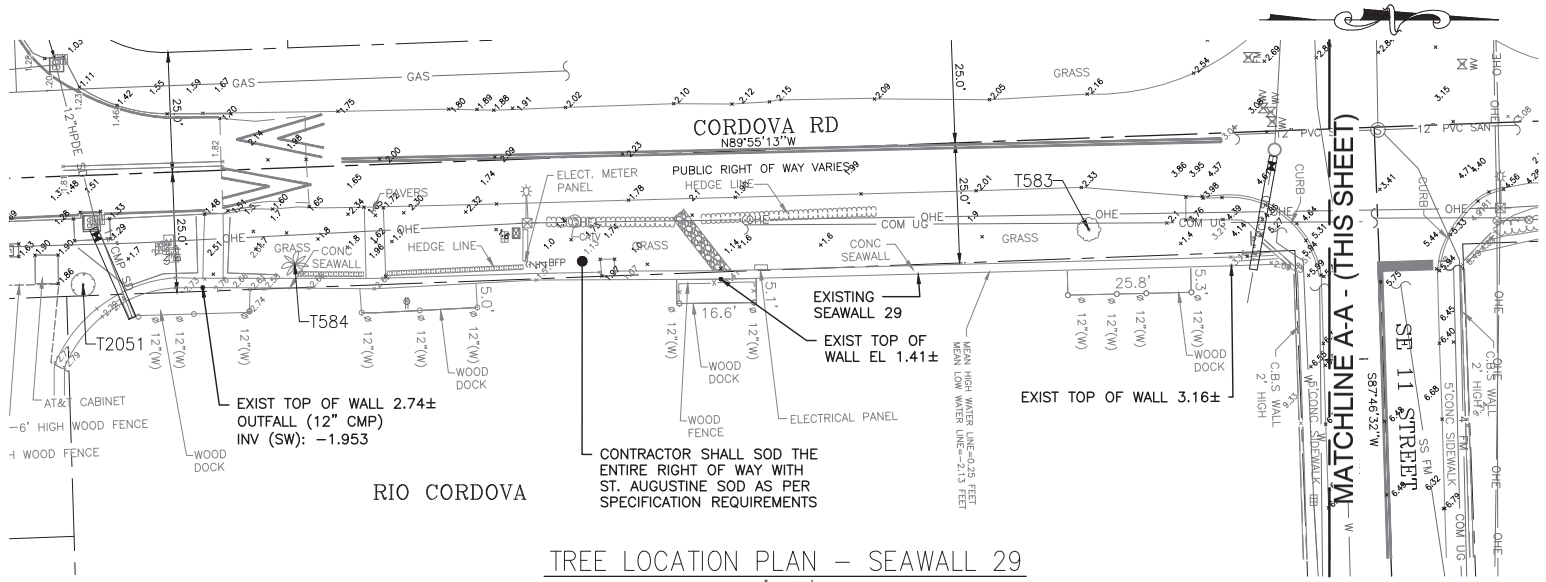
NO.	DATE	BY	CHKD	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVEMENT RESTORATION
AND STRIPING - SHEET 3

SHEET NO.
CS-PV-03
TOTAL: 43
CAD FILE: 12337-CS-PV03
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM

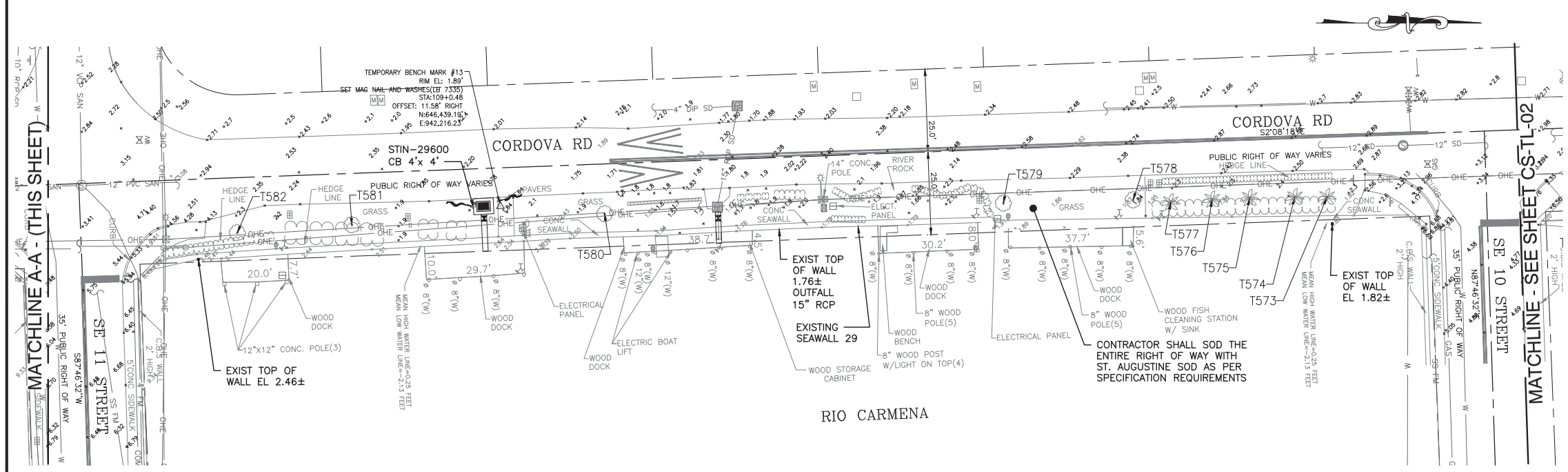
PLOT DATE: 2/21/2019 5:37 PM BY: GDIAZ XREFs= ..\dms84593\12074BSLN,..\dms84593\12074TOPO,..\dms84593\12074SURV,..\dms84593\12074XREF03PROP,..\dms84593\12074-XREF02STRM,..\dms84593\12074-XREF02UTIL,..\dms84593\12074-XREF03UTIL,..\dms84593\12074XREF04UTIL,..\dms84593\12074XREF01UTIL,..\dms84593\12074XREF04PROP File = C:\bms\hazen-pw\dms89466\12337-CS-PV03 Saved by gdiaz Save date = 2/21/2019 7:19 AM



TREE LOCATION PLAN – SEAWALL 29

1" = 20'

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T583	BLACK OLIVE	12.5"	REMOVE
T584	ADONIDIA PALM CLUSTER (4)	16"	REMOVE
T2051	SEA GRAPE TREE	12"	REMOVE

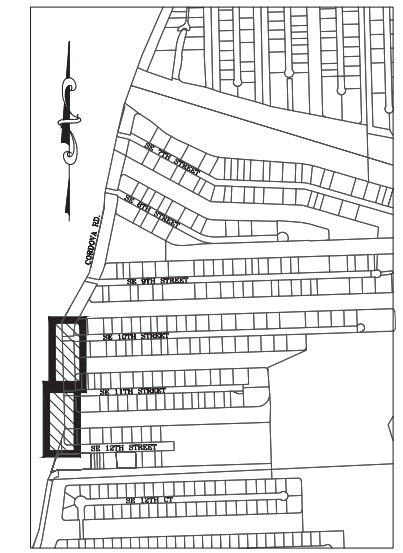


TREE LOCATION PLAN – SEAWALL 29

1" = 20'

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T573	ALEXANDER PALM	4.8"	TO REMAIN
T574	ALEXANDER PALM	4.0"	TO REMAIN
T575	ADONIDIA PALM CLUSTER (3)	6"	TO REMAIN
T576	ADONIDIA PALM CLUSTER (3)	6"	TO REMAIN
T577	ALEXANDER PALM	4.8"	TO REMAIN
T578	SILVER BUTTONWOOD	12.5"	RELOCATE
T579	SILVER BUTTONWOOD	9.5"	RELOCATE
T580	BLACK OLIVE	10"	REMOVE
T581	BLACK OLIVE	11.5"	REMOVE
T582	BLACK OLIVE	13"	REMOVE

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP

NTS

NOTES :

1. CONTRACTOR SHALL REPLACE SURROUNDING GROUND AFFECTED INCLUDING BUT NOT LIMITED TO PAVERS, SIDEWALK, SOD, LANDSCAPE AND BRING IT TO EXISTING OR BETTER CONDITIONS.
2. CONTRACTOR SHALL RELOCATE TREE(S) TO THE FOLLOWING LOCATIONS: ABREU PARK RIO VISTA, FLORENCE C HARDY PARK & SOUTHSIDE CULTURAL CENTER, HECTOR PARK, EVERGREEN CEMETERY, HARBORDALE PARK, CORDOVA ROAD. CONTRACTOR TO COORDINATE WITH ENGINEER OR CITY THE FINAL LOCATION OF TREES INDICATED AS "RELOCATE" IN TREE CHART.
3. THE LOCATIONS OF THE EXISTING TREES HAVE BEEN PREPARED FROM THE MOST RELIABLE INFORMATION AVAILABLE TO THE ENGINEER. THE CONTRACTOR SHALL VERIFY THE LOCATIONS, TYPE AND CALIPERS OF ALL TREES PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES. ALL COST OF RELOCATING AND REMOVING TREES AS INDICATED IN THIS DRAWING OR AS REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE INCLUDED IN THE BID PRICE.

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LEGEND

- EXISTING
- T### — TREE NUMBER
- PROPOSED STORMWATER STRUCTURE

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

0 20' 40'

BID SET

ENGINEER: LIZ. E. FELIBERTY-RUDERTS
LEC. # 41466
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY:	DATE:
OLC	02/21/19
DESIGNED BY:	SCALE:
LEFR	AS NOTED
CHECKED BY:	
AH	
FIELD BOOK:	

CAM 19-0646
Exhibit 3 (Part 3 of 3)
Page 597 of 660

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

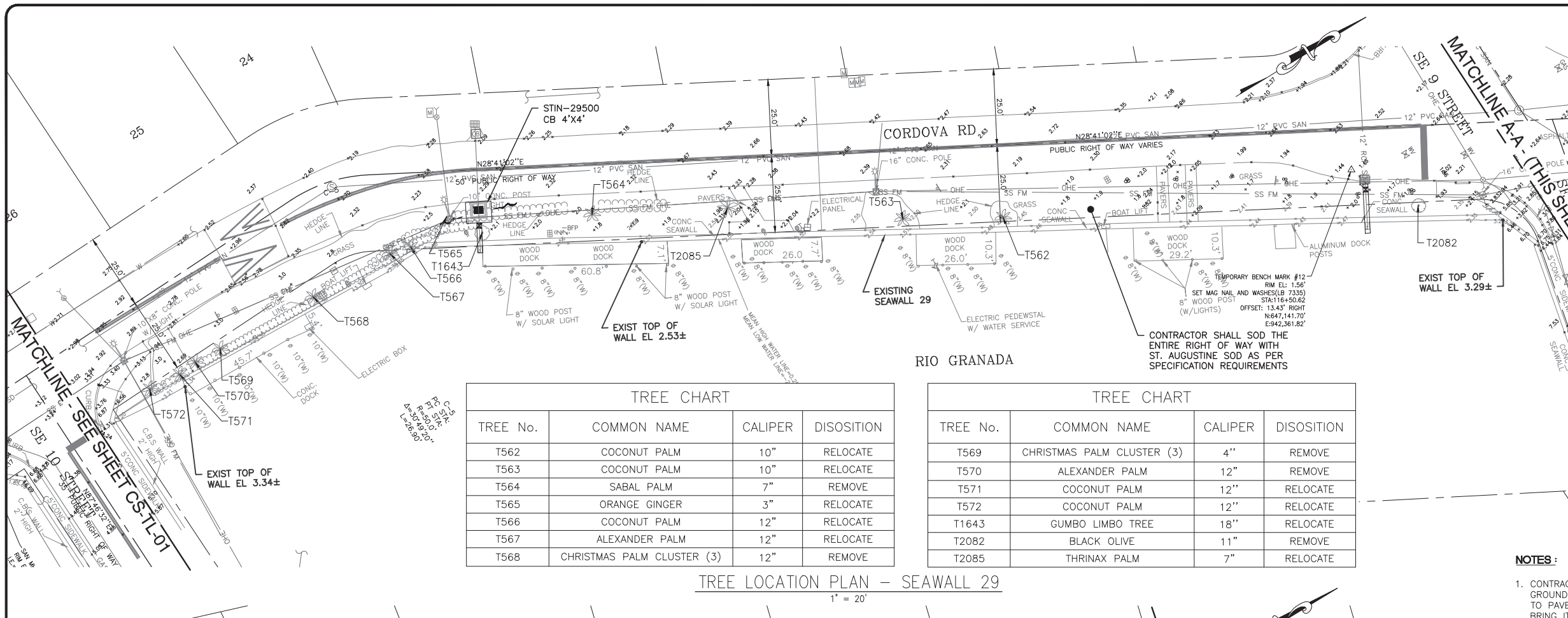
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
TREE LOCATION PLAN - SHEET 1

SHEET NO.
CS-TL-01
TOTAL: 43
CAD FILE: 12337-CS-TL01
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM

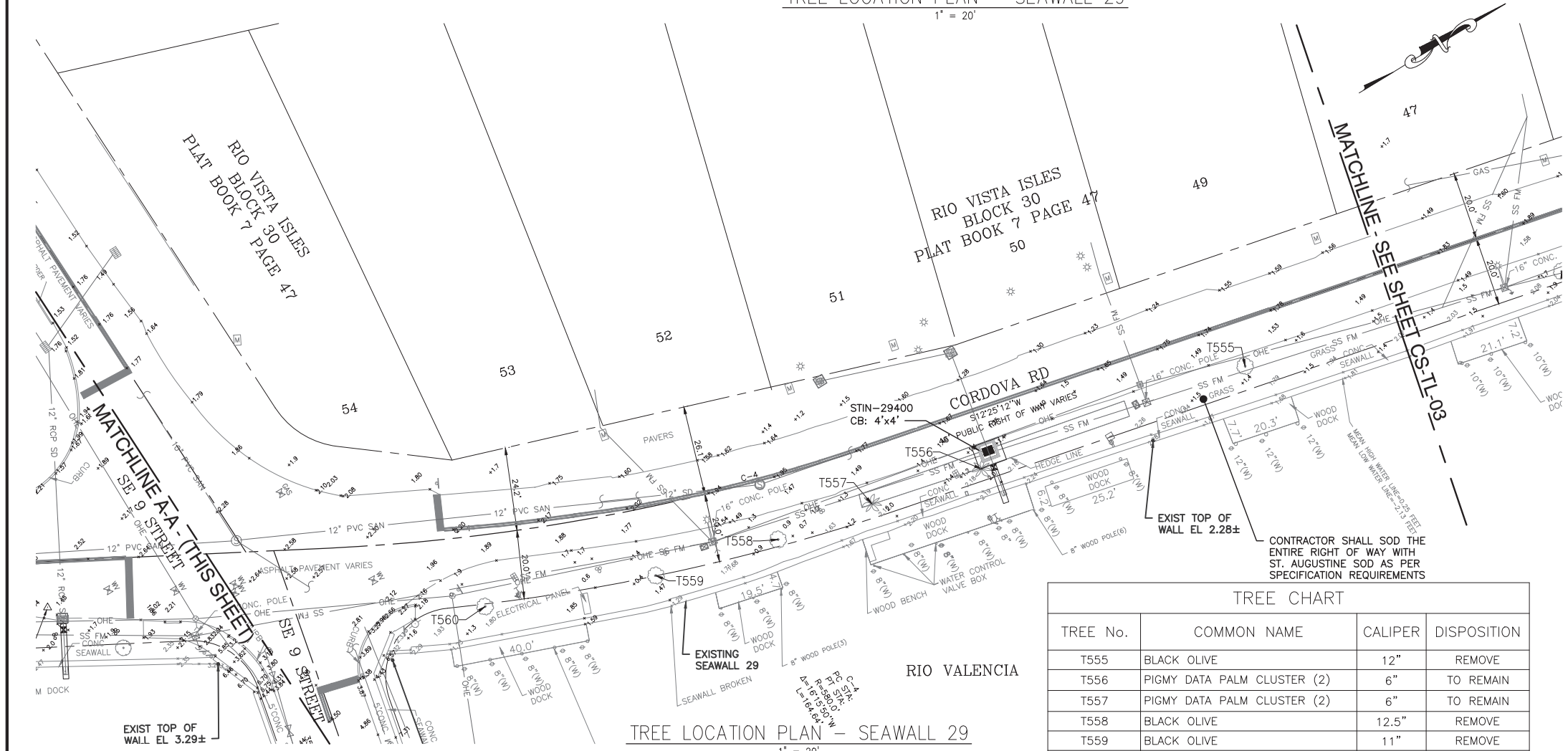


TREE LOCATION PLAN – SEAWALL 29

1" = 20'

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISOSITION
T562	COCONUT PALM	10"	RELOCATE
T563	COCONUT PALM	10"	RELOCATE
T564	SABAL PALM	7"	REMOVE
T565	ORANGE GINGER	3"	RELOCATE
T566	COCONUT PALM	12"	RELOCATE
T567	ALEXANDER PALM	12"	RELOCATE
T568	CHRISTMAS PALM CLUSTER (3)	12"	REMOVE

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISOSITION
T569	CHRISTMAS PALM CLUSTER (3)	4"	REMOVE
T570	ALEXANDER PALM	12"	REMOVE
T571	COCONUT PALM	12"	RELOCATE
T572	COCONUT PALM	12"	RELOCATE
T1643	GUMBO LIMBO TREE	18"	RELOCATE
T2082	BLACK OLIVE	11"	REMOVE
T2085	THRINAX PALM	7"	RELOCATE

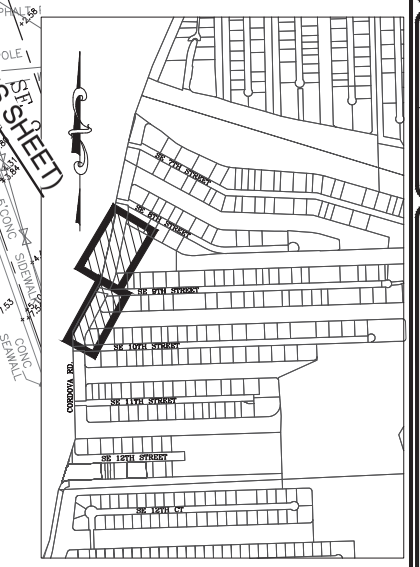


TREE LOCATION PLAN – SEAWALL 29

1" = 20'

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T555	BLACK OLIVE	12"	REMOVE
T556	PIGMY DATA PALM CLUSTER (2)	6"	TO REMAIN
T557	PIGMY DATA PALM CLUSTER (2)	6"	TO REMAIN
T558	BLACK OLIVE	12.5"	REMOVE
T559	BLACK OLIVE	11"	REMOVE
T560	BLACK OLIVE	18"	REMOVE

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL-KEY MAP
NTS

NOTES :

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ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 1988)

LEGEND

- EXISTING
- T### TREE NUMBER
- PROPOSED STORMWATER STRUCTURE

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTE
REG. # 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: 4-141-55

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
KIRK 954-987-0066
FAX 954-987-2949

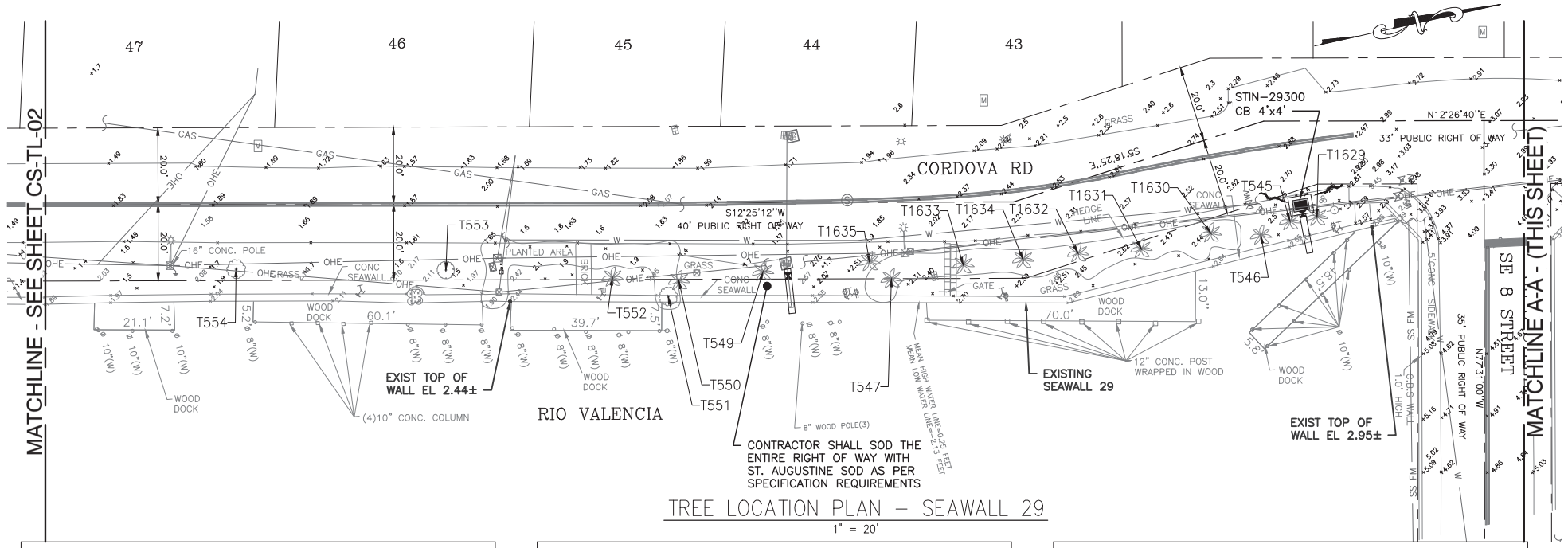
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
TREE LOCATION PLAN - SHEET 2

SHEET NO. CS-TL-02
TOTAL: 43
CAD FILE: 12337-CS-TL02
DRAWING FILE NO. 4-141-55

6/4/2019 2:31 PM



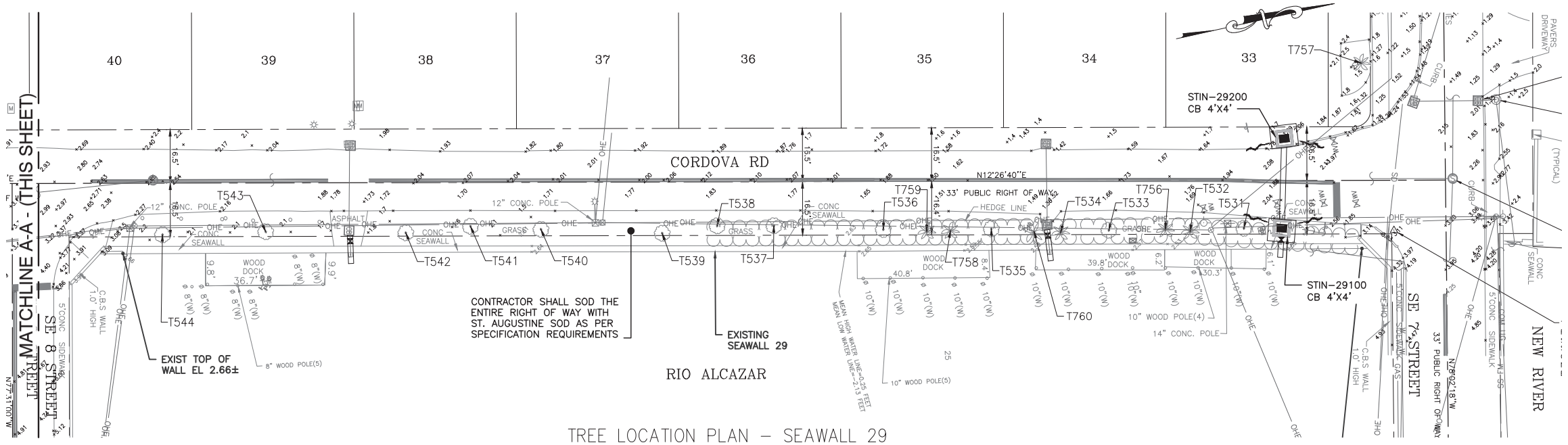
TREE LOCATION PLAN – SEAWALL 29

1" = 20'

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T545	ADONIDIA PALM CLUSTER (3)	10"	TO REMAIN
T546	ADONIDIA PALM CLUSTER (3)	7"	TO REMAIN
T547	ADONIDIA PALM CLUSTER (3)	7"	TO REMAIN
T549	COCONUT PALM	8"	RELOCATE
T550	COCONUT PALM	8"	RELOCATE
T551	SEA GRAPE CLUSTER	36"	TO REMAIN

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T552	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T553	BLACK OLIVE	12"	REMOVE
T554	BLACK OLIVE	11.5"	REMOVE
T1629	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T1630	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T1631	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T1632	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T1633	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T1634	ADONIDIA PALM CLUSTER (3)	12"	TO REMAIN
T1635	COCONUT PALM	7"	TO REMAIN



TREE LOCATION PLAN – SEAWALL 29

1" = 20'

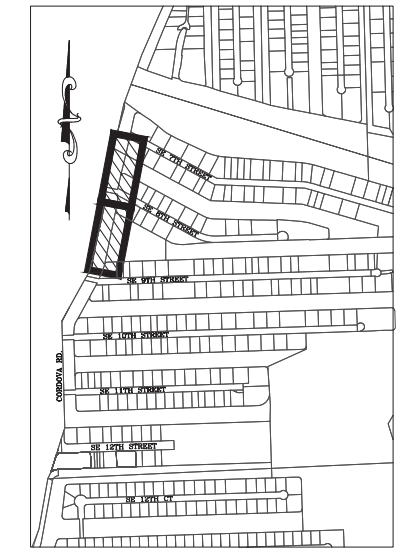
TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T531	BLACK OLIVE	9.5"	REMOVE
T532	COCONUT PALM	6.5"	RELOCATE
T533	BLACK OLIVE	9.5"	REMOVE
T534	COCONUT PALM	7"	RELOCATE
T535	BLACK OLIVE	9.5"	REMOVE
T536	BLACK OLIVE	10"	REMOVE
T537	SILVER BUTTONWOOD	20"	REMOVE

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T538	SILVER BUTTONWOOD	21"	REMOVE
T539	SILVER BUTTONWOOD	23"	REMOVE
T540	SILVER BUTTONWOOD	10.5"	REMOVE
T541	SILVER BUTTONWOOD	10"	REMOVE
T542	SILVER BUTTONWOOD	16.5"	REMOVE
T543	BLACK OLIVE	11.5"	REMOVE
T544	BLACK OLIVE	13.8"	REMOVE

TREE CHART			
TREE No.	COMMON NAME	CALIPER	DISPOSITION
T756	COCONUT PALM	6.5"	RELOCATE
T757	COCONUT PALM	28.8"	TO REMAIN
T758	COCONUT PALM	7.5"	RELOCATE
T759	COCONUT PALM	7.5"	REMOVE
T760	COCONUT PALM	12"	RELOCATE

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771



SEAWALL–KEY MAP

NTS

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LEGEND

- EXISTING
- T### TREE NUMBER
- PROPOSED STORMWATER STRUCTURE

0 20' 40'

BID SET

ENGINEER: ERIC B. FELIBERTY-RUDERTH
REG. No: 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: LEFR
SCALE: AS NOTED
CHECKED BY: AH
FIELD BOOK: XXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301
P: 954-987-0066
FAX: 954-987-2949

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
TREE LOCATION PLAN - SHEET 3

SHEET NO.
CS-TL-03

TOTAL: 43
CAD FILE: 12337-CS-TL03
DRAWING FILE NO. 4-141-55

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DEMOLITION NOTES:

GENERAL DEMOLITION SPECIFICATIONS:

1. THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF ALL EXISTING UTILITIES SHOWN ON THE DRAWINGS HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY.
2. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATIONS, AND DIMENSIONS OF ALL EXISTING UTILITIES AND OTHER FEATURES AFFECTING THE WORK. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES THAT MIGHT IMPACT THE WORK.
3. CHAPTER 553.851 OF THE FLORIDA STATUTES REQUIRES THAT AN EXCAVATOR NOTIFY ALL UTILITIES A MINIMUM OF TWO (2) WORKING DAYS PRIOR TO EXCAVATING.
4. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES BEFORE EXCAVATION.
5. THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR, SUPERVISION, AND EQUIPMENT REQUIRED FOR THE ORDERLY DEMOLITION AND REMOVAL OF EXISTING STRUCTURES, PAVEMENT AND UTILITIES AS SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN.
6. THE CONTRACTOR IS REQUIRED TO FAMILIARIZE HIMSELF WITH THE STRUCTURES TO BE DEMOLISHED.
7. THE FOLLOWING LIST OF STRUCTURES REQUIRING DEMOLITION IS INCLUDED FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE DRAWINGS INDICATE THE SCOPE OF DEMOLITION WHERE DEMOLITION IS REQUIRED.
   - 7.1. DEMOLITION AND REMOVAL OF A 5' MIN.± STRIP OF EXISTING ON-SITE ASPHALT, CONCRETE AND CURBING AROUND THE PERIMETER OF THE EXISTING STRUCTURES AND UTILITIES BEING DEMOLISHED.
   - 7.2. REMOVAL OF EXISTING ON-SITE ABOVEGROUND AND UNDERGROUND UTILITIES, INCLUDING REMOVAL OR PLUGGING OF EXISTING UTILITIES AS SHOWN ON PLANS.
8. PRIOR TO REMOVAL OF ANY UNDERGROUND TANK AND OTHER COMPONENT, CONTRACTOR MUST COMPLETELY DRAIN THE SYSTEMS TO AN APPROVED SANITATION TANK FOR DISPOSAL TO AN APPROVED LOCATION, AS REQUIRED BY DISPOSAL PERMIT.
9. PROTECT ALL UTILITIES, UNLESS OTHERWISE NOTED.
10. ALL THE CONCRETE AND PAVEMENT TO BE REMOVED MUST BE SAW CUT CLEAN PRIOR TO REMOVAL.
11. WET DOWN MASONRY WALLS AND DEBRIS DURING DEMOLITION AND LOADING OPERATIONS TO PREVENT THE SPREAD OF DUST (AS APPLICABLE TO PROJECT).
12. ALL EXISTING STRUCTURES, PAVEMENTS, SLABS, FOUNDATIONS, STEPS AND OTHER ON-SITE EXISTING FEATURES INDICATED ON THE DRAWINGS TO BE REMOVED SHALL BE DEMOLISHED AND REMOVED BY THE CONTRACTOR (AS APPLICABLE TO PROJECT).

