PROJECT NO. 11842

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. Replacements shall be established 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 2019 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. 11842

SECTION 01320

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall submit Project Record Documents, including As Builts and As Built GIS Database updates as specified herein.

B. 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. Make documents and samples available at all times for inspection by City and City Project Manager.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by Engineer.

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 ACAD format)

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 AND RECORD 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 for review. Contractor will prepare record drawings based on as-built information.

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 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-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 (one-tenth 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 (24"x36" or 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, 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 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 Project Manager the reproducible AS-BUILT Drawings and electronic files. The completed AS-BUILT Drawings shall be delivered to the City Project Manager 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 Project Manager.

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 '90 adjustment for horizontal).

G. Representative items of Work that should be shown on the record Drawings as verified, changed or added are shown below:

1. <u>Plans:</u>

a. Structure types, location with grade of rim and flow-line elevations.

b. Pipe 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-of-way.

e. Spot (critical) elevations at plateaued intersections. (P.C., P.T., and mid point of all intersections, etc.)

f. Sewer laterals shall 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 an electronic set 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.

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 the 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 Drawings 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 stormwater, 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 stormwater, water, and wastewater facilities.

3. Indicate pipe joint locations where stormwater, water, wastewater or reclaimed water piping crosses.

4. Indicate the length of gravity stormwater and 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 elevations at vertical deflection points and every 200 feet along straight runs.

b. Top of pipe of stormwater, 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 and stormwater 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/stormwater 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 AS BUILT GIS DATABASE REQUIREMENTS

A. The Contractor shall submit updates to the City's GIS database cataloging the constructed stormwater infrastructure. Updates shall be in accordance with the City's latest geodatabase and corresponding Geodatabase Data Dictionary. The Geodatabase Data Dictionary is provided as an attachment to this specification.

B. Contractor shall enter location and attribute information collected from survey field work and final As-Built Drawings into a City issued geodatabase template. The City shall provide a template in Microsoft Excel format to be used for data entry. This template will adhere to the City's geodatabase schema for feature classes, related tables, and domain tables. The asset types to be collected and delivered shall include, but not limited to, the following assets:

1. Control valves
2. Exfiltration trenches
3. Gravity mains
4. Pressurized mains
5. Inlets
6. Manholes
7. Network structures (including pump stations or pipe ends)
8. Inline valves
9. Outfalls

C. Attribute types shall be coordinated with the City, but shall adhere to the requirements of the City's Geodatabase Data Dictionary.

1.07 SUBMITTAL

A. Submittals of final As-Built Drawings shall be made with monthly payment applications and at the completion of the entire project. 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. Submittal of the draft As-Built GIS Database shall be done electronically. The Engineer will review the Excel file for completeness. The City shall provide written comments on the submittal. The Contractor shall provide a written response for each comment. The Contractor shall make revisions to the Excel file and submit both the responses to the comments and the revised database file for review by the Engineer and the City. Should further modifications of GIS database file be required, the Contractor shall make these modifications at no additional cost to the City.

D. Accompany all submittals with transmittal letters 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 -

Geodatabase Documentation

Date: Monday, July 6, 2020
Time: 2:44:41 PM

Summary Information and Links

0 Feature Datasets and 13 Feature Classes
No Topology Datasets
No Geometric Networks
No Rasters
16 Tables (Object Classes)
13 Relationship Classes
30 Domains

Feature Datasets and Child Classes

Rasters

Workspace-Level Tables and Feature Classes

DynamicValue - Table
GDB_ServiceItems - Table
GenerateId - Table
ssBendReference - Table
ssCleanOutReference - Table
ssControlValveReference - Table
ssEmergencyOverflowReference - Table
ssFittingReference - Table
ssGravityMainReference - Table
ssLateralLineReference - Table
ssManholeReference - Table
ssNetworkStructureReference - Table
ssPressurizedMainReference - Table
ssPumpStationReference - Table
ssServiceConnectionReference - Table
ssSystemValveReference - Table
ssBend - Feature Class
ssCleanOut - Feature Class
ssControlValve - Feature Class
ssEmergencyOverflow - Feature Class
ssFitting - Feature Class
ssGravityMain - Feature Class
ssLateralLine - Feature Class
ssManhole - Feature Class
ssNetworkStructure - Feature Class
ssPressurizedMain - Feature Class
ssPumpStation - Feature Class
ssServiceConnection - Feature Class
ssSystemValve - Feature Class

Relationship Classes

ssBendReferenceRC
ssCleanOutReferenceRC
ssControlValveReferenceRC
ssEmergencyOverflowReferenceRC
ssFittingReferenceRC

ssGravityMainReferenceRC
ssLateralLineReferenceRC
ssManholeReferenceRC
ssNetworkStructureReferenceRC
ssPressurizedMainReferenceRC
ssPumpStationReferenceRC
ssServiceConnectionReferenceRC
ssSystemValveReferenceRC

Domains

AncillaryRoleDomain
AssetManager
AssetOwner
BooleanDomain
ControlSetRef
Datum
Direction
EnabledDomain
InventoryClass
piAccessDiameter
piAccessType
piActiveStatus
piCleanoutTypes
piConditionPACP
piControlValveType
piDischargePointType
piFittingType
piLiningMethod
piManholeCoverType
piManholeType
piPipeDiameter
piPipeMaterial
piPipeShape
piSystemValveType
ssNetworkStructureType
ssPumpStationType
ssValveUse
ssWaterType
ValueMethod
YesNo

---

ssBend - FeatureClass

Name ssBend
ShapeType Point
FeatureType Simple
AliasName ss Bends
HasM false
HasZ false
HasAttachments false
Description Bends in sanitary sewer.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin		0	true		

				created database trigger					
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
INLETDIAM	Double	8	Inlet Diameter	Diameter of pump inlet	piPipeDiameter		true		
DISCHDIAM	Double	8	Discharge Diameter	Diameter of pump discharge	piPipeDiameter		true		
BENDANGLE	String	3	Angle	Angle			true		
BENDRADIUS	String	3	Radius	Radius			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached			true		

				to a work order (address in Utility Billing database)					
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily		0	true		

				relied upon for asset management analysis.					
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an			true		

				asset or group of assets are captured, may be the same as the Service Request or Work Order Number					
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
SIZENOTES	String	10	Size Notes	Size Notes			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssCleanOut - FeatureClass

Name ssCleanOut
ShapeType Point
FeatureType Simple
AliasName ss Clean Outs
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer cleanout access points.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier		0	true		

				populated by database admin created database trigger					
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
DEVICETYPE	String	30	Device Type	The type of backflow device reported	piCleanoutTypes	Cleanout	true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in			true		