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | DEMOLITION NOTES SHEET 1 | DETAIL NO. GNRL 009 | REVISED 2017/07/13

13. ALL EXISTING SEWERS, PIPING AND UTILITIES SHOWN ON THE DRAWINGS ARE NOT TO BE INTERPRETED AS THE EXACT LOCATION, OR AS THE ONLY OBSTACLES THAT MAY OCCUR ON THE SITE. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND PROCEED WITH CAUTION AROUND ANY ANTICIPATED FEATURES. GIVE NOTICE TO ALL UTILITY COMPANIES REGARDING DESTRUCTION AND REMOVAL OF ALL SERVICE LINES AND CAP ALL LINES BEFORE PROCEEDING WITH THE WORK.
14. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO REMOVAL OR RELOCATION OF ANY ELECTRICAL, TELEPHONE, CABLE AND/OR GAS LINES. SUFFICIENT TIME SHALL BE PROVIDED FOR RELOCATION AND CLOSE COORDINATION WITH THE UTILITY COMPANY TO PROVIDE A SMOOTH TRANSITION IN UTILITY SERVICE.
15. CONTRACTOR MUST STOP OPERATION AND NOTIFY THE OWNER/ENGINEER FOR PROPER DIRECTION IF ANY ENVIRONMENTAL OR HEALTH RELATED CONTAMINANT IS ENCOUNTERED DURING THE DEMOLITION/EXCAVATION PROCESS.
16. FILL FOR LOWER LEVELS OF DEMOLISHED STRUCTURES MAY INCLUDE CONCRETE OR MASONRY RUBBLE RESULTING FROM DEMOLITION, SUBJECT TO THE ENGINEER'S/ARCHITECT'S APPROVAL. RUBBLE SHALL PASS THROUGH A THREE-INCH RING.
17. REMOVE AND LEGALLY DISPOSE OF ALL OTHER RUBBISH, RUBBLE, AND DEBRIS. COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS GOVERNING DISPOSAL OF WASTES AND DEBRIS.
18. MAINTAIN ACCESS TO SURROUNDING PROPERTIES AND BUILDINGS.
19. PRIOR TO DEMOLITION OCCURRING ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED.
20. ALL TRAFFIC SIGNS OUTSIDE THE DEMOLITION AREA ARE TO REMAIN UNLESS OTHERWISE SPECIFIED.
21. ANY MUCK ENCOUNTERED UNDER PROPOSED STRUCTURES SHALL BE REMOVED TO FIVE-FEET BEYOND THE FOOTPRINT OF THAT STRUCTURE. BACKFILL WITH APPROVED FILL MATERIAL SATISFYING ALL COMPACTION REQUIREMENTS.
22. ALL EXISTING UTILITIES WITHIN THE DEMOLITION SITE AREA SHALL BE ADJUSTED, REMOVED OR RELOCATED AT THE CONTRACTOR'S EXPENSE. WORK SHALL BE COORDINATED BY THE CONTRACTOR DIRECTLY WITH THE APPROPRIATE UTILITY COMPANY. ALL EXPENSES SHALL BE INCLUDED IN THE CONTRACTOR'S BID.
23. ALL TRASH, DEBRIS AND OTHER MATERIAL REMOVED FROM THE SITE SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | DEMOLITION NOTES SHEET 2 | DETAIL NO. GNRL 009 | REVISED 2017/07/13

PRE-DEMOLITION RESPONSIBILITIES:

1. UPON RECEIPT OF NOTICE OF AWARD, THE CONTRACTOR SHALL ARRANGE A PRE-DEMOLITION CONFERENCE TO INCLUDE ALL INVOLVED GOVERNMENTAL AGENCIES, ALL AFFECTED UTILITY OWNERS, THE OWNER, THE ENGINEER AND THE CONTRACTOR.
2. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A DEMOLITION SCHEDULE DEPICTING EACH PHASE OF THE WORK.
3. PRIOR TO DEMOLITION, CONTRACTOR TO PROVIDE FOR THE OWNER A LISTING OF THE FACILITIES THE CONTRACTOR SHALL UTILIZE FOR RECYCLING AND DISPOSAL OF SPECIFIC MATERIALS. CONTRACTOR TO INDICATE THE MATERIALS INTENDED FOR RECYCLING AND THE MATERIALS INTENDED FOR DISPOSAL FOR OWNER'S APPROVAL.
4. PRIOR TO DEMOLITION, CONTRACTOR TO PROVIDE THE OWNER SKETCHES SHOWING PROPOSED HAULING ROUTES TO RECYCLING AND DISPOSAL FACILITIES FOR APPROVAL.
5. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL VERIFY THE SIZE, LOCATION, ELEVATION, AND MATERIAL OF ALL EXISTING UTILITIES WITHIN THE AREA OF DEMOLITION.
6. EXISTING UTILITY LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE. THE CITY AND THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF EXISTING UTILITIES SHOWN OR FOR ANY EXISTING UTILITIES NOT SHOWN.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ANY EXISTING UTILITIES FOR WHICH IT FAILS TO REQUEST LOCATIONS FROM THE UTILITY OWNER. THE CONTRACTOR IS RESPONSIBLE AS WELL FOR DAMAGE TO ANY EXISTING UTILITIES WHICH ARE PROPERLY LOCATED.
8. THE LOCATIONS OF EXISTING UTILITIES AND STORM DRAINAGE SHOWN ON THE PLANS HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. ENGINEER ASSUMES NO RESPONSIBILITY FOR INACCURACY.
9. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL FIELD LOCATE EXISTING UNDERGROUND UTILITIES WITH THE UTILITY OWNERS.
10. THE CONTRACTOR IS RESPONSIBLE FOR RELOCATION'S OF THE VARIOUS EXISTING UTILITIES WITH THE UTILITY OWNERS, WHICH SHALL BE DONE IN A TIMELY MANNER TO MINIMIZE IMPACT ON DEMOLITION SCHEDULE. ANY DELAY CAUSED BY THE CONTRACTOR BY THE RELOCATION OF UTILITIES SHALL BE INCIDENTAL TO THE CONTRACT AND NO EXTRA COMPENSATION WILL BE ALLOWED.
11. SUNSHINE STATE ONE CALL OF FLORIDA, INC. REQUIRES THE CONTRACTOR TO CALL TWO (2) FULL BUSINESS DAYS (BUT NOT MORE THAN FIVE) PRIOR TO BREAKING GROUND TO FIND OUT WHERE BURIED FACILITIES (ELECTRICAL, GAS, TELEPHONE, CABLE, WATER) ARE LOCATED.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | DEMOLITION NOTES SHEET 3 | DETAIL NO. GNRL 009 | REVISED 2017/07/13

DEMOLITION SAFETY:

1. ALL DEMOLITION SHALL BE DONE IN A SAFE MANNER, SPECIFICALLY, THE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), THE FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SHALL BE STRICTLY OBSERVED.
2. PROVIDE ADEQUATE PROTECTION FOR PERSONS AND PROPERTY AT ALL TIMES. EXECUTE THE WORK IN A MANNER TO AVOID HAZARDS TO PERSONS AND PROPERTY AND PREVENT INTERFERENCE WITH THE USE OF AND ACCESS TO ADJACENT BUILDINGS. STREETS AND SIDEWALKS SHALL NOT BE UNNECESSARILY BLOCKED BY DEBRIS AND EQUIPMENT.
3. BUILDING MATERIALS TO BE REMOVED SHALL BE TESTED FOR ASBESTOS AND LEAD PAINT.
4. IF PETROLEUM PRODUCTS ARE FOUND WHILE DEMOLISHING, DISPOSE OF PETROLEUM WASTE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

PAVEMENT DEMOLITION:

1. WHERE EXISTING PAVEMENT IS TO BE REMOVED, SAW-CUT THE SURFACING LEAVING A UNIFORM AND STRAIGHT EDGE WITH MINIMUM DISTURBANCE TO THE REMAINING ADJACENT SURFACING. IF DEMOLITION RESULTS IN RAVELING OF SAW CUT SURFACE, RECUT BACK FROM THE RAVELED EDGE PRIOR TO RESTORATION.
2. WHERE EXISTING PAVEMENT, CURB, CURB AND GUTTER, SIDEWALK, DRIVEWAY, OR VALLEY GUTTER IS REMOVED FOR INLETS, MANHOLES, APPURTENANCES, FACILITIES OR STRUCTURES, SAID PAVEMENT, ETC., SHALL BE REPLACED WITH NEW PAVEMENT, ETC. CONTRACTOR SHALL PROVIDE ALL NECESSARY LABOR, MATERIALS, EQUIPMENT, TOOLS, SUPPLIES, AND OTHER EQUIPMENT AS REQUIRED.
3. CONTRACTOR MAY LIMIT SAW-CUT AND PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THE DRAWINGS. HOWEVER, IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT, SIDEWALK, BUILDINGS, UTILITIES, ETC., THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR IT'S REMOVAL AND REPLACEMENT. REPLACEMENT PAVEMENT, SIDEWALK, ETC., SHALL BE NEW.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | DEMOLITION NOTES SHEET 4 | DETAIL NO. GNRL 009 | REVISED 2017/07/13

DEMOLITION PERMITTING:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ANY REQUIRED PERMITS FOR DEMOLITION FROM RESPONSIBLE REGULATORY AGENCIES WHILE FULLY ACKNOWLEDGING AND COMPLYING WITH ALL REQUIREMENTS PRIOR TO COMMENCING DEMOLITION WORK.
2. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE EXTENT OF DEMOLITION, RECYCLING OR REUSE REQUIRED TO PERFORM THE CONTRACT WORK FOR THIS PROJECT. THE CONTRACTOR SHALL CONDUCT SITE VISITS AND SHALL EXAMINE ALL THE INFORMATION WITHIN THESE DOCUMENTS. ALL DISCREPANCIES AND/OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BID SUBMITTAL.
3. THE CONTRACTOR SHALL COORDINATE WITH OWNER PRIOR TO COMMENCEMENT OF ANY WORK. ACTUAL REMOVAL AND/OR RELOCATION OF ALL EXISTING LANDSCAPING WITHIN DEMOLITION AREAS TO BE CONDUCTED BY A LANDSCAPE CONTRACTOR. IT IS THE RESPONSIBILITY OF THE SITEWORK DEMOLITION CONTRACTOR TO COORDINATE DEMOLITION ACTIVITIES WITH THE LANDSCAPE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND PRESERVING TREES AS INDICATED ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TREE REMOVAL PERMIT OR ANY OTHER APPLICABLE PERMIT TO REMOVE, RELOCATE, OR PRESERVE EXISTING LANDSCAPE AND TREES.
4. ANY TREES FOR REMOVAL FOUND TO BE GREATER THAN OR EQUAL TO THREE (3) INCHES IN DIAMETER AT BREAST HEIGHT (DBH) SHALL REQUIRE A PERMIT WITH THE BROWARD COUNTY ENVIRONMENTAL PROTECTION AND GROWTH MANAGEMENT DEPARTMENT (BCEPGMD).
5. SHOULD REMOVAL AND/OR RELOCATION ACTIVITIES DAMAGE THE LIGHTING, STORM INLET STRUCTURES, OR OTHER STRUCTURES DESIGNATED TO BE SAVED, THEN THE CONTRACTOR SHALL PROVIDE NEW MATERIALS/STRUCTURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | DEMOLITION NOTES SHEET 5 | DETAIL NO. GNRL 009 | REVISED 2017/07/13

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DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: GAB	SCALE: AS NOTED
CHECKED BY: LEFR	
FIELD BOOK: XXXX	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
DEMOLITION NOTES CITY
STANDARDS - SHEET 1

BID SET

SHEET NO.
CZ-DT-01
TOTAL: 43
CAD FILE: 12337-CZ-DT01
DRAWING FILE NO. 4-141-55 D 600

PLOT DATE: 2/21/2019 5:38 PM BY: GDIAZ
File = C:\bms\hazen-pw\dms89502\12337-CZ-DT01 Spell: en_US Saved: = 2/21/2019 7:26 AM

DEMOLITION EROSION AND SEDIMENT CONTROL NOTES:

1. THE SCHEDULING, SEQUENCING AND CONTROL MEASURES, WHICH ARE OUTLINED HEREIN, ARE SUBJECT TO THE FINAL DEFINITION BY THE CONTRACTOR WHO SHALL BE SELECTED TO PERFORM THE WORK AND SHALL BE RESPONSIBLE FOR IMPLEMENTATION AND COMPLIANCE.

2. PRIOR TO DEMOLITION, THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A DEMOLITION SCHEDULE DEPICTING EACH PHASE OF THE WORK. THE CONTRACTOR SHALL ALSO BE REQUIRED TO SUBMIT AN EROSION AND SEDIMENT CONTROL PLAN ENCOMPASSING THE PRINCIPALS AND THE REQUIREMENTS DESCRIBED HEREIN AND A SCHEDULE FOR THEIR IMPLEMENTATION AND MAINTENANCE FOR THE PROJECT DURATION.

3. DURING DEMOLITION, THE CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO ENSURE AGAINST POLLUTING, SILTATION OR DISTURBANCE TO SUCH AN EXTENT AS TO CAUSE AN INCREASE IN TURBIDITY TO THE EXISTING DRAINAGE SYSTEMS AND ADJACENT WATER BODIES AND WETLANDS, IN COMPLIANCE WITH ALL PERMIT REQUIREMENTS RELATED TO SUCH MEASURES.

4. METHODS MAY INCLUDE TEMPORARY EROSION AND SEDIMENT CONTROLS SUCH AS SEDIMENT BASINS, SEDIMENT CHECKS, SILT BARRIERS, SILT SCREENS, TURBIDITY BARRIERS OR THE BEST MANAGEMENT PRACTICES AVAILABLE TO THE INDUSTRY.

5. EROSION AND SEDIMENT CONTROL INSTALLATIONS SHALL BE MAINTAINED THROUGHOUT THE DEMOLITION PERIOD AND UNTIL NEW VEGETATIVE GROWTH HAS BEEN ESTABLISHED.

6. THROUGHOUT THE DEMOLITION PERIOD, THE CONTRACTOR SHALL INSPECT DAILY THE EROSION AND SEDIMENT CONTROL INSTALLATIONS FOR FAILURE OR SIGNS OF FAILURE OR MALFUNCTION. REPAIR OR REPLACE THE EROSION AND SEDIMENT CONTROL INSTALLATIONS IMMEDIATELY UPON DISCOVERY OF FAILURE OR MALFUNCTION.

7. INLETS AND CATCH BASINS, EXISTING ON-SITE AND OFF-SITE, SHALL BE PROTECTED FROM SEDIMENT STORM RUNOFF.

8. THE CONTRACTOR SHALL PROMPTLY REMOVE ALL MUD, DIRT OR OTHER MATERIALS TRACKED OR SPILLED ONTO EXISTING PUBLIC ROADS AND FACILITIES DUE TO DEMOLITION.

9. DEWATERING ACTIVITIES SHALL NOT RESULT IN ANY DISCHARGE OF TURBID WATER FROM THE PROJECT SITE WITHOUT PROPER EROSION AND SEDIMENT CONTROL AND APPROVAL FROM ENGINEER.

10. PHASING OF EROSION CONTROL DEMOLITION SHALL BE RECOMMENDED AS FOLLOWS:

    10.1. PLACEMENT OF PERIMETER PROTECTIVE MEASURES (SILT FENCE, HAY BALES, TURBIDITY BARRIERS, ETC.) AROUND ON-SITE FEATURES TO BE RETAINED, AT POINTS OF OFF-SITE DISCHARGE AND AROUND WORK AREAS TO BE EXCAVATED OR FILLED.

    10.2. REROUTE RUNOFF FROM AREAS OUTSIDE OF THE DEMOLITION AREA TO MINIMIZE FLOW THROUGH AREAS TO BE DISTURBED BY DEMOLITION. BERMS, SWALES AND OTHER MEANS USED FOR SUCH CONVEYANCE SHALL BE VEGETATED AND MEASURES TAKEN TO PROVIDE PROTECTION UNTIL STABILIZATION OCCURS (AS APPLICABLE TO THE PROJECT).

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 6	DETAIL NO. GNRL 009 REVISED 2017/07/13

10.3 SELECT LOCATIONS FOR PLACEMENT OF EXCAVATED MATERIAL, WHERE SUITABLE FOR FILL OR UNSUITABLE MATERIAL, AND CONSTRUCT CONTAINMENT BERMS AROUND THE AREA. THE USE OF STRIPING FOR THIS PURPOSE MAY ACCELERATE BERM REVEGETATION. CONSTRUCT TEMPORARY OUTLETS FOR CONTAINMENT AREAS WITH SCREENS, HAY BALES, SETTLING BASINS OR OTHER MEASURES TO PREVENT SILT TRANSPORT.

10.4 SELECT / DESIGNATE ACCESS ROUTING FOR DEMOLITION EQUIPMENT AND VEHICLES AND PROVIDE PERIMETER PROTECTIVE MEASURES WHERE EXISTING TERRAIN SHALL BE SUBJECT TO DISRUPTION BY SUCH TRAFFIC.

10.5 CONSTRUCT ABOVE GROUND OR OTHER CONTAINMENT AREAS FOR DEMOLITION AREA RUNOFF. PROVIDE SCREENS, HAY BALES, ETC. TO FILTER DISCHARGE FROM THOSE AREAS.

10.6 SPOIL MOUNDS SHALL NOT BE LEFT FOR MORE THAN ONE WEEK PRIOR TO REPLACEMENT UNLESS PROTECTIVE CONTAINMENT MEASURES IN THE WORK AREA ARE APPLIED.

10.7 GRASSING, SODDING, ETC. SHALL BE IN PLACE IMMEDIATELY UPON COMPLETION OF REGRADING, SWALE SLOPES AND THE CONSTRUCTED OR DISTURBED AREAS.

11. THE CONTRACTOR IS REQUIRED TO ADHERE TO THE REQUIREMENT OF THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES). THE CONTRACTOR SHALL INSTITUTE BEST MANAGEMENT PRACTICES (BMPS) TO ENSURE COMPLIANCE WITH THE NPDES PROGRAM AND TO MINIMIZE THE IMPACT TO PUBLIC STORMWATER FACILITIES. A NOTICE OF INTENT (NOI) SHALL BE FILED BY THE CONTRACTOR PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.

12. THE CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND MAINTAIN ALL RECORDS REQUIRED BY ITS NPDES STORMWATER PERMIT FOR ITS CONSTRUCTION ACTIVITIES.

13. PRIOR TO CONSTRUCTION, A SILT FENCE IN ACCORDANCE WITH CITY'S DETAIL SHALL BE ERECTED AS NOTED ON PLANS. ALL PROPOSED CATCH BASINS SHALL HAVE THEIR INLETS PROTECTED BY THE INSTALLATION OF FILTER INLET INSERTS INTO THE FRAME AND GRATE. SILT FENCES AND FILTER INLET INSERTS SHALL REMAIN IN PLACE DURING THE ENTIRE DURATION OF CONSTRUCTION.

14. CONTRACTOR SHALL BRACE ALL EXISTING LANDSCAPING TO REMAIN PRIOR TO BEGINNING ANY WORK AND SHALL ENSURE ITS STABILIZATION THROUGHOUT THE ENTIRE CONSTRUCTION PROCESS. EXISTING SOD DISTURBED BY CONSTRUCTION THAT IS NOT AFFECTED BY PROPOSED GRADING SHALL BE RESTORED TO NEW CONDITION UPON COMPLETION OF CONSTRUCTION. SODDED SLOPES STEEPER THAN FOUR HORIZONTAL TO ONE VERTICAL SHALL BE PEGGED.

15. ALL WASTE GENERATED FROM THE CONSTRUCTION SHALL BE DISCARDED IN ACCORDANCE WITH ALL APPLICABLE STATE, LOCAL AND FEDERAL REGULATIONS. CONTRACTOR SHALL OBTAIN ALL APPLICABLE CODES AND BECOME FAMILIAR WITH STATE, LOCAL AND FEDERAL REGULATIONS PRIOR TO BEGINNING CONSTRUCTION.

16. TO ENSURE THAT OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST IS MINIMIZED, CONTRACTOR SHALL PUT INTO PRACTICE THE METHODS DETAILED IN FLORIDA DEPARTMENT OF TRANSPORTATION INDEX 106 (2010 DESIGN STANDARDS) AND BMPS.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 7	DETAIL NO. GNRL 009 REVISED 2017/07/13

17. DUST GENERATED FROM CONSTRUCTION SHALL BE MINIMIZED BY DAILY WATERING OF THE SITE.

18. AT ANY TIME DURING CONSTRUCTION THAT THE SILT FENCING IS DISTURBED, THE SILT FENCING SHALL BE RESTORED TO ITS ORIGINAL STATE WITHIN 24 HOURS. AT NO TIME DURING CONSTRUCTION SHALL WORK BE PERFORMED WITHOUT THE INTEGRITY OF THE SILT FENCING SECURED.

19. A QUALIFIED INSPECTOR, PROVIDED BY THE CONTRACTOR, SHALL INSPECT ALL POINTS OF DISCHARGE INTO NEARBY SURFACE WATER. THE INSPECTION SHALL OCCUR AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM THAT IS 0.5 INCHES OR GREATER. INSPECTION INCLUDES THE WRITTEN RECORDING OF THE CONDITION OF ALL DISCHARGE POINTS, INTEGRITY OF SILT FENCING, DAILY DUST CONTROL MEASURES, VEHICULAR TRAFFIC AND CONSTRUCTION MATERIAL STORAGE AND DISPOSAL. WRITTEN RECORD OF ALL INSPECTIONS SHALL BE STORED BY THE CONTRACTOR.

20. THE INSPECTION REPORT SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING INFORMATION: NAME AND QUALIFICATION OF PERSONNEL MAKING THE INSPECTION, DATE OF INSPECTION, RAINFALL DATE, MAJOR OBSERVATIONS RELATING TO THE SWPPP, ACTIONS TAKEN BY CONTRACTOR AND ANY INCIDENT OF NONCOMPLIANCE WITH PERMIT. WHERE AN INSPECTION DOES NOT IDENTIFY ANY INCIDENT OF NONCOMPLIANCE, THE REPORT SHALL CONTAIN A CERTIFICATION THAT THE FACILITY IS IN COMPLIANCE WITH THE SWPPP AND THE PERMIT.

21. THE CONTRACTOR SHALL RETAIN A COPY OF THE SWPPP AND ALL REPORTS, RECORDS AND DOCUMENTATION REQUIRED BY THE PERMIT AT THE CONSTRUCTION SITE, OR AN APPROPRIATE ALTERNATIVE LOCATION AS SPECIFIED IN THE NOTICE OF INTENT, FROM THE DATE OF PROJECT INITIATION TO THE DATE OF FINAL STABILIZATION.

22. THE CONTRACTOR SHALL RETAIN THE SWPPP, NOI AND ALL RECORDS ASSOCIATED THEREWITH FOR A PERIOD OF AT LEAST THREE (3) YEARS FROM THE DATE THAT THE SITE IS FINALLY STABILIZED.

23. SEE LANDSCAPE PLANS FOR TREE REMOVAL AND LANDSCAPE DEMOLITION.

24. CONTRACTOR SHALL COORDINATE THROUGH CITY'S CONSTRUCTION DIVISION AND CITY'S PARKS DEPARTMENT ON HOW TO STOCK AND RE-USE EXCAVATED SOIL FROM SITE (AS APPLICABLE TO THE PROJECT).

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 8	DETAIL NO. GNRL 009 REVISED 2017/07/13

INTERRUPTION OF EXISTING UTILITIES:

1. ANY DEMOLITION WORK THAT REQUIRES INTERRUPTION OF SERVICE TO ANY CUSTOMER SHALL BE DONE SO WITH A MINIMUM OF SEVENTY-TWO (72) HOUR WRITTEN NOTICE TO, AND WRITTEN APPROVAL BY, THE APPROPRIATE UTILITY COMPANY.

2. THE CONTRACTOR SHALL ARRANGE A MEETING WITH THE LOCAL JURISDICTIONAL AGENCIES AND OTHER GOVERNING AGENCIES, AND OTHER AFFECTED UTILITIES PRIOR TO SCHEDULING THE SHUT DOWN TO ASSESS THE SCOPE OF WORK.

3. ALL SYSTEM SHUT DOWNS SHALL BE SCHEDULED BY THE CONTRACTOR AT SUCH TIME THAT SYSTEM DEMAND IS LOW. THIS GENERALLY REQUIRES NIGHT TIME WORK BY THE CONTRACTOR AND REQUIRES FULL-TIME INSPECTION BY A REPRESENTATIVE OF THE UTILITY. ALL COST FOR OVERTIME WORK BY THE REPRESENTATIVE OF THE UTILITY SHALL BE BORNE BY THE CONTRACTOR.

4. EACH CUSTOMER AFFECTED BY THE SHUT-DOWN SHALL BE PROVIDED, MINIMUM, FORTY-EIGHT (48) HOURS WRITTEN NOTIFICATION BY THE CONTRACTOR.

TEMPORARY DEMOLITION FACILITIES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE OR SUPPLY TEMPORARY WATER SERVICE, SANITARY FACILITIES AND ELECTRICITY TO ITS EMPLOYEES AND SUBCONTRACTORS FOR THEIR USE DURING DEMOLITION.

2. MAINTENANCE OF TRAFFIC (MOT) IN THE PUBLIC RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND FLORIDA DEPARTMENT OF TRANSPORTATION STANDARDS.

3. ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAYS OR WALKWAYS SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.

4. NO TRENCHES OR HOLES NEAR WALKWAYS OR IN ROADWAYS OR THEIR SHOULDERS ARE TO BE LEFT OPEN DURING NIGHTTIME HOURS WITHOUT EXPRESS WRITTEN PERMISSION OF THE CITY OR RESPECTIVE GOVERNING AGENCY.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 9	DETAIL NO. GNRL 009 REVISED 2017/07/13

WASTE MANAGEMENT PLAN:

1. IMPLEMENT A WASTE MANAGEMENT PLAN FOR APPROVAL BY THE OWNER. PROVIDE HANDLING, CONTAINERS, STORAGE, SIGNAGE, TRANSPORTATION AND OTHER ITEMS AS NEEDED TO IMPLEMENT THE WASTE MANAGEMENT PLAN DURING THE ENTIRE DURATION OF THE CONTRACT.

2. DESIGNATE A WASTE MANAGEMENT COORDINATOR TO BE RESPONSIBLE FOR IMPLEMENTING, MONITORING AND REPORTING STATUS OF WASTE MANAGEMENT WORK PLAN. COORDINATOR SHALL BE PRESENT AT PROJECT SITE FULL-TIME FOR DURATION OF PROJECT.

3. TRAIN WORKERS, SUBCONTRACTORS AND SUPPLIERS ON PROPER WASTE MANAGEMENT PROCEDURES, AS APPROPRIATE FOR THE WORK AT THE PROJECT SITE.

4. DISTRIBUTE A WASTE MANAGEMENT PLAN BEFORE WORK BEGINS. REVIEW PLAN PROCEDURES AND LOCATION ESTABLISHED FOR SALVAGE, RECYCLING AND DISPOSAL.

RECYCLING DEMOLITION WASTE:

1. SEPARATE RECYCLABLE WASTE FROM OTHER WASTE MATERIALS, TRASH AND DEBRIS. SEPARATE RECYCLABLE WASTE BY TYPE AT THE PROJECT SITE TO THE MAXIMUM EXTENT PRACTICAL.

2. PROVIDE APPROPRIATELY MARKED CONTAINERS OR BINS FOR CONTROLLING RECYCLABLE WASTE UNTIL THEY ARE REMOVED FROM THE PROJECT SITE. INCLUDE A LIST OF ACCEPTABLE AND UNACCEPTABLE MATERIALS AT EACH CONTAINER AND BIN.

3. INSPECT CONTAINERS AND BINS FOR CONTAMINATION AND REMOVE CONTAMINATED MATERIALS IF FOUND.

4. STOCKPILE PROCESSED MATERIALS ON-SITE WITHOUT INTERMIXING WITH OTHER MATERIALS. PLACE, GRADE AND SHAPE STOCKPILES TO DRAIN SURFACE WATER. COVER TO PREVENT WINDBLOWN DUST.

5. STOCKPILE MATERIALS AWAY FROM DEMOLITION AREA. DO NOT STORE WITHIN DRIP LINE OF REMAINING TREES.

6. STORE COMPONENTS OFF THE GROUND AND PROTECT FROM THE WEATHER.

7. REMOVE RECYCLABLE WASTE OFF THE OWNER'S PROPERTY AND TRANSPORT TO RECYCLING RECEIVER OR PROCESSOR.

8. ASPHALTIC CONCRETE PAVING: BREAK UP AND TRANSPORT PAVING TO ASPHALT RECYCLING FACILITY.

9. CONCRETE: REMOVE REINFORCEMENT AND OTHER METALS FROM CONCRETE AND SORT WITH OTHER METALS.

10. MASONRY: MASONRY WASTE SHALL INCLUDE WHOLE OR BROKEN BRICK AND CONCRETE MASONRY UNITS. WHOLE MASONRY UNITS SHALL BE CLEANED AND REUSED OR DONATED. BROKEN MASONRY SHALL BE CRUSHED AND USED AS FILL FOR OFFSITE AREAS. REMOVE METAL REINFORCEMENT, ANCHORS AND TIES FROM MASONRY AND SORT WITH OTHER METALS.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 10	DETAIL NO. GNRL 009 REVISED 2017/07/13

11. METALS: METALS FROM REINFORCED CONCRETE, REINFORCED MASONRY, STRUCTURAL STEEL MEMBERS, FLASHING AND SHEET METAL, CONDUIT PIPE, SIDING, PIPING AND WIRING SHALL BE SEPARATED BY TYPE.

12. STRUCTURAL STEEL: STACK MEMBERS ACCORDING TO THEIR SIZE, TYPE AND LENGTH.

13. NUTS AND BOLTS: REMOVE BOLTS, NUTS, WASHERS AND OTHER ROUGH HARDWARE.

14. SITE-CLEARING WASTE SHALL BE RECYCLED BY CHIPPING BRUSH, BRANCHES AND TREES, THEN HAUL TO WOOD RECYCLING CENTER.

DISPOSAL OF WASTE:

1. GENERAL: EXCEPT FOR ITEMS OR MATERIALS TO BE SALVAGED, RECYCLED OR OTHERWISE REUSED, REMOVE WASTE MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN A LANDFILL OR OTHER PERMITTED DISPOSAL FACILITY.

2. EXCEPT AS OTHERWISE SPECIFIED, DO NOT ALLOW WASTE MATERIALS THAT ARE TO BE DISPOSED OF TO ACCUMULATE ON-SITE.

3. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT SHALL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.

4. BURNING: DO NOT BURN WASTE MATERIALS.

5. DISPOSAL: TRANSPORT WASTE MATERIALS OFF THE OWNER'S PROPERTY AND LEGALLY DISPOSE OF THEM.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DEMOLITION NOTES SHEET 11	DETAIL NO. GNRL 009 REVISED 2017/07/17

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DRAWN BY: OLC | DATE: 02/21/19
DESIGNED BY: GAB | SCALE: AS NOTED
CHECKED BY: LEFR | FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
DEMOLITION NOTES CITY
STANDARDS - SHEET 2

SHEET NO.
CZ-DT-02
TOTAL: 43
CAD FILE: 12337-CZ-DT02
DRAWING FILE NO. 4-141-55

BID SET

TRAFFIC CONTROL PLAN NOTES:

1. THE TRAFFIC CONTROL PLANS FOR THE PROJECT SHALL COMPLY WITH THE LATEST EDITION OF THE FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY AND TRAFFIC DESIGN STANDARDS, INDEX NO. 600-660. MUTCD AND THE STANDARD SPECIFICATIONS. THE CONTRACTOR'S RESPONSE TIME TO ALL REPORTED MALFUNCTIONS OF TRAFFIC SIGNALS WITHIN THE PROJECT LIMITS SHALL BE NO MORE THAN TWO (2) HOURS AND SHALL RESTORE ALL MALFUNCTIONING TRAFFIC SIGNAL EQUIPMENT TO ITS LEVEL OF OPERATION PRIOR TO THE MALFUNCTIONING WITHIN TWENTY-FOUR (24) HOURS. DURING THIS TIME THE CONTRACTOR SHALL PROVIDE AT HIS EXPENSE TEMPORARY TRAFFIC CONTROL DEVICES, FLAGGLER PERSONNEL AND LAW ENFORCEMENT PERSONNEL AS NECESSARY TO MAINTAIN A SAFE AND EFFICIENT FLOW OF TRAFFIC AT THE AFFECTED WORK ZONE. THE ENGINEER OR THE CITY OF FORT LAUDERDALE SHALL APPROVE ALL MODIFICATIONS PRIOR TO THEIR IMPLEMENTATION.
2. THE CONTRACTOR SHALL MAINTAIN PROPER OPERATION OF ALL TRAFFIC SIGNAL LOOP ASSEMBLIES AND LOOP DETECTORS WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL CORRECT ALL LOOP ASSEMBLY/DETECTOR MALFUNCTIONS WITHIN 24 HOURS OF NOTIFICATION OF SUCH MALFUNCTIONS BY THE ENGINEER.
3. THE AGENCY RESPONSIBLE FOR MAINTENANCE OF THE TRAFFIC SIGNALS AND RELATED EQUIPMENT IS BROWARD COUNTY TRAFFIC ENGINEERING.
4. A REGULATORY SPEED OF 25 MPH SHALL BE POSTED WITHIN THE LIMITS OF THE WORK ZONE.
5. EXISTING SIGNS AND PAVEMENT MARKINGS THAT CONFLICT WITH CONSTRUCTION SIGNS AND MARKINGS SHALL BE REMOVED DURING CONSTRUCTION. ALL EXISTING SIGNS THAT ARE REMOVED SHALL BE STOCKPILED IN A SECURE PLACE AND REINSTALLED AFTER CONSTRUCTION. REMOVE AND REPLACE ANY GROUND MOUNT SIGN BY USE OF INDEX NO. 611.
6. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE PATTERNS AND PREVENT ADVERSE FLOODING OF THE TRAVEL LANES DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL OBTAIN WRITTEN AUTHORIZATION FROM THE CITY OF FORT LAUDERDALE FOR ANY AND ALL CONSTRUCTION ACTIVITIES TO BE PERFORMED AT NIGHT. NO LANE CLOSURE SHALL BE ALLOWED BETWEEN THE HOURS OF 6:00 AM TO 9:00 AM AND 4:00 PM TO 7:00 PM, MONDAY THROUGH FRIDAY UNLESS APPROVED BY THE ENGINEER.
8. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANY TWO (2) BUSINESS DAYS IN ADVANCE OF ANY EXCAVATION INVOLVING ITS UTILITIES SO THAT A COMPANY REPRESENTATIVE CAN BE PRESENT. THE LOCATION OF THE UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR DURING CONSTRUCTION. SEE SPECS FOR LIST OF UTILITY COMPANIES.
9. TRAFFIC CONTROL ON ALL COUNTY RIGHTS-OF-WAY SHALL MEET THE ADDITIONAL REQUIREMENTS OF THE BROWARD COUNTY ENGINEERING DEPARTMENT.
10. CONTRACTOR SHALL PREPARE AND SUBMIT MAINTENANCE OF TRAFFIC PLAN (MOT) WHERE REQUIRED BY FEDERAL, STATE, COUNTY, OR LOCAL AGENCIES HAVING JURISDICTION. CONTRACTOR SHALL OBTAIN ALL REQUIRED APPROVALS AND PERMITS ASSOCIATED WITH THE MOT'S. ALL MOT'S TO BE ATS CERTIFIED.
11. THE CONTRACTOR SHALL ALSO COORDINATE THE CONSTRUCTION SCHEDULE WITH FDOT, BROWARD COUNTY AND THE CITY OF FORT LAUDERDALE TO AVOID LANE CLOSURES WHICH WOULD ADVERSELY AFFECT TRAFFIC DURING RUSH HOUR.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TRAFFIC CONTROL PLAN NOTES

DETAIL NO. GNRL 002
REVISED: 2017/07/13

FDOT GENERAL NOTES:

1. ALL MATERIALS AND CONSTRUCTION WITHIN THE FDOT RIGHT-OF-WAY SHALL CONFORM TO FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS (2010 EDITION). STANDARD SPECIFICATIONS (2010 EDITION) AND THE SUPPLEMENTS THERETO.
2. THE APPLICANT'S ENGINEER RESPONSIBLE FOR CONSTRUCTION INSPECTION SHALL INSURE THAT THE MAINTENANCE OF TRAFFIC PLAN (MOT) FOR THE PROJECT IS IN ACCORDANCE WITH THE APPLICABLE FDOT INDEX NUMBER (600 SERIES) AND THIS DOCUMENT: THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (D.S. DEPARTMENT OF TRANSPORTATION, FHWA).
3. AT THE END OF EACH WORK PERIOD, ANY DROP-OFF IN THE AREA ADJACENT TO THE TRAVEL WAY OF THE STATE ROAD SHALL BE BACKFILLED IN ACCORDANCE WITH STANDARD INDEX 600 OR SHALL BE OTHERWISE PROTECTED WITH TEMPORARY BARRIER WALL AT THE CONTRACTOR'S EXPENSE.
4. IF THE PERMITTED WORK IS ON A ROADWAY THAT HAS BEEN SELECTED AS A HURRICANE OR DISASTER EVACUATION ROUTE, THE APPLICANT, AT THE PRE-CONSTRUCTION CONFERENCE IS REQUIRED TO PRESENT, AS PART OF THE WORK PLAN, AN EMERGENCY FUNCTIONAL RESTORATION PLAN TO ADDRESS EVENTUALITIES SUCH AS HURRICANES.
5. THE CONTRACTOR MUST CALL THE APPROPRIATE COUNTY TRAFFIC ENGINEERING DIVISION, HAVING JURISDICTION OVER THE PROJECT AT LEAST 48 HOURS, BEFORE ANY EXCAVATION WITHIN THE FDOT RIGHT-OF-WAY TO DETERMINE THE LOCATION OF THE EXISTING TRAFFIC SIGNAL INTERCONNECT CABLE.
6. THE LOCATION OF EXISTING UTILITIES SHOWN IS APPROXIMATE ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION DURING CONSTRUCTION. RELOCATION OF UTILITIES SHALL BE COORDINATED WITH UTILITY COMPANIES AFTER IDENTIFICATION OF CONFLICT BY CONTRACTOR. CONTRACTOR WILL NOTIFY ENGINEER IN ADVANCE BEFORE ANY RELOCATION.
7. BEFORE PERMIT APPROVAL AND CONSTRUCTION OF THIS PROJECT, THE APPLICANT MUST CONTACT THE FLORIDA DEPARTMENT OF TRANSPORTATION LOCAL MAINTENANCE OFFICE TO SCHEDULE A PRE-CONSTRUCTION MEETING. THE TELEPHONE NUMBER IS 954-776-4300 OR 1-800-300-8236. THE APPLICANT AT THE EARLIEST CONVENIENT TIME SHALL NOTIFY IN WRITING ALL RIGHT-OF-WAY USERS AFFECTED BY THE CONSTRUCTION OF THIS PROJECT.
8. ALL MOT LANE CLOSURE SIGNS SHALL BE COVERED WHEN LANES ARE NOT CLOSED. NO LANES ARE TO BE CLOSED EXCEPT AT TIMES PRESCRIBED BY THE DEPARTMENT.
9. SODDING SHALL BE IN ACCORDANCE WITH SECTION 575.
10. ALL CURB CUT RAMPS MUST FACE IN THE DIRECTION OF PEDESTRIAN TRAVEL.
11. SPECIFY THE ALPHANUMERIC IDENTIFICATION FOR THE CURB CUT RAMPS PER STANDARD INDEX 304. A COPY OF THE APPROPRIATE DETAIL(S) MUST BE SHOWN ON THE PLANS.
12. FLAGGERS MUST BE PRESENT DURING THE INGRESS AND EGRESS OF CONSTRUCTION VEHICLES TO AND FROM THE PROJECT SITE. WARNING SIGNS MUST BE ERECTED ADVISING MOTORIST OF TRUCKS ENTERING THE HIGHWAY.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

FDOT GENERAL NOTES

DETAIL NO. GNRL 003
REVISED: 2016/09/21

MINIMUM DENSITY REQUIREMENTS

LOCATION	MATERIAL	MINIMUM DENSITY (% OF MAX)	TESTING FREQUENCY
ROADS (INCLUDES SIDEWALKS, ASPHALT PATHS)	BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT TOP OF FIRST LIFT AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED AT RANDOMLY SELECTED LOCATIONS WITHIN EACH 300 FOOT INTERVAL (MAXIMUM) ALONG THE LENGTH OF ROADWAY, SIDEWALK OR PATHWAY.
	SUBGRADE	98%	
	BASE	98%	
MANHOLES AND VAULTS (IN ROADS AND PARKING AREAS)	IN-PLACE SUBGRADE BENEATH STRUCTURES	95%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT THE BOTTOM OF THE STRUCTURE AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: PERFORM TESTING AT EACH STRUCTURE.
	BACKFILL BENEATH STRUCTURES	98%	
	BACKFILL AROUND STRUCTURES	98%	
	CRUSHED STONE BENEATH STRUCTURES	NOTE 6	
PARKING AREAS	BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT TOP OF FIRST LIFT AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED EVERY 6,000 SQUARE FEET OF PARKING AREA.
	SUBGRADE	98%	
	BASE	98%	
UTILITY TRENCH BACKFILL	BEDDING AND BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT THE SPRING LINE AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED AT RANDOMLY SELECTED LOCATIONS WITHIN EACH 300 FOOT INTERVAL (MAXIMUM) ALONG THE LENGTH OF A PIPE INSTALLATION, AND BETWEEN EACH SET OF STRUCTURES SEPARATED BY LESS THAN 300 FEET.
ROADS AND PARKING	ASPHALT	94%	ASPHALT TESTING MAY BE DONE BY CORE SAMPLING OR NUCLEAR GAUGE DENSITY TESTING. ASPHALT TESTING SHALL BE AT MAXIMUM 300 LINEAR FOOT ALONG ROADWAYS AND 6,000 SQUARE FOOT INTERVALS FOR PARKING AREAS.