				Utility Billing database)					
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset		0	true		

				management analysis.					
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are			true		

				captured, may be the same as the Service Request or Work Order Number					
ACCESSDIAM	Double	8	Access Diameter	Access diameter for the inlet	piAccessDiameter	0	true		
ACCESSMAT	String	20	Access Material	The material used to construct the access cover	piPipeMaterial		true		
ACCESSTYPE	String	20	Access Type	Method for accessing the opening	piAccessType	Cover	true		
INTDEPTH	Double	8	Interior Depth	Interior Depth		0	true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
SIZENOTES	String	10	Size Notes	Size Notes			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssControlValve - FeatureClass

Name ssControlValve
ShapeType Point
FeatureType Simple
AliasName ss Control Valves
HasM false
HasZ false

HasAttachments false

Description Sanitary sewer network valves that have a flow control mechanism.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
VALVETYPE	String	30	Valve Type	Type of control valve	piControlValveType		true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter		true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location			true		

				Details field when attached to a work order.					
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and		0	true		

				project funding needs.					
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		

WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssEmergencyOverflow - FeatureClass

Name ssEmergencyOverflow
ShapeType Point
FeatureType Simple
AliasName ss Emergency Overflows
HasM false

HasZ false
HasAttachments false
Description Sanitary sewer emergency overflow locations.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		

ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		

RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		

WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter		true		
DISCHRGTYP	String	50	Discharge Type	The type of stormwater discharge	piDischargePointType		true		
AVGDISCH	String	10	Average Discharge	Average Discharge			true		
DISCHID	String	20	Discharge Identifier	Discharge Identifier			true		
PEAKDISCH	String	10	Peak Discharge	Peak Discharge			true		
PERMIT	String	30	Permitted	A flag used to indicate whether the discharge point is permitted	YesNo		true		
PERMITID	String	20	Permit Identifier	Unique permit identifier			true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including			true		

				surveyors, that are relevant to the asset					
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssFitting - FeatureClass

Name ssFitting
ShapeType Point
FeatureType Simple
AliasName ss Fittings
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer network features that connect segments of pipe.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FITTINGTYPE	String	50	Fitting Type	The type of fitting	piFittingType		true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		

OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks	piConditionPACP		true		

				Inspection and updated from there to GIS.					
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently			true		

				inspected					
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
SIZENOTES	String	10	Size Notes	Size Notes			true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that			true		

				are relevant to the asset					
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssGravityMain - FeatureClass

Name ssGravityMain
ShapeType Polyline
FeatureType Simple
AliasName ss Gravity Mains
HasM false
HasZ false
HasAttachments false
Description Sanitary gravity sewer conveyance pipes.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FROMMH	String	20	From Manhole	The unique idendentifier of the From Manhole (upstream manhole)			true		
TOMH	String	20	To Manhole	The unique idendentifier of the To Manhole (downstream manhole)			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic	InventoryClass		true		

				location of the asset					
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition	piConditionPACP		true		

				analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.					
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		

LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
MATERIAL	String	20	Pipe Material	Identifies the construction material of the pipe connection	piPipeMaterial		true		
MAINSHAPE	String	50	Main Shape	The shape of the main	piPipeShape		true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter		true		
UPELEV	Double	8	Upstream Elevation	The upstream invert elevation of the pipe		0	true		
DOWNELEV	Double	8	Downstream Elevation	The downstream invert elevation of the pipe		0	true		
SLOPE	Double	8	Slope	The slope of the pipe.		0	true		
WATERTYPE	String	30	Water Type	Identifies the type of water in the pipe	ssWaterType		true		
SUMFLOW	Double	8	Flow Summary	The sum of flow		0	true		
LINED	String	3	Lined	Indicates if the manhole is lined	YesNo		true		
LINEDYEAR	String	4	Year Lined	The year the pipe was last lined			true		

LINERTYPE	String	20	Liner Type	The method used to line the pipe	piLiningMethod		true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

---

ssLateralLine - FeatureClass

Name ssLateralLine
ShapeType Polyline
FeatureType Simple
AliasName ss Lateral Lines
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer lateral pipes.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		

INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
MATERIAL	String	20	Pipe Material	Identifies the construction material of the pipe connection	piPipeMaterial		true		
LINEDYEAR	String	4	Year Lined	The year the pipe was last lined			true		
LINERTYPE	String	30	Liner Type	The method used to line the pipe	piLiningMethod		true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter	0	true		
DISTANCE	Integer	4	Distance	Distance		0	true		
WATERTYPE	String	30	Water Type	Identifies the type of water in the pipe	ssWaterType		true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		

WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		

POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		

FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssManhole - FeatureClass

Name ssManhole
ShapeType Point
FeatureType Simple
AliasName ss Manholes
HasM false
HasZ false
HasAttachments false
Description Manhole features may connect two or more pipes and control the flow of water in the network through pipe elevations.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
MHTYPE	String	15	Manhole Type	The type of manhole	piManholeType		true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		

COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output.	piConditionPACP		true		

				May be calculated within a Cityworks Inspection and updated from there to GIS.					
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		

LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
CVTYPE	String	20	Cover Type	The type of stormwater manhole cover	piManholeCoverType		true		
WALLMAT	String	25	Wall Material	The material used to construct the manhole wall	piPipeMaterial		true		
CUTDEPTH	Double	8	Pavement Cut Depth	Pavement cut depth		0	true		
LINED	String	3	Lined	Indicates if the manhole is lined	YesNo		true		
WATERTYPE	String	30	Water Type	Identifies the type of water in the pipe	ssWaterType		true		
SUMFLOW	Double	8	Flow Summary	The sum of flow		0	true		
FLOWDIR	String	25	Flow Direction	Defines the direction of flow using geometric flow direction values	Direction		true		
RIMELEV	Double	8	Rim Elevation	The elevation of the inlet rim		0	true		
HIGHELEV	Double	8	High Pipe Elevation	High pipe elevation inside manhole		0	true		
INVERT	Double	8	Invert	Invert		0	true		
INVERTELEV	Double	8	Invert Elevation	The invert elevation		0	true		