NOTES:

1. THE DENSITY REQUIREMENTS PRESENTED ASSUME DRY TRENCH CONDITIONS.
2. UNLESS INDICATED OTHERWISE IN THE SPECIFICATIONS, TESTING SHALL COMPLY WITH THE REQUIREMENTS PRESENTED IN THIS TABLE.
3. LIFT THICKNESSES FOR BASE, SUBGRADE AND BACKFILL SHALL BE AS INDICATED ON THE DETAILS OR DESCRIBED IN THE SPECIFICATIONS.
4. MAXIMUM DENSITY SHALL BE DETERMINED BY ASTM D 1557 OR AASHTO T180 (MODIFIED PROCTOR).
5. FIELD DENSITY TESTS SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D 1556 OR D 2922.
6. THE AGGREGATE SHALL BE COMPACTED TO A DEGREE ACCEPTABLE TO THE ENGINEER BY USE OF A VIBRATORY COMPACTOR AND/OR CRAWLER TRACTOR.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DENSITY TESTING NOTES

DETAIL NO. GNRL 010
REVISED: 2017/07/13

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

BROWARD COUNTY COMMUNICATION NOTES:

1. THE AGENCY RESPONSIBLE FOR MAINTENANCE OF THE TRAFFIC SIGNALS AND RELATED EQUIPMENT IS BROWARD COUNTY TRAFFIC ENGINEERING DIVISION (BCTED). ALL SYSTEM COMMUNICATIONS EQUIPMENT, CABLING AND RELATED MATERIAL SHALL COMPLY WITH BROWARD COUNTY'S LATEST EDITION OF THE MINIMUM STANDARDS AS EXPRESSED IN THE "STANDARDS AND SPECIFICATIONS - COMMUNICATION INFRASTRUCTURE" DOCUMENT. PLEASE REFER TO (BCTED'S) COMMUNICATIONS POLICIES AND PROCEDURES FOR ADDITIONAL INFORMATION. BROWARD COUNTY TRAFFIC ENGINEERING DIVISION WILL NOT ACCEPT ANY PROJECTS THAT DO NOT MEET THESE STANDARDS AND SPECIFICATIONS. IF FIBER OPTIC PULL BOXES ALREADY EXIST AT AN INTERSECTION, NO ADDITIONAL FIBER OPTIC PULL BOXES WILL NEED TO BE INSTALLED. FOR A COPY OF THESE STANDARDS REFER TO THE BROWARD COUNTY WEB SITE AT WWW.BROWARD.ORG/TRAFFIC UNDER PUBLICATIONS.
2. IF THERE ARE COPPER INTERCONNECT CABLE/S WITHIN YOUR PROJECT LIMITS OR WITHIN 1,500 FEET OF YOUR PROJECT LIMITS, CONTACT THE COMMUNICATIONS MANAGER AT TECOMMUNICATIONS@BROWARD.ORG OR 954-847-2745.
3. IF THERE ARE FIBER OPTIC CABLE/S WITHIN YOUR PROJECT LIMITS OR WITHIN 1,500 FEET OF YOUR PROJECT LIMITS, CONTACT THE COMMUNICATIONS MANAGER AT TECOMMUNICATIONS@BROWARD.ORG OR 954-847-2745.
4. IF THERE ARE CELLULAR COMMUNICATIONS WITHIN YOUR PROJECT LIMITS, CONTACT THE COMMUNICATIONS MANAGER AT TECOMMUNICATIONS@BROWARD.ORG OR 954-847-2745.
5. ALL BCTED COMMUNICATIONS CABLES/CONDUIT SHALL BE LOCATED A MINIMUM OF 48 HOURS IN ADVANCE.

BROWARD COUNTY TRAFFIC ENGINEERING DIVISION
PROCEDURE FOR NOTIFICATION OF COMMUNICATION DISRUPTION

COPPER INTERCONNECT CABLE NOTIFICATION CONTACT PERSON:

WHEN COMMUNICATIONS TO AN INTERSECTION MUST BE DISRUPTED BY A CONTRACTOR TO PERFORM WORK, THE CONTRACTOR SHALL PROVIDE TWO DAY ADVANCE NOTICE IN WRITING TO THE BROWARD COUNTY TRAFFIC ENGINEERING DIVISION. THIS NOTIFICATION SHALL BE CONVEYED VIA ELECTRONIC MAIL (EMAIL) TO THE TRAFFIC SIGNAL TECHNICIAN III AT TECOMMUNICATIONS@BROWARD.ORG. NOTIFICATION SHALL INCLUDE CONTACT PERSON, TELEPHONE NUMBER, PURPOSE, LOCATION AND DURATION. THE DISRUPTION SHALL LAST FOR NO MORE THAN 3 CONSECUTIVE BUSINESS DAYS. WHERE POSSIBLE, THE DISRUPTION SHALL BE DURING OFF PEAK HOURS BEGINNING AT 9:00 AM AND ENDING AT 3:00 PM.

FIBER OPTIC CABLE NOTIFICATION CONTACT PERSON:

WHEN COMMUNICATIONS TO AN INTERSECTION MUST BE DISRUPTED BY A CONTRACTOR TO PERFORM WORK, THE CONTRACTOR SHALL PROVIDE TWO DAY ADVANCE NOTICE IN WRITING TO THE BROWARD COUNTY TRAFFIC ENGINEERING DIVISION. THIS NOTIFICATION SHALL BE CONVEYED VIA ELECTRONIC MAIL (EMAIL) TO THE COMMUNICATIONS MANAGER AT TECOMMUNICATIONS@BROWARD.ORG. NOTIFICATION SHALL INCLUDE CONTACT PERSON, TELEPHONE NUMBER, PURPOSE, LOCATION AND DURATION. THE DISRUPTION SHALL LAST FOR NO MORE THAN 3 CONSECUTIVE BUSINESS DAYS. WHERE POSSIBLE, THE DISRUPTION SHALL BE DURING OFF PEAK HOURS BEGINNING AT 9:00 AM AND ENDING AT 3:00 PM.

UTILITY OWNER CONTACT PERSON:

INTERCONNECT COMMUNICATIONS CABLES - (ROBERT BLOUNT) BROWARD COUNTY TRAFFIC ENGINEERING DIVISION (BCTED) 954-847-2745

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

BROWARD COUNTY COMMUNICATION NOTES

DETAIL NO. GNRL 006
REVISED: 2016/09/21

DRAINAGE NOTES:

1. DRAINAGE PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) OR REINFORCED CONCRETE (RCP), THE USE OF RCP PIPE FOR PUBLIC ROADWAY CROSSINGS IS PREFERRED.
2. CATCH BASINS, INLETS AND JUNCTION BOXES SHALL NOT BE INSTALLED IN DRIVEWAYS.
3. PRIOR TO BACKFILLING EXFILTRATION TRENCHES, DRAINAGE INLETS OR MANHOLES, THE CONTRACTOR SHALL NOTIFY THE ENGINEERING INSPECTOR FOR AN INSPECTION.
4. DRAINAGE STRUCTURES SHALL BE CLEANED PRIOR TO ACCEPTANCE BY CITY.
5. ALL PIPES SHALL BE LAID IN DRY TRENCH. ALL MUCK OR UNSUITABLE MATERIALS IN TRENCHES, INLETS OR MANHOLES SHALL BE REMOVED AND BACKFILLED WITH SELECTED MATERIAL APPROVED BY THE ENGINEER.
6. MINIMUM COVER FOR HDPE PIPE UNDER ASPHALT SHALL BE 24-INCH COMPACTED LIMEROCK BASE. MINIMUM COVER FOR PIPE UNDER GRASS SHALL BE 18" COMPACTED SUBGRADE.
7. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE PATTERNS AND PREVENT ADVERSE FLOODING OF THE TRAVEL LANES DURING CONSTRUCTION.
8. MAINTENANCE ACCESS SHALL BE PROVIDED ON BOTH SIDES OF EXFILTRATION TRENCHES IN THE FORM OF MANHOLES OR CATCH BASINS. THE MAXIMUM DISTANCE BETWEEN STORM STRUCTURES SHALL NOT EXCEED TREE HUNDRED (300) FEET).
9. ALL EXFILTRATION SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH THE FLORIDA DEPARTMENT OF TRANSPORTATION DOCUMENT TITLED "DRAINAGE DESIGN GUIDE", LATEST EDITION.
10. GEOTEXTILE MATERIALS USED IN THE CONSTRUCTION OF EXFILTRATION TRENCHES SHALL BE IN ACCORDANCE WITH THE CRITERIA OF FLORIDA DEPARTMENT OF TRANSPORTATION'S DESIGN STANDARDS LATEST EDITION AND CITY OF FORT LAUDERDALE'S SPECIFICATIONS.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DRAINAGE NOTES

DETAIL NO. GNRL 008
REVISED: 2017/07/13

ENGINEER:
EVON B. FELIBERTY-RUBERTE
REG. NO. 64686
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: GAB
SCALE: AS NOTED
CHECKED BY: LEFR
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
GENERAL NOTES
CITY STANDARDS

SHEET NO.
CZ-DT-03
TOTAL: 43
CAD FILE: 12337-CZ-DT03
DRAWING FILE NO. 4-141-55

BID SET

EROSION AND SEDIMENT CONTROL:

1. CONTRACTOR TO EMPLOY BEST MANAGEMENT PRACTICES THROUGHOUT CONSTRUCTION IN ORDER TO ENSURE POLLUTION PREVENTION. CONTRACTOR TO COMPLY WITH ALL LOCAL STATE AND OTHER GOVERNMENTAL ENVIRONMENTAL REGULATIONS THROUGHOUT CONSTRUCTION.
2. DURING CONSTRUCTION ALL CATCH BASIN INLETS SHALL BE PROTECTED TO PREVENT SEDIMENT AND DEBRIS FROM ENTERING THE CATCH BASIN.
3. SILT FENCES SHALL BE INSTALLED AS NECESSARY TO CONTROL OR PREVENT DISCHARGE OF SEDIMENT ONTO ADJACENT UNDISTURBED AREAS, OR OFF-SITE AREAS.
4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE STABILIZED WITHIN A REASONABLE PERIOD OF TIME TO ASSURE MINIMUM EROSION OF SOILS.
5. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL ALL EROSION CONTROL MEASURES HAVE BEEN INSTALLED.
6. ALL EXPOSED AREAS SHALL BE SODDED AS SPECIFIED WITHIN 30 DAYS OF FINAL GRADING.
7. MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN AND AT LEAST ONCE A WEEK.
8. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SOIL SEDIMENT FROM LEAVING THE SITE.
9. CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
10. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY CITY, COUNTY, AND STATE OF FLORIDA ON SITE INSPECTION, AT NO ADDITIONAL COST TO THE OWNER.
11. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES.
12. IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
13. BURNING OF DEBRIS WILL NOT BE ALLOWED.
14. CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
15. CONTRACTOR IS TO PROVIDE EROSION CONTROL/SEDIMENTATION BARRIER (HAY BALES OR SILTATION CURTAIN) TO PREVENT SILTATION OF ADJACENT PROPERTY, STREETS, STORM SEWERS AND WATER WAYS. IN ADDITION CONTRACTOR SHALL PLACE STRAW, MULCH OR OTHER SUITABLE MATERIAL ON GROUND IN AREAS WHERE CONSTRUCTION RELATED TRAFFIC IS TO ENTER AND EXIT SITE IF IN THE OPINION OF THE ENGINEER AND/OR LOCAL AUTHORITIES IF EXCESSIVE QUANTITIES OF EARTH ARE TRANSPORTED OFF-SITE EITHER BY NATURAL DRAINAGE OR BY VEHICULAR TRAFFIC. THE CONTRACTOR IS TO REMOVE AND CLEAN SAID EARTH TO THE SATISFACTION OF THE ENGINEER AND/OR AUTHORITIES. EROSION CONTROL BARRIER SHALL BE ESTABLISHED AS THE FIRST ITEM OF WORK.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

EROSION AND SEDIMENT CONTROL NOTES
SHEET 1

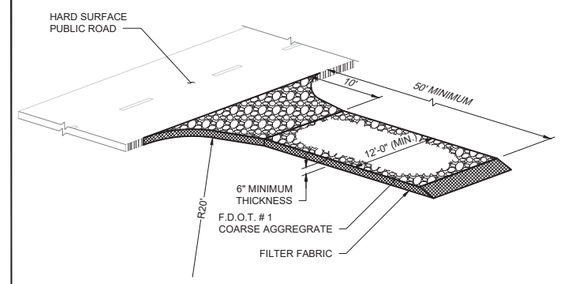
DETAIL NO. ESC 001
REVISED 2017/07/08

16. THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S STORMWATER PERMITTING PROGRAM APPLIES TO ALL CONSTRUCTION ACTIVITY THAT: 1) CONTRIBUTE STORMWATER DISCHARGES TO SURFACE WATER OF THE STATE OR INTO A MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4); 2) DISTURBS ONE OR MORE ACRES OF LAND; OR 3) LESS THAN ONE ACRE IS INCLUDED IF THE ACTIVITY IS PART OF A LARGER COMMON PLAN OF DEVELOPMENT THAT WILL MEET OR EXCEED THE ONCE ACRE THRESHOLD. DISTURB INCLUDES CLEARING, GRADING AND EXCAVATING.
17. FOR CONSTRUCTION ACTIVITY THAT IS SUBJECT TO THE NPDES FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S STORMWATER PERMITTING PROGRAM, THE CONTRACTOR SHALL:
    - 17.1. OBTAIN A GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION DOCUMENT 62-621.300(4)(A).
    - 17.2. COMPLY WITH ALL REQUIREMENTS OF THE GENERIC PERMIT.
    - 17.3. DEVELOP AND IMPLEMENT A STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
    - 17.4. COMPLETE A NOTICE OF INTENT (NOI) FLORIDA DEPARTMENT OF ENVIORNMENTAL PROTECTION FORM 62-621.300(4)(B) IN ITS ENTIRETY USING THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S WEBSITE.
18. SUBMIT COPIES OF THE SWPPP AND THE NOI TO THE ENGINEER AS INFORMATIONAL RECORDS. THESE SUBMITTALS WILL NOT BE REVIEWED BY THE ENGINEER.
19. CONTRACTOR TO CLEAN AND REPAIR ALL EXISTING STORMWATER INFRASTRUCTURE THAT IS IMPACTED BY CONSTRUCTION ACTIVITIES, BEFORE LEAVING THE JOBSITE.
20. CONTRACTOR TO REMOVE ALL FILTER FABRIC AND POLLUTION PREVENTION ITEMS BEFORE THE FINAL WALK-THROUGH.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

EROSION AND SEDIMENT CONTROL NOTES
SHEET 2

DETAIL NO. ESC 001
REVISED 2017/07/08



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

GRAVEL CONSTRUCTION ENTRANCE

DETAIL NO. ESC 002
REVISED 2017/07/08

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUBERTE
REG. No: 64861
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: GAB	SCALE: AS NOTED
CHECKED BY: LEFR	
FIELD BOOK: XXXX	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

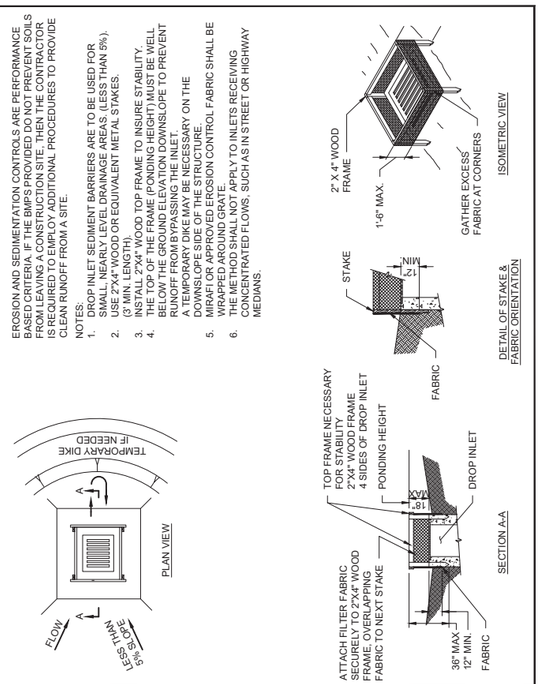
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

CONTRACTOR'S RESPONSIBILITY

EROSION AND SEDIMENTATION CONTROLS ARE PERFORMANCE BASED CRITERIA. IF THE BMPS PROVIDED DO NOT PREVENT SOILS FROM LEAVING A CONSTRUCTION SITE, THEN THE CONTRACTOR IS REQUIRED TO EMPLOY ADDITIONAL PROCEDURES TO PROVIDE CLEAN RUNOFF FROM A SITE.

NOTES:

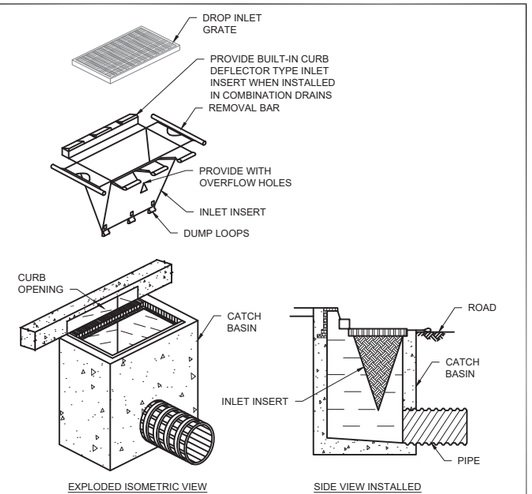
1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. USE 2"X4" WOOD OR EQUIVALENT METAL STAKES.
3. FOR FINAL INSPECTION.
4. INSTALL 2"X4" WOOD TOP FRAME TO INSURE STABILITY.
4. THE TOP OF THE FRAME (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET.
   A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.
5. MAKE SURE THE PROPER EROSION CONTROL FABRIC SHALL BE WRAPPED AROUND GRATE.
6. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DROP INLET PROTECTION - SEDIMENT BARRIER

DETAIL NO. ESC 004
REVISED 2016/08/21



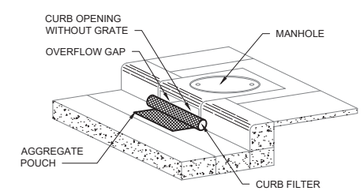
NOTES:

1. THE INLET INSERT SHALL BE A SEDIMENT CONTROL DEVICE DESIGNED FOR DROP INLETS OR COMBINATION DRAINS WHERE A DROP INLET IS COUPLED WITH A CURB INLET.
2. THE INLET INSERT SHALL BE MADE OF A PERMEABLE GEOTEXTILE THAT ALLOWS WATER TO PASS BUT PREVENTS SILT AND SEDIMENT FROM CLOGGING THE DRAIN SYSTEM.
3. THE CONTRACTOR SHALL CLEAN AND INSPECT REGULARLY AND AFTER EVERY MAJOR RAIN EVENT.
4. INLET INSERTS SHALL BE "SILTSACK" BY ACF ENVIRONMENTAL, OR EQUAL. SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH THE SPECIFICATIONS.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DROP INLET PROTECTION - INLET INSERT

DETAIL NO. ESC 005
REVISED 2017/07/13



NOTES:

1. INSTALL CURB FILTERS AT ALL INLETS WITHOUT GRATES TO KEEP SILT, SEDIMENT AND CONSTRUCTION DEBRIS OUT OF THE STORM SYSTEM
2. THE CURB FILTER SHALL BE DANDY CURB AS MANUFACTURED BY DANDY PRODUCTS INC., OR EQUAL. SUBMIT SHOP A SHOP DRAWING FOR THE CURB FILTERS.
3. THE CURB FILTER SHALL FORM OF A CYLINDRICAL TUBE PLACED IN FRONT OF AND EXTENDING BEYOND THE INLET OPENING ON BOTH SIDES.
4. THE CURB FILTER SHALL HAVE A POUCH ON THE STREET SIDE OF THE UNIT FOR STONE AGGREGATE TO HOLD THE FILTER IN PLACE.
5. THE CURB FILTER SHALL BE CONSTRUCTED OF A HIGH VISIBILITY ORANGE MONOFILAMENT FABRIC.
6. FILL POUCH WITH FDOT #57 STONE AGGREGATE TO A LEVEL (AT LEAST HALF-FULL) THAT WILL KEEP UNIT IN PLACE DURING A RAIN EVENT AND CREATE A SEAL BETWEEN THE CURB FILTER AND THE SURFACE OF THE STREET.
7. CENTER THE UNIT AGAINST CURB OR MEDIAN INLET OPENING SO THAT THE CURB SIDE OF THE UNIT CREATES A SEAL WITH THE CURB OR MEDIAN BARRIER AND INLET STRUCTURE. THERE WILL BE APPROXIMATELY TWELVE (12) INCHES OF THE INLET PROTECTION UNIT OVERHANGING ON EACH SIDE OF THE OPENING.
8. THE CONTRACTOR SHALL REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM SURFACE AND VICINITY OF UNIT AFTER EACH RAIN EVENT.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

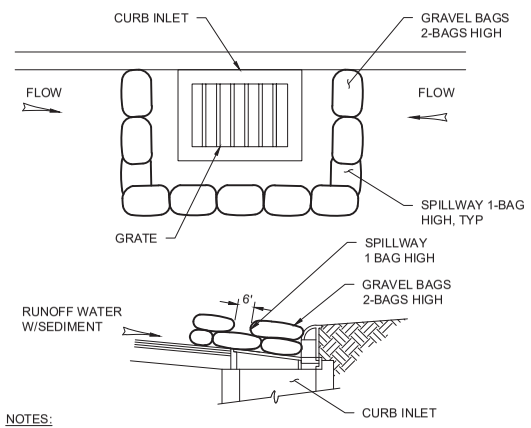
CURB INLET PROTECTION - CURB FILTER

DETAIL NO. ESC 006
REVISED 2017/07/19

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EROSION CONTROL DETAILS
CITY STANDARDS - SHEET 1

SHEET NO.
CZ-DT-04
TOTAL: 43
CAD FILE: 12337-CZ-DT04
DRAWING FILE NO. 4-141-56

BID SET



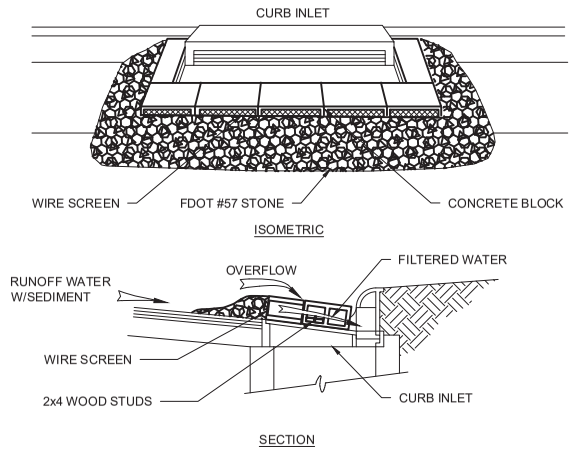
NOTES:

1. A SPILLWAY SHALL BE DESIGNATED FOR EACH DIRECTION OF APPROACHING FLOW AS SHOWN. THE SPILLWAY SHALL BE LOCATED TO ALLOW THE MAXIMUM AMOUNT OF STORMWATER TO POOL WITHOUT FLOODING AREAS UP GRADE OF THE INLET.
2. FOR INLETS THAT ARE NOT ADJACENT TO CURBS, PLACE GRAVEL BAGS ONE BAG HIGH AROUND THE ENTIRETY OF THE INLET TO ACCOMMODATE FLOW FROM ALL DIRECTIONS.
3. BAG MATERIAL: BAGS SHALL BE WOVEN POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE FABRIC, MINIMUM UNIT WEIGHT FOUR OUNCES PER SQUARE YARD, MULLEN BURST STRENGTH EXCEEDING 300 PSI IN CONFORMANCE WITH THE REQUIREMENTS IN ASTM D3786, AND ULTRAVIOLET STABILITY EXCEEDING 70% IN CONFORMANCE WITH THE REQUIREMENTS IN ASTM D4355.
4. BAG SIZE: EACH GRAVEL-FILLED BAG SHALL BE 18-INCHES X 12-INCHES X 3-INCHES AND HAVE A MASS OF APPROXIMATELY 33 LBS. ALTERNATIVE BAG SIZES SHALL BE CONSIDERED BASED ON LOCALLY AVAILABLE MATERIALS.
5. FILL MATERIAL: GRAVEL SHALL BE PEA GRAVEL 3/8 INCHES IN DIAMETER AND SHALL BE CLEAN AND FREE OF CLAY BALLS, ORGANIC MATTER, OR OTHER DELETERIOUS MATERIALS.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CURB INLET PROTECTION - GRAVEL BAG

DETAIL NO. ESC 007
REVISION 2017.08.08



NOTES:

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2 - 3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW THE TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR INLETS IN ROADWAYS WITH HEAVY TRAFFIC CONDITIONS PREFABRICATED FILTER INSERTS MAY BE USED.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CURB INLET PROTECTION - BLOCK AND STONE

DETAIL NO. ESC 008
REVISION 2017.07.08

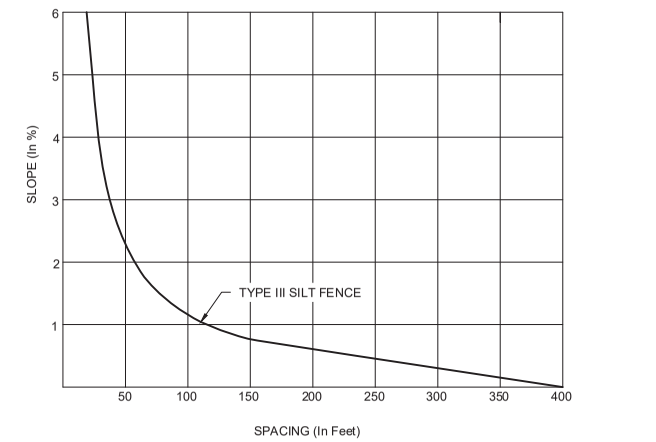
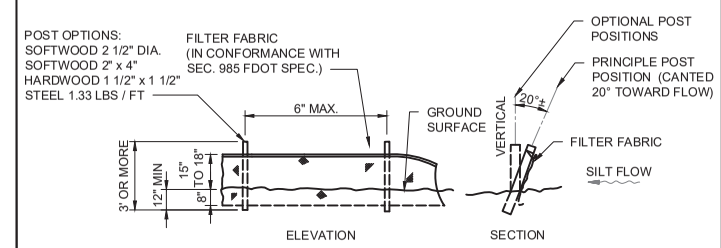


CHART 1: SILT FENCE SPACING

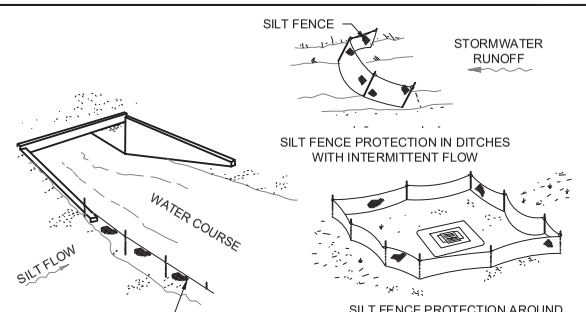


TYPE III SILT FENCE

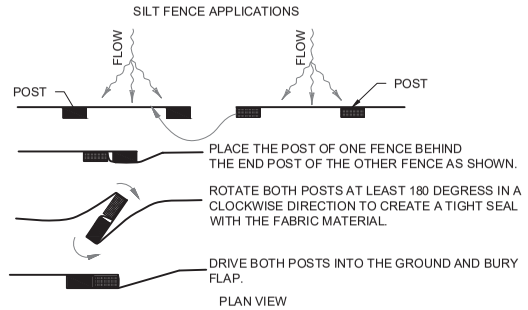
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

SILT FENCE - SHEET 1

DETAIL NO. ESC 009
REVISION 2017.07.12



SILT FENCE APPLICATIONS



JOINING TWO SILT FENCES

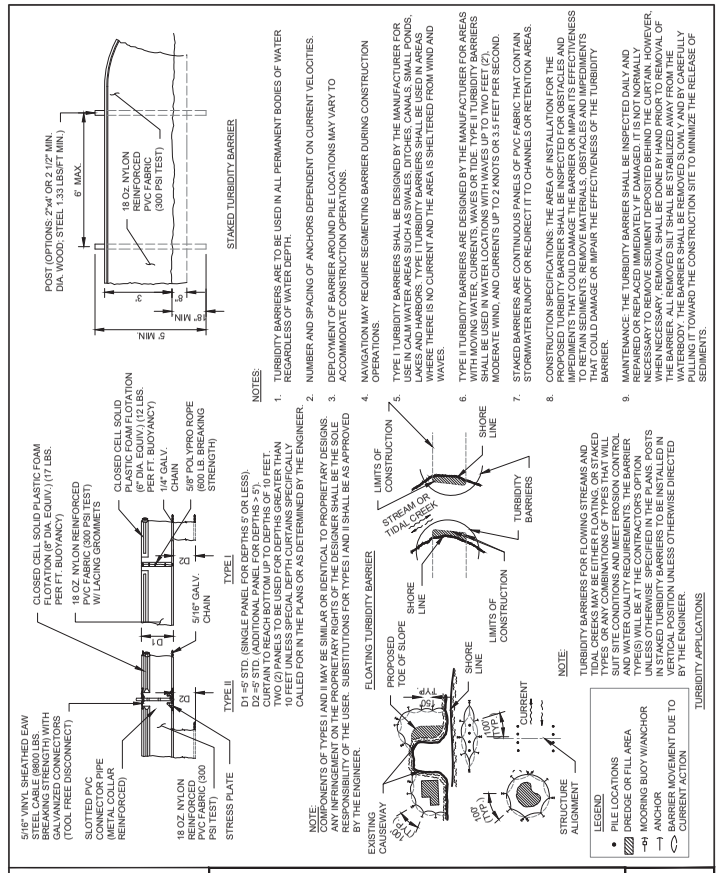
NOTES:

1. WHERE USED IN DITCHES, THE SPACING FOR TYPE III SILT FENCE SHALL BE IN ACCORDANCE WITH CHART 1.
2. DO NOT CONSTRUCT SILT FENCES ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE AT UPLAND LOCATIONS AND TURBIDITY BARRIERS USED AT PERMANENT BODIES OF WATER.
3. WHERE USED AS SLOPE PROTECTION . SILT FENCE IS TO BE CONSTRUCTED ON 0% LONGITUDINAL GRADE TO AVOID CHANNELIZING RUNOFF ALONG THE LENGTH OF THE FENCE.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

SILT FENCE - SHEET 2

DETAIL NO. ESC 010
REVISION 2017.07/11



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. TYPE I TURBIDITY BARRIERS SHALL BE DESIGNED BY THE MANUFACTURER FOR USE IN CALM WATER AREAS SUCH AS SWALES, DITCHES, CANALS, SMALL PONDS, LAKE AND RIVER SHORELINES, AND OTHER SIMILAR AREAS. THEY SHALL BE USED WHERE THERE IS NO CURRENT AND THE AREA IS SHELTERED FROM WIND AND WAVES.
6. TYPE II TURBIDITY BARRIERS ARE DESIGNED BY THE MANUFACTURER FOR AREAS WITH MODERATE WIND, AND CURRENTS UP TO 2 KNOTS OR 3.5 FEET PER SECOND. THEY SHALL BE USED IN WATER LOCATIONS WITH WAVES UP TO TWO FEET (2') MODERATE WIND, AND CURRENTS UP TO 2 KNOTS OR 3.5 FEET PER SECOND.
7. STAKED BARRIERS ARE CONTINUOUS PANELS OF PVC FABRIC THAT CONTAIN STORMWATER RUNOFF OR RE-DIRECT IT TO CHANNELS OR RETENTION AREAS.
8. CONSTRUCTION SPECIFICATIONS: THE AREA OF INSTALLATION FOR THE PROPOSED TURBIDITY BARRIER SHALL BE INSPECTED FOR OBSTACLES AND IMPEDIMENTS THAT COULD DAMAGE THE BARRIER OR IMPAIR ITS EFFECTIVENESS TO ENSURE A GOOD SEAL. ALL OBSTACLES AND IMPEDIMENTS THAT COULD DAMAGE OR IMPAIR THE EFFECTIVENESS OF THE TURBIDITY BARRIER.
9. MAINTENANCE: THE TURBIDITY BARRIER SHALL BE INSPECTED DAILY AND REPAIRED OR REPLACED IMMEDIATELY UPON DETECTING ANY DEFICIENCY. IF IT IS NECESSARY TO REMOVE SEDIMENT FROM BEHIND THE BARRIER, HOWEVER, WHEN NECESSARY: REMOVAL SHALL BE DONE BY HAND PRIOR TO REMOVAL OF THE BARRIER. ALL SEDIMENT REMOVED SHALL BE DISPOSED IN AN APPROVED WATERBODY. THE BARRIER SHALL BE REMOVED SLOWLY AND BY CAREFULLY PULLING IT TOWARD THE CONSTRUCTION SITE TO MINIMIZE THE RELEASE OF SEDIMENTS.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TURBIDITY BARRIER - FLOATING

DETAIL NO. ESC 011
REVISION 2017.07.08

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUBERTE
LIC. NO. 64866
DATE: 02/01/2017

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: GAB
SCALE: AS NOTED
CHECKED BY: LEFR
FIELD BOOK:

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

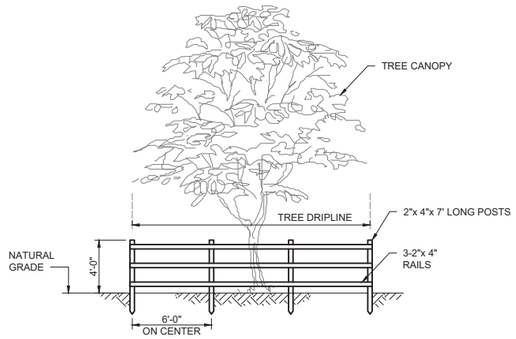
NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EROSION CONTROL DETAILS
CITY STANDARDS - SHEET 2

SHEET NO.
CZ-DT-05
TOTAL: 43
CAD FILE: 12337-CZ-DT05
DRAWING FILE NO. 4-141-55

BID SET

6/4/2019 2:31 PM



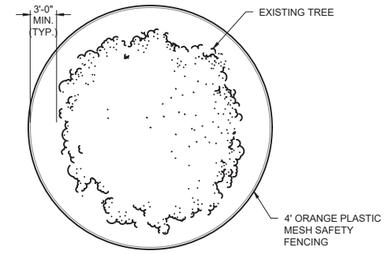
NOTES:

1. BEFORE SITE CLEARING BEGINS PROVIDE NECESSARY MEASURES TO ASSURE SURVIVAL OF VEGETATION.
2. REMOVE BARRIERS AND RESTORE SURFACES PRIOR TO FINAL CLOSEOUT.