INVERT1ELEV	Double	8	Invert1 Elevation	The invert elevation		0	true		
INVERT1DIR	String	50	Invert 1 Direction	Invert 1 Direction	Direction		true		
INVERT1SIZE	Double	8	Invert 1 Size	Invert 1 Size	piPipeDiameter		true		
INVERT1MAT	String	50	Invert1 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
INVERT2ELEV	Double	8	Invert2 Elevation	The invert elevation		0	true		
INVERT2DIR	String	50	Invert 2 Direction	Invert 2 Direction	Direction		true		
INVERT2SIZE	Double	8	Invert 2 Size	Invert 2 Size	piPipeDiameter		true		
INVERT2MAT	String	50	Invert2 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
INVERT3ELEV	Double	8	Invert 3 Elevation	The invert elevation		0	true		
INVERT3DIR	String	50	Invert 3 Direction	Invert 3 Direction	Direction		true		
INVERT3SIZE	Double	8	Invert 3 Size	Invert 3 Size	piPipeDiameter		true		
INVERT3MAT	String	50	Invert 3 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
INVERT4ELEV	Double	8	Invert 4 Elevation	The invert elevation		0	true		
INVERT4DIR	String	50	Invert 4 Direction	Invert 4 Direction	Direction		true		
INVERT4SIZE	Double	8	Invert 4 Size	Invert 4 Size	piPipeDiameter		true		
INVERT4MAT	String	50	Invert 4 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
INVERT5ELEV	Double	8	Invert 5 Elevation	The invert elevation		0	true		
INVERT5DIR	String	50	Invert 5 Direction	Invert 5 Direction	Direction		true		
INVERT5SIZE	Double	8	Invert 5 Size	Invert 5 Size	piPipeDiameter		true		
INVERT5MAT	String	50	Invert 5 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
INVERT6ELEV	Double	8	Invert 6 Elevation	The invert elevation		0	true		
INVERT6DIR	String	50	Invert 6 Direction	Invert 6 Direction	Direction		true		
INVERT6SIZE	Double	8	Invert 6 Size	Invert 6 Size	piPipeDiameter		true		
INVERT6MAT	String	50	Invert 6 Pipe Material	The construction material of the invert pipe	piPipeMaterial		true		
XYCONVERTED	String	5	X, Y Converted	XYCONVERTED	YesNo		true		
XCOORD	Double	8	X Coordinate	XCOORD			true		
YCOORD	Double	8	Y Coordinate	YCOORD			true		
ZCOORD	Double	8	Z Coordinate	ZCOORD			true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	ANCILLARYROLE	AncillaryRoleDomain		true		
ENABLED	SmallInteger	2	Enabled	ENABLED	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	FIELDNOTES			true		
NOTES	String	200	GIS Notes	NOTES			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssNetworkStructure - FeatureClass

Name ssNetworkStructure
ShapeType Point
FeatureType Simple
AliasName ss Network Structures
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer network structures such as pump stations or pipe ends.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
STRUCTTYPE	String	30	Structure Type	The teyp of water structure	ssNetworkStructureType		true		
NAME	String	100	Name	The name of the facility or location the pump is housed in			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		

LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated			true		

				from Cityworks Inspection to the GIS.					
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		

MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
OPDATE	Date	8	Operational Date	Date when the facility was put into service			true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter		true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		

FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

---

ssPressurizedMain - FeatureClass

Name ssPressurizedMain
ShapeType Polyline
FeatureType Simple
AliasName ss Pressurized Mains
HasM false
HasZ false
HasAttachments false
Description Pressurized sanitary sewer mains.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		

OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and	piConditionPACP		true		

				updated from there to GIS.					
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		

LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
MATERIAL	String	20	Pipe Material	Identifies the construction material of the pipe connection	piPipeMaterial		true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in Utility Billing database)	piPipeDiameter		true		
LINED	String	3	Lined	Indicates if the manhole is lined	YesNo		true		
LINEDYEAR	String	4	Year Lined	The year the pipe was last lined			true		
LINERTYPE	String	20	Liner Type	The method used to line the pipe	piLiningMethod		true		
FROMSTRUC	String	20	From Structure	From Structure			true		
TOSTRUC	String	20	To Structure	To Structure			true		
WATERTYPE	String	30	Water Type	Identifies the type of water in the pipe	ssWaterType		true		
CASING	String	5	Casing	Identifies whether the asset is enclosed in casing	YesNo		true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		

FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssPumpStation - FeatureClass

Name ssPumpStation
ShapeType Point
FeatureType Simple
AliasName ss Pump Stations
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer pump stations.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
NAME	String	100	Name	The name of the facility or location the pump is housed in			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the	InventoryClass		true		

				asset					
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
CPSETA	String	50	Control Point A	Control Point A	ControlSetRef		true		
CPSETB	String	50	Control Point B	Control Point B	ControlSetRef		true		
CPSETC	String	50	Control Point C	Control Point C	ControlSetRef		true		
CPSETD	String	50	Control Point D	Control Point D	ControlSetRef		true		
CPAYCOORD	Double	8	Control Point A Y Coord	Control Point A Y Coord		0	true		
CPAXCOORD	Double	8	Control Point A X Coord	Control Point A X Coord		0	true		
CPAZCOORD	Double	8	Control Point A Z Coord	Control Point A Z Coord		0	true		
CPBYCOORD	Double	8	Control Point B Y Coord	Control Point B Y Coord		0	true		
CPBXCOORD	Double	8	Control Point B X Coord	Control Point B X Coord		0	true		
CPBZCOORD	Double	8	Control Point B Z Coord	Control Point B Z Coord		0	true		
CPCYCOORD	Double	8	Control Point C Y Coord	Control Point C Y Coord		0	true		
CPCXCOORD	Double	8	Control Point C X Coord	Control Point C X Coord		0	true		
CPCZCOORD	Double	8	Control Point C Z Coord	Control Point C Z Coord		0	true		
CPDYCOORD	Double	8	Control Point D Y Coord	Control Point D Y Coord		0	true		
CPDXCOORD	Double	8	Control Point D X Coord	Control Point D X Coord		0	true		
CPDZCOORD	Double	8	Control Point D Z Coord	Control Point D Z Coord		0	true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		

PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		

COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as			true		

				the Service Request or Work Order Number					
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
OPDATE	Date	8	Operational Date	Date when the facility was put into service			true		
PSTYPE	String	30	Pump Station Type	Pump Station Type	ssPumpStationType		true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

---

ssServiceConnection - FeatureClass

Name ssServiceConnection
ShapeType Point
FeatureType Simple
AliasName ss Service Connections
HasM false
HasZ false
HasAttachments false
Description A point of service at the end of a lateral where sanitary sewer service is connected.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by		0	true		

				database admin created database trigger					
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FACILITYNAME	String	100	Facility Name	Facility Name			true		
LARGEMETER	SmallInteger	2	Large Meter Flag	Large Meter Flag	BooleanDomain	0	true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		

PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		
WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		

COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset failure.		0	true		
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service			true		

				Request or Work Order Number					
SUMFLOW	Double	8	Flow Summary	The sum of flow		0	true		
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
ACCOUNTID	String	20	Account ID	Utility billing account identifier			true		
LOCATIONID	String	20	Location Identifier	Location Identifier			true		
CRITICAL	SmallInteger	2	Critical Customer	Flag to indicate if this is a critical customer	BooleanDomain	0	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssSystemValve - FeatureClass

Name ssSystemValve
ShapeType Point
FeatureType Simple
AliasName ss System Valves
HasM false
HasZ false
HasAttachments false
Description Sanitary sewer network valves used to isolate mains for maintenance and repair.