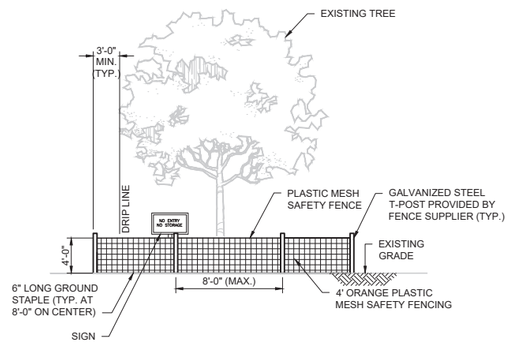
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TREE PROTECTION BARRIER

STDDWG. NO. ROAD 101
REVISED: 2017/07/17



PLAN

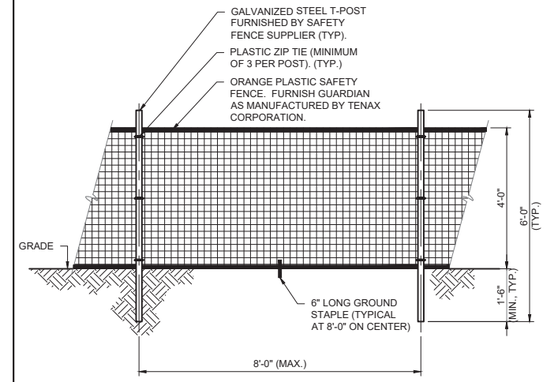


ELEVATION

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TREE PROTECTION FENCE

STDDWG. NO. ROAD 102
REVISED: 2017/07/24



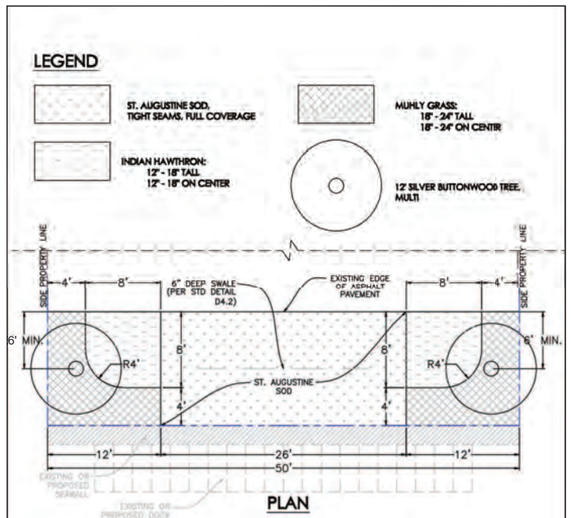
NOTES:

1. REBAR SHALL NOT BE USED FOR SUPPORTING THE FENCE.
2. LOOP THE ZIP TIES THROUGH THE AVAILABLE HOLES OR "TEETH" IN THE POST TO PREVENT THE FENCE FROM SLIDING DOWN THE POST.
3. PLASTIC ZIP TIES SHALL BE AS FOLLOWS:
   A. MINIMUM WIDTH = 0.3 INCHES.
   B. LENGTH = AS REQUIRED.
   C. COLOR = BLACK WITH UV STABILIZER.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

PLASTIC SAFETY FENCE

STDDWG. NO. ROAD 103
REVISED: 2016/08/21



PLAN

NOTES:

1. ALL IRRIGATION & PLANT MATERIAL SHALL BE INSTALLED & MAINTAINED BY APPLICANT.
2. ALL PLANT MATERIAL SHALL BE FLORIDA #1 GRADE OR BETTER.
3. ALL PLANT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH INDUSTRY BEST MANAGEMENT PRACTICES.
4. ALL AREAS TO RECEIVE AUTOMATIC IRRIGATION FROM A PERMANENT WATER SOURCE PROVIDING 100% COVERAGE AND RAIN SENSOR SHUT OFF.
5. ALL PLANT MATERIAL SUBSTITUTIONS SHALL BE FLORIDA-FREINDLY LANDSCAPING (FFL) EQUIVALENT.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

1009 CORDOVA ROAD
LANDSCAPING PLAN (ROW)

STDDWG. NO. EXHIBIT 6
REVISED: 2015/02

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUDERTS
LIC. No: 64686
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC	DATE: 02/21/19		
DESIGNED BY: GAB	SCALE: AS NOTED		
CHECKED BY: LEFR			
FIELD BOOK: XXXX			

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

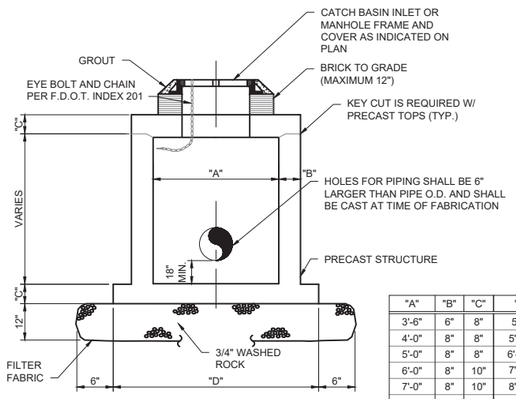
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
EROSION CONTROL DETAILS
CITY STANDARDS - SHEET 3

BID SET

SHEET NO.
CZ-DT-06
TOTAL: 43
CAD FILE: 12337-CZ-DT06
DRAWING FILE NO. 4-141-55



SECTION

"A"	"B"	"C"	"D"
3'-6"	6"	8"	5'-0"
4'-0"	8"	8"	5'-10"
5'-0"	8"	8"	6'-10"
6'-0"	8"	10"	7'-10"
7'-0"	8"	10"	8'-10"
8'-0"	10"	10"	10'-2"

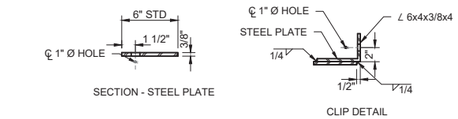
NOTES:

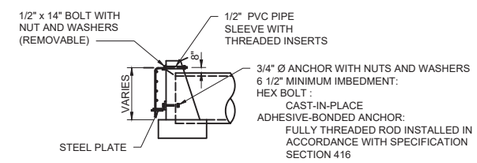
1. PRECAST STRUCTURE SHALL BE EITHER SQUARE OR ROUND AS INDICATED ON THE PLANS.
2. REINFORCING SHALL BE DESIGNED BY THE PRECAST MANUFACTURER TO COMPLY WITH FDOT INDEX 200.
3. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER'S REVIEW. SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA.
4. DESIGN STRUCTURE FOR H-20 TRUCK LOAD.
5. SHOP DRAWINGS SHALL INCLUDE CALCULATIONS DEMONSTRATING THAT STRUCTURE WILL RESIST FLOATION WHEN EMPTY AND SUBJECT TO GROUNDWATER TO TOP OF STRUCTURE.
6. CATCH BASINS SHALL HAVE USF 4155 FRAME AND 6209 GRATE.
7. MANHOLES SHALL HAVE USF 230 RING AND TYPE AA COVER WITH THE LETTERING "STORM SEWER" CAST IN THE COVER.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

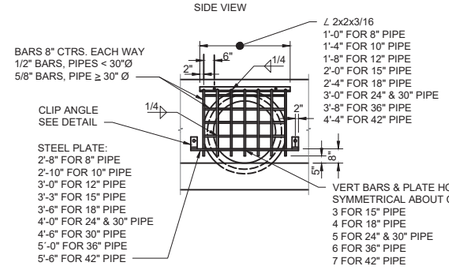
PRECAST CIRCULAR & SQUARE DRAINAGE STRUCTURES

DETAIL NO. STRM 009
REVISED: 2017/07/14





SIDE VIEW



PIPE DIA.	8"	10"	12"	15"	18"	24"	30"	36"	42"
GRATE (LBS).	25	30	35	40	48	58	74	90	111

FRONT VIEW

NOTE:
1. GUARDS TO BE CONSTRUCTED ONLY AT LOCATIONS SPECIFICALLY CALLED FOR IN PLANS.
2. ALL METAL FABRICATIONS SHALL BE 304 STAINLESS STEEL.
3. INSTALL MANATEE GRATE ON ALL PIPES 8-INCH DIAMETER AND ABOVE.

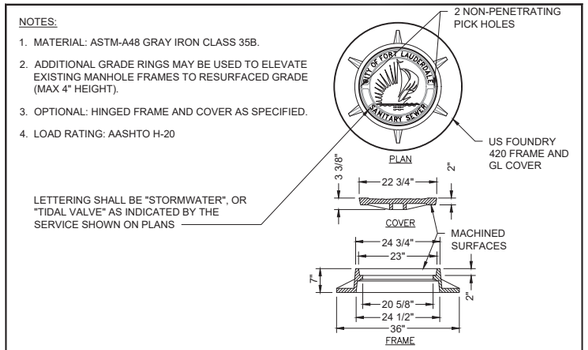
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

MANATEE GRATE

DETAIL NO. STRM 013
REVISED: 2017/07/25

NOTES:

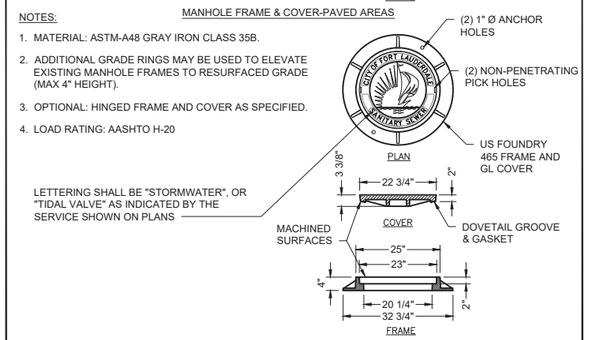
1. MATERIAL: ASTM-A48 GRAY IRON CLASS 35B.
2. ADDITIONAL GRADE RINGS MAY BE USED TO ELEVATE EXISTING MANHOLE FRAMES TO RESURFACED GRADE (MAX 4" HEIGHT).
3. OPTIONAL: HINGED FRAME AND COVER AS SPECIFIED.
4. LOAD RATING: AASHTO H-20



MANHOLE FRAME & COVER-PAVED AREAS

NOTES:

1. MATERIAL: ASTM-A48 GRAY IRON CLASS 35B.
2. ADDITIONAL GRADE RINGS MAY BE USED TO ELEVATE EXISTING MANHOLE FRAMES TO RESURFACED GRADE (MAX 4" HEIGHT).
3. OPTIONAL: HINGED FRAME AND COVER AS SPECIFIED.
4. LOAD RATING: AASHTO H-20

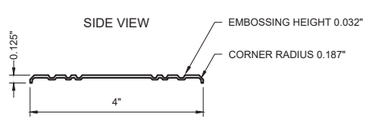


MANHOLE FRAME & COVER-UNPAVED AREAS

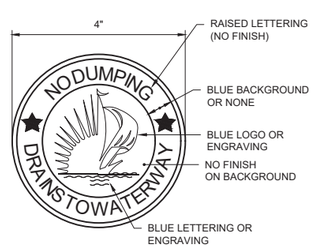
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

MANHOLE FRAME AND COVER

DETAIL NO. STRM 017
REVISED: 2017/12/22



TOP VIEW



FINISH		
UV BAKED ENAMEL - 1 COLOR OPTION		
MATERIAL	THICKNESS	WEIGHT
304 ANNEALED STAINLESS STEEL	0.062"	0.218 LBS.

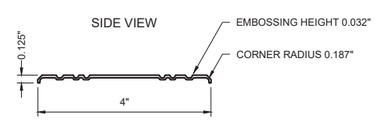
NOTES:

1. DRAIN MARKER SHALL BE BY LORDON, INC., OR EQUAL.
2. SECURE WITH SIKAFLEX IIFC ADHESIVE.

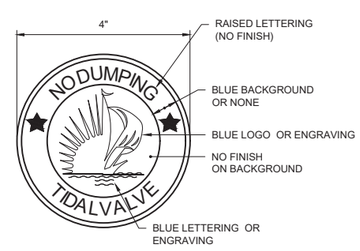
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

DRAIN MARKER

DETAIL NO. STRM 021
REVISED: 2017/12/22



TOP VIEW



FINISH		
UV BAKED ENAMEL - 1 COLOR OPTION		
MATERIAL	THICKNESS	WEIGHT
304 ANNEALED STAINLESS STEEL	0.062"	0.218 LBS.

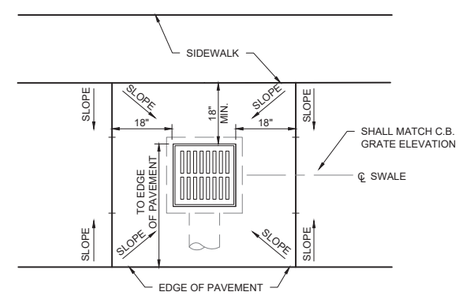
NOTES:

1. DRAIN MARKER SHALL BE BY LORDON, INC., OR EQUAL.
2. SECURE WITH SIKAFLEX IIFC ADHESIVE.

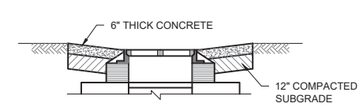
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TIDAL VALVE MARKER

DETAIL NO. STRM 022
REVISED: 2017/12/22



PLAN



SECTION

NOTES

1. PAVING AROUND CATCH BASIN TO BE 6" THICK CONCRETE ON COMPACTED SUBGRADE
2. PAVE 18" WIDE (MIN.) APRON ON (3) SIDES. EXTEND FOURTH SIDE TO EDGE OF PAVEMENT.
3. IF DISTANCE FROM BACK OF CATCH BASIN TO FRONT OF SIDEWALK IS 3.0' OR LESS, EXTEND APRON TO FRONT OF SIDEWALK.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CATCH BASIN APRON DETAIL
CONCRETE
SHEET 1

DETAIL NO. ROAD 040
REVISED: 2018/02/21

Hazen

HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021

Certificate of Authorization No: 2771

ENGINEER: EVAN R. FELIBERTY-RUBERTE
REG. No: 64866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: GAB
SCALE: AS NOTED
CHECKED BY: LEFR
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

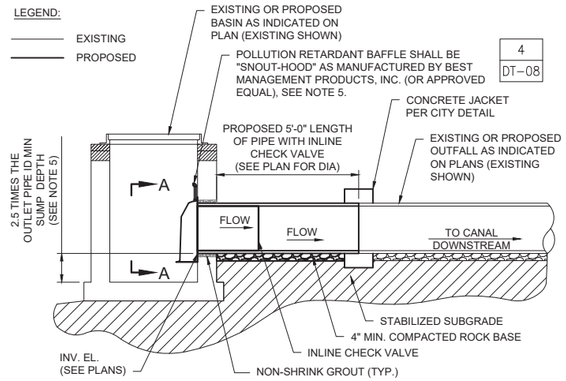
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STORM DRAINAGE DETAILS CITY STANDARDS

BID SET

SHEET NO.
CZ-DT-07
TOTAL: 43
CAD FILE: 12337-CZ-DT07
DRAWING FILE NO. 4-141-55

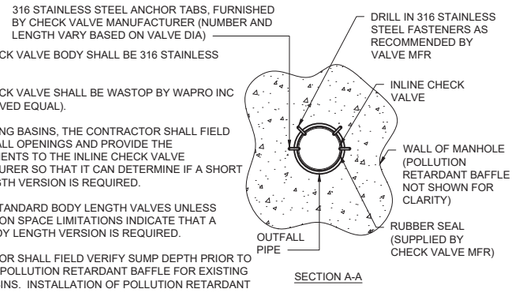
LEGEND:

EXISTING
PROPOSED



NOTES:

1. INLINE CHECK VALVE BODY SHALL BE 316 STAINLESS STEEL.
2. INLINE CHECK VALVE SHALL BE WASTOP BY WAPRO INC (OR APPROVED EQUAL).
3. FOR EXISTING BASINS, THE CONTRACTOR SHALL FIELD MEASURE ALL OPENINGS AND PROVIDE THE MEASUREMENTS TO THE INLINE CHECK VALVE MANUFACTURER SO THAT IT CAN DETERMINE IF A SHORT BODY LENGTH VERSION IS REQUIRED.
4. PROVIDE STANDARD BODY LENGTH VALVES UNLESS INSTALLATION SPACE LIMITATIONS INDICATE THAT A SHORT BODY LENGTH VERSION IS REQUIRED.
5. CONTRACTOR SHALL FIELD VERIFY SUMP DEPTH PRIOR TO ORDERING POLLUTION RETARDANT BAFFLE FOR EXISTING CATCH BASINS. INSTALLATION OF POLLUTION RETARDANT BAFFLE ON EXISTING STRUCTURES WITH SUMP LESS THAN 2.5 TIMES THE OUTLET PIPE ID SHALL BE APPROVED BY ENGINEER.



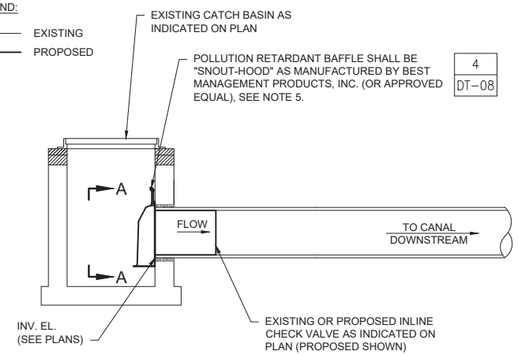
SECTION A-A

INLINE CHECK VALVE FOR TIDAL FLOOD CONTROL

DETAIL 1
NTS –

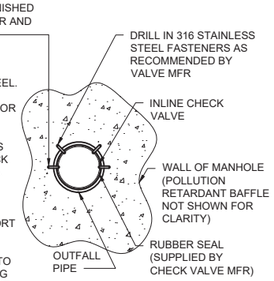
LEGEND:

EXISTING
PROPOSED



NOTES:

1. INLINE CHECK VALVE BODY SHALL BE 316 STAINLESS STEEL.
2. INLINE CHECK VALVE SHALL BE WASTOP BY WAPRO INC (OR APPROVED EQUAL).
3. THE CONTRACTOR SHALL FIELD MEASURE ALL OPENINGS AND PROVIDE THE MEASUREMENTS TO THE INLINE CHECK VALVE MANUFACTURER SO THAT IT CAN DETERMINE IF A SHORT BODY LENGTH VERSION IS REQUIRED.
4. PROVIDE STANDARD BODY LENGTH VALVES UNLESS INSTALLATION SPACE LIMITATIONS INDICATE THAT A SHORT BODY LENGTH VERSION IS REQUIRED.
5. CONTRACTOR SHALL FIELD VERIFY SUMP DEPTH PRIOR TO ORDERING POLLUTION RETARDANT BAFFLE FOR EXISTING CATCH BASINS. INSTALLATION OF POLLUTION RETARDANT BAFFLE ON EXISTING STRUCTURES WITH SUMP LESS THAN 2.5 TIMES THE OUTLET PIPE ID SHALL BE APPROVED BY ENGINEER.



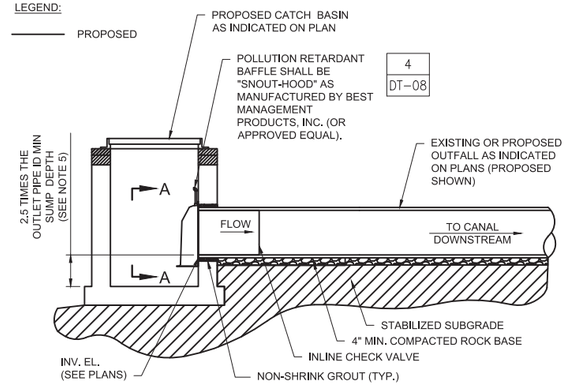
SECTION A-A

INLINE CHECK VALVE FOR EXISTING CATCH BASIN

DETAIL 2
NTS –

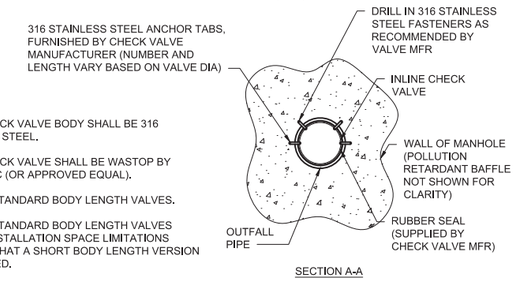
LEGEND:

PROPOSED



NOTES:

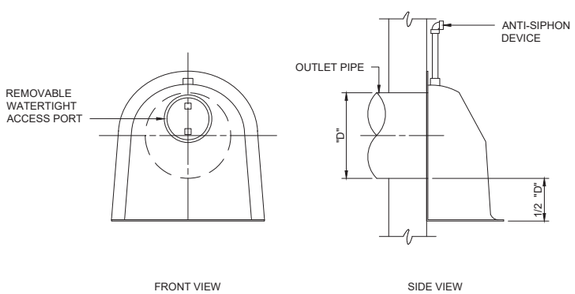
1. INLINE CHECK VALVE BODY SHALL BE 316 STAINLESS STEEL.
2. INLINE CHECK VALVE SHALL BE WASTOP BY WAPRO INC (OR APPROVED EQUAL).
3. PROVIDE STANDARD BODY LENGTH VALVES.
4. PROVIDE STANDARD BODY LENGTH VALVES UNLESS INSTALLATION SPACE LIMITATIONS INDICATE THAT A SHORT BODY LENGTH VERSION IS REQUIRED.



SECTION A-A

INLINE CHECK VALVE FOR PROPOSED CATCH BASIN

DETAIL 3
NTS –



POLLUTION RETARDANT BAFFLE – "SNOUT-HOOD"

DETAIL 4
NTS –

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: LEO R. FELIBERTY-RUBERTE
REG. No: 44866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: GAB
SCALE: AS NOTED
CHECKED BY: LEFR
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STORM DRAINAGE DETAILS
PROJECT SPECIFIC

BID SET

SHEET NO.
CZ-DT-08
TOTAL: 43
CAD FILE: 12337-CZ-DT08
DRAWING FILE NO. 4-141-55

PLOT DATE: 2/21/2019 5:39 PM BY: GDIAZ
File = C:\bms\hazen-pw\dms89502\12337-CZ-DT08 Saved by GDIAZ on = 2/21/2019 7:24 AM

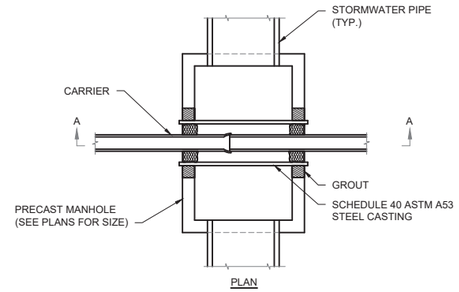
WATER MAIN SEPARATION IN ACCORDANCE WITH F.A.C. RULE 62-555.314

OTHER PIPE	HORIZONTAL SEPARATION	CROSSINGS (NOTE 1)	JOINT SPACING AT CROSSINGS (FULL JOINT CENTERED)
STORM SEWER, STORM WATER FORCE MAIN, RECLAIMED WATER (NOTE 2)	WATER MAIN / OTHER PIPE	WATER MAIN / OTHER PIPE	WATER MAIN
VACUUM SANITARY SEWER	WATER MAIN / OTHER PIPE	WATER MAIN / OTHER PIPE	WATER MAIN
GRAVITY SANITARY SEWER, (NOTE 3) SANITARY SEWER FORCE MAIN, RECLAIMED WATER	WATER MAIN / OTHER PIPE	WATER MAIN / OTHER PIPE	WATER MAIN
ON-SITE SEWAGE TREATMENT & DISPOSAL SYSTEM	10 FT. MINIMUM	—	—

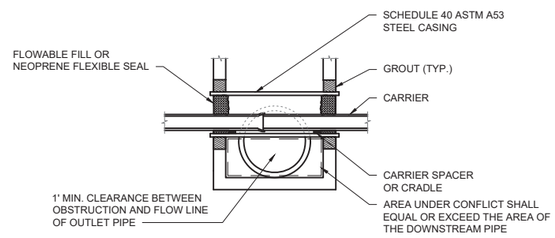
NOTES:

1. WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MINIMUM SEPARATION IS 12 INCHES.
2. RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
3. 3 FT. FOR GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY SANITARY SEWER.
4. ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPE SO THAT THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATE JOINT LOCATIONS ALLOWED UNDER FAC 62-555.314 WILL ONLY BE ALLOWED BY THE ENGINEER ON A CASE-BY-CASE BASIS.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | WATER MAIN SEPARATION | DETAIL NO. WATR 001 | REVISED: 2016/09/01

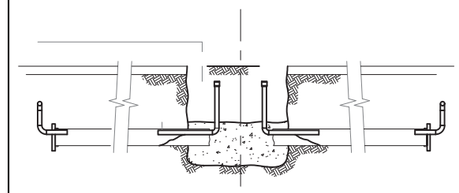


PLAN



SECTION A-A

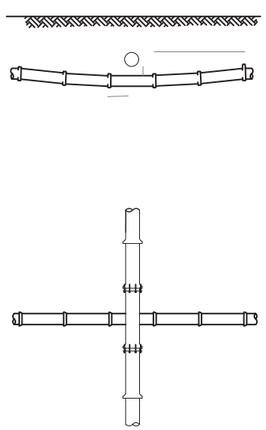
CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | CONFLICT MANHOLE | DETAIL NO. WATR 011 | REVISED: 2016/09/21



NOTE:

1. PROVIDE PLUGS, CORPORATION STOPS AND PIPING AS REQUIRED TO REMOVE AIR FROM THE ABANDONED PIPELINES WHILE GROUTING.

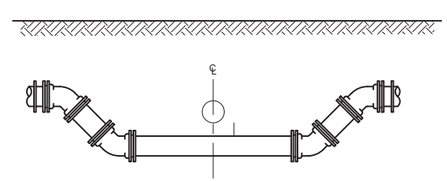
CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | PIPE GROUTING | DETAIL NO. WATR 012 | REVISED: 2016/09/21



NOTE:

1. JOINTS SHALL NOT BE DEFLECTED MORE THAN 50% OF MANUFACTURER'S RECOMMENDED DEFLECTION.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | UTILITY CROSSING DEFLECTION TYPE | DETAIL NO. WATR 013 | REVISED: 2016/09/21



NOTE:

1. WHEREVER POSSIBLE, DEFLECTION OF THE PIPE (PER THE DETAIL TITLED "UTILITY CROSSING - DEFLECTION TYPE") SHALL BE USED TO AVOID EXISTING OBSTRUCTIONS. THIS DETAIL SHALL BE USED ONLY WHEN APPROVED BY ENGINEER.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301 | UTILITY CROSSING FITTING TYPE | DETAIL NO. WATR 014 | REVISED: 2016/09/21

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUBERTE
REG. No: 44861
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC | DATE: 02/21/19
DESIGNED BY: GAB | SCALE: AS NOTED
CHECKED BY: LEFR | FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

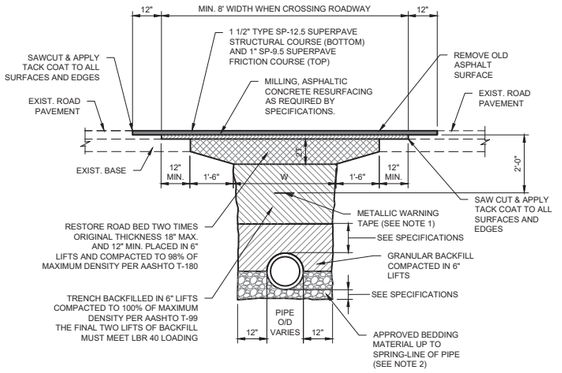
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
UTILITY SEPERATION & CROSSING
DETAILS CITY STANDARDS

SHEET NO.
CZ-DT-09
TOTAL: 43
CAD FILE: 12337-CZ-DT09
DRAWING FILE NO. 4-141-55

BID SET



NOTES:

1. METALLIC WARNING TAPES SHALL BE INSTALLED 24" BELOW FINISH GRADE ABOVE MAIN. (SEE SPECIFICATION 2320 SECTION 3.6 FOR MARKING TYPE)
2. UNLESS OTHERWISE SPECIFIED SELECTED MATERIAL SHALL BE FREE OF STONES LARGER THAN 3/8" DIA.
3. REPLACE ALL LANE MARKINGS AND REFLECTIVE MARKERS.

T=6" PARKING
T=8" RESIDENTIAL STREETS
T=10" MAJOR STREETS (4 LANE)
T=12" MAJOR STREETS (6 LANE)

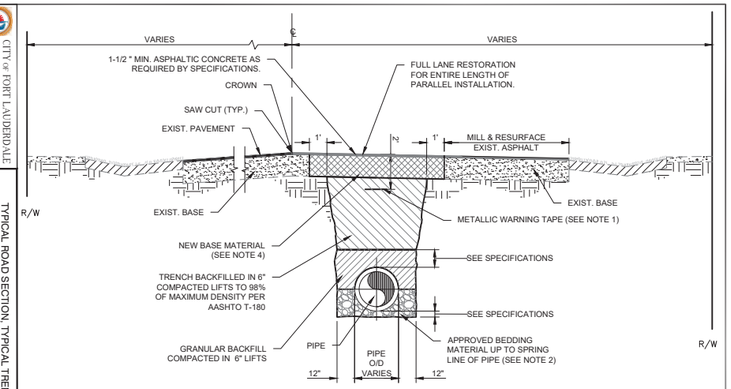
2T=18" MAX. 12" MIN.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	TYPICAL TRENCH AND PAVEMENT RESTORATION FOR TRANSVERSE PIPE CROSSING SHEET 1	DETAIL NO. ROAD 001 REVISED: 2019/02/21

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TYPICAL ROAD SECTION, TYPICAL TRENCH AND TRENCH RESTORATION FOR PARALLEL PIPE TRENCH
SHEET 2

DETAIL NO. ROAD 002
REVISED: 2019/02/21



NOTES:

1. 2" WIDE METALLIC WARNING TAPES SHALL BE INSTALLED 24" BELOW FINISH GRADE.
2. UNLESS OTHERWISE SPECIFIED SELECTED MATERIAL SHALL BE FREE OF STONES LARGER THAN 3/8" DIA.
3. REPLACE ALL LANE MARKINGS AND REFLECTIVE MARKERS.
4. 12" MIN. LIMEROCK BASE PLACED IN 6" LAYERS AND COMPACTED TO 98% OF MAXIMUM DENSITY PER AASHTO T-180.

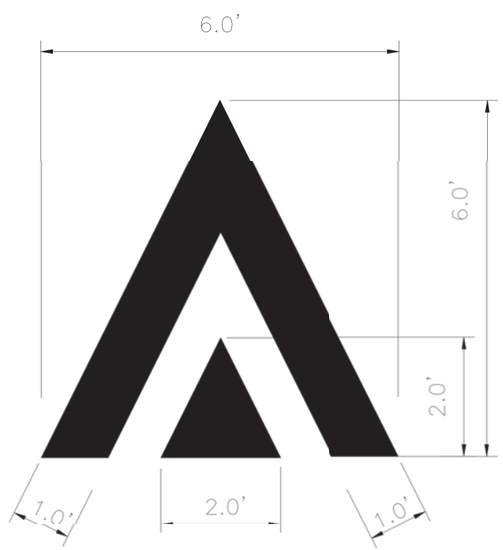
MINIMUM DENSITY REQUIREMENTS

LOCATION	MATERIAL	MINIMUM DENSITY (% OF MAX)	TESTING FREQUENCY
ROADS (INCLUDES SIDEWALKS, ASPHALT PATHS)	BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT TOP OF FIRST LIFT AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED AT RANDOMLY SELECTED LOCATIONS WITHIN EACH 300 FOOT INTERVAL (MAXIMUM) ALONG THE LENGTH OF ROADWAY, SIDEWALK OR PATHWAY.
	SUBGRADE	98%	
	BASE	98%	
MANHOLES AND VAULTS (IN ROADS AND PARKING AREAS)	IN-PLACE SUBGRADE BENEATH STRUCTURES	95%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT THE BOTTOM OF THE STRUCTURE AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: PERFORM TESTING AT EACH STRUCTURE.
	BACKFILL BENEATH STRUCTURES	98%	
	BACKFILL AROUND STRUCTURES	98%	
	CRUSHED STONE BENEATH STRUCTURES	NOTE 6	
PARKING AREAS	BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT TOP OF FIRST LIFT AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED EVERY 6,000 SQUARE FEET OF PARKING AREA.
	SUBGRADE	98%	
	BASE	98%	
UTILITY TRENCH BACKFILL	BEDDING AND BACKFILL	98%	VERTICAL DISTRIBUTION: ONE TEST AT EVERY LIFT STARTING AT THE SPRING LINE AND PROCEEDING UPWARD TO GRADE. HORIZONTAL DISTRIBUTION: TESTS SHALL BE PERFORMED AT RANDOMLY SELECTED LOCATIONS WITHIN EACH 300 FOOT INTERVAL (MAXIMUM) ALONG THE LENGTH OF A PIPE INSTALLATION, AND BETWEEN EACH SET OF STRUCTURES SEPARATED BY LESS THAN 300 FEET.
ROADS AND PARKING	ASPHALT	94%	ASPHALT TESTING MAY BE DONE BY CORE SAMPLING OR NUCLEAR GAUGE DENSITY TESTING. ASPHALT TESTING SHALL BE AT MAXIMUM 300 LINEAR FOOT ALONG ROADWAYS AND 6,000 SQUARE FOOT INTERVALS FOR PARKING AREAS.

NOTES:

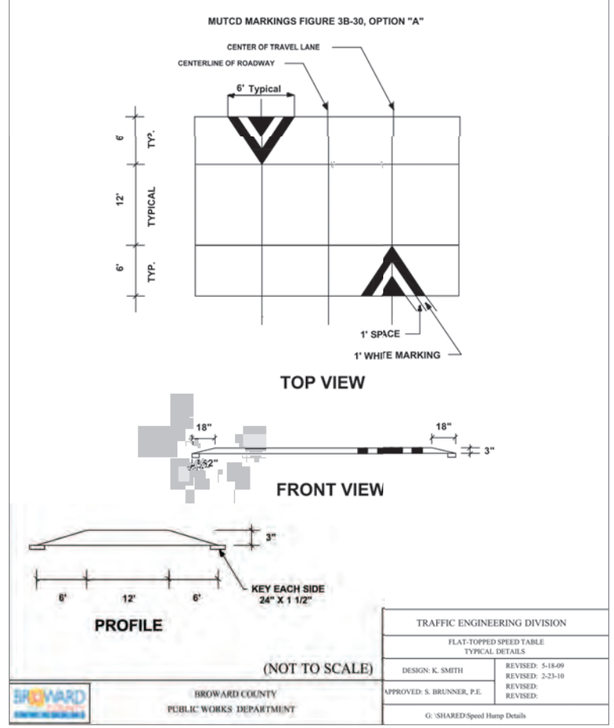
1. THE DENSITY REQUIREMENTS PRESENTED ASSUME DRY TRENCH CONDITIONS.
2. UNLESS INDICATED OTHERWISE IN THE SPECIFICATIONS, TESTING SHALL COMPLY WITH THE REQUIREMENTS PRESENTED IN THIS TABLE.
3. LIFT THICKNESSES FOR BASE, SUBGRADE AND BACKFILL SHALL BE AS INDICATED ON THE DETAILS OR DESCRIBED IN THE SPECIFICATIONS.
4. MAXIMUM DENSITY SHALL BE DETERMINED BY ASTM D 1557 OR AASHTO T180 (MODIFIED PROCTOR).
5. FIELD DENSITY TESTS SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D 1556 OR D 2922.
6. THE AGGREGATE SHALL BE COMPACTED TO A DEGREE ACCEPTABLE TO THE ENGINEER BY USE OF A VIBRATORY COMPACTOR AND/OR CRAWLER TRACTOR.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	DENSITY TESTING NOTES	DETAIL NO. GNRL 010 REVISED: 2017/07/13



CITY OF FT. LAUDERDALE ENGINEERING DIVISION	DATE JUNE 2009 N.T.S.	SPEED HUMP THERMOPLASTIC STRIPING DETAIL	1 OF 1

FLAT- TOPPED SPEED TABLE



BROWARD COUNTY PUBLIC WORKS DEPARTMENT

TRAFFIC ENGINEERING DIVISION
FLAT-TOPPED SPEED TABLE
TYPICAL DETAILS
DESIGN: K. SMITH
APPROVED: S. BRUNNER, P.E.
REVISED: 5-18-09
REVISED: 2-23-10
REVISED:
REVISED:
G: \SHARED\Speed Hump Details

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC P. FELIBERTY-RUBERTE
REG. No: 54866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: GAB	SCALE: AS NOTED
CHECKED BY: LEFR	
FIELD BOOK: XXXX	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

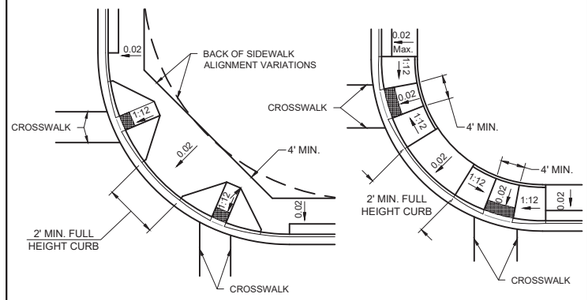
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

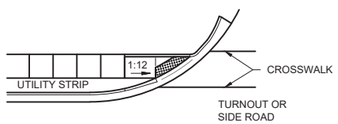
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVING AND GRADING DETAILS
CITY STANDARDS - SHEET 1

BID SET

SHEET NO.
CZ-DT-10
TOTAL: 43
CAD FILE: 12337-CZ-DT10
DRAWING FILE NO. 4-141-55 D 609



RADIAL SIDEWALK RAMPS



LINEAR SIDEWALK RAMPS

NOTES:

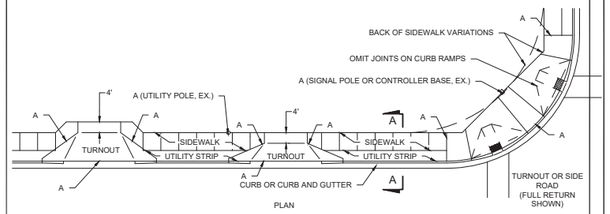
1. WHERE CROSSWALK MARKINGS ARE USED, RAMPS SHALL FALL WITHIN THE CROSSWALK LIMITS. A CLEAR SPACE OF 48" MINIMUM IS REQUIRED AT THE BOTTOM OF THE RAMP WITHIN A MARKED CROSSWALK. IF CROSSWALK MARKINGS ARE NOT PRESENT, A CLEAR SPACE OF 48" MINIMUM IS REQUIRED AT THE BOTTOM OF THE RAMP OUTSIDE OF ACTIVE TRAVEL LANES.
2. CROSSWALK WIDTHS AND CONFIGURATIONS VARY; MUST CONFORM TO INDEX NO. 17344 AND 17346.

TYPICAL PLACEMENT OF SIDEWALK CURB RAMPS AT CURBED RETURNS

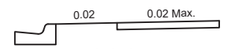
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

TYPICAL PLACEMENT OF SIDEWALK CURB RAMPS AT CURBED RETURNS
SHEET 21

DETAIL NO. ROAD 034
REVISED: 2019/02/21



SIDEWALK WITH UTILITY STRIP

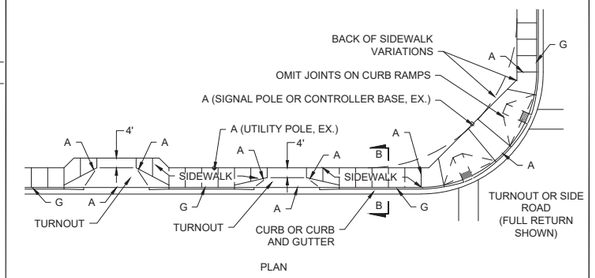


SECTION AA

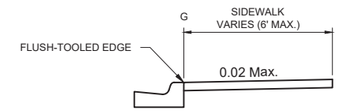
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CONCRETE SIDEWALK
SHEET 1

DETAIL NO. ROAD 035
REVISED: 2019/02/21



SIDEWALK WITHOUT UTILITY STRIP



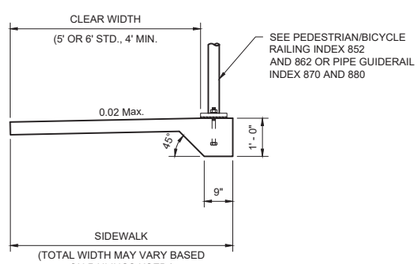
SECTION BB

CONCRETE SIDEWALK ON CURBED ROADWAYS

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CONCRETE SIDEWALK
SHEET 2

DETAIL NO. ROAD 036
REVISED: 2019/02/21



SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILINGS

SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILINGS

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

CONCRETE SIDEWALK
SHEET 3

DETAIL NO. ROAD 037
REVISED: 2019/02/21

BASE THICKNESS AND OPTION CODES

BASE GROUP	STRUCTURAL RANGE	BASE GROUP PAY ITEM NUMBER	Base Options: LIMEROCK, LBR 100	CEMENTED COQUINA, LBR 100	SHELL ROCK, LBR 100	BANK RUN SHELL, LBR 100	RECYCLED CONCRETE AGGREGATE, LBR 150**	GRADED AGGREGATE BASE, LBR 100	TYPE B-12.5	B-12.5 AND 7" GRANULAR SUBBASE, LBR 100 *	RAP BASE
			STRUCTURAL NUMBER (PER. IN.)								
			(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.15)	(0.30)	(0.30 & 0.15)	(NA)
1	0.65-0.75	701	4"	4"	4"	4"	4"	4½"	4"		☐ 5"
2	0.80-0.90	702	5"	5"	5"	5"	5"	5½"	4"		
3	0.95-1.05	703	5½"	5½"	5½"	5½"	5½"	6½"	4"		
4	1.05-1.15	704	6"	6"	6"	6"	6"	7½"	4"		
5	1.25-1.35	705	7"	7"	7"	7"	7"	8½"	4½"		
6	1.35-1.50	706	8"	8"	8"	8"	8"	9"	5"		
7	1.50-1.65	707	8½"	8½"	8½"	8½"	8½"	10"	5½"		
8	1.65-1.75	708	9½"	9½"	9½"	9½"	9½"	11"	5½"		
9	1.75-1.85	709	10"	10"	10"	10"	10"	12"	6"	4"	
10	1.90-2.00	710	11"	11"	11"	11"	11"	Ø 13"	6½"	4½"	
11	2.05-2.15	711	12"	12"	12"	12"	12"	Ø 14"	7"	5"	
12	2.20-2.30	712	12½"	12½"	12½"	12½"	12½"		7½"	5½"	
13	2.35-2.45	713	Ø 13½"	Ø 13½"	Ø 13½"	Ø 13½"	Ø 13½"		8"	6"	
14	2.45-2.55	714	Ø 14"	Ø 14"	Ø 14"	Ø 14"	Ø 14"		8½"	6½"	
15	2.60-2.70	715							9"	7"	

* FOR GRANULAR SUBBASE, THE CONSTRUCTION OF BOTH THE SUBBASE AND TYPE B-12.5 WILL BE BID AND USED AS OPTIONAL BASE. GRANULAR SUBBASES INCLUDE LIMEROCK, CEMENTED COQUINA, SHELL ROCK, BANK RUN SHELL, RECYCLED CONCRETE AGGREGATE AND GRADED AGGREGATE BASE. THE BASE THICKNESS SHOWN IS TYPE B-12.5. ALL SUBBASE THICKNESSES ARE 4" MINIMUM.

** FOR RESTRICTIONS ON THE USE OF RECYCLED CONCRETE AGGREGATE - SEE SPECIFICATIONS SECTION 911.

Ø TO BE USED FOR WIDENING, THREE FEET OR LESS.

BASED ON MINIMUM PRACTICAL THICKNESSES.

☐ FOR RESTRICTIONS ON THE USE OF RAP BASE - SEE STANDARD SPECIFICATIONS.

GENERAL NOTES

1. WHERE BASE OPTIONS ARE SPECIFIED IN THE PLANS, ONLY THOSE OPTIONS MAY BE BID AND USED.
2. IN SITUATIONS WHERE THE DESIGNER REQUIRES THE USE OF A SINGLE BASE OPTION, AS SHOWN IN THE PLANS, BID AND USE AS OPTIONAL BASE.

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING DETAILS
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

OPTIONAL BASE GROUP & STRUCTURAL NUMBERS

DETAIL NO. ROAD 038
REVISED: 2019/02/21

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: ERIC R. FELIBERTY-RUBERTE
LIC. No: 44866
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: GAB
SCALE: AS NOTED
CHECKED BY: LEFR
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

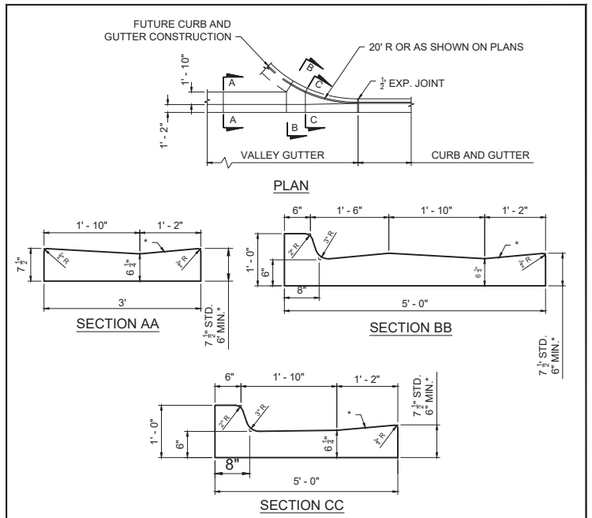
REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVING AND GRADING DETAILS
CITY STANDARDS - SHEET 2

BID SET

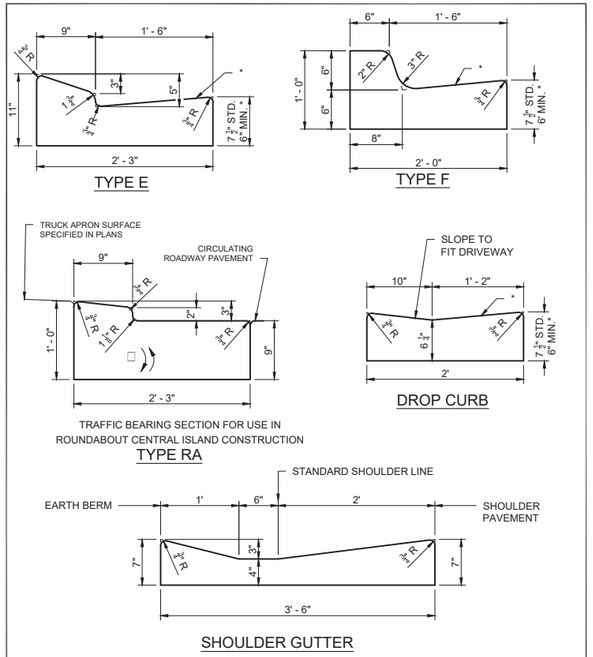
SHEET NO.
CZ-DT-11
TOTAL: 43
CAD FILE: 12337-CZ-DT11
DRAWING FILE NO. 4-141-55



NOTES:

1. WHEN USED ON HIGH SIDE OF ROADWAYS, THE CROSS SLOPE OF THE GUTTER SHALL MATCH THE CROSS SLOPE OF THE ADJACENT PAVEMENT. THE THICKNESS OF THE LIP SHALL BE 6", UNLESS OTHERWISE SHOWN ON PLANS.
2. ROTATE ENTIRE SECTION SO THAT GUTTER CROSS SLOPE MATCHES SLOPE OF ADJACENT CIRCULATING ROADWAY PAVEMENT.
3. FOR USE ADJACENT TO CONCRETE OR FLEXIBLE PAVEMENT. FOR DETAILS DEPICTING USAGE ADJACENT TO FLEXIBLE PAVEMENT, SEE SHEET 2. EXPANSION JOINT, PREFORMED JOINT FILLER AND JOINT SEAL ARE REQUIRED BETWEEN CURB & GUTTER AND CONCRETE PAVEMENT ONLY, SEE SHEET 2.
4. 4" CURB PAD (LBR 100, 98% COMPACTION T-180) TO BE PLACED UNDER CURB AND GUTTER, AND EXTEND 6" BEYOND OUTSIDE EDGE OF CURB. SEE SPECIFICATIONS FOR MATERIAL

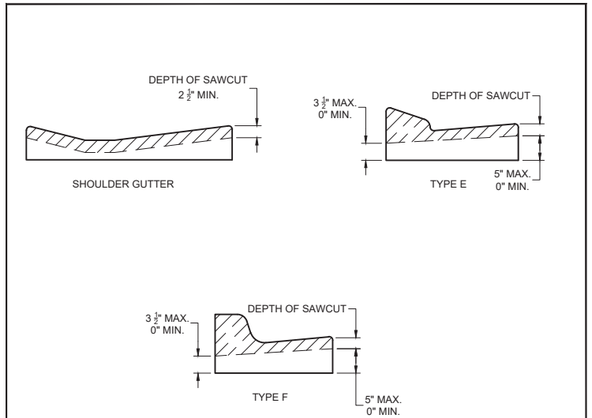
CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	CONCRETE CURB AND GUTTER VALLEY GUTTER SHEET 1	DETAIL NO. ROAD 005 REVISION 2019/02/21



NOTE:

4" CURB PAD (LBR 100, 98% COMPACTION T-180) TO BE PLACED UNDER CURB AND GUTTER, AND EXTEND 6" BEYOND OUTSIDE EDGE OF CURB. SEE SPECIFICATIONS FOR MATERIAL

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	CONCRETE CURB AND GUTTER TYPE E, TYPE F, TYPE RA, DROP CURB, AND SHOULDER GUTTER SHEET 2	DETAIL NO. ROAD 006 REVISION 2019/02/21

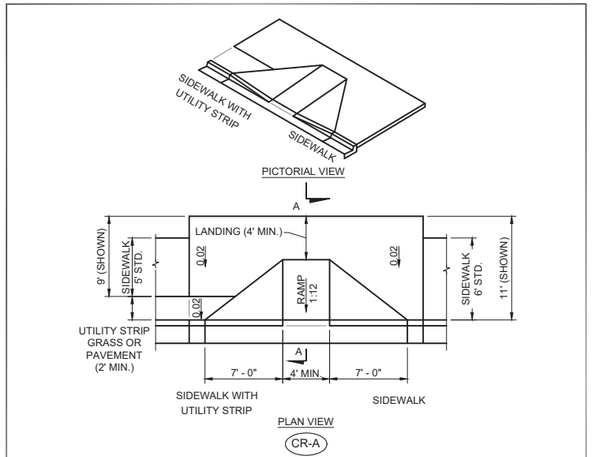


SAWCUTS SHOULD BE AVOIDED WITHIN VALLEY GUTTER AND WITHIN CURB AND GUTTER ENDINGS.

NOTES:

1. FOR CURB, GUTTER AND CURB & GUTTER PROVIDE ⅛" - ¼" CONTRACTION JOINTS AT 10' CENTERS (MAX.). CONTRACTION JOINTS ADJACENT TO CONCRETE PAVEMENT ON TANGENTS AND FLAT CURVES ARE TO MATCH THE PAVEMENT JOINTS, WITH INTERMEDIATE JOINTS NOT TO EXCEED 10' CENTERS. CURB, GUTTER AND CURB & GUTTER EXPANSION JOINTS SHALL BE LOCATED IN ACCORDANCE WITH SECTION 520 OF THE STANDARD SPECIFICATIONS.
2. ENDS OF CURBS TYPES B AND D SHALL TRANSITION FROM FULL TO ZERO HEIGHTS IN 3'.

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	CONCRETE CURB AND GUTTER CONTRACTION JOINT IN CURB SHEET 6	DETAIL NO. ROAD 010 REVISION 2019/02/21



RAMP AND LANDING DEPTHS NOT RESTRICTED

CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT ENGINEERING DETAILS 100 North Andrews Avenue, Fort Lauderdale, Florida 33301	SIDEWALK CURB RAMPS SHEET 1	DETAIL NO. ROAD 014 REVISION 2019/02/21

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DRAWN BY: OLC	DATE: 02/21/19
DESIGNED BY: GAB	SCALE: AS NOTED
CHECKED BY: LEFR	
FIELD BOOK: XXXX	

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	LEFR	JNM	ERP/SWM PERMIT SET
2	02/21/19	LEFR	JNM	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
PAVING AND GRADING DETAILS
CITY STANDARDS - SHEET 3

SHEET NO.
CZ-DT-12
TOTAL: 43
CAD FILE: 12337-CZ-DT12
DRAWING FILE NO. 4-141-55

BID SET

GENERAL STRUCTURAL NOTES

G-1 THESE NOTES ARE GENERAL AND SUPPLEMENT THE SPECIFICATIONS. THESE NOTES APPLY TO THE ENTIRE PROJECT UNLESS MODIFIED OR NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.

G-2 STANDARD DETAILS SHALL BE USED WHEN REFERRED TO OR WHEN NO MORE RESTRICTIVE OR DIFFERENT DETAILS ARE SHOWN ON THE DRAWINGS.

G-3 DESIGN IS IN ACCORDANCE WITH AND CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE 2017 FLORIDA BUILDING CODE. THE DESIGN LOADS AND OTHER DESIGN VALUES GIVEN WERE USED FOR DESIGN OF STRUCTURES UNLESS NOTED OTHERWISE ON THE DRAWINGS.

G-4 SOIL LOADS: SEAWALLS DESIGNED FOR A LANDSIDE SOIL ELEVATION AT TOP OF SEAWALL.

G-5 HYDRAULIC LOADS: SEAWALLS DESIGNED FOR A LANDSIDE WATER ELEVATION AT TOP OF PROPOSED GRADE CONCURRENT WITH A WATERSIDE ELEVATION AT MEAN LOW WATER..

G-6 LIVE LOAD SURCHARGE: SEAWALLS DESIGNED FOR A LANDSIDE LIVE LOAD SURCHARGE OF 200 PSF CONCURRENT WITH SOIL AND HYDRAULIC LOADS SPECIFIED.

G-7 ALL DIMENSIONS INDICATED (*) SHALL BE VERIFIED EITHER BY FIELD MEASUREMENTS FOR EXISTING STRUCTURES OR BY SHOP DRAWINGS FOR EQUIPMENT FURNISHED. STRUCTURAL DIMENSIONS NOT SHOWN BUT CONTROLLED BY OR RELATED TO EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR WITH THE MANUFACTURER PRIOR TO CONSTRUCTION.

G-8 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING INFORMATION IN THE FIELD AS REQUIRED FOR NEW WORK.

G-9 IF A CONFLICT IS FOUND BETWEEN DIFFERENT PORTIONS OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. CONTINUED CONSTRUCTION OF THE AREA IN CONFLICT SHALL BE AT THE CONTRACTOR'S OWN RISK UNTIL THE CONFLICT IS RESOLVED.

G-11 STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH THE DRAWINGS OF ALL OTHER DISCIPLINES AND MANUFACTURER'S SHOP DRAWINGS.

G-12 STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURE. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED BY BRACING AND TEMPORARY SUPPORTS WHEREVER EXCESSIVE CONSTRUCTION LOADS MAY OCCUR. OVERSTRESSING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.

G-13 NO BACKFILL SHALL BE PLACED AGAINST ANY SUBSTRUCTURE WALLS UNLESS ALL ADJACENT SUPPORTING ELEMENTS HAVE ACHIEVED DESIGN STRENGTH, OR WALLS HAVE BEEN PROPERLY BRACED, AND IN ANY CASE NOT SOONER THAN 28 DAYS AFTER THE PLACING OF CONCRETE UNLESS APPROVED BY THE ENGINEER. SUPPORTING ELEMENTS SHALL INCLUDE ADJACENT WALLS, SLABS, BEAMS AND COLUMNS.

STRUCTURAL METALS

M-1 DETAIL, FABRICATE, AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN, LATEST EDITION.

M-2 STEEL MATERIAL:
- A) STRUCTURAL TUBING: ASTM A500, GRADE B OR A501 (42 KSI)
- B) STRUCTURAL PIPE: ASTM A53, TYPE E OR S, GRADE B (35 KSI)
- C) PLATES AND ANGLES: ASTM A36 UNO (36 KSI)
- D) STRUCTURAL W SHAPES: ASTM A992 (50 KSI)
- E) STRUCTURAL S, M, C & H SHAPES: ASTM A572 GRADE 50 (50 KSI)

M-3 PROVIDE MINIMUM 3/4" DIAMETER ASTM A325 HIGH STRENGTH BOLTS WITH SNUG TIGHTENED TYPE N CONNECTIONS FOR STRUCTURAL STEEL UNLESS NOTED OTHERWISE. HOLES FOR BOLTS SHALL BE STANDARD SIZE UNLESS NOTED OTHERWISE.

M-4 PROVIDE TYPICAL STEEL BEAM CONNECTIONS FOR A CAPACITY OF NOT LESS THAN THE TOTAL UNIFORM LOAD CAPACITY TABULATED IN THE AISC TABLES FOR ALLOWABLE LOADS OF BEAMS UNLESS NOTED OTHERWISE.

M-5 ALL STAINLESS STEEL FABRICATIONS EXPOSED TO UNDERWATER SERVICE SHALL BE TYPE 316. ALL OTHER STAINLESS STEEL FABRICATIONS SHALL BE TYPE 304 UNLESS NOTED OTHERWISE.

M-6 ALL GROOVE AND BUTT WELDS SHALL BE FULL PENETRATION.

M-7 FILLET WELD SIZES SHALL NOT BE LESS THAN THE MINIMUM SIZE REQUIRED BY AISC CODE FOR PLATE SIZES TO BE CONNECTED AND SHALL BE APPLIED TO THE ENTIRE JOINT CONTACT LENGTH, AND NOT LESS THAN 3/16".

M-8 BOTTOM SURFACES OF BASE PLATES SHALL BE GROUTED TO ENSURE FULL BEARING CONTACT WITH CONCRETE SLAB.

M-9 WHENEVER ONE MEMBER IS FASTENED TO ANOTHER WITH FASTENINGS (BOLTS, WELDS, ETC.) SET AT A UNIFORM SPACING, THERE SHALL BE A MINIMUM OF TWO FASTENINGS PER PIECE CONNECTED AND THE FIRST AND LAST FASTENINGS SHALL BE LOCATED NOT TO EXCEED 0.25 OF FASTENER SPACING FROM EACH END.

M-10 BOLTED CONNECTIONS FOR STRUCTURAL STEEL SHALL BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC (SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS).

M-11 STRUCTURAL WELDED JOINTS SHALL CONFORM TO THE PROVISIONS OF AWS D1.1, STRUCTURAL WELDING CODE BY AMERICAN WELDING SOCIETY. PROOF OF WELDER CERTIFICATION SHALL BE AVAILABLE AT THE JOB SITE DURING TIMES OF INSPECTION.

STEEL SHEET PILE

S-1 STEEL SHEET PILE SHALL BE ASTM A572 GRADE 50 (50 KSI) STEEL. HIGHER GRADES ARE ACCEPTABLE BUT SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

S-2 SEAWALL SHEET PILE SHALL HAVE MINIMUM PROPERTIES AS SHOWN IN TABLE:

SEAWALL	t (IN, MIN)	S (IN^3, MIN)	I (IN^4, MIN)	SECTION
29	3/8	37.20	329.90	AZ20-800

S-3 SEAWALL CAP WIDTH IS DESIGNED FOR THE SECTIONS INDICATED. LARGER OR SMALLER DEPTH SHEET PILE WILL REQUIRE MODIFICATION TO THE CAP WIDTH. MODIFICATION TO CAP WIDTH SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

S-4 SHEET PILES SHALL BE PAINTED/COATED PER SPECIFICATION 09900.

S-5 DAMAGE TO COATINGS BY IMPACT, WELDING, CUTTING, ETC. SHALL BE REPAIRED PER COATING MANUFACTURER SPECIFICATIONS.

S-6 SHEET PILES SHALL BE INSTALLED TO ACHIEVE TIP ELEVATIONS SHOWN ON THE DRAWINGS AND SHALL BE CUT LEVEL WITH A PLASMA CUTTER TO ±1/2 INCH FROM THE TOP ELEVATION SPECIFIED.

S-7 CONTRACTOR SHALL SUBMIT COMPLETE SHEET PILE LAYOUT ALONG WITH DETAILED STEEL MILL REPORTS AND INSTALLATION DRAWINGS FOR REVIEW AND APPROVAL BY THE ENGINEER PRIOR TO INSTALLATION. ADJUSTMENTS TO NEW SEAWALL BULKHEAD CONDITIONS WILL BE REQUIRED TO FIT FIELD CONDITIONS AND WILL BE CONSIDERED AN INCIDENTAL AND NECESSARY PART OF THE WORK.

S-8 PARTIAL DEMOLITION OF THE EXISTING SEAWALL WILL BE REQUIRED TO PLACE THE PROPOSED SEAWALL ON THE ALIGNMENT SHOWN IN THE DRAWINGS. ADJUSTMENTS TO SCHEDULE OR LABOR REQUIRED TO INSTALL THE SEAWALL AS SPECIFIED WILL BE CONSIDERED AN INCIDENTAL AND NECESSARY PART OF THE WORK.

S-9 SHEET PILING FOR NEW SEAWALL IS DESIGNED WITH SOIL PARAMETERS IN ACCORDANCE WITH, "GEOTECHNICAL SERVICES REPORT", BY RADISE INTERNATIONAL, DATED 02-18-2018.

CONCRETE (CAST-IN-PLACE)

C-1 DESIGN OF CONCRETE ELEMENTS IS IN ACCORDANCE WITH ACI 318 (CODE REQUIREMENTS FOR STRUCTURAL CONCRETE).

C-2 FOR CONCRETE MIX DESIGN SEE SPECIFICATION SECTION 03300.

C-3 CONCRETE STRENGTH CLASSES (28-DAY COMPRESSIVE STRENGTH):

A) CLASS A1 CONCRETE (4,500 PSI): NORMAL WEIGHT CONCRETE SHALL BE USED IN ALL STRUCTURES, EXCEPT WHERE NOTED OTHERWISE IN CONTRACT DOCUMENTS. ALL CONCRETE SHALL BE CLASS A1 CONCRETE UNLESS ANOTHER CLASS IS SPECIFICALLY CALLED FOR ON CONTRACT DOCUMENTS OR SPECIFIED HEREIN.

C-4 ALL BAR REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60. WHERE REINFORCEMENT IS TO BE WELDED IN ACCORDANCE WITH AWS D1.4, ASTM A706 GRADE 60 SHALL BE USED. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

C-5 CONCRETE COVER FOR REINFORCING (UNLESS NOTED OTHERWISE ON THE DRAWINGS) SHALL BE 3 INCHES MINIMUM.

C-6 SPLICES SHALL BE CLASS "B" CONFORMING TO THE PROVISIONS OF ACI 318 UNLESS NOTED OTHERWISE. SPLICE LENGTH FOR TWO DIFFERENT SIZED BARS TO BE LAP SPLICED TOGETHER SHALL BE THE LENGTH OF THE LARGER BAR UNLESS NOTED OTHERWISE.

C-7 CONSTRUCTION JOINTS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. CONSTRUCTION JOINTS NOT SHOWN SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE APPROVAL OF THE ENGINEER PRIOR TO SUBMITTING REBAR SHOP DRAWINGS.

C-8 ALL EXPOSED CORNERS SHALL HAVE A 3/4" CHAMFER OR A 1/2" RADIUS TOOLED CORNER.

C-9 EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DOCUMENTS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.

C-10 REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY METAL PIPE, PIPE FLANGE, METAL CONDUIT, OR OTHER METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM CLEARANCE OF 2" SHALL BE PROVIDED.

C-11 DOWELS, ANCHOR BOLTS, PIPES, REBAR AND OTHER EMBEDDED ITEMS SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

C-12 CONDUITS AND OTHER SIMILAR ITEMS EMBEDDED IN OR PENETRATING THROUGH CONCRETE SHALL BE SPACED ON CENTER NOT LESS THAN 3 TIMES THEIR OUTSIDE DIMENSION, BUT NOT LESS THAN 2 1/2" CLEAR. WHEN SUCH ITEMS ARE EMBEDDED IN WALLS OR SLABS, THEY SHALL NOT OCCUPY MORE THAN 1/3 OF THE MEMBER THICKNESS.

C-13 DRILLED ADHESIVE DOWELS (WHERE DOWELS ARE SHOWN TO BE PLACED INTO HARDENED CONCRETE):

A) THE HOLE DIAMETER SHALL BE NO LARGER THAN 1/8" GREATER THAN THE DIAMETER OF THE REINFORCING BAR AT THE DEFORMATIONS.
B) THE DEPTH OF EMBEDMENT SHALL BE 12 BAR DIAMETERS, UNLESS NOTED OTHERWISE.
C) ADJUST THE DOWEL LOCATIONS AS NEEDED TO AVOID DRILLING THROUGH ANY REINFORCING BARS. IF THE LOCATION NEEDS TO BE MODIFIED, CONTACT THE ENGINEER. CONTRACTOR SHALL USE NON-DESTRUCTIVE MEANS TO FIELD LOCATE REINFORCEMENT PRIOR TO DRILLING HOLES FOR DOWELS.

C-14 CLEAR DISTANCE FROM ANCHOR BOLTS TO ANY CONCRETE EDGE SHALL BE 4" MINIMUM UNLESS NOTED OTHERWISE.

C-15 CONCRETE COMPRESSIVE STRENGTH TESTS SHALL BE AVAILABLE ON THE JOB SITE FOR REVIEW BY THE ENGINEER.

DEMOLITION

D-1 FOR DEMOLITION REQUIREMENTS, REFER TO SPECIFICATION 02050 – DEMOLITION.

D-2 CONCRETE DEMOLITION WITHIN STRUCTURES BEING MODIFIED SHALL BE SELECTIVE DEMOLITION BY CORE DRILLING OR SAWCUTTING AND CAREFUL REMOVAL OF CONCRETE SHOWN TO BE REMOVED. NO OVER CUTTING OF AREAS TO BE DEMOLISHED SHALL BE PERMITTED. CONTRACTOR SHALL CORE DRILL CORNERS OF OPENING PRIOR TO SAWCUTTING. EXPLOSIVES AND VIBRATORY HAMMERS SHALL NOT BE USED FOR DEMOLITION WORK.

D-3 UNLESS ANCHORING DEVICES AND/OR REINFORCEMENT IS NOTED TO REMAIN FOLLOWING DEMOLITION, REMOVE AND/OR BURN BACK ANCHORS AND REINFORCEMENT STEEL 1/2" MIN BELOW SURFACE AND VOIDS CREATED SHALL BE FILLED WITH EPOXY RESIN BINDER SUCH AS SIKAGARD 62, DURALKOTE 240 OR EQUAL.

D-4 EMBEDDED CONDUIT ENCOUNTERED DURING DEMOLITION WORK LIMITS SHALL BE PERMANENTLY REROUTED AS NECESSARY. CONTRACTOR SHALL SUBMIT PROPOSED MEANS OF REROUTING ANY INTERFERING CONDUIT.

D-6 PRIOR TO DEMOLITION OF SMALL OPENINGS (LESS THAN 6 INCHES IN SIZE) FOR PENETRATIONS, ETC., CONTRACTOR SHALL USE NON-DESTRUCTIVE MEANS TO FIELD LOCATE REINFORCEMENT. OPENINGS SHALL BE LOCATED TO AVOID CUTTING THROUGH EXISTING REINFORCEMENT, IF POSSIBLE. EXISTING REINFORCEMENT SHALL NOT BE CUT WITHOUT APPROVAL OF ENGINEER.

D-8 A DETAILED CONSTRUCTION AND DEMOLITION PLAN SHALL BE SUBMITTED TO THE ENGINEER AND APPROVED BY THE ENGINEER AND OWNER PRIOR TO BEGINNING CONSTRUCTION.

SPECIAL INSPECTIONS

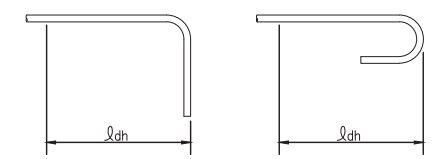
SI-1 SPECIAL PERIODIC AND CONTINUOUS INSPECTIONS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND THE FLORIDA BUILDING CODE.

DEVELOPMENT LENGTH OF STANDARD HOOKS
FOR BARS IN TENSION

fy = 60,000 psi fc' = 4500 psi OR GREATER

BAR SIZE	DEVELOPMENT LENGTH, ℓdh	
	BASIC	W/ CONC COVER *
#3	7"	6"
#4	9"	7"
#5	1'-0"	8"
#6	1'-2"	10"
#7	1'-4"	11"
#8	1'-6"	1'-1"
#9	1'-9"	1'-3"
#10	1'-11"	1'-4"
#11	2'-2"	1'-6"

* SIDE COVER NORMAL TO PLANE OF HOOK AT LEAST 2 1/2"; AND FOR 90° HOOK, END COVER BEYOND OUTSIDE END OF HOOK AT LEAST 2".



BASIC DEVELOPMENT LENGTH AND SPLICE LENGTH
FOR BARS IN TENSION

** BASED ON MATERIALS AND CONDITIONS AS FOLLOWS:
fy = 60,000 psi fc' = 4000 psi OR GREATER
UNCOATED BARS NORMAL WEIGHT CONCRETE
CLEAR COVER ≥ 1.5 INCHES

BASIC DEVELOPMENT LENGTH ℓd				BAR SIZE	CLASS B SPLICE LENGTH 1.3 xℓ d			
CLEAR SPACING ≥ 3"		CLEAR SPACING < 3"			CLEAR SPACING ≥ 3"		CLEAR SPACING < 3"	
BASIC	TOP *	BASIC	TOP *		BASIC	TOP *	BASIC	TOP *
1'-0"	1'-0"	1'-0"	1'-4"	# 3	1'-0"	1'-3"	1'-4"	1'-8"
1'-0"	1'-3"	1'-7"	2'-1"	# 4	1'-3"	1'-8"	2'-1"	2'-9"
1'-3"	1'-7"	2'-4"	3'-0"	# 5	1'-7"	2'-0"	3'-0"	3'-11"
1'-6"	1'-11"	3'-1"	4'-0"	# 6	1'-11"	2'-5"	4'-0"	5'-2"
2'-5"	3'-1"	4'-11"	6'-4"	# 7	3'-1"	4'-0"	6'-4"	8'-3"
3'-0"	3'-11"	6'-0"	7'-9"	# 8	3'-11"	5'-1"	7'-9"	10'-1"
3'-8"	4'-9"	6'-9"	8'-9"	# 9	4'-9"	6'-3"	8'-9"	11'-4"
4'-6"	5'-10"	7'-7"	9'-10"	# 10	5'-10"	7'-7"	9'-10"	12'-9"
5'-5"	7'-0"	8'-5"	10'-11"	# 11	7'-0"	9'-1"	10'-11"	14'-2"

* TOP REINFORCEMENT IS HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

** FOR MATERIALS OR CONDITIONS DIFFERENT FROM THOSE STATED, LENGTHS SHOWN IN CHART SHALL BE MODIFIED TO CONFORM TO THE PROVISIONS OF ACI 318, SECTION 12.2.