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYNUM	Integer	4	Facility Number	Locally asssigned numeric unique identifier populated by database admin created database trigger		0	true		
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique			true		

				identifier populated by database admin created database trigger					
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
ACTIVESTATUS	String	20	Active Status	Identifies whether the asset is in use, not in use or removed from the ground	piActiveStatus	Active	true		
ACTIVEFLAG	SmallInteger	2	Active Flag	Identifies whether the feature is in use/active	BooleanDomain	1	true		
INVCLASS	String	20	Inventory Class	The method used to establish the geographic location of the asset	InventoryClass		true		
COLLECTEDDATE	Date	8	GPS Collected Date	Date the feature was located by a surveyor			true		
OWNEDBY	SmallInteger	2	Owned By	Indicates which organization owns the asset	AssetOwner	1	true		
MAINTBY	SmallInteger	2	Maintained By	Indicates which organization maintains the asset	AssetManager	1	true		
INSTALLDATE	Date	8	Install Date	The date the asset was installed			true		
LOCATION	String	200	Location Description	Identifies the meter box location (area_served in Utility Billing database). Value is copied to Cityworks work order Location Details field when attached to a work order.			true		
ADDRESS	String	50	Address	The address or closest address to the asset. Value is copied to Cityworks work order Address field when attached to a work order (address in Utility Billing database)			true		
PURCHASEDATE	Date	8	Purchase Date	The purchase date of the asset. Used for future asset management analysis.			true		

WARRANTYDATE	Date	8	Warranty Date	The date the warranty expires on the asset. If populated and asset is still under warranty, asset record will show up pink on the Cityworks work order.			true		
ASSETCOST	Double	8	Asset Cost	The replacement cost of the asset. If populated, this will be used for asset management analysis and repair/replace decisions.		0	true		
CONDITION	SmallInteger	2	Condition Rating	The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.	piConditionPACP		true		
CONDITIONDATE	Date	8	Condition Date	The date of the last condition assessment. Can be updated from Cityworks Inspection to the GIS.			true		
SERVICELIFE	SmallInteger	2	Service Life	The expected number of years an asset is physically capable of continuing to operate. Used to anticipate retirement of assets and project funding needs.		0	true		
RUL	SmallInteger	2	Remaining Useful Life	The Remaining Useful Life of an asset calculated by subtracting the number of years since installation, from the sevice life. It will be heavily relied upon for asset management analysis.		0	true		
COF	SmallInteger	2	Consequence of Failure	The consequence of failure. Used in the BRE model as the impact due to asset		0	true		

				failure.					
POF	SmallInteger	2	Probability of Failure	Probability of Failure. Used in the BRE model to estimate the likelihood the predicted asset (or service) failure will occur and is adjusted for backup and redundancy of the asset.		0	true		
BRE	SmallInteger	2	Business Risk Exposure	Business Risk Exposure is a the product of probablity of failure (POF) and consequence of failure (COF). Values range from 1 (low risk) to 100 (high risk) and is used to prioritize investments.		0	true		
LASTINSPECTDATE	Date	8	Last Inspection Date	The date the asset was most recently inspected			true		
LASTMAINTDATE	Date	8	Last Maintenance Date	The date of the most recent maintenance activity			true		
MANUFACTURER	String	50	Manufacturer	The manufacturer or brand of the asset (company_cd in Utility Billing database)			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
WORKORDERNUM	String	60	City Work Order Number	The work order number for performing work on the asset (Cityworks, Qalert, etc)			true		
SURVEYRPTNUM	String	32	Survey Report Number	The City's Surveyor's Report Number under which the location of an asset or group of assets are captured, may be the same as the Service Request or Work Order Number			true		
DIAMETER	Double	8	Diameter	Identified the size of meter (meter_sz in	piPipeDiameter		true		

				Utility Billing database)					
XYCONVERTED	String	5	X, Y Converted	X, Y Converted	YesNo		true		
XCOORD	Double	8	X Coordinate	X-Coordinate of the asset (FL State Plane-East)		0	true		
YCOORD	Double	8	Y Coordinate	Y-Coordinate of the asset (FL State Plane-East)		0	true		
ZCOORD	Double	8	Z Coordinate	Z-Coordinate of the asset		0	true		
TOPNUTELEV	Double	8	Top Nut Elevation	Top Nut Elevation		0	true		
ANCILLARYROLE	SmallInteger	2	Ancillary Role	Identifies whether the asset participates in a geometric network as either a source or a sink	AncillaryRoleDomain	0	true		
ROTATION	Double	8	Rotation	Map symbol rotation value		0	true		
VALVETYPE	String	30	Valve Type	Type of control valve	piSystemValveType		true		
VALVEUSE	Integer	4	Valve Use	Valve Use	ssValveUse		true		
INMH	String	5	In Manhole	In Manhole	YesNo		true		
BYPASSVALVE	SmallInteger	2	Bypass Valve?	Identifies whether the asset is a bypass valve	BooleanDomain	0	true		
CLOCKTOCLOSE	SmallInteger	2	Clockwise To Close	Clockwise To Close	BooleanDomain	1	true		
NORMALLYOPEN	SmallInteger	2	Normally Open?	Identifies whether the asset is normally open	BooleanDomain	1	true		
TURNSTOCLOSE	Integer	4	Turns to Close	The number of turns required to close the asset		0	true		
OPERABLE	SmallInteger	2	Operable	Is inlet operable?	BooleanDomain	1	true		
CURROPEN	SmallInteger	2	Currently Open?	Identifies whether the asset is currently open	BooleanDomain	1	true		
ENABLED	SmallInteger	2	Enabled Flag	Indicates if the asset is enabled within a geometric network.	EnabledDomain	1	true		
FIELDNOTES	String	255	Field Notes	Comments or notes from field staff, including surveyors, that are relevant to the asset			true		
NOTES	String	200	GIS Notes	GIS entry notes or comments relevant to the asset			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		

last_edited_date	Date	8	last_edited_date	last_edited_date			true		

DynamicValue - Table

Name DynamicValue
AliasName Dynamic Value
HasAttachments false
Description DynamicValue

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
TABLENAME	String	254	Table Name	Table Name			true		
FIELDNAME	String	64	Field Name	Field Name			true		
VALUEMETHOD	String	254	Value Method	Value Method	ValueMethod		true		
VALUEINFO	String	254	Value Info	Value Info			true		
ON_CREATE	SmallInteger	2	On Create	On Create	EnabledDomain	1	true		
ON_CHANGE	SmallInteger	2	On Change (Attribute)	On Change (Attribute)	EnabledDomain	1	true		
ON_CHANGEGEO	SmallInteger	2	On Change (Geometry)	On Change (Geometry)	BooleanDomain	1	true		
ON_MANUAL	SmallInteger	2	Manual Only	Manual Only	EnabledDomain	0	true		
RUN_WEIGHT	SmallInteger	2	Rule Weight	Rule Weight		0	true		
COMMENTS	String	255	Comments	Used to record any pertinent information that the user or the City staff should be made aware of.			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

GDB_ServiceItems - Table

Name GDB_ServiceItems
AliasName GDB Service Items
HasAttachments false
Description GDB_ServiceItems

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
ItemType	SmallInteger	2	ItemType	ItemType			false		
ItemInfo	String	100000000	ItemInfo	ItemInfo			false		
ItemId	Integer	4	ItemId	ItemId			false		
DatasetName	String	1024	DatasetName	DatasetName			false		
AdvancedDrawingInfo	String	100000000	Advanced Drawing Information	Advanced Drawing Information			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

GenerateId - Table

Name GenerateId
AliasName Generate Id
HasAttachments false
Description GenerateId

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
SEQNAME	String	75	Sequence Name	Sequence Name			true		
SEQCOUNTER	Integer	4	Sequence Counter	Sequence Counter		0	true		
SEQINTERV	SmallInteger	2	Interval Value	Interval Value		0	true		
COMMENTS	String	255	Comments	Used to record any pertinent information that the user or the City staff should be made aware of.			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssBendReference - Table

Name ssBendReference
AliasName Sanitary Sewer Bend Reference
HasAttachments false
Description ssBendReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		

last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssCleanOutReference - Table

Name ssCleanOutReference
AliasName Sanitary Sewer Clean Out Reference
HasAttachments false
Description ssCleanOutReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssControlValveReference - Table

Name ssControlValveReference
AliasName Sanitary Sewer Control Valve Reference
HasAttachments false
Description ssControlValveReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric			true		

				unique identifier populated by database admin created database trigger					
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssEmergencyOverflowReference - Table

Name ssEmergencyOverflowReference
AliasName Sanitary Sewer Emergency Overflow Reference
HasAttachments false
Description ssEmergencyOverflowReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset			true		

				was installed					
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
SEWERBOOK	String	2	Sewer Book	Sewer Book			true		
SEWERBOOKNUM	String	4	Sewer Book Sheet	Sewer Book Sheet			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	50	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssFittingReference - Table

Name ssFittingReference
AliasName Sanitary Sewer Fitting Reference
HasAttachments false
Description ssFittingReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical	Datum		true		

				elevation					
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssGravityMainReference - Table

Name ssGravityMainReference
AliasName Sanitary Sewer Gravity Main Reference
HasAttachments false
Description ssGravityMainReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
UNITID2	String	20	Old Downstream Unit ID	Old Downstream Unit ID			true		
OLDID	String	16	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
SEWERBOOK	String	2	Sewer Book	Sewer Book			true		
SEWERBOOKNUM	String	5	Sewer Book Sheet	Sewer Book Sheet			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		

created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssLateralLineReference - Table

Name ssLateralLineReference
AliasName Sanitary Sewer Lateral Line Reference
HasAttachments false
Description ssLateralLineReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssManholeReference - Table

Name ssManholeReference
AliasName Sanitary Sewer Manhole Reference
HasAttachments false
Description ssManholeReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a			true		

				related table.					
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
SEWERBOOK	String	2	Sewer Book	Sewer Book			true		
SEWERBOOKNUM	String	5	Sewer Book Sheet	Sewer Book Sheet			true		
ASBUILT	String	10	As-built Location	As-built Location			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssNetworkStructureReference - Table

Name ssNetworkStructureReference
AliasName Sanitary Sewer Network Structure Reference
HasAttachments false
Description ssNetworkStructureReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		

DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssPressurizedMainReference - Table

Name ssPressurizedMainReference
AliasName Sanitary Sewer Pressurized Main Reference
HasAttachments false
Description ssPressurizedMainReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
UNITID2	String	20	Old Downstream Unit ID	Old Downstream Unit ID			true		
OLDID	String	16	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		

ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssPumpStationReference - Table

Name ssPumpStationReference
AliasName Sanitary Sewer Pump Station Reference
HasAttachments false
Description ssPumpStationReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssServiceConnectionReference - Table

Name ssServiceConnectionReference
AliasName Sanitary Sewer Service Connection Reference

HasAttachments false
Description ssServiceConnectionReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		
FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssSystemValveReference - Table

Name ssSystemValveReference
AliasName Sanitary Sewer System Valve Reference
HasAttachments false
Description ssSystemValveReference

Field	DataType	Length	AliasName	Description	Domain	DefaultValue	IsNullable	Precision	Scale
FACILITYID	String	20	Facility Identifier	Locally asssigned alpha-numeric unique identifier populated by database admin created database trigger			true		
LEGACYID	String	20	Legacy ID (Unit ID)	Former asset identifier. To be moved to a related table.			true		
FEATUREID	Integer	4	FEATURE_ID	Feature ID from Unkown Point		0	true		
OLDID	String	6	Old ID	Old ID			true		
PROJECTNUM	String	32	City Project Number	The City's Project Number under which the asset was installed			true		

FILENUM	String	32	City File Number	The City's File Number			true		
DENUM	String	32	City Detail Number	The City's Detail Number			true		
IMPROVENUM	String	32	City Improvement Number	The City's Improvement Number			true		
DATUM	String	8	Datum	Identifies the datum used to establish the asset's vertical elevation	Datum		true		
IMAGEID	String	12	Old Image ID	Old Image ID			true		
INTDETAIL	String	4	City Intersection Detail	The City's Intersection Detail			true		
ASBUILTLOC	String	255	As-built Location	The URL or filepath to the electronic as-built documents			true		
created_user	String	255	created_user	created_user			true		
created_date	Date	8	created_date	created_date			true		
last_edited_user	String	255	last_edited_user	last_edited_user			true		
last_edited_date	Date	8	last_edited_date	last_edited_date			true		

ssBendReferenceRC - RelationshipClass

Name ssBendReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssBendReference
BackwardPathLabel ssBend
Description ssBendReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssBend	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssBendReference		

ssCleanOutReferenceRC - RelationshipClass

Name ssCleanOutReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssCleanOutReference
BackwardPathLabel ssCleanOut
Description ssCleanOutReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssCleanOut	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssCleanOutReference		

ssControlValveReferenceRC - RelationshipClass

Name ssControlValveReferenceRC

Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssControlValveReference
BackwardPathLabel ssControlValve
Description ssControlValveReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssControlValve	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssControlValveReference		