BID SET

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Certificate of Authorization No: 2771

ENGINEER: SAMUEL J. SMITH, PE
REG. No: 73430
DATE: 02/01/2017

DRAWN BY: OLC DATE: 02/21/19
DESIGNED BY: SJS SCALE: AS NOTED
CHECKED BY: JPS
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REVISIONS

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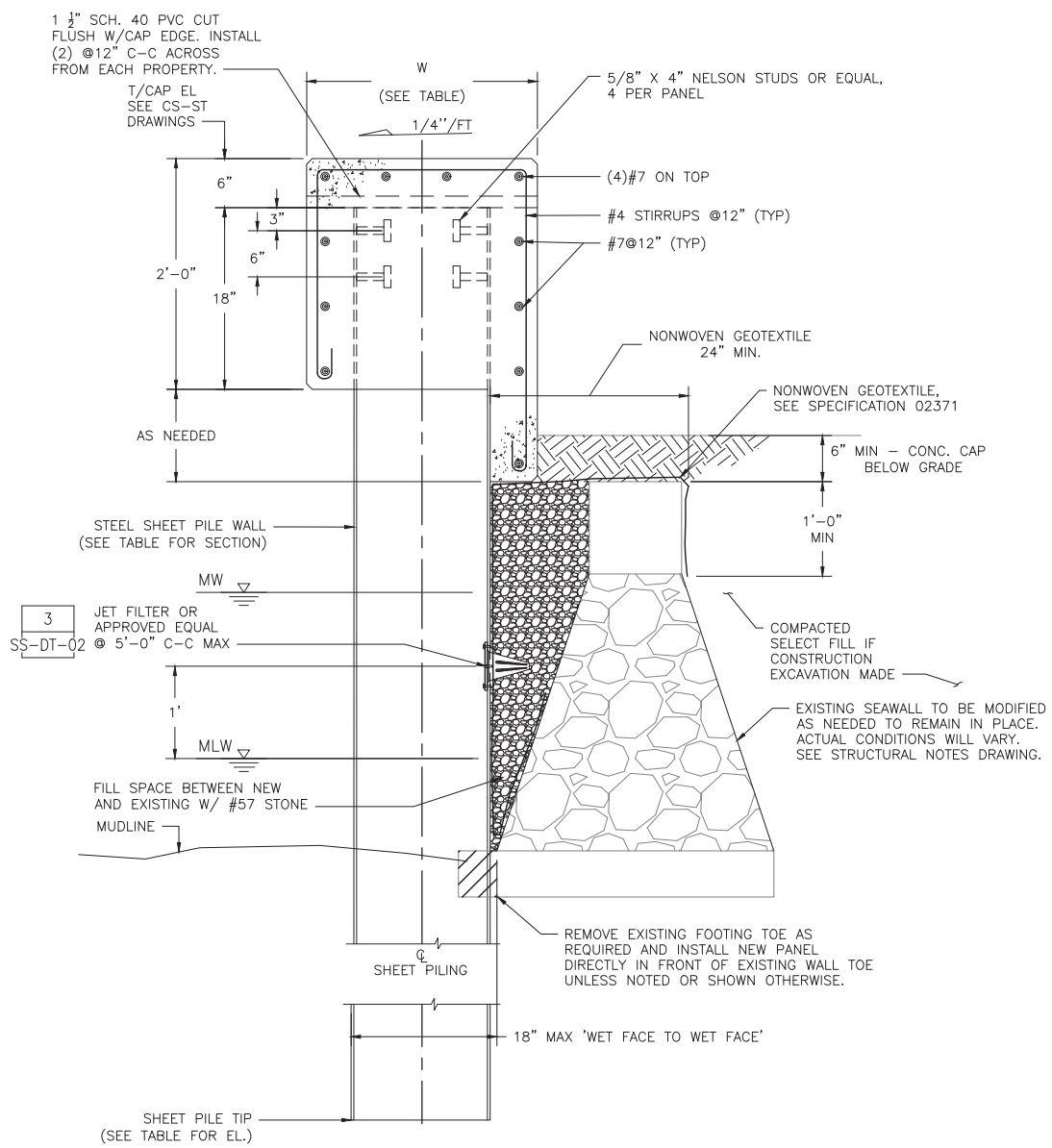
1	02/01/19	SJS	JPS	ERP/SWM PERMIT SET
2	02/21/19	SJS	JPS	BID SET

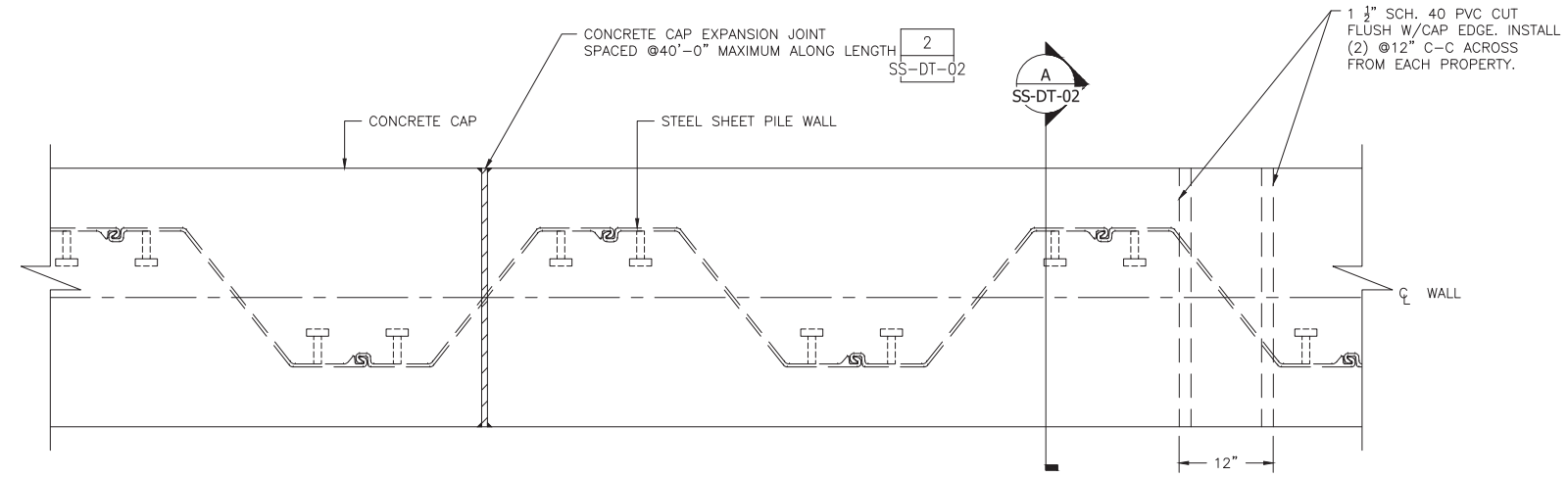
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STRUCTURAL NOTES

SHEET NO.
SS-DT-01
TOTAL: 43
CAD FILE: 12337-SS-DT01
DRAWING FILE NO. 4-141-55

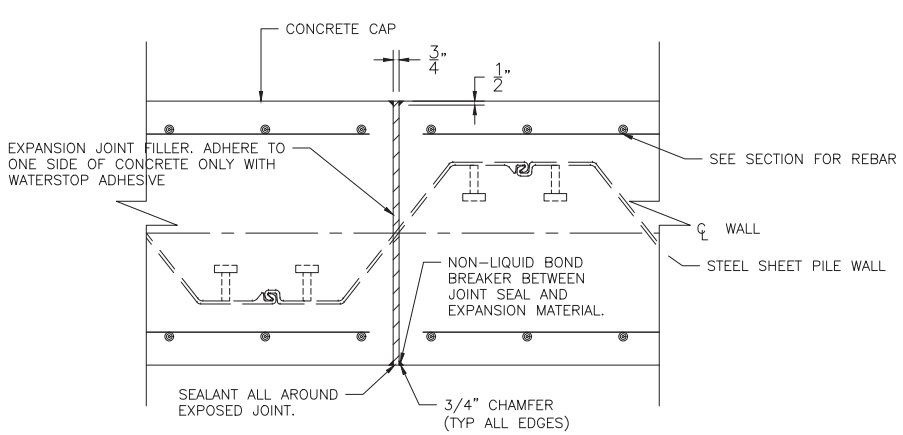


STEEL CAINTILEVER WALL SECTION

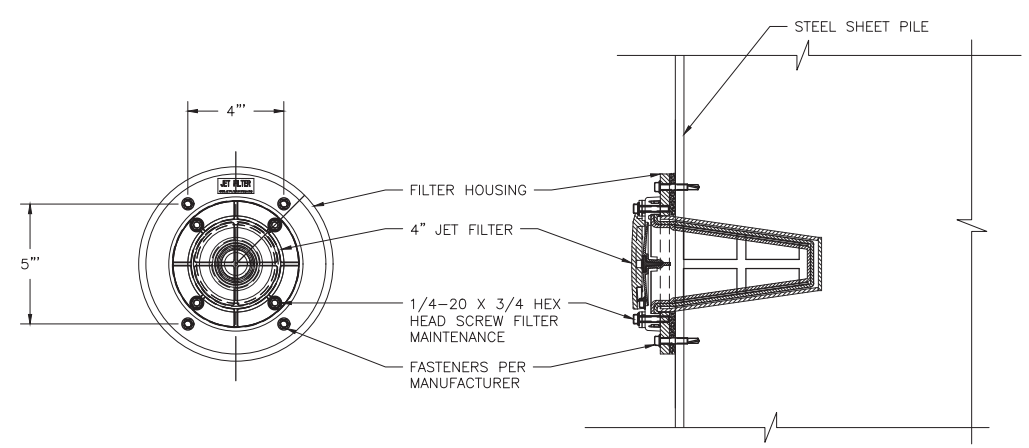
SECTION A SS-DT-02
1"= 1'-0"



1 TYPICAL STEEL CANTILIEVER WALL PLAN
1"= 1'-0"



2 CONCRETE CAP EXPANSION JOINT
1"= 1'-0"



3 FILTER
3"= 1'-0"

FILTER NOTE:
JET FILTER SHALL BE 4" DIAMETER STAINLESS STEEL WITH DEFLECTION CAP AND ONE-WAY CHECK VALVE. FASTENERS SHALL BE 316 STAINLESS STEEL.

SEAWALL INFORMATION

SEAWALL	SECTION	PILE TIP EL.	W
29	AZ20-800	-34.00	2'-6"

TABLE NOTE: THE CAP WIDTH IS SIZED PER THE SHEET PILE SECTION INDICATED. IF SHEET PILE SECTION(S) WITH STRONGER PROPERTIES ARE APPROVED BY THE ENGINEER, THE CAP WILL NEED TO BE RE-SIZED TO FIT THE NEW SECTION.

BID SET

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: SAMUEL J. SMITH, PE
REG. No: 73430
DATE: 02/01/2017
TEL 954-987-0066
FAX 954-987-2949

DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: SJS
SCALE: AS NOTED
CHECKED BY: JPS
FIELD BOOK:

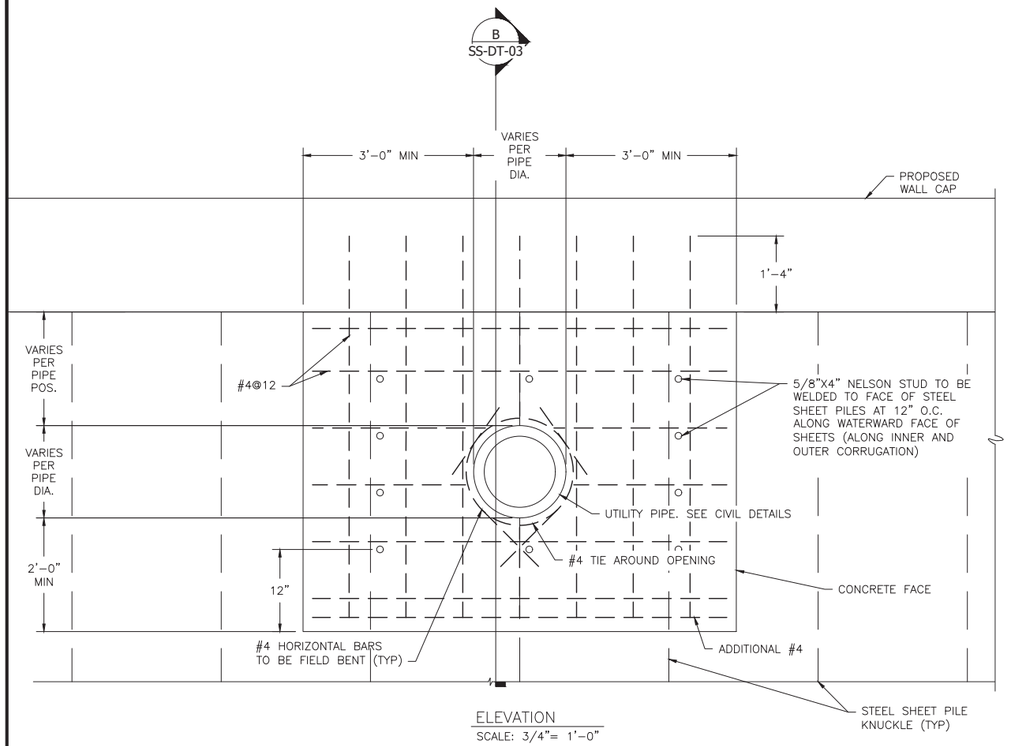
CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	SJS	JPS	ERP/SWM PERMIT SET
2	02/21/19	SJS	JPS	BID SET

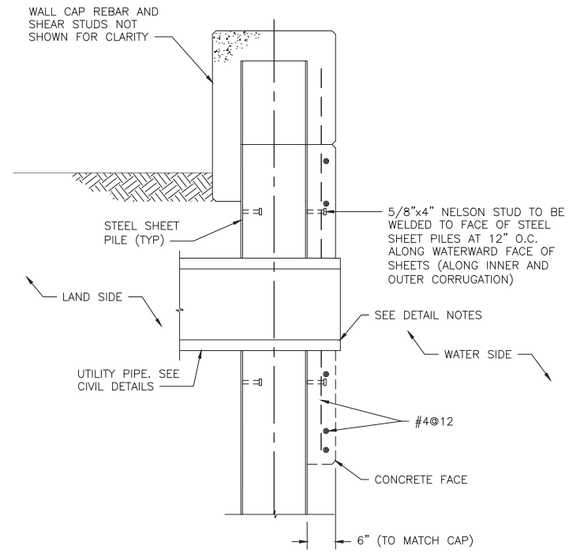
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STRUCTURAL DETAILS - SHEET 1

SHEET NO.
SS-DT-02
TOTAL: 43
CAD FILE: 12337-SS-DT02
DRAWING FILE NO. 4-141-55



ELEVATION
SCALE: 3/4"= 1'-0"

4 TYPICAL PIPE PENETRATION
3/4"= 1'-0"



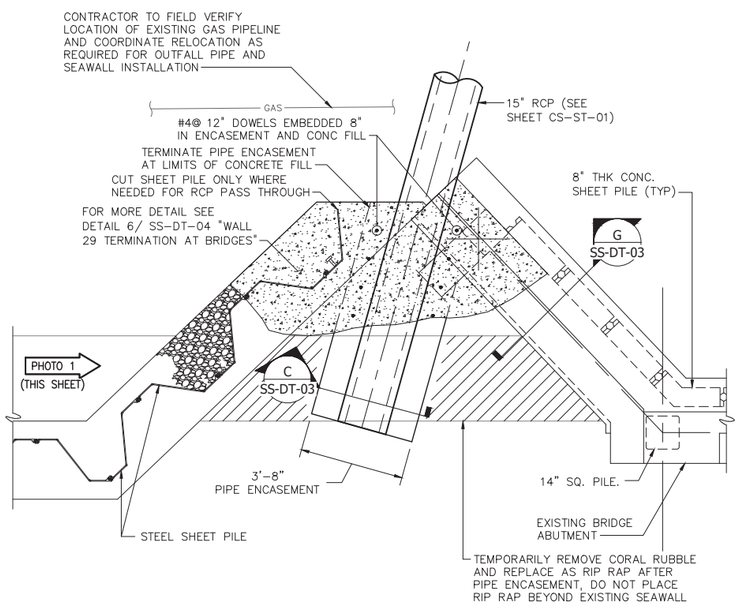
SECTION B
3/4"= 1'-0" SS-DT-03

NOTES:

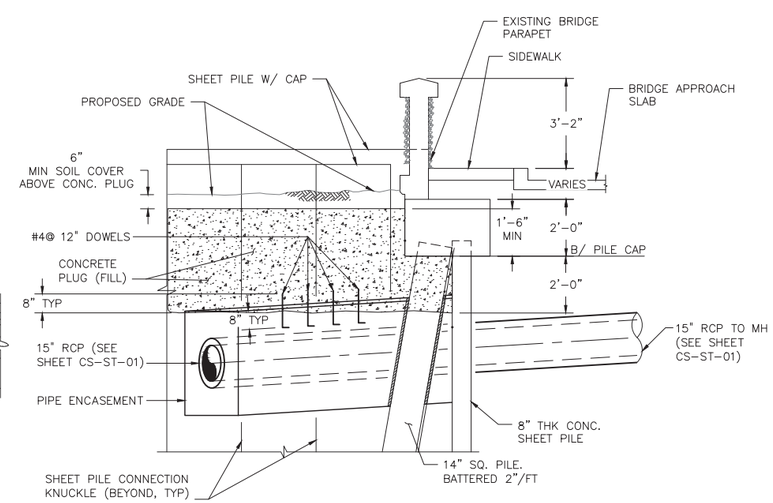
1. PROVIDE MANATEE GRATE FOR OPENINGS LARGER THAN 8". GRATE SHALL COVER OPENINGS SUCH THAT THERE IS NO OPENING GREATER THAN 8". MANATEE GRATE SHALL BE BASED ON CIVIL DETAIL STRM-013 AND SHALL BE SUBMITTED FOR REVIEW BY THE ENGINEER. GRATE AND CONNECTIONS SHALL BE PAINTED WITH THE SAME PAINT SYSTEM AS THE SHEET PILES. TOUCH-UP FIELD WELDED AND DAMAGED AREAS PER PAINT MANUFACTURER'S SPECIFICATIONS.
2. FORM TIES SHALL BE 316 STAINLESS STEEL AND OF A DESIGN SUCH THAT WHEN FORMS ARE REMOVED NO METAL SHALL BE WITHIN TWO INCHES OF THE FINISHED SURFACE. HOLES REMAINING FROM WITHDRAWN TIE RODS OR BOLTS SHALL BE FILLED SOLID WITH BASF MASTEREMACO N 425, OR APPROVED EQUAL, NON-SAG CONCRETE REPAIR MORTAR.
3. PROVIDE 1/2" EXPANSION JOINT WHERE CONCRETE IS CAST AGAINST EXISTING BRIDGE COMPONENTS SUCH AS CAPS OR PILES.

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

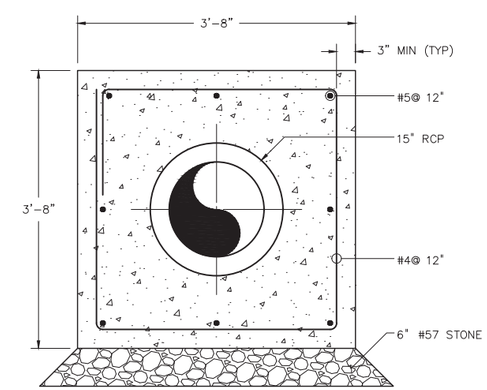
PHOTO 1 – SEAWALL 29@ SE 11th ST, LOOKING NORTH
NTS



5 PIPE PENETRATION - SOUTH SIDE OF SE 11TH STREET
3/8"= 1'-0"



SECTION G
3/8"= 1'-0" SS-DT-03



SECTION C
1"= 1'-0" SS-DT-03

1"=1'-0" 12" 6 0 1'
3/4"=1'-0" 6" 0 1 2'

REVISIONS

NO.	DATE	BY	CHK'D	DESCRIPTION
1	02/01/19	SJS	JPS	ERP/SWM PERMIT SET
2	02/21/19	SJS	JPS	BID SET

ENGINEER: SAMUEL J. SMITH, PE
REG. No: 73430
DATE: 02/01/2017
TEL: 954-987-0066
FAX: 954-987-2949

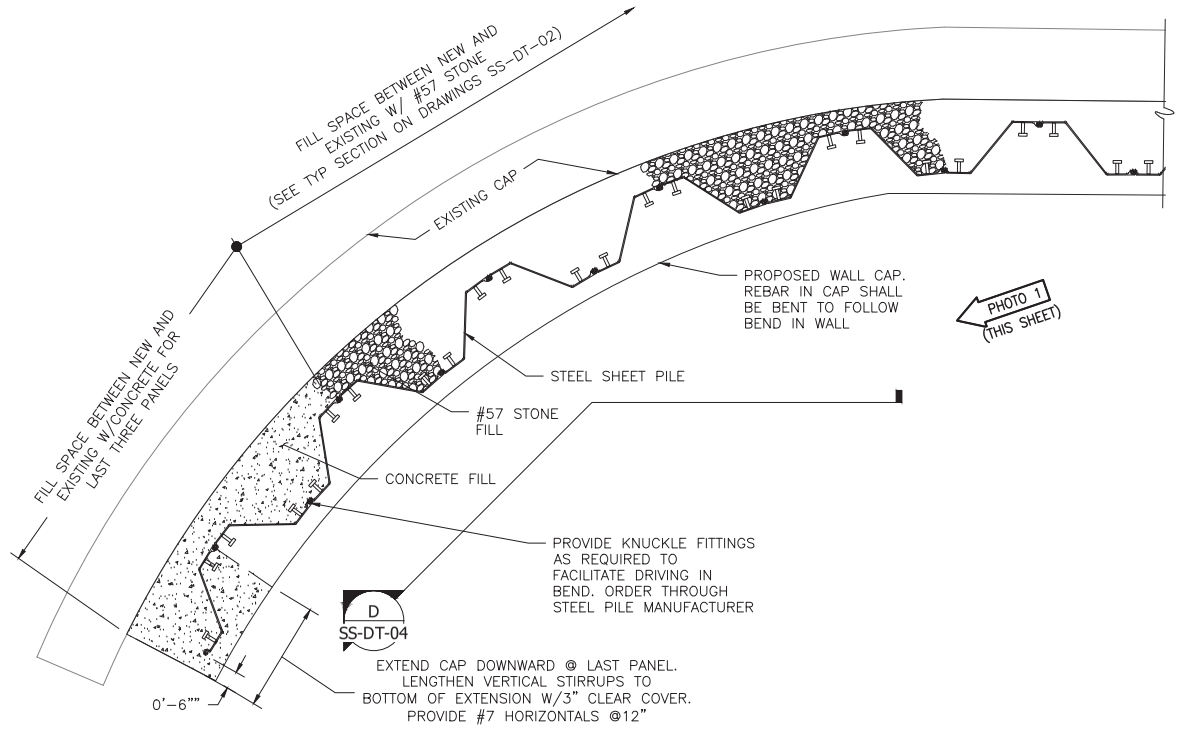
DRAWN BY: OLC
DATE: 02/21/19
DESIGNED BY: SJS
SCALE: AS NOTED
CHECKED BY: JPS
FIELD BOOK: XXXX

CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT
ENGINEERING & ARCHITECTURE
100 North Andrews Avenue, Fort Lauderdale, Florida 33301

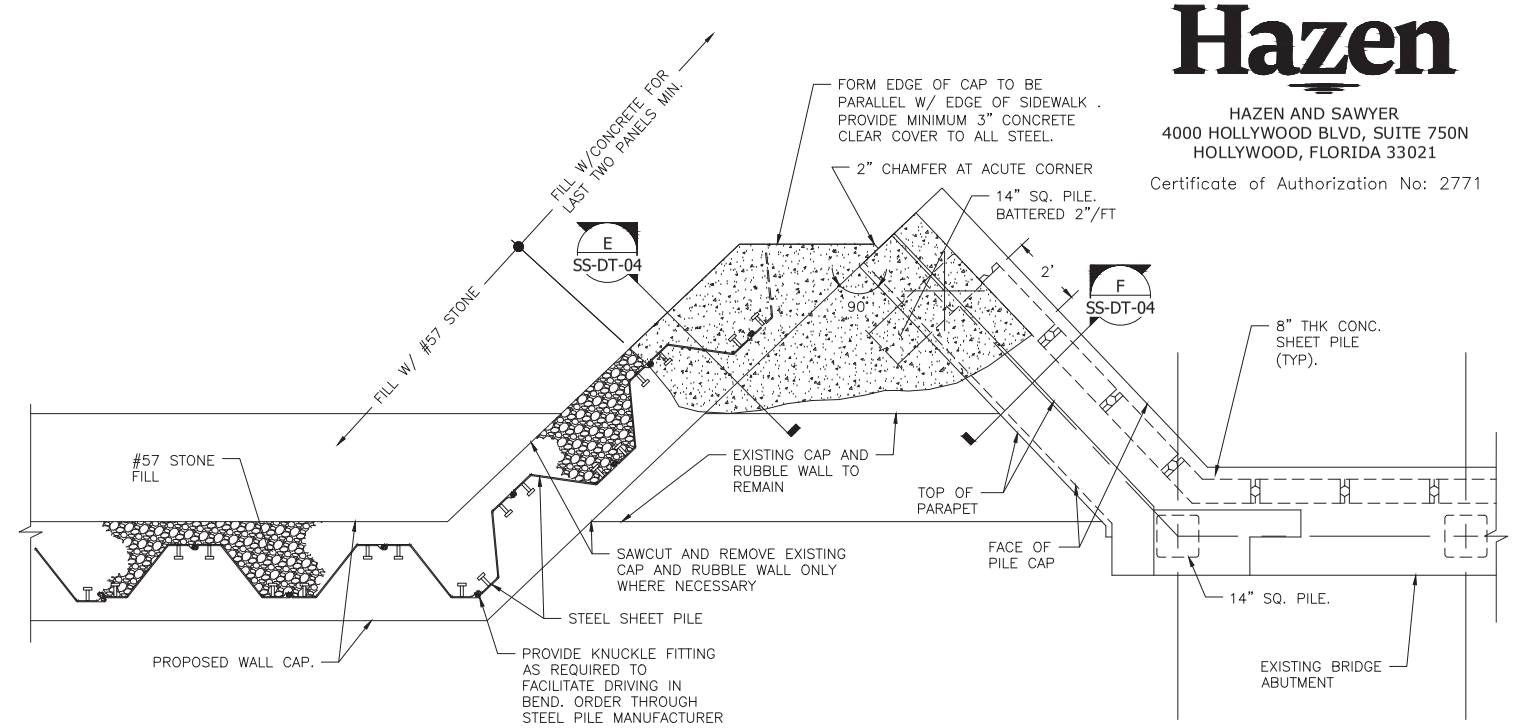
PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STRUCTURAL DETAILS - SHEET 2

BID SET

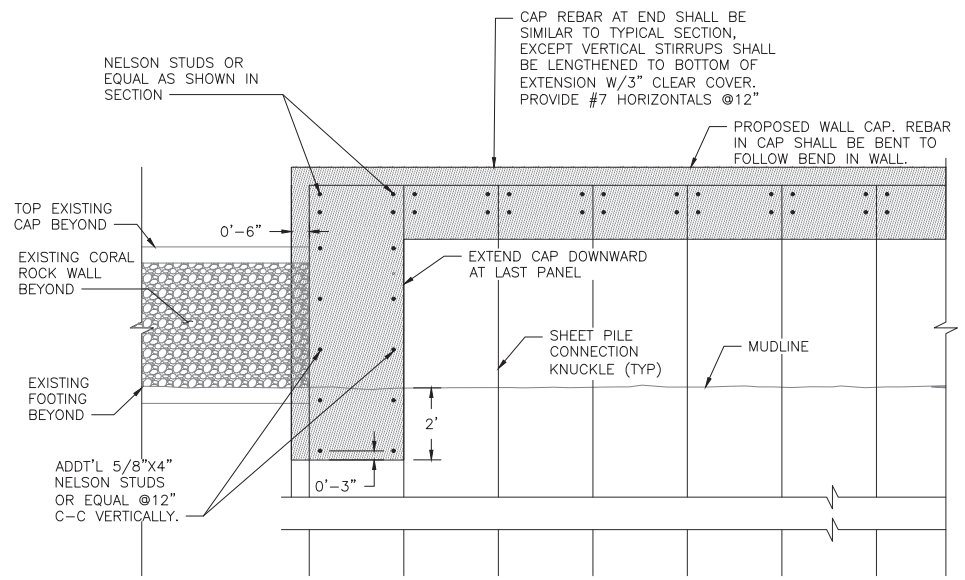
SHEET NO.
SS-DT-03
TOTAL: 43
CAD FILE: 12337-SS-DT03
DRAWING FILE NO. 4-141-55



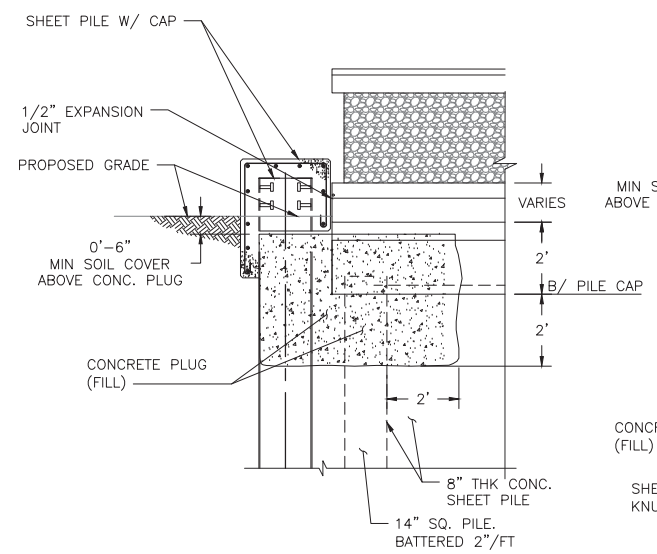
7 WALL 29 SOUTH END TERMINATION
3/8"= 1'-0"



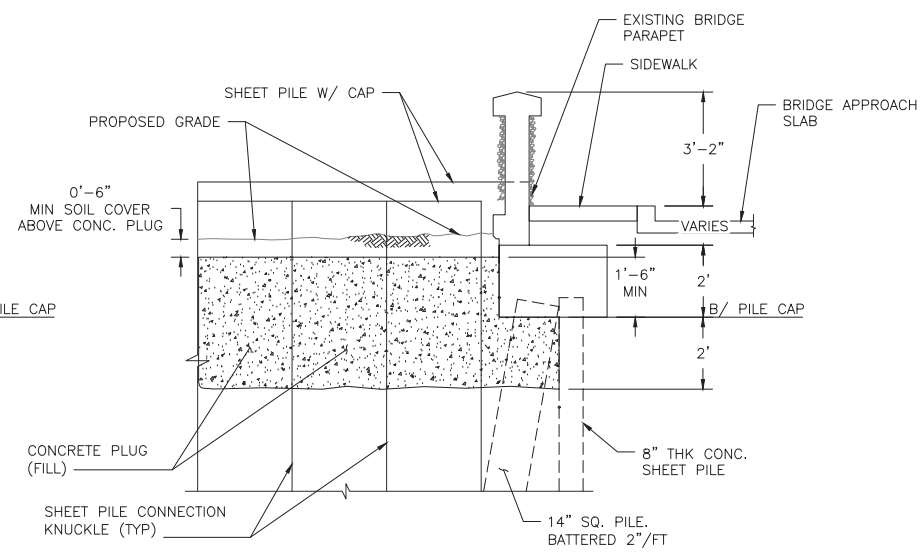
6 WALL 29 TERMINATION AT BRIDGES
3/8"= 1'-0"



SECTION D SS-DT-04
3/8"= 1'-0"



SECTION E SS-DT-04
3/8"= 1'-0"



SECTION F SS-DT-04
3/8"= 1'-0"

EXISTING SEAWALL 29

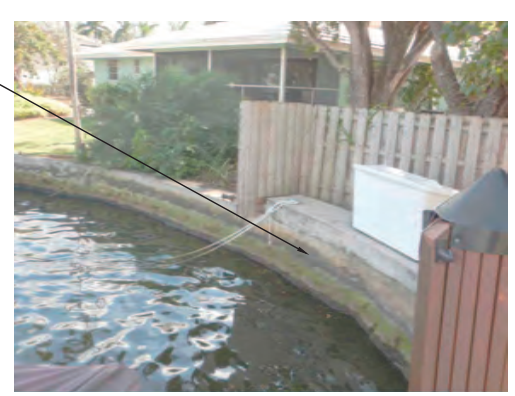


PHOTO 1 – SOUTH END OF SEAWALL 29, LOOKING SOUTH
NTS

NOTES:

1. PROVIDE 1/2" EXPANSION JOINT WHERE CONCRETE IS CAST AGAINST EXISTING BRIDGE COMPONENTS SUCH AS CAPS OR PILES.

3/8"=1'-0"

BID SET

Hazen
HAZEN AND SAWYER
4000 HOLLYWOOD BLVD, SUITE 750N
HOLLYWOOD, FLORIDA 33021
Certificate of Authorization No: 2771

ENGINEER: SAMUEL J. SMITH, PE
REG. No: 73430
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TEL 954-987-0066
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DRAWN BY: OLC
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FIELD BOOK:

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100 North Andrews Avenue, Fort Lauderdale, Florida 33301

REVISIONS

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2	02/21/19	SJS	JPS	BID SET

PROJECT # 12337
CORDOVA ROAD
SEAWALL REPLACEMENT
STRUCTURAL DETAILS - SHEET 3

SHEET NO.
SS-DT-04
TOTAL: 43
CAD FILE: 12337-SS-DT04
DRAWING FILE NO. 4-141-55

CITY OF FORT LAUDERDALE
CONTRACT AND SPECIFICATIONS PACKAGE

BID NO. 12256-493

PROJECT NO. 12337

CORDOVA ROAD SEAWALL REPLACEMENT

Issued on Behalf of: The Public Works Department
100 North Andrews Avenue
Fort Lauderdale, Florida 33301

JUAN CARLOS SAMUEL, E.I
PROJECT MANAGER II

Penelope Burger, CPPB
SENIOR PROCUREMENT SPECIALIST
Telephone: (954) 828-5189 E-mail: pburger@fortlauderdale.gov

APPENDICIES

TABLE OF CONTENTS

APPENDICIES

CITY OF FORT LAUDERDALE

APPENDIX A

GEOTECHNICAL REPORT

The attached report is provided for informational purposes with the Contract Documents. The attached report is not a part of the Contract Documents. The Owner and the Engineer make no guarantee, either expressed or implied, as to its accuracy or completeness.

RADISE International, L.C.

Geotechnical Engineering Services Report

City of Fort Lauderdale
Stormwater Master Plan Modeling and Design Implementation
Broward County, Florida

Submission Date: August 1, 2018

Prepared by:
RADISE International, L.C.
4152 W. Blue Heron Boulevard, Suite 1114
Riviera Beach, Florida 33404

August 1, 2018

Hazen and Sawyer
4000 Hollywood Blvd., Suite 750N
Hollywood, Florida 33201

Attn: Mr. Robert B. Taylor, Jr., P.E.
Office: (954) 987- 0066
Cell: (772) 595- 2535
Email: rbtaylor@hazenandsawyer.com

RE: Geotechnical Engineering Services Report
City of Fort Lauderdale
Stormwater Master Plan Modeling and Design Implementation
Broward County, Florida
RADISE Project No: 170901

Dear Mr. Taylor,

RADISE International, LC (RADISE) is pleased to submit this *Geotechnical Engineering Services Report* for the above-referenced project. The purpose of this report is to provide geotechnical information and recommendations to aid in the design and construction of the project. This report describes the field exploration and laboratory testing performed, presents the data obtained, and provides our recommendations regarding geotechnical aspects of the of the proposed project.

The study was performed in general accordance with our agreement executed on August 30, 2017 and amendment executed on June 19, 2018.