---

ssEmergencyOverflowReferenceRC - RelationshipClass

Name ssEmergencyOverflowReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssEmergencyOverflowReference
BackwardPathLabel ssEmergencyOverflow
Description ssEmergencyOverflowReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssEmergencyOverflow	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssEmergencyOverflowReference		

---

ssFittingReferenceRC - RelationshipClass

Name ssFittingReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssFittingReference
BackwardPathLabel ssFitting
Description ssFittingReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssFitting	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssFittingReference		

---

ssGravityMainReferenceRC - RelationshipClass

Name ssGravityMainReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssGravityMainReference
BackwardPathLabel ssGravityMain
Description ssGravityMainReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key

ssGravityMain	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssGravityMainReference		

ssLateralLineReferenceRC - RelationshipClass

Name ssLateralLineReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssLateralLineReference
BackwardPathLabel ssLateralLine
Description ssLateralLineReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssLateralLine	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssLateralLineReference		

ssManholeReferenceRC - RelationshipClass

Name ssManholeReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssManholeReference
BackwardPathLabel ssManhole
Description ssManholeReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssManhole	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssManholeReference		

ssNetworkStructureReferenceRC - RelationshipClass

Name ssNetworkStructureReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssNetworkStructureReference
BackwardPathLabel ssNetworkStructure
Description ssNetworkStructureReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssNetworkStructure	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssNetworkStructureReference		

ssPressurizedMainReferenceRC - RelationshipClass

Name ssPressurizedMainReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssPressurizedMainReference
BackwardPathLabel ssPressurizedMain
Description ssPressurizedMainReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssPressurizedMain	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssPressurizedMainReference		

---

ssPumpStationReferenceRC - RelationshipClass

Name ssPumpStationReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssPumpStationReference
BackwardPathLabel ssPumpStation
Description ssPumpStationReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssPumpStation	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssPumpStationReference		

---

ssServiceConnectionReferenceRC - RelationshipClass

Name ssServiceConnectionReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssServiceConnectionReference
BackwardPathLabel ssServiceConnection
Description ssServiceConnectionReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssServiceConnection	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssServiceConnectionReference		

---

ssSystemValveReferenceRC - RelationshipClass

Name ssSystemValveReferenceRC
Cardinality OneToOne
IsAttributed false
IsComposite false
ForwardPathLabel ssSystemValveReference
BackwardPathLabel ssSystemValve
Description ssSystemValveReferenceRC

Origin Class Name	Origin Primary Key	Origin Foreign Key
ssSystemValve	FACILITYID	FACILITYID

Destination Class Name	Destination Primary Key	Destination Foreign Key
ssSystemValveReference		

AncillaryRoleDomain - Domain

DomainName AncillaryRoleDomain
FieldType SmallInteger
Domain Type CodedValue

Code	Name
0	None
1	Source
2	Sink

AssetManager - Domain

DomainName AssetManager
Description Indicates which organization maintains the asset
FieldType SmallInteger
Domain Type CodedValue

Code	Name
1	City
2	County
3	State
4	Private
5	Other
-99	Unknown

AssetOwner - Domain

DomainName AssetOwner
Description Indicates which organization owns the asset
FieldType SmallInteger
Domain Type CodedValue

Code	Name
1	City
2	County
3	State
4	Private
5	Other
-99	Unknown

BooleanDomain - Domain

DomainName BooleanDomain
FieldType SmallInteger
Domain Type CodedValue

Code	Name
0	False
1	True

ControlSetRef - Domain

DomainName ControlSetRef
FieldType String
Domain Type CodedValue

Code	Name
N	North
NE	North East
E	East
SE	South East
S	South
SW	South West
W	West
NW	North West
NORTH RIM	North Rim

Datum - Domain

DomainName Datum
Description Identifies the datum used to establish the asset's vertical elevation
FieldType String
Domain Type CodedValue

Code	Name
29	NGVD 29
88	NAVD 88
-99	Unknown

Direction - Domain

DomainName Direction
FieldType String
Domain Type CodedValue

Code	Name
East	East
North	North
South	South
West	West
Northeast	Northeast
Northwest	Northwest
Southeast	Southeast
Southwest	Southwest
North/South	North/South
East/West	East/West
Northeast/Northwest	Northeast/Northwest
Southeast/Southwest	Southeast/Southwest

EnabledDomain - Domain

DomainName EnabledDomain
FieldType SmallInteger
Domain Type CodedValue

Code	Name
0	False
1	True

InventoryClass - Domain

DomainName InventoryClass
Description The method used to establish the geographic location of the asset
FieldType String
Domain Type CodedValue

Code	Name
DGPS	DGPS (1-meter)
GIS	GIS Entry
GPS	GPS (< 1-foot)
GPS-Converted	GPS Asbuilt Converted (< 1-foot)

piAccessDiameter - Domain

DomainName piAccessDiameter
Description The diameter of the receiving chamber for circular access points
FieldType Double
Domain Type Range

Minimum Value	Maximum Value
0	72

piAccessType - Domain

DomainName piAccessType
Description Method for accessing the opening
FieldType String
Domain Type CodedValue

Code	Name
Door	Door
Grate	Grate
Cover	Cover
Hand	Hand
Lid	Lid
Unknown	Unknown

piActiveStatus - Domain

DomainName piActiveStatus
Description Describes the status of the easement, whether Vacated or Dedicated. Vacated is used to identify easements that have been released and are no longer active (no longer Dedicated). Dedicated are easements that are valid and are in effect.
FieldType String
Domain Type CodedValue

Code	Name
Active	Active
Abandoned	Abandoned
Inactive	Inactive
Removed	Removed
Not Found	Not Found
Inactive-Plugged	Inactive-Plugged

piCleanoutTypes - Domain

DomainName piCleanoutTypes
FieldType String
Domain Type CodedValue

Code	Name
Cleanout	Cleanout
Flushing Structure	Flushing Structure
Lamp Hole	Lamp Hole
Other	Other
Unknown	Unknown

piConditionPACP - Domain

DomainName piConditionPACP
Description The condition rating of the asset. Used by Cityworks Analytics for condition analysis output. May be calculated within a Cityworks Inspection and updated from there to GIS.
FieldType SmallInteger
Domain Type CodedValue

Code	Name
1	Severity 1 - Minor defect grade
2	Severity 2 - Minor to moderate defect grade
3	Severity 3 - Moderate defect grade
4	Severity 4 - Significant defect grade
5	Severity 5 - Most significant defect grade

piControlValveType - Domain

DomainName piControlValveType
Description The type of control valve
FieldType String
Domain Type CodedValue

Code	Name
Altitude	Altitude
Blowoff	Blowoff
Combination	Combination
Vacuum	Vacuum
Air Control	Air Control
Air Gap	Air Gap
Air Release	Air Release
Atmospheric Vacuum	Atmospheric Vacuum
Backflow Control	Backflow Control
Double Check	Double Check
Pressure Vacuum	Pressure Vacuum
Pressure Reducer	Pressure Reducer
Simple Check	Simple Check
Vacuum Breaker	Vacuum Breaker
Vacuum Release	Vacuum Release
Surge Relief	Surge Relief
Snubber	Snubber
CLA	CLA
RPZ	Reduced Pressure Zone
Other	Other
Unknown	Unknown

piDischargePointType - Domain

DomainName piDischargePointType
Description The type of sanitary sewer discharge
FieldType String
Domain Type CodedValue

Code	Name
Outfall	Outfall
Overflow	Overflow
Standard Outlet	Standard Outlet
Other	Other
Unknown	Unknown

piFittingType - Domain

DomainName piFittingType
Description The type of fitting
FieldType String
Domain Type CodedValue

Code	Name
Bend	Bend
Cap	Cap
Coupling	Coupling
Cross	Cross
Expansion Joint	Expansion Joint
Over Under	Over Under
Reducer	Reducer
Reducing Cross	Reducing Cross
Reducing Tee	Reducing Tee
Sleeve	Sleeve
Tap	Tap
Tee	Tee
Transition	Transition
Other	Other
Unknown	Unknown
Wye	Wye
Taping Tee	Taping Tee
Offset	Offset
Plug	Plug

piLiningMethod - Domain

DomainName piLiningMethod
Description The type of lining method
FieldType String
Domain Type CodedValue

Code	Name
CP	Cured in Place
FF	Fold and Form or Deform/Reform
SN	Segmented Panel
SP	Segmented Pipe
SW	Spiral Wound
OTH	Other
NONE	None

piManholeCoverType - Domain

DomainName piManholeCoverType
Description The type of manhole cover
FieldType String
Domain Type CodedValue

Code	Name
Standard W/ Lock	Standard W/ Lock
Standard W/ Ears	Standard W/ Ears
Non-District	Non-District
Water Tight	Water Tight
27" Diameter	27" Diameter
42" Diameter	42" Diameter
Large - Water Tight	Large - Water Tight
Rectangular	Rectangular
Other	Other
Unknown	Unknown

piManholeType - Domain

DomainName piManholeType
Description The type of manhole
FieldType String
Domain Type CodedValue

Code	Name
STD	Standard
DRP	Drop
SPL	Split
DIV	Diversion
SED	Sedimentation
OTH	Other
UNK	Unknown
CON	Conflict
TER	Terminal
WEI	Weir

piPipeDiameter - Domain

DomainName piPipeDiameter
Description The diameter of the asset
FieldType Double
Domain Type CodedValue

Code	Name
0.75	3/4"
1	1"
1.25	1 1/4"
1.5	1 1/2"
2	2"
2.5	2 1/2"
3	3"
4	4"
6	6"
8	8"
10	10"
12	12"
14	14"

15	15"
16	16"
18	18"
20	20"
24	24"
30	30"
36	36"
40	40"
42	42"
48	48"
54	54"
60	60'
66	66"
72	72"
75	75"
-1	Other
11	11"
13	13"
19	19"
21	21"
22	22"
23	23"
27	27"
33	33"
45	45"
84	84"
96	96"
102	102"
-99	Unknown
-88	Not Applicable
41	41"
52	52"
5	5"

piPipeMaterial - Domain

DomainName piPipeMaterial
Description The construction material of the asset
FieldType String
Domain Type CodedValue

Code	Name
ABS	ABS Plastic
ASP	Asphalt
BR	Brick
CT	Clay Tile
CSB	Concrete Segments (Bolted)
CSU	Concrete Segments (Unbolted)
CMP	Corrugated Metal
CIPP	Cured In Place
DIP	Ductile Iron
FRP	Fiberglass Reinforced
EARGEO	Earth & Geotextile
EAR	Earthen
GEO	Geotextile
GRC	Glass Reinforced Cement
OB	Pitch Fiber (Orangeburg)

PSC	Plastic/Steel Composite
PE	Polyethylene
PP	Polypropylene
PVC	Polyvinyl Chloride
PCCP	Pre-Stressed Concrete Cylinder
RCP	Reinforced Concrete
RPM	Reinforced Plastic (Truss)
SB	Segmented Block
SP	Steel
TTE	Transite
VCP	Vitrified Clay
WD	Wood
BMP	Brick Masonry
HDPE	High Density Polyethylene
STL	Stainless Steel
RCPC	Reinforced concrete pipe w cylinder
PBL	Polybutylene
CSTL	Corrugated Steel
CAL	Corrugated Aluminimum
CPEL	Corrugated Polyethylene
ALU	Aluminum pipe
CONC	Concrete (Non-Reinforced)
ACP	Asbestos Cement
CIP	Cast Iron
CUP	Copper
GIP	Galvanized Pipe
ZZZ	Other
XXX	Unknown
LEAD	Lead

piPipeShape - Domain

DomainName piPipeShape
Description The shape of the main
FieldType String
Domain Type CodedValue

Code	Name
Circular	Circular
Horseshoe	Horseshoe
Oblong	Oblong
Rectangular	Rectangular
Trapezoidal	Trapezoidal
Triangular	Triangular
Other	Other
Unknown	Unknown

piSystemValveType - Domain

DomainName piSystemValveType
Description Type of control valve
FieldType String
Domain Type CodedValue

Code	Name
Ball	Ball
Butterfly	Butterfly

Cone	Cone
Gate	Gate
Plug	Plug
Roundway	Roundway
Other	Other
Unknown	Unknown
Tapping	Tapping
Bypass	Bypass
Check	Check

ssNetworkStructureType - Domain

DomainName ssNetworkStructureType
Description The type of control structure
FieldType String
Domain Type CodedValue