We appreciate the opportunity to work with Hazen and Sawyer on this project, and trust that the information presented is clear. Should you have any questions regarding this report, or if we can be of additional assistance as this project develops, please contact us at (561) 841-0103.

Sincerely,

RADISE International, LC
Florida Certificate of Authorization No.8901

DRAFT

Khaled Abdelli
Staff Engineer

DRAFT

Akash Bissoon, P.E.
Project Engineer
FL Registration No. 74582

DRAFT

Andrew Nixon, P.E.
Operations Manager
FL Registration No. 71458

ATTACHMENTS

Sheets 6A through 6C – Progresso Subsurface Profiles
Sheets 7A through 7E – River Oaks Subsurface Profiles
Sheets 8A through 8C – Southeast Isles Subsurface Profiles
Sheets 9A through 9N – Seawalls Subsurface Profiles
Sheets 10A through 10D – Victoria Park Subsurface Profiles

APPENDIX A
Table A-1 – Laboratory Test Results Summary
Grain Size Distribution

APPENDIX B
Preliminary Design Geotechnical Services Report

1.0 INTRODUCTION

RADISE understands that the City of Fort Lauderdale is performing a study for seawall replacement designs, stormwater master plan modeling, and design implementation within the City of Fort Lauderdale. To aid in the evaluation and design of the project, RADISE was requested to provide soil investigations and evaluation services that included drilling of exploratory borings to determine the subsurface stratigraphy, groundwater levels and physical properties of the soils underlying the site.

The information presented in this report is based upon our interpretation of the subsurface information revealed by the test borings. The report does not reflect variations in subsurface conditions that may exist between or beyond these borings. Variations in soil and groundwater conditions should be expected, the nature and extent of which might not become evident until construction is undertaken. If variations are encountered, and/or the scope of the project altered, we should be consulted for additional recommendations.

2.0 PROJECT DESCRIPTION

The project is located within the City of Fort Lauderdale, Florida and includes seawall and stormwater improvements within seven (7) neighborhoods located east of I-95 and between the Port Everglades Expressway and Sunrise Boulevard. The neighborhoods include Durrs, Dorsey Riverbend, Edgewood, Progresso Village, River Oaks, Southeast Isles and Victoria Park. The approximate location of the overall project and the neighborhoods are shown on the attached *Vicinity Map*, Sheet 1.

It is our understanding that improvements are proposed to fourteen (14) seawall segments at the site. Specific design information is not available at this time; however, we presume that a steel sheet pile cantilever wall with a concrete cap and suitable lateral support system (tie-backs, battered piles, etc.) will be utilized.

In addition, it is our understanding that the proposed stormwater improvements will provide improved flood protection and enhanced water quality treatment by using Best Management Practices (BMPs). The proposed stormwater collection and conveyance systems will include, but are not limited to:

- Swales
- Inlets and catch basins
- Exfiltration trenches
- Dry and wet retention systems (basins)
- Backflow prevention valves
- Underdrain systems
- Stormwater pump stations
- Electrical equipment buildings
- Outfalls
- Control structures
- Drainage wells
- Green infrastructure such as bio-swales and precast porous pavement

3.0 PURPOSE AND SCOPE OF WORK

The purpose of this study was to perform a limited exploration of the subsurface conditions within the project proposed areas, to aid in the planning and design of the overall neighborhood site drainage infrastructure and seawalls.

More specifically, the purpose of the work included the following:

- Development of the anticipated soil profiles and the subsurface conditions within the depth of influence at the seawall structure locations and anticipated stormwater management infrastructure improvements.

- Identification of critical geotechnical design or construction considerations based on the soil and groundwater conditions encountered in the borings.

RADISE performed the following services in accordance with the proposed scope of work:

1. Reviewed and incorporated our recommendations provided in our Geotechnical Services Report, dated January 31, 2018, which was prepared for the preliminary design of the project. The preliminary design Geotechnical Services Report is included in Appendix B of this report.

2. Visited the sites to field mark (paint or/and stake) the planned soil boring test locations and observe existing site conditions.

3. Contacted Sunshine 811 to request the field location and clearance of underground utilities in the areas of the proposed borings, as per Florida Statutes.

4. Set up Maintenance of Traffic (MOT) safety controls prior to and during the field drilling operations.

5. Mobilized drilling equipment to the site to perform:

    - Fifty (50) Standard Penetration Test (SPT) soil borings to depths of fifteen (15) feet and thirteen (13) SPT soil borings to depths of fifty (50) feet below the existing ground surface for the proposed stormwater improvements.

    - Twenty-six (26) SPT borings to depths of fifty (50) feet below the existing ground surface for the proposed seawall improvements.

    - Asphalt pavement cores at sixty-eight (68) of the SPT boring locations.

    Samples of the subsurface soils encountered in the SPT borings were obtained and placed in labeled air-tight containers. The depth to the groundwater level was measured and recorded for each of the borings. Following completion of the groundwater measurements,

the boreholes were backfilled with neat cement grout.

6. Visually classified the SPT soil samples retrieved from the soil borings in accordance with the Unified Soil Classification System (USCS) using the Visual-Manual Procedure in general accordance with the American Society of Testing and Materials (ASTM) test method D 2488, *Description and Identification of Soils*.

7. Reviewed, assigned and performed a limited laboratory testing program for soil index property determinations on selected SPT samples to aid in the classification process in general accordance with the ASTM test method D 2487, *Classification of Soils for Engineering Purposes*.

8. Prepared this Geotechnical Engineering Services Report to summarize the results of the field exploration and laboratory testing, and to present our findings, evaluations and design recommendations.

4.0 FIELD EXPLORATION

During this work phase, MOT was used to protect our field personnel, equipment, and the general public. The MOT was designed and set up in accordance with the FDOT Design Standards.

4.1 CORING

The field exploration program to evaluate the existing asphalt pavement section consisted of a total of sixty-eight (68) Pavement Cores at respective SPT borings locations. The approximate coring and boring locations are shown on the attached *Boring Location Plans*, Sheets 2A through 2R.

Pavement Core samples were obtained at sixty-eight (68) locations using a portable electric stand-up core drill with a 6-inch diameter diamond tipped core drill bit. Upon removal of the asphalt core, a hand-held power auger and a hand operated bucket-type auger were used to loosen the base course material and to clean out the borehole. Subsequent down-hole field measurements were made using a surveyor's tape to document the approximate thickness and composition of the encountered pavement base course materials. Representative samples of the base course, obtained from the hand bucket-type auger, were placed in moisture proof bags and transported to our laboratory. The samples were then examined by a geotechnical engineer in the lab to confirm the field classifications. Tables 1 and 2 presented below in Section 4.2 provide information on the boring locations along with a summary of the measured asphalt section thickness and base thickness at the boring locations. Latitude and Longitude coordinates of the boring locations were obtained by the field crew using hand-held GPS equipment.

A review of the asphalt and base rock thicknesses data tabulated in Tables 1 and 2 indicates that there are a number of apparent cores with either thin or thick pavement layers. Discussion of the nature and locations of deficient cores along with comparisons to more current day pavement design sections is included in Section 7.4 - Pavement Design Considerations of this report.

4.2 SOIL BORINGS

The field exploration program to evaluate the existing subsurface conditions consisted of drilling eighty-nine (89) SPT borings. Fifty (50) SPT soil borings were drilled to depths of fifteen (15) feet and thirteen (13) SPT soil borings were drilled to depths of fifty (50) feet below the existing ground surface for the proposed stormwater improvements. Twenty-six (26) SPT borings were drilled to depths of fifty (50) feet below the existing ground surface for the proposed seawall improvements. A summary of the boring information is included in Tables 1 and 2 presented below. The approximate locations of the SPT borings are depicted on the attached *Boring Location Plans*, Sheets 2A through 2R. Latitude and Longitude coordinates of the test locations were obtained by the field crew using hand-held GPS equipment and are listed on the attached Subsurface Profiles, Sheets 3A through 10D.

The SPT borings were performed in general accordance with ASTM D 1586, "Standard Test Method for the Standard Penetration Test and Split-Barrel Sampling". Upon retrieval, the split-spoon, soil samples were visually classified and placed in moisture proof containers for transportation to our laboratory. Each borehole was backfilled with neat cement grout to the ground surface after the completion of drilling, sampling and monitoring operations.

Table 1 – Boring Location Information for Seawall Improvements

Seawall	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
Seawall 9	S-28	Inside Victoria Park. At the intersection of Broward Boulevard and North Victoria Park Road.	-	-
Seawall 10	S-29	At the intersection of SE 23rd Avenue and Del Mar Place. Approximately 450 feet north of E Las Olas Boulevard.	3.75	4.5
Seawall 12	S-15	South side of E Las Olas Boulevard, between Lido Drive and San Marco Drive.	-	-
Seawall 13	S-14	South side of E Las Olas Boulevard, between San Marco Drive and Coral Way.	-	-
Seawall 14	S-13	South side of E Las Olas Boulevard, between Coral Way and Royal Plaza Drive.	-	-
Seawall 15	S-9	On the east side of Isle of Palms Drive. Approximately 800 feet south of E Las Olas Boulevard.	4.5	6.0
	S-10	On the east side of Isle of Palms Drive. Approximately 570 feet south of E Las Olas Boulevard.	5.25	4.0
	S-11	On the east side of Isle of Palms Drive. Approximately 350 feet south of E Las Olas Boulevard.	5.75	6.0
	S-12	On the east side of Isle of Palms Drive. Approximately 120 feet south of E Las Olas Boulevard.	6.25	6.0

Seawall	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
Seawall 17	S-8	On the south side of SE 5th Street. Approximately 75 feet west of the intersection of Riviera Isle Drive and SE 5th Street.	6.5	6.0
Seawall 29	S-17	On the east side of Cordova Road. Between SE 7th Street and SE 8th Street. Approximately 230 feet south of the intersection of Cordova Road and SE 7th Street.	12.0	6.0
	S-18	On the east side of Cordova Road. Between SE 8th Street and SE 9th Street. Approximately 175 feet south of the intersection of Cordova Road and SE 8th Street.	9.5	5.0
	S-19	On the east side of Cordova Road. Between SE 8th Street and SE 9th Street. Approximately 400 feet south of the intersection of Cordova Road and SE 8th Street.	8.25	6.0
	S-20	On the east side of Cordova Road. Between SE 8th Street and SE 9th Street. Approximately 175 feet south of the intersection of Cordova Road and SE 8th Street.	9.0	5.0
	S-21	On the east side of Cordova Road. Between SE 8th Street and SE 9th Street. Approximately 220 feet south of the intersection of Cordova Road and SE 9th Street.	5.75	6.0
	S-22	On the east side of Cordova Road. Between SE 10th Street and SE 11th Street. Approximately 215 feet south of the intersection of Cordova Road and SE 10th Street.	5.0	5.0
	S-23	On the east side of Cordova Road. Between SE 11th Street and SE 12th Street. Approximately 160 feet south of the intersection of Cordova Road and SE 11th Street.	5.0	8.0
Seawall 30	S-26	On the south side of SE 10th Street. Approximately 2,000 feet east of the intersection of Cordova Road and SE 10th Street.	5.25	6.0
	S-27	On the south side of SE 10th Street. Approximately 2,250 feet east of the intersection of Cordova Road and SE 10th Street.	3.75	5.0
Seawall 32	S-16	On Mola Avenue. Approximately 775 feet south of the intersection of SE 17th Way and Mola Avenue.	-	-
Seawall 34	S-30	Located on the north side of Barcelona Drive. At the northeast quadrant of Barcelona Drive and NE 26th Terrace.	3.5	6.0
Seawall 35	S-24	Located on the south side of SE 8th Street. Approximately 1,000 feet east of Cordova Road.	4.5	6.0
	S-25	Located on the south side of SE 8th Street. Approximately 1,335 feet east of Cordova Road.	4.5	6.0

Seawall	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
TBD1	S-31	Located on the west side of Hendricks isle. Approximately 3200 feet north of E Las Olas Boulevard.	-	-
	S-32	Located on the west side of Hendricks isle. Approximately 3350 feet north of E Las Olas Boulevard.	-	-
TBD2	S-33	Located on the east side at the end of Hendricks isle.	-	-

*Base course thicknesses were measured in the field to the nearest half inch.

Table 2 – Boring Location Information for Stormwater Improvements

Neighborhood	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
Durrs	D-1	Intersection of NW 9th Street and NW 17th Avenue.	4.0	5.0
	D-2	Intersection of NW 16th Avenue and NW 8th Street.	7.0	3.0
	D-3	On NW 19th Avenue. Approximately 60 feet south of the intersection of NW 19th Avenue and NW 7th Street.	4.0	8.0
	D-4	Intersection of NW 8th Street and NW 13th Terrace.	1.3	3.0
	D-5	On the west side of NW 14th Way. Approximately 170 feet north of the intersection of NW 14th Way and NW 6th Street.	3.2	3.0
Dorsey Riverbend	DR-1	Approximately 160 feet north of NW 5th Street, between NW 15th Terrace and NW 15th Avenue.	-	-
	DR-2	On the east side of NW 15th Avenue. Approximately 200 feet north of the intersection of NW 15th Street and NW 15th Avenue.	-	-
	DR-3	Intersection of NW 4th Street and NW 15th Avenue.	5.0	6.0
	DR-4	Approximately 75 feet north of the intersection of NW 4th Street and NW 18th Avenue.	5.2	1.0
	DR-5	On the west side of NW 18th Avenue, approximately 130 feet south of the intersection of NW 6th Street and NW 18th Avenue.	1.0	2.0
Edgewood	E-1	Intersection of SW 15th Avenue and SW 32nd Court.	1.2	4.0
	E-2	Intersection of SW 15th Avenue and SW 31st Street.	3.7	4.0
	E-3	Intersection of SW 15th Avenue and SW 29th Street.	2.2	4.0

Neighborhood	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
Edgewood	E-4	On SW 30th Street. Approximately 400 feet east of the intersection of SW 15th Avenue and SW 30th Street.	3.2	4.0
	E-5	On SW 32nd Street. Approximately 400 feet east of the intersection of SW 15th Avenue and SW 32nd Street.	2.0	6.0
	E-6	Intersection of SW 14th Avenue and SW 28th Street.	1.7	9.0
	E-7	On SW 28th Street. Approximately 620 feet east of the intersection of SW 12th Avenue and SW 28th Street.	4.7	6.0
	E-8	On SW 12th Avenue, between SW 31st Street and SW 32nd Street.	1.5	4.0
	E-9	On SW 29th Street. Approximately 240 feet east of the intersection of SW 12th Avenue and SW 29th Street.	-	-
	E-10	On SW 9th Avenue, between SW 30st Street and SW 31st Street.	6.0	3.0
	E-11	Intersection of SW 8th Avenue and SW 30th Street.	3.7	4.0
	E-12	Intersection of SW 8th Avenue and SW 28th Street.	5.0	4.0
	E-13	On SW 9th Avenue, between SW 26th Court and SW 27th Court.	1.7	6.0
	E-14	On the west side of S Andrews Avenue. Near the intersection of S Andrews Avenue and SE 26th Street.	3.5	4.0
	E-15	On S Andrews Avenue. Between SE 30th Street and SE 31st Street.	3.0	4.0
Progresso	P-1	On the east side of SW 4th Avenue. Approximately 100 feet north of the intersection of Himmarshee Street and SW 4th Avenue.	3.0	4.0
	P-2	On NW 5th Avenue. Approximately 150 feet north of the intersection of Broward Boulevard and NW 5th Avenue.	3.2	2.0
	P-3	Intersection of NW 2nd Street and NW 4th Avenue.	2.7	6.0
	P-4	Intersection of NW 7th Street and NW 3rd Avenue.	1.2	8.0
	P-5	Intersection of NW 7th Street and NW 3rd Avenue.	-	-
	P-6	Approximately 130 feet north of NW 8th Street and between NW 4th Avenue and NW 3rd Avenue.	-	-
	P-7	On NW 7th Avenue. Between NW 5th Street and NW 4th Street.	2.0	7.0
	P-8	Intersection of NW 7th Street and NW 7th Terrace.	1.7	7.0
River Oaks	R-1	On SW 15th Avenue. Approximately 100 feet north of the intersection of SW 15th Avenue and Marina Boulevard.	2.7	6.0

Neighborhood	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
River Oaks	R-2	On SW 15th Avenue. Between SW 22nd Avenue and SW 23rd Street.	1.5	8.0
	R-3	On SW 24th Street. Between SW 18th Terrace and SW 24th Street.	1.5	6.0
	R-4	At the intersection of SW 17th Avenue and SW 22nd Street.	1.0	6.0
	R-5	On SW 19th Avenue. Between SW 21st Street and SW 22nd Street.	1.7	6.0
	R-6	On SW 20th Street. Between SW 15th Avenue and Coconut Drive.	5.0	10.0
	R-7	At the intersection of SW 18th Court and SW 14th Avenue.	2.0	8.0
	R-8	At the intersection of SW 17th Street and SW 13th Avenue.	1.2	9.0
	R-9	Approximately 610 feet west of the intersection of SW 19th Avenue and SW 21st Street. Near a wooded area.	-	-
	R-10	Approximately 550 feet west of the intersection of SW 19th Avenue and SW 21st Street. Near a wooded area.	-	-
	R-11	Approximately 150 feet north west of the intersection of SW 19th Avenue and SW 23rd Court.	-	-
	R-12	Approximately 240 feet north west of the intersection of SW 19th Avenue and SW 23rd Court.	-	-
	R-13	Intersection of SW 18th Court and SW 10th Avenue.	1.7	9.0
Southeast Isles	S-1	Approximately 65 feet west of the intersection of SE 17th Way and Mola Avenue.	-	-
	S-2	On the south side of E Las Olas Boulevard, between SE 18th Avenue and Lido Drive.	-	-
	S-3	On the west side of Lido Drive, approximately 130 feet south of the intersection of E Las Olas Boulevard and Lido Drive.	-	-
	S-4	On the south side of E Las Olas Boulevard, between Royal Plaza Drive and Isle of Palms Drive.	-	-
	S-5	On the south side of E Las Olas Boulevard. Approximately 100 feet west of the intersection of E Las Olas Boulevard and Sunset Drive.	-	-
	S-6	In the south-east quadrant of the intersection of E Las Olas Boulevard and Poinciana Drive. In Merle Fogg Park.	-	-

Neighborhood	Boring No.	Boring Location Remarks	Asphalt Thickness (inches)	Base Course Thickness* (inches)
Southeast Isles	S-7	In the south-east quadrant of the intersection of E Las Olas Boulevard and Poinciana Drive. In Merle Fogg Park.	-	-
Victoria Park	V-1	Intersection of NE 6th Street and NE 10th Avenue.	3.0	7.0
	V-2	Intersection of NE 6th Street and NE 16th Avenue.	7.0	4.0
	V-3	Intersection of NE 9th Street and NE 15th Avenue.	2.0	6.0
	V-4	Intersection of NE 8th Street and NE 16th Terrace.	3.8	3.0
	V-5	Intersection of NE 7th Street and NE 17th Way.	1.0	7.0
	V-6	On Victoria Trace. Approximately 250 feet north of the intersection of NE 5th Street and Victoria Way.	2.0	7.0
	V-7	Intersection of NE 20th Avenue and NE 19th Avenue.	3.0	6.0
	V-8	Intersection of NE 20th Avenue and NE 7th Street.	5.0	6.0
	V-9	Approximately 160 feet east of the intersection of NE 20th Avenue and NE 7th Street.	-	-
	V-10	On NE 20th Avenue. Approximately 900 feet north of the intersection of NE 20th Avenue and NE 7th Street.	2.2	9.0

*Base course thicknesses were measured in the field to the nearest half inch.

4.3 GROUNDWATER LEVEL MEASUREMENTS

After completion of the borings and after a short stabilization period, the depth to the groundwater was measured from the existing ground surface in each boring. The measured groundwater depth is plotted adjacent to the soil profiles shown on the attached *Subsurface Profiles*, Sheets 3A through 10D.

5.0 LABORATORY TESTING

5.1 GENERAL

Representative soils samples collected from the borings were visually reviewed in the laboratory by a RADISE Geotechnical Engineer to confirm field classifications. The samples were classified in general accordance with the Unified Soil Classification System (USCS). The classifications were based on visual observations supplemented by laboratory test results performed on selected representative SPT samples. Laboratory index tests consisting of Full Sieve Analysis, Percent

Passing No. 200 Sieve, Moisture, Atterberg limits, and Organics Content tests were performed on selected samples to further confirm and finalize field soils classifications.

5.2 LABORATORY TEST RESULTS

Test assignments were provided by a Geotechnical Engineer during the laboratory review of secured soil samples. Laboratory assignments were made to supplement and confirm soil classification at each general boring location.

The following list summarizes the types and numbers of laboratory tests performed.

- One hundred (100) Moisture Content Tests (ASTM D 2216).
- Sixty-six (66) Organics Content Tests (ASTM 2216 D).
- Twenty-seven (27) Full Sieve Analysis Test (ASTM D422).
- Eighteen (18) Percent Passing No. 200 Sieve Tests (ASTM D 1140).
- Three (3) Atterberg limits tests (ASTM D 4318).

All of the laboratory test results are presented on the attached *Subsurface Profiles*, Sheet 3A through 10D, and on Table A - *Laboratory Test Results Summary* in Appendix A.

6.0 SURFACE AND SUBSURFACE EXPLORATION

6.1 STRATIGRAPHY

Stratification of the explored soils is based on visual examination of the recovered soil samples, index testing, laboratory classification and interpretation of the field boring logs by a geotechnical engineer in accordance with the Unified Soil Classification System (USCS). Subsurface profiles showing the soil stratification at the boring locations were developed and are presented on the attached *Subsurface Profiles*, Sheets 3A through 10D. Stratification lines represent approximate boundaries between soil types, but the actual transition between layers may be gradual or abrupt. Additionally, soil and groundwater conditions will vary between boring locations.

The encountered soils generally consisted of sand with varying amounts of silt and limestone fragments mostly underlain by limestone. Some of the borings encountered a layer of soil containing appreciable amounts of organic matter. Generalized descriptions of the soil stratigraphy are provided in Table 3:

TABLE 3 - STRATIGRAPHY

Stratum No.	Description	USCS Class.
1	Brown, fine to medium SAND, occasionally with Gravel, Limestone fragments, and Silt	SP, SP-SM
2	Gray, fine to medium Silty SAND, occasionally with Gravel and Limestone fragments	SM
3	Gray, Sandy SILT	ML
4	Tan to gray, LIMESTONE	-
5	Tan, Sandy LIMESTONE	-
6	Dark Brown Organic Material/Peat	PT

It is noted that the Layer 6: Dark Brown Organic Material/Peat were primarily encountered in the borings performed in the River Oaks, Southeast Isles, and Victoria Park neighborhoods. Review of the boring logs and boring locations for the River Oaks neighborhood area indicates that the organic material was encountered in the borings performed in an undeveloped, wooded area adjacent to the east side of Interstate I-95 and just south of the South Fork New River. It appears this area contains a layer of fill soils placed over organic soils along the south side of the South Fork New River. Review of the boring logs and boring locations for the Southeast Isles and Victoria Park neighborhood areas indicates that there appear to be layers of fill soils which were placed over remnant buried mangrove preserve areas along the Intracoastal Waterway. This land reclamation work occurred during early 1920's to allow residential and commercial development of the coastal Ft. Lauderdale area.

Table 4 summarizes the borings, depths and thickness of the Stratum 6 soils, which have organic contents ranging from 5.3 to 67.3 percent:

TABLE 4 – STRATUM 6 SOILS (PEAT)

Boring No.	Depth from (feet)	Depth to (feet)	Organic layer thickness (feet)
R-9	2	6	4
R-10	2	4	2
R-12	4	6	2
S-2	4	10	6
S-3	6	8	2
S-4	4	8	4

Boring No.	Depth from (feet)	Depth to (feet)	Organic layer thickness (feet)
S-5	4	10	6
S-8	2	6	4
S-14	4	9	5
S-15	4	9	5
S-16	4	6	2
S-17	4	12	8
S-18	4	12	8
S-19	4	12	8
S-20	4	8	4
S-21	4	6	2
S-22	8	12	4
S-23	8	12	4
S-23	8	10	2
S-27	8	10	2
S-28	0	2	2
S-29	6	10	4
S-30	2	6	4
S-30	10	15	5
S-31	4	10	6
S-32	4	8	6
S-33	2	10	8
V-1	4	8	4
V-7	4	8	4
V-8	4	10	6
V-10	8	10	2

6.2 GROUNDWATER LEVELS

Groundwater was encountered in each of the SPT borings. The groundwater level varied between 0.5 to 6.5 feet below the existing ground surface. It is our recommendation that the seasonal high groundwater table levels along the various project infrastructure alignments, be based on the normal high tide water levels of the adjacent waterways existing near the various neighborhood project areas and with additional geotechnical explorations. In inland areas not directly influenced by the water levels in the adjacent waterways and canals, normal high groundwater levels can be expected to be on the order of as much as two feet above the measured groundwater levels in the borings. It should be noted that the groundwater levels will fluctuate with variations of precipitation.

Borings P-4 and P-7 encountered groundwater at 0.5 feet below the existing ground surface. These two boings were performed in the Progresso neighborhood and the high groundwater is suspected be caused by adjacent exfiltration trenches which were filled up from recent storm events.

7.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

The soils encountered in the majority of the borings performed for this study will be suitable for the proposed construction. However, it was previously noted that the portions of the River Oaks, Victoria Park and Southeast Isles areas are likely historical land reclamation areas. These areas as well as several others in the surrounding region, were infilled sometime in the historical past to facilitate the construction of the present residential communities.

The presence of the buried organics will be problematic to the installation of underground utilities especially when the inverts of such systems are founded in the organic layers. Such organics have very low shear strengths and will not support significant excavations made within or through them. As such, it is anticipated that the significant use of sliding trench boxes/shoring/sheet piling will be required to install infrastructure systems in this area.

Lift station structures are anticipated to be constructed well into the underlying sands and limestones. Uplift flotation resistance may be a concern for their design and construction. The buried organics encountered are expected to have little effect on the stability of the wet well structures in the ground since the bottom of the wet wells will be bearing in the sand and limestone layers. Sheet piling will likely be required to support excavations for these deep structures.

Valve vault and pavement structures are anticipated to be constructed above the buried organics. The organic material can remain in-place and a geogrid layer can be placed below the bottom of the valve vault and pavement bedding materials during construction.

7.1 SEAWALL STRUCTURE DESIGN RECOMMENDATIONS

We understand new seawalls are proposed on to be constructed within 18 inches on the water side of the existing seawalls. A #57 stone backfill is proposed for filling between the existing seawalls and the new seawalls. Fourteen (14) separate seawall segments are proposed. Twenty-six (26) SPT borings were performed for the seawall structures. The adjacent roadway or park, approximate wall length, and borings performed for each wall are presented in Table 5:

Table 5 – Sea Wall Locations and Lengths

Seawall Number	Adjacent to	Approximate Length of Wall (feet)	Borings
Seawall 9	Victoria Park	110	S-28

Seawall Number	Adjacent to	Approximate Length of Wall (feet)	Borings
Seawall 10	NE 23rd Avenue	275	S-29
Seawall 12	E Las Olas Boulevard	90	S-15
Seawall 13	E Las Olas Boulevard	80	S-14
Seawall 14	E Las Olas Boulevard	90	S-13
Seawall 15	Isle of Palms Drive	910	S-9 through S-12
Seawall 17	SE 5th Street	170	S-8
Seawall 29	Cordova Road	2,440	S-17 through S-23
Seawall 30	SE 10th Street	360	S-26 and S-27
Seawall 32	Mola Avenue	215	S-16
Seawall 34	Barcelona Drive	110	S-30
Seawall 35	SE 8th Street	550	S-24 and S-25
TBD	Hendricks Isle	255	S-31 and S-32
TBD	Hendricks Isle	65	S-33

7.1.1 SOIL DESIGN PARAMETERS FOR SEAWALLS

Geotechnical soil design parameters for the seawall systems were derived based on field data, laboratory test data, established empirical correlations based on SPT N-values, and our experience. The design soil parameters were developed on an average boring soil profile/per wall basis.

The proposed seawalls will be subjected to lateral earth pressures. The final design elevation of the wall base was not decided and provided at the time of this study. The seawalls will be subjected to lateral at-rest or active earth pressures acting in the direction of the adjacent canal. We have also assumed that adequate drainage provisions will be incorporated into the wall design as needed to prevent hydrostatic build up behind the walls where practical.

The lateral active earth pressures acting on the roadway side of the seawalls, will primarily be resisted by the lateral wall resistance resulting from the wall embedment below the canal side ground elevation exterior face of the wall. The recommend soil parameters with respect to strata are presented in Tables 6 through 20. Input parameters for LPILE are also included in Tables 6 through 20. LPILE is a special-purpose program published by ENSOFT Inc and is used for analyzing a single pile (or drilled shaft) under lateral loading using the p-y method.

Table 6 – Recommended Soil Parameters for Seawall #9 (Boring S-28)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 2	4	22	75	13	11	14	0.455	2.198	0.625	–	5	–	PT
2 – 4	4	29	102	40	16	22	0.347	2.882	0.515	–	10	–	SM
4 – 6	14	36	110	48	19	26	0.260	3.852	0.412	–	30	–	Limestone
6 – 10	6	30	105	43	16	23	0.333	3.000	0.500	–	12	–	Limestone
10 – 20	15	37	110	48	20	26	0.249	4.023	0.398	–	35	–	Limestone
20 – 25	1	28	105	43	15	21	0.361	2.770	0.531	–	5	–	Limestone
25 – 30	29	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
30 – 40	76	38	115	53	17	22	0.238	4.204	0.384	–	125	–	SP
40 – 45	4	29	105	43	16	22	0.347	2.882	0.515	–	10	–	Limestone
45 – 50	12	36	110	48	19	26	0.260	3.852	0.412	–	25	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 7 – Recommended Soil Parameters for Seawall #10 (Boring S-29)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 6	17	32	114	52	17	22	0.307	3.255	0.470	–	40	–	SP, SP-SM
6 – 10	11	24	82	20	12	15	0.422	2.371	0.593	–	10	–	PT
10 – 40	18	38	110	48	21	26	0.238	4.204	0.384	–	45	–	Limestone
40 – 50	34	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 8 – Recommended Soil Parameters for Seawall #12 (Boring S-15)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	14	31	110	48	17	22	0.320	3.124	0.485	–	30	–	SP, SP-SM
4 – 9	5	22	75	13	11	14	0.455	2.198	0.625	–	5	–	PT
9 – 50	17	37	110	48	20	26	0.249	4.023	0.398	–	40	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 9 – Recommended Soil Parameters for Seawall #13 (Boring S-14)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	14	32	114	52	17	22	0.307	3.255	0.470	–	30	–	SP, SP-SM
4 – 9	6	22	75	13	11	14	0.455	2.198	0.625	–	5	–	PT
9 – 50	15	37	110	48	20	26	0.249	4.023	0.398	–	35	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 10 – Recommended Soil Parameters for Seawall #14 (Boring S-13)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 2	17	32	114	52	17	22	0.307	3.255	0.470	–	40	–	SP
2 – 8	10	30	106	44	16	22	0.333	3.000	0.500	–	20	–	SP-SM (Gravelly Sand)
8 – 10	6	30	106	44	16	22	0.333	3.000	0.500	–	12	–	SM
10 – 35	18	38	110	48	21	26	0.238	4.204	0.384	–	45	–	Limestone
35 – 40	10	30	105	43	16	22	0.333	3.000	0.500	–	20	–	Limestone
40 – 50	26	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 11 – Recommended Soil Parameters for Seawall #15 (Boring S-10)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	17	32	114	52	17	22	0.307	3.255	0.470	–	40	–	SP-SM
4 – 8	9	30	106	44	16	22	0.333	3.000	0.500	–	17	–	SP
8 – 20	15	37	110	48	20	26	0.249	4.023	0.398	–	35	–	Limestone
20 – 25	10	30	105	43	16	22	0.333	3.000	0.500	–	20	–	Limestone
25 – 45	13	36	110	48	19	26	0.260	3.852	0.412	–	30	–	Limestone
9 – 50	10	30	105	43	16	22	0.333	3.000	0.500	–	20	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 12 – Recommended Soil Parameters for Seawall #17 (Boring S-8)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 2	14	31	110	48	17	22	0.320	3.124	0.485	–	32	–	SP
2 – 6	5	22	75	13	11	14	0.455	2.198	0.625	–	5	–	PT
6 – 10	10	30	106	44	16	22	0.333	3.000	0.500	–	20	–	SP-SM
10 – 15	19	31	110	48	11	14	0.320	3.124	0.485	–	30	–	ML
15 – 40	17	37	110	48	20	26	0.249	4.023	0.398	–	40	–	Limestone
40 – 50	33	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 13 – Recommended Soil Parameters for Seawall #29 (Boring S-22)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	11	31	110	48	17	22	0.320	3.124	0.485	–	22	–	SP
4 – 12	1	20	66	70	8	14	0.490	2.040	0.658	–	2	–	PT/CL
12 – 20	20	38	110	48	21	26	0.238	4.204	0.384	–	50	–	Limestone
20 – 25	10	30	105	43	16	23	0.333	3.000	0.500	–	20	–	Limestone
25 – 38	11	31	110	48	17	22	0.320	3.124	0.485	–	22	–	SP
38 – 50	14	36	110	48	19	26	0.260	3.852	0.412	–	32	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 14 – Recommended Soil Parameters for Seawall #30 (Boring S-26)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	26	35	120	58	17	22	0.271	3.690	0.426	–	68	–	SP
4 – 8	15	32	114	52	17	22	0.307	3.255	0.470	–	35	–	SP-SM
8 – 10	4	22	75	13	11	14	0.455	2.198	0.625	–	5	–	PT
10 – 20	27	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
20 – 25	4	29	105	43	16	22	0.347	2.882	0.515	–	10	–	Limestone
25 – 35	14	37	110	48	20	26	0.249	4.023	0.398	–	32	–	Limestone
35 – 40	10	30	105	43	16	23	0.333	3.000	0.500	–	20	–	Limestone
40 – 50	12	36	110	48	19	26	0.260	3.852	0.412	–	25	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 15 – Recommended Soil Parameters for Seawall #32 (Boring S-16)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	12	31	110	48	17	22	0.320	3.124	0.485	–	25	–	SP
4 – 6	9	24	82	20	12	15	0.422	2.371	0.593	–	10	–	PT
6 – 10	6	30	106	44	16	22	0.333	3.000	0.500	–	12	–	SP
10 – 30	16	37	110	48	20	26	0.249	4.023	0.398	–	38	–	Limestone
30 – 35	29	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
35 – 50	20	38	110	48	21	26	0.238	4.204	0.384	–	50	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 16 – Recommended Soil Parameters for Seawall #34 (Boring S-30)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 2	16	32	114	52	17	22	0.307	3.255	0.470	–	37	–	SP
2 – 6	12	24	82	20	11	14	0.422	2.371	0.593	–	10	–	PT
6 – 10	4	29	102	40	16	22	0.347	2.882	0.515	–	10	–	SP
10 – 15	21	25	86	24	11	14	0.406	2.464	0.577	–	15	–	PT
15 – 20	15	37	110	48	20	26	0.249	4.023	0.398	–	35	–	Limestone
20 – 30	26	40	115	53	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
30 – 50	19	38	110	48	21	26	0.238	4.204	0.384	–	47	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 17 – Recommended Soil Parameters for Seawall #35 (Boring S-25)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	17	32	114	52	17	22	0.307	3.255	0.470	–	40	–	SP
4 – 10	11	31	110	48	17	22	0.320	3.124	0.485	–	22	–	SP
10 – 50	16	37	110	48	20	26	0.249	4.023	0.398	–	37	–	Limestone

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 18 – Recommended Soil Parameters for Seawall TBD1 (Boring S-31)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	7	30	106	44	16	22	0.333	3.000	0.500	–	12	–	SP
4 – 10	2	24	82	20	11	14	0.422	2.371	0.593	–	2	–	PT
10 – 20	29	40	135	73	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
20 – 40	50	40	135	73	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
40 – 50	19	33	115	53	18	22	0.295	3.392	0.455	–	47	–	SP

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 19 – Recommended Soil Parameters for Seawall TBD1 (Boring S-32)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 4	6	29	102	40	16	22	0.347	2.882	0.515	–	12	–	SP
4 – 18	4	24	82	20	11	14	0.422	2.371	0.593	–	5	–	PT
8 – 10	14	31	110	48	17	22	0.320	3.124	0.485	–	30	–	SP
10 – 20	11	31	135	73	17	24	0.320	3.124	0.485	–	25	–	Limestone
20 – 40	39	40	135	73	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
40 - 50	17	32	114	52	17	22	0.307	3.255	0.470	–	38	–	SP

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

Table 20 – Recommended Soil Parameters for Seawall TBD2 (Boring S-33)

Depth [1] (ft. – ft.)	Average N_{ES}	Recommended Values					Earth Pressure (Rankine's) Coefficients			LPILE Parameters			Soil Class. (USCS/ Soil Type)
		Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Wall Friction Angle [4] (Degrees)		Active, Ka	Passive, Kp	At rest, K_O	Cohesion (psf)	Subgrade Modulus (k, pci)	E50 [2]	
					with Steel	with Concrete							
0 – 2	3	29	102	40	16	22	0.347	2.882	0.515	–	5	–	SP
2 – 10	2	24	82	20	11	14	0.422	2.371	0.593	–	2	–	PT
10 – 20	1	28	98	36	15	21	0.361	2.770	0.531	–	5	–	SP
20 – 30	27	35	135	73	19	22	0.271	3.690	0.426	–	68	–	SP
30 – 40	64	40	135	73	22	26	0.217	4.599	0.357	4,000	1,000	0.004	Limestone[3]
40 - 50	22	33	115	53	18	22	0.295	3.392	0.455	–	55	–	SP

Note: 1. Depth below the existing ground surface.
2. E50 is soil stain parameters for LPILE software analysis.
3. Hard Limestone layer should be modeled as Hard to Stiff Clay in LPILE software analysis.
4. Wall friction angle is based on Table 3-3 in the US Army Corps of Engineers Manual (Design of Sheet Pile Walls, EM 1110-2-2504).

7.2 FOUNDATION RECOMMENDATIONS FOR PUMP STATIONS

Based on the geotechnical exploration and providing the subgrade preparation procedures presented below are followed, it is our opinion that the sites are suitable for the planned pump station construction. The proposed structures may be supported on a mat foundation.

Following the in-situ foundation preparation recommendations below, the proposed structure foundations may bear within the prepared existing sands and limestones beneath the organic materials. The net allowable soil bearing pressures are provided in Tables 21 through 32. The net bearing pressure is defined as the soil bearing pressure at the foundation bearing level in excess of the natural overburden pressure at that level. To verify suitable bearing, we recommend that the foundation excavation subgrade be checked by a geotechnical engineer just prior to mat rebar placement. The excavation bottom should be kept as dry as practically possible during construction.

Resistance to lateral loads can be derived from 1) passive pressure acting on the sides of the foundations and any grade beams, and 2) lateral resistance along the base of the foundations. Lateral resistance derived from friction between the soil and the bases of the footings should be calculated based on a friction factor of 0.35 times the base contact bearing pressure. Passive resistance of the upper foot of soil should be neglected, unless it is confined by a slab or pavement. Passive resistance on the sides of the foundations should be ignored if these soils can be hypothetically washed away during a hurricane storm event.

A subgrade modulus of 250 psi/in may be used in the design of a mat/raft foundation provided that the subgrade and subsequent engineered granular fill is prepared as described below. A 6-inch

leveling layer of clean (less than 5% passing a #200 sieve) granular fill is recommended to be placed directly below slab-on-grade floors where appropriate. The granular fill should be compacted until densities of at least 95% of the maximum dry density as determined by ASTM D1557, the Modified Proctor method. Based on our assumption of a structure supported on a shallow footing or mat foundation system, the total settlement should be less than 1.0 inches, and differential settlements should be less than 0.50 inches.

7.2.1 RECOMMENDED SOIL PARAMETERS FOR PUMP STATION DESIGN

Underground pump stations for this project will need to be designed to resist pressures exerted by the adjacent soils and hydrostatic uplift head conditions on the base of the structure. For walls that are not restrained during backfilling but are free to rotate at the top, active earth pressure should be used in design. Walls that are restrained should be designed assuming at-rest pressures. Recommended soil parameters for the soils encountered at the sites are given in Tables 21 through 32.

Table 21 – SPT BORING DR-1

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 8	7	8	30	108	46	0.333	3.000	0.500	1250
8 - 10	2	2	29	106	44	0.347	2.882	0.515	400
10 - 25	15	18	33	114	52	0.295	3.392	0.455	2500
25 - 30	13	16	32	112	50	0.307	3.255	0.470	3000
30 -50	28	34	40	128	66	0.217	4.599	0.357	4000

Table 22 – SPT BORING DR-2

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	7	9	30	108	46	0.333	3.000	0.500	1250
2 - 4	9	11	31	110	48	0.320	3.124	0.485	1800
4 - 6	6	7	30	108	46	0.333	3.000	0.500	1200
6 - 10	3	4	29	106	44	0.347	2.882	0.515	500
10 - 30	13	16	32	112	50	0.307	3.255	0.470	3000
30 - 50	23	29	40	128	66	0.217	4.599	0.357	4000

Table 23 – SPT BORING P-5

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	7	9	30	108	46	0.333	3.000	0.500	1200
2 - 4	11	14	31	110	48	0.320	3.124	0.485	2000
4 - 10	7	9	30	108	46	0.333	3.000	0.500	1500
10 - 30	13	16	32	112	50	0.307	3.255	0.470	3000
30 - 50	19	24	39	126	64	0.228	4.395	0.371	4000

Table 24 – SPT BORING P-6

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	4	5	29	106	44	0.347	2.882	0.515	750
2 - 4	9	11	31	110	48	0.320	3.124	0.485	1500
4 - 10	6	7	30	108	46	0.333	3.000	0.500	1000
10 - 30	13	16	32	112	50	0.307	3.255	0.470	3000
30 - 50	19	24	39	126	64	0.228	4.395	0.371	4000

Table 25 – SPT BORING R-9

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	9	11	31	110	48	0.320	3.124	0.485	1500
2 - 6	7	9	27	102	40	0.376	2.663	0.546	1000
6 - 8	3	4	29	106	44	0.347	2.882	0.515	500
8 - 15	7	9	30	108	46	0.333	3.000	0.500	1500
15 - 25	14	17	32	112	50	0.307	3.255	0.470	2500
25 - 30	7	9	30	108	46	0.333	3.000	0.500	2500
30 - 50	10	12	31	110	48	0.320	3.124	0.485	3000

Table 26 – SPT BORING R-10

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	9	11	31	110	48	0.320	3.124	0.485	1500
2 - 4	6	7	27	102	40	0.376	2.663	0.546	1000
4 - 6	9	11	31	110	48	0.320	3.124	0.485	1500
6 - 8	5	6	30	108	46	0.333	3.000	0.500	750
8 - 10	3	4	29	106	44	0.347	2.882	0.515	500
10 - 15	7	9	30	108	46	0.333	3.000	0.500	1250
15 - 20	9	11	31	110	48	0.320	3.124	0.485	1750
20 - 25	8	10	30	108	46	0.333	3.000	0.500	1750
25 - 50	11	14	31	110	48	0.320	3.124	0.485	2500

Table 27 – SPT BORING R-11

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 4	7	8	30	108	46	0.333	3.000	0.500	1100
4 - 6	3	4	29	106	44	0.347	2.882	0.515	500
6 - 15	7	9	30	108	46	0.333	3.000	0.500	1250
15 - 30	19	24	34	116	54	0.283	3.537	0.441	3000
30 - 40	28	35	37	122	60	0.249	4.023	0.398	4000
40 - 50	19	24	34	116	54	0.283	3.537	0.441	4000

Table 28 – SPT BORING R-12

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 4	8	10	30	108	46	0.333	3.000	0.500	1500
4 - 6	2	2	10	68	6	0.704	1.420	0.826	0

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
6 - 8	9	11	31	110	48	0.320	3.124	0.485	1500
8 - 15	6	7	30	108	46	0.333	3.000	0.500	1000
15 - 35	20	25	34	116	54	0.283	3.537	0.441	3000
35 - 40	29	36	35	118	56	0.271	3.690	0.426	4000
40 - 50	20	25	34	116	54	0.283	3.537	0.441	4000

Table 29 – SPT BORING S-6

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	5	6	30	108	46	0.333	3.000	0.500	800
2 - 6	12	15	32	112	50	0.307	3.255	0.470	2100
6 - 8	7	9	30	108	46	0.333	3.000	0.500	1250
8 - 10	2	2	29	106	44	0.347	2.882	0.515	250
10 - 35	26	32	35	118	56	0.271	3.690	0.426	3000
35 - 50	6	7	30	108	46	0.333	3.000	0.500	2000

Table 30 – SPT BORING S-7

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 2	5	6	30	108	46	0.333	3.000	0.500	800
2 - 6	10	12	31	110	48	0.320	3.124	0.485	1750
6 - 10	6	7	30	108	46	0.333	3.000	0.500	1000
10 - 20	31	38	40	128	66	0.217	4.599	0.357	3500
20 - 25	9	11	31	110	48	0.320	3.124	0.485	2500
25 - 35	15	19	38	124	62	0.238	4.204	0.384	2750
35 - 40	7	9	30	108	46	0.333	3.000	0.500	2500
40 - 50	12	15	37	122	60	0.249	4.023	0.398	3000

Table 31 – SPT BORING V-8

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 4	14	17	32	112	50	0.307	3.255	0.470	2500
4 - 10	3	4	10	68	6	0.704	1.420	0.826	0
10 - 20	10	12	36	120	58	0.260	3.852	0.412	1500
20 - 30	12	15	32	112	50	0.307	3.255	0.470	2500
30 - 50	35	43	40	128	66	0.217	4.599	0.357	4000

Table 32 – SPT BORING V-9

Boring depth (ft - ft)	Average N_{AUTO}	Average N_{ES}	Recommended Values			Earth Pressure Coefficients			Bearing Capacity (psf)
			Friction Angle (Degrees)	Total Unit Weight (pcf)	Submerged Unit Weight (pcf)	Active, Ka	Passive, Kp	At rest, Ko	
0 - 6	3	3	29	106	44	0.347	2.882	0.515	400
6 - 8	11	14	31	110	48	0.320	3.124	0.485	1500
8 - 15	6	7	30	108	46	0.333	3.000	0.500	1000
15 - 35	7	9	30	108	46	0.333	3.000	0.500	1500
35 - 50	11	14	36	120	58	0.260	3.852	0.412	2000

Design should incorporate hydrostatic effects. In order to avoid wall damage due to excessive compaction, hand operated mechanical tampers should be used to densify backfill soils. Heavy vibratory compaction equipment should not be allowed within five feet of walls. The soils behind walls should consist of clean sands as described in the Select Fill Composition, Placement and Compaction section of this report and should be compacted to approximately 95 percent of the material's modified Proctor (ASTM D-1557) maximum dry density.

7.2.2 AUGER CAST PILE RECOMMENDATIONS FOR LIFT STATION DESIGN

At the time of this report, three lift stations were proposed. The proposed locations and depths of the lift stations are presented in the following Table 33:

Table 33 – Lift Station Information

Lift Station Location	Bottom Depth from existing ground surface (feet)	Borings
Merle Fogg Park	12	S-6 and S-7
River Oaks Outfall	19	R-9 through R-12
Victoria Park	16	S-28

Due to the depth of the lift stations, buoyancy is a potential concern where the weight of concrete structure is not sufficient to resist uplift without using piles in tension. Augered Cast-In Place (ACIP) concrete piles are reportingly being proposed to counter act the buoyancy forces. It is our understanding that an uplift resistance on the order of 35 tons is necessary for each lift station to counteract the buoyancy forces.

The following capacity estimates have been provided for 16-inch diameter ACIP piles:

- For the Merle Fogg Park lift station, ACIP piles tipped 50 feet below the existing ground surface can achieve approximately fifteen (15) tons of design tension capacity each.
- For the River Oaks lift station, piles tipped 50 feet below the existing ground surface can achieve approximately eight (8) tons of tension capacity each.
- For the Victoria Park lift station, piles tipped 50 feet below the existing ground surface can achieve approximately eight (8) tons of tension capacity each.

Please note that different combinations of pile depths and diameters may be considered depending on the final design. Also note that additional uplift capacity can be achieved by overbuilding the Lift Station mat so that it protrudes a few to several feet beyond the walls of the structure. Under such a design, the submerged unit weight of the soils above the outer extending foundation mat lip will help hold the structure down. If the mat is enlarged enough, the weight of the exterior submerged soils above the extending lip may be able to resist a significant portion of the uplift. For analysis purposes, an average submerged unit weight of 62.4 pcf can be used for the Lift Station backfill for that soil volume directly around the structure and above the mat. Additionally, if the Lift station were to begin to rise, it would also have to shear the soil in a box type vertical plane surrounding the structure mat perimeter. This shear will add additional uplift resistance to the structure and can be calculated using a soil Phi (ϕ) value of 32 degrees times the average normal in-situ horizontal (Ko) effective (i.e. submerged) soil pressure along the vertical plane surrounding the structure.

7.3 FOUNDATION RECOMMENDATIONS FOR ELECTRICAL EQUIPMENT BUILDINGS

Our recommendations for foundation design and construction of the electrical equipment buildings are based on the following:

1. Two buildings are proposed,
    a. One building is proposed at Merle Fogg Park, in the southeast quadrant of the intersection of E. Las Olas Boulevard and Poinciana Drive in the Southeast Isles Neighborhood. Borings S-6 and S-7 are located in this area.
    b. The second building is proposed at the River Oaks-Outfall. The River Oaks Outfall is located in the west side of the River Oaks neighborhood, adjacent to the east side of I-95 and just south of the South Fork New River. Borings R-9 through R-12 are located in this area.
2. The buildings will be one-story in height, and will house electrical equipment.
3. The floor elevation of the buildings will be approximately 6 feet above current grade.
4. The anticipated foundation system will be a combination of continuous strip footings under walls and isolated spread footing under columns.

If this information is incorrect or changes, we should be notified so we can review our recommendations and revise them if necessary.

Based on the geotechnical exploration and providing that the subgrade preparation procedures presented below are followed, it is our opinion that the site is suitable for the planned building construction. The proposed structure may be supported on shallow footings or preferably a raft mat type of foundation.

Following the in-situ foundation preparation recommendations herein, the proposed structure foundation may be designed using a net allowable soil bearing pressure of up to 1,500 pounds per square foot (psf) bearing when founded within the densified existing sands. When founded within a well compacted, elevated fill pad constructed with select engineered granular fill, a net allowable soil bearing pressure of up to 2,500 pounds per square foot (psf) bearing may be utilized.

The net bearing pressure is defined as the soil bearing pressure at the foundation bearing level more than the natural overburden pressure at that level. To verify suitable bearing, we recommend that the foundation excavation subgrade be checked by a RADISE geotechnical engineer just prior to concreting. The excavation bottom should be kept as dry as practical during construction.

A subgrade modulus of 200 psi/in may be used in the design of a mat/raft foundation if the subgrade and subsequent engineered granular fill is prepared as described below. A 6-inch layer of clean (less than 5% passing a #200 sieve) granular fill is recommended to be placed directly below slab-on-grade floors where appropriate. The granular fill should be compacted until densities of at least 95% of the maximum dry density as determined by ASTM D1557, the Modified Proctor method. This layer will aid in providing a capillary moisture break below the concrete slab. We also recommend a moisture vapor barrier be placed under all areas especially where floors will have moisture sensitive coverings, or where stored materials are moisture sensitive.

To assure an adequate factor of safety against a shearing failure in the subsoils:

- Footing base should be at a depth of at least 18 inches below lowest adjacent grades.
- Continuous footings should be at least 16 inches wide.
- Isolated foundations should not be less than 30 inches wide.
- The required embedment depth may be reduced to 12 inches if a monolithic raft/ mat slab type of foundations is used.

7.3.1 RIVER OAKS OUTFALL ELECTRICAL EQUIPMENT BUILDING

For Merle Fogg Park, none of the borings performed in this location encountered any organic material. For the River Oaks Outfall, three of the four soil borings (R-9, R-10, and R-12) performed in the area of the proposed electrical equipment building encountered a 2 to 4 feet thick layer of organic material at depths ranging from 2 to 5 feet below the existing ground surface. The evaluation of the organic material layer is only relevant for the electrical equipment building, since the bearing depth of the foundation for the lift station structure is well below the organic material layer.

The foundation for the electrical equipment building is expected to bear above the organic material layer encountered in the borings. If the organic material layer is left in place below the electrical equipment building, some total and differential settlement (both short-term “immediate-type” and long term “creep-type” secondary settlement) will occur. Such settlements result from the weight of the structural fill and structure placed above the organic material and the associated short term primary settlement and long term “creep-type” secondary settlement inherent to compressible organic soil material. Settlement caused by the encountered organic material layer beneath he structure is expected to moderately affect the proposed electrical equipment building.

If moderate settlements of the electrical equipment building on the order of 3-4 inches is considered problematic, then we recommend that to eliminate settlement related issues, the organic material encountered in the borings be excavated and removed prior to construction of the electrical equipment building. Alternatively, the organic material can be left in place and the area preloaded with 5 feet of dumped and stacked fill to induce settlement similar to the increased stress caused by the construction of the proposed control building. Excavated organic material is generally not appropriate for reuse in other construction as it has a tendency to consolidate, erode and generally bio-degrade with time. Therefore, excavated organic material should be disposed of at a suitable on or off-site location.

7.4 PAVEMENT DESIGN CONSIDERATIONS

The following information is provided and intended as a guideline only, as the roadway or any replacements/repairs thereof, should be designed specifically for the vehicle load intensities for the respective roadways and frequencies anticipated during the life of the project. Flexible pavement systems in this south Florida geographic area, typically consist of an asphaltic concrete wearing course, limerock base course and a stabilized pavement subgrade. Based on our preliminary findings and analysis and experience in the area, the typical pavement section

thicknesses shown in the following Table 34, are commonly used by local pavement design engineers.

TABLE 34: TYPICAL FLEXIBLE AND RIGID PAVEMENT DESIGN

TYPE OF PAVEMENT	LAYER	MATERIAL DESCRIPTION	LAYER THICKNESS		
			LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY
Flexible	Asphaltic concrete	Florida DOT Asphalt Type S	1.5	1.75	2.0
	Base course	Crushed limerock with minimum LBR of 100, compacted to 98% of the Modified Proctor maximum dry density	6.0	7.0	8.0
	Stabilized subbase	Stabilized sub-base fill with a minimum LBR of 40 compacted to 95% of the Modified Proctor maximum dry density	12.0	12.0	12.0
Rigid	Concrete	Florida DOT Portland Cement Concrete	6.0	7.0	8.0
	Compacted subgrade	Natural in place soils compacted to at least 95 percent of the materials Modified Proctor maximum dry density	12.0	12.0	12.0

Comparison of the above typical design thicknesses with asphalt pavement measurements provided in Tables 1 and 2 indicates that most of the asphalt cores measured thickness would comply with or exceed the above typical design thicknesses for light duty pavements. The asphalt cores that do not comply with the above typical asphalt design thickness for light duty asphalt pavement were encountered at borings D-4, DR-5, E-1, P-4, R-4, R-8, and V-5. We suspect that the substandard asphalt thicknesses were likely adequate for the design traffic loading conditions at the time of the initial roadway design and construction. For the asphalt thickness that exceed the above recommended thicknesses, we suspect that asphalt mill and resurfacing overlays were installed over the original asphalt to repair distress.

From a base thickness perspective, thirty-eight (38) of the sixty-eight (68) base course thickness measurements meet or exceeds a base course thicknesses of 6 inches and are considered acceptable for light duty pavement design and use in light duty trafficked areas. However, given the thickness of the asphalt cores and a general rule of thumb that one inch of asphalt is equivalent to two inches of compacted limerock base, the combination of both of the measured base and asphalt material thicknesses would appear to provide a suitable pavement section thickness in most areas such that a pavement mill and re-surface program may prove cost effective. Further analyses of the pavement section will need to be provided by a civil pavement design engineer experienced with such evaluations. We suspect that the substandard base course thicknesses were adequate for the traffic loading during the initial roadway construction.

From a subgrade perspective, in our opinion the nature and composition of the subgrade soils at the location of the borings performed for this study would essentially be in compliance with typical pavement construction designs for light duty pavement section design.

Any new or re-constituted base course material should consist of crushed limestone having a minimum Limerock Bearing Ratio (LBR) of 100. Base materials should meet the requirements presented in the latest revisions of the Florida Department of Transportation "Specifications for Road and Bridge Construction", Section 911 (limestone). The base course should be compacted to at least ninety-eight (98) percent of its maximum dry modified proctor density (AASHTO T 180).

We recommend that any new pavement subgrade be stabilized to a depth of twelve (12) inches to achieve a minimum LBR of 40. If necessary, this LBR value can be achieved by blending base material (limerock) with the existing sandy subgrade soils. The required mixing ratio should be determined by laboratory testing. The stabilized subgrade should be compacted to at least ninety-eight (98) percent of its maximum dry as determined per ASTM D 1557, the Modified Proctor Method.

A Portland concrete pavement thickness in the range of eight (8) inches would also be recommended for the project if a rigid pavement is to be employed (the thickness would depend on specific pavement use). Any concrete pavement should be reinforced to withstand the anticipated traffic loadings and jointed to reduce the chances for rigid pavement crack development. The minimum rigid pavement thickness recommended above is based upon concrete with an unconfined compressive strength of at least 3,000 psi and a modulus of rupture of at least 450 psi. It should be noted that this recommendation is intended for the street pavement and not for concrete driveway aprons or sidewalks.

Actual pavement section thickness should be determined by the Design Civil Engineer based on traffic loads, volume, and the Owner's design life requirements. The above sections represent minimum thickness representative of typical local construction practices and, as such, periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to FDOT, American Concrete Institute (ACI), and/or appropriate City or County requirements for roadway pavement construction.

7.4.1 PERVIOUS PAVEMENT DESIGN CONSIDERATIONS

The soil borings and laboratory test results indicate that most of the existing sands encountered are suitable for subgrade use in pervious pavement areas, as defined by the South Florida Water Management District (SFWMD). The sand subgrade soils should be compacted to a maximum density of 95% of the maximum dry density as determined by ASTM D1557, or AASHTO T180, to a minimum depth of 24 inches. As per the SFWMD specifications, subgrade stabilization is not required for sand type of soils (SP). If additional fill material is required to bring the subgrade to final elevation, it should be hydraulically clean (maximum of 10% silt or clay), and free of deleterious materials.

For redevelopment projects where the existing pavement section is to be removed; the compacted base should also be removed and the underlying subgrade soils scarified to a minimum depth of 20 inches. The subgrade should be re-graded and filled with clean (hydraulically clean and free of deleterious material) soils. The clean soils should be placed in 8-inch maximum layers and compacted to a maximum density of 95% of the Modified Proctor density within 3% of the optimum moisture content (ASTM D-1557, or AASHTO T180).

It is recommended by SFWMD that the Seasonal High Groundwater Table (SHGWT) elevation be greater than 24 inches below the bottom of any pervious pavement system. The pervious pavement system is suggested to include an underlying storage reservoir consisting of pea rock, #57 stone, etc. If utilized, the underlying storage reservoir should be wrapped with geo-fabric. SFWMD recommends that the underlying storage reservoir layer be no more than 36 inches thick. Runoff from adjacent landscaped areas should not be directed onto any pervious pavement system unless the adjacent landscape areas that drain onto the pervious pavement, will not increase sediment, silt, sand, or organic debris deposition on the pavement that increases the potential for clogging of the pervious pavement section. The site design should include measures to reduce the likelihood of silts and sands from entering and plugging the pervious pavement system void spaces.

Periodic vacuum sweeping of pervious pavements can be used and is recommended. For areas where wind transported soil (i.e. near sand dunes or other coastal areas), or other conditions where excessive soil or other material deposition can occur, vacuum sweeping should be utilized a minimum of twice a year.

7.5 CLEARING AND GRUBBING

Clearing and grubbing may be required in some of the proposed construction areas. Clearing and grubbing where required should include the complete removal and disposal of surficial grasses, associated root systems, topsoil, rubbish, debris, any demolition material/pavement and all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas.

7.6 UNDERGROUND UTILITIES

Existing underground utilities and structures are likely to be present in the proposed construction areas. These utilities need to be properly identified, and located and/or relocated as necessary to construct the new components of the project. The excavation bottoms of any relocated or replacement utilities should be cleaned of any undesirable materials prior to placing any engineered backfill.

Site preparation, excavation, and backfilling for new utilities or re-aligned utilities should follow all of the applicable recommendations of this report.

7.7 EXCAVATIONS

The project construction Contractor is solely responsible for making any utility or other excavations in a safe manner and to provide appropriate measures to retain side slopes to ensure that persons working in or near the excavation are protected. Any structural retaining walls shall be designed and sealed by a structural engineer registered in the State of Florida.

Excavations shall comply with Occupational Health and Safety Administration (OHSA) stipulations for Trench Excavation Safety including all temporary design and safety requirements. The soils encountered in the majority borings outside of the Victoria Park and Southeast Isles area, generally consist of relatively clean sands. OSHA 29 CFR part 1926 (Subpart P, Excavations) defines such soils as Type C soils. As such, the granular deposits encountered in the borings are readily capable of being excavated to a depth of several feet with standard backhoe construction equipment. As such, temporary side slopes in fully dewatered excavations could be made at a 1½H:1V inclination or flatter. Adjustment to this inclination and/or the use of sheeting, shoring or sliding trench boxes should be evaluated by the Contractor if other soil strata are encountered.

It is noted that in the Victoria Park, River Oaks, and Southeast Isles areas, that significant organic deposits were encountered in the borings performed for these areas. Correspondingly, utilities installed in these areas are likely to encounter highly organic material during the utility excavation and installation process requiring cleaning or removing of the organic deposits prior to placing any engineered backfill as mentioned in section 7.10.

7.8 DEWATERING

At the time of the field exploration (i.e. September 2017, October 2017 & July 2018), the groundwater encountered varied between 0.5 to 6.5 feet below the existing ground surface. In-the-dry construction of the underground utilities may require groundwater lowering and control of groundwater seepage depending on the design installation depths. Dewatering of the excavations may necessitate the use of sumps, wells, wellpoints or combinations thereof. Control of groundwater should be accomplished in a manner that preserves the integrity of the in-situ soils and limestones and does not cause instability of the excavation sidewalls. The dewatering system employed should be capable of maintaining a pre-drained surface a minimum of 24 inches below the excavation bottoms. It is important to note that dewatering measures should be controlled in areas with organic soils so that the groundwater is not lowered beneath any nearby structure supported on grade. Dewatering of the organic soils will cause an increase in unit weight of the soils and a reduction in volume, resulting in primary consolidation settlement.

7.9 PIPE BEDDING

Most of the sands encountered in the borings are expected to provide good support for utility pipelines without the need for bedding when the invert elevations are at least 24 inches above the groundwater level (natural or pre-drained by dewatering). In areas where organics or other deleterious materials are encountered at or within 2 feet below the pipe invert, such soils shall be

considered compressible and unsuitable for pipe support. These soils should be over-excavated and replaced with compacted clean sand or FDOT No. 57 coarse aggregate or an approved equivalent. If FDOT No. 57 stone or an approved equivalent is utilized, such stone material will need to be encapsulated and/or covered with a geosynthetic fabric especially beneath pavement areas. Such fabric material is needed to prevent granular excavation soils and trench backfill from penetrating/settling into the void volumes of the open stone resulting in loss of ground and eventual settlement of the ground surface above the piping.

The bedding surface should be uniformly compacted to a density of not less than 95 percent of the maximum dry density in accordance with ASTM D 1557, the Modified Proctor Method.

7.10 TRENCH BACKFILL AND COMPACTION

Soils used to backfill utility excavations should consist of clean sands having no materials larger than one inch in size, not more than ten (10) percent passing the U.S. Standard No. 200 sieve, and not more than three (3) percent organics or other deleterious materials by weight. Some of the subsurface soils encountered at these neighborhood sites appear to meet these criteria and are suitable for reuse as backfill once inspected, tested and approved.

Granular backfill should be placed at a moisture content within three (3) percent of its ASTM D 1557 determined optimum moisture and in level lifts whose thickness does not exceed eight (8) inches. Each fill lift should be stable, unyielding and uniformly compacted to at least 95 percent of the maximum dry density in accordance with ASTM D 1557, the Modified Proctor Method. We recommend the use of only relatively light, hand-held compaction equipment in the densification operations around utilities to limit the potential damage to the pipelines and buried structures.

7.11 SITE PREPARATION

The site preparation for any roadway modifications and for new structures should consist of necessary clearing and grubbing in general accordance with Section 110 of the FDOT Standard Specifications for Road and Bridge Construction or any similar City/County standard design criteria applicable to the project. Any topsoil or other deleterious material encountered in proposed construction areas, will need to be stripped, removed and replaced with embankment, roadway or structural fill, as applicable. If buried organic soils, debris or other unsuitable materials are encountered during the construction, which are or are not disclosed by the borings, they should be removed and replaced with a backfill material as described in following sections.

The Stratum 1 soils are select granular soils and are satisfactory to use in the subgrade and embankment when utilized in general accordance with FDOT Standard Index 505 or any similar City/County standard design criteria applicable to the project. Soils exposed at the stripped grades will require moisture conditioning to near the optimum moisture content prior to initiating the densification operations. In residential areas, the use of such heavy vibratory compaction equipment may prove problematic and disruptive or even damaging to existing/adjacent home

owner's properties. In such cases, the compaction will need to be performed and achieved with lighter weight, less vibration generation capable equipment such as walk behind (e.g. Whacker) ground pounder or small vibratory rolling equipment.

Each section of the stripped grade should be subjected to multiple, overlapping coverages of the compactor as it operates at a travel speed of no more than 1.5 miles per hour (normal walking speed). Compaction should be continued until no further settlement can be visually discerned at the ground surface. The densified areas should include a 3-foot perimeter along proposed new pavement areas.

Density control should be exercised for the exposed subgrade for any roadway repairs or beneath new structures. Soils in this interval should be compacted to not less than 95 percent of the maximum dry density in accordance with ASTM D 1557, the Modified Proctor Method. Subgrade soils that noticeably pump or deflect under the weight of the passing compaction equipment, could indicate the presence of soft, weak, overly saturated soils or compressible and loose soil zones existing in the near surface subgrade within the depth of influence of the roller. In such cases, those areas should be remedied by appropriate means to be determined by the inspecting field representative in consultation with representatives of the design team.

7.12 SELECT FILL COMPOSITION, PLACEMENT AND COMPACTION

Site structural and pavement embankment fill and backfill required for construction should consist of clean, granular materials that are free of debris, cinders, combustibles and organic matter. The fines content (i.e., material passing U.S. Standard No. 200 sieve) should not be more than ten (10) percent by weight, no particle sizes larger than one (1) inches in any direction and the organic content should not exceed three (3) percent by dry weight. The on-site sand soils appear to meet the above criteria and are suitable for use as structural fill and backfill material. Organic laidened soils encountered in several of the borings soils beneath the upper sand layer such as those encountered in the River Oaks, Victoria Park and Southeast Isles area, will not be suitable for use of Select Fill.

The granular fill should be placed at a moisture content within three (3) percent of its Modified Proctor (ASTM D 1557) determined optimum in level lifts whose loose thickness does not exceed twelve (12) inches. In areas where heavy equipment cannot be operated for compaction, the fill should be placed in six (6) inch thick level lifts. Each fill lift should be stable, unyielding and uniformly compacted to 95 percent of the ASTM D 1557 maximum dry density, as verified by the designated site construction inspecting representative.

Select fill soils will require moisture conditioning to near the optimum moisture content prior to initiating the densification operations. Similar to the subgrade preparation, the fill densification should normally be accomplished using a self-propelled vibratory compactor which imparts a dynamic drum force of not less than 44,000 pounds. However, in residential areas, the use of such heavy vibratory compaction equipment may prove problematic and disruptive or even damaging to existing/adjacent home owner's properties. In such cases, the compaction will need to be

performed and achieved with lighter weight, less vibration generation capable equipment such as walk behind (e.g. Whacker) ground pounder or small vibratory rolling equipment.

7.13 OBSERVATION AND TESTING

It is recommended that a geotechnical engineer be retained to provide soil engineering inspection services during the construction excavation phase of the project. This is to observe compliance with the design concept, specifications and recommendations, and to allow design changes in the event subsurface conditions differ from those anticipated. In addition, an inspection and testing representative of a geotechnical engineer should be present to provide monitoring and testing of both fill and concrete placement during the construction phase of the project.

8.0 EXISTING UTILITIES

Existing utilities could potentially be present within or near the proposed seawalls. Precautionary measures should be taken to identify and locate any such systems impacted by the planned construction. Where encountered, mitigative design details should be provided accordingly. Consideration should be given as to what kind of utilities are present (i.e. nature and composition), and what the utility or other owner's guidelines and specifications are regarding their re-location etc. Utility locates should be in general accordance with the FDOT Plans Preparation Manual, Section 5.3 – Utility Locates.

9.0 PROTECTION OF EXISTING STRUCTURES

Ground vibrations induced upon adjacent structures, primarily by soil compaction equipment or any other construction activities such as pile driving, should be monitored to assure that they do not reach levels which prove damaging to any adjacent/nearby structures. Vibration Monitoring should be performed in general accordance with "Section 108, Protection of Existing Structures" of the current FDOT Standard Specifications for Road and Bridge Construction or other similar local City/County regulations or ordinances.

Vibration levels on adjacent facilities should generally be maintained below a 0.25 inches/second peak particle velocity level however, more restrictive/lessor levels as low as 0.10 inches/second may be specified for highly sensitive residential or historical areas. The construction Contractor will need to inventory and provide a pre-construction inspection of adjacent structures and determine suitable vibration monitoring programs and impact limits for their construction activities. Such monitoring will be particularly important for the Victoria Park and Southeast Isles area as the ground conditions will have a higher tendency and capability to transmit vibrations horizontally from the construction activities.

It is noted that the residential homes in the Victoria Park and Southeast Isles area are likely founded on short driven piles installed to sound bearing conditions beneath the buried organics.

Vibrations in the lower soil/rock layers beneath the organics, from construction activities such as sheet piling installation, will have the potential to be transmitted into the residences via the piling foundations installed for the structures. Typically, for sheet piling and driven pile installations, a maximum allowable peak particle velocity of 0.10 inches/second has been used in the construction specifications for areas of similar natured residential and commercial structures that exist in this project area.

10.0 LIMITATIONS

This report is intended for geotechnical purposes only, and not to document or detect the presence, or absence of any environmental conditions at the site, or to perform an environmental assessment of the site.

The analysis and recommendations presented in this report are based upon our interpretation of the subsurface information revealed by the test borings. The report does not reflect variations in subsurface conditions that may exist between or beyond these borings. Variations in soil and groundwater conditions should be expected, the nature and extent of which might not become evident until construction is undertaken. If variations are encountered, and/or the scope of the project altered, we should be consulted for additional recommendations.

RADISE International warrants that the professional services performed and presented in this report are prepared for Hazen and Sawyer, and are based upon typical standard of care recognized principles and practices in the discipline of geotechnical engineering and hydrogeology at this place and point in time, for this project site. No other warranties are expressed or implied.

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RADISE appreciates the opportunity to be of service to you. Please feel free to contact us at 561-841-0103 if you have any questions or comments regarding this report.

Respectfully submitted
RADISE International, L.C.