Code	Name
Diversion Chamber	Diversion Chamber
Diversion Point	Diversion Point
Junction Chamber	Junction Chamber
Production Well	Production Well
Pump Station	Pump Station
Split Manhole	Split Manhole
Storage Basin	Storage Basin
Tide Chamber	Tide Chamber
Treatment Plant	Treatment Plant
Lift Station	Lift Station
Discharge Structure	Discharge Structure
Unknown	Unknown
Other	Other
Virtual Junction	Virtual Junction
Flow Meter	Flow Meter
Monitoring Well	Monitoring Well
Pump	Pump
Backflow Prevention	Backflow Prevention
Grease Separator	Grease Separator
Injection Well	Injection Well
ASR Well	Aquifer Storage and Recovery Well
Master Meter	Master Meter

ssPumpStationType - Domain

DomainName ssPumpStationType
Description Type of pump station
FieldType String
Domain Type CodedValue

Code	Name
Lift Station	Lift Station
Pump Around Station	Pump Around Station
Pump Station	Pump Station
Repump Station	Repump Station
Unknown	Unknown

ssValveUse - Domain

DomainName ssValveUse
Description Use of the valve
FieldType Integer
Domain Type CodedValue

Code	Name
23	Bypass
24	Shutoff/Isolation
25	Backflow preventor
26	Tapping
-99	Unknown

ssWaterType - Domain

DomainName ssWaterType
Description Type of control valve
FieldType String
Domain Type CodedValue

Code	Name
Treated	Treated Water
Combined	Combined Waste Water
Potable	Potable Water
Raw	Raw Water
Reclaimed	Reclaimed Water
Salt	Salt Water
Sewage	Sewage
Storm	Storm Runoff
Effluent	Waste Water Effluent
Overflow	Overflow

ValueMethod - Domain

DomainName ValueMethod
FieldType String
Domain Type CodedValue

Code	Name
ANGLE	ANGLE
AUTONUMBER	AUTONUMBER
CASCADE_ATTRIBUTE	CASCADE_ATTRIBUTE
COPY_FEATURE	COPY_FEATURE
COPY_LINKED_RECORD	COPY_LINKED_RECORD
CREATE_LINKED_RECORD	CREATE_LINKED_RECORD
CREATE_PERP_LINE	CREATE_PERP_LINE
CREATE_PERP_LINE_TO_LINE	CREATE_PERP_LINE_TO_LINE
CURRENT_USER	CURRENT_USER
EDGE_STATS	EDGE_STATS
EXPRESSION	EXPRESSION
FEATURE_STATS	FEATURE_STATS
FIELD	FIELD
FIELD_TRIGGER	FIELD_TRIGGER
FROM_EDGE_FIELD	FROM_EDGE_FIELD
FROM_EDGE_MULTI_FIELD_INTERSECT	FROM_EDGE_MULTI_FIELD_INTERSECT
FROM_EDGE_STATS	FROM_EDGE_STATS
FROM_JUNCTION_FIELD	FROM_JUNCTION_FIELD
GENERATE_ID	GENERATE_ID

GENERATE_ID_BY_INTERSECT	GENERATE_ID_BY_INTERSECT
GET_ADDRESS_FROM_CENTERLINE	GET_ADDRESS_FROM_CENTERLINE
GET_ADDRESS_USING_ARCGIS_SERVICE	GET_ADDRESS_USING_ARCGIS_SERVICE
GET_ADDRESS_USING_GEOCODER	GET_ADDRESS_USING_GEOCODER
GUID	GUID
INTERSECT_STATS	INTERSECT_STATS
INTERSECTING_BOOLEAN	INTERSECTING_BOOLEAN
INTERSECTING_COUNT	INTERSECTING_COUNT
INTERSECTING_EDGE	INTERSECTING_EDGE
INTERSECTING_FEATURE	INTERSECTING_FEATURE
INTERSECTING_FEATURE_DISTANCE	INTERSECTING_FEATURE_DISTANCE
INTERSECTING_LAYER_DETAILS	INTERSECTING_LAYER_DETAILS
INTERSECTING_RASTER	INTERSECTING_RASTER
JUNCTION_ROTATION	JUNCTION_ROTATION
LAST_VALUE	LAST_VALUE
LATITUDE	LATITUDE
LENGTH	LENGTH
LINK_TABLE_ASSET	LINK_TABLE_ASSET
LONGITUDE	LONGITUDE
MAP_INFO	MAP_INFO
MINIMUM_LENGTH	MINIMUM_LENGTH
MULTI_FIELD_INTERSECT	MULTI_FIELD_INTERSECT
NEAREST_FEATURE	NEAREST_FEATURE
NEAREST_FEATURE_ATTRIBUTES	NEAREST_FEATURE_ATTRIBUTES
OFFSET	OFFSET
PREVIOUS_VALUE	PREVIOUS_VALUE
PROMPT	PROMPT
SET_MEASURES	SET_MEASURES
SIDE	SIDE
SPLIT_INTERSECTING_FEATURE	SPLIT_INTERSECTING_FEATURE
TIMESTAMP	TIMESTAMP
TO_EDGE_FIELD	TO_EDGE_FIELD
TO_EDGE_MULTI_FIELD_INTERSECT	TO_EDGE_MULTI_FIELD_INTERSECT
TO_EDGE_STATS	TO_EDGE_STATS
TO_JUNCTION_FIELD	TO_JUNCTION_FIELD
TRIGGER_AAEVENT_FROM_EDGE	TRIGGER_AAEVENT_FROM_EDGE
TRIGGER_AAEVENT_FROM_JUNCTION	TRIGGER_AAEVENT_FROM_JUNCTION
TRIGGER_AAEVENT_INTERSECTING_FEATURE	TRIGGER_AAEVENT_INTERSECTING_FEATURE
TRIGGER_AAEVENT_TO_EDGE	TRIGGER_AAEVENT_TO_EDGE
TRIGGER_AAEVENT_TO_JUNCTION	TRIGGER_AAEVENT_TO_JUNCTION
UPDATE_FROM_EDGE_FIELD	UPDATE_FROM_EDGE_FIELD
UPDATE_FROM_JUNCTION_FIELD	UPDATE_FROM_JUNCTION_FIELD
UPDATE_INTERSECTING_FEATURE	UPDATE_INTERSECTING_FEATURE
UPDATE_LINKED_RECORD	UPDATE_LINKED_RECORD
UPDATE_TO_EDGE_FIELD	UPDATE_TO_EDGE_FIELD
UPDATE_TO_JUNCTION_FIELD	UPDATE_TO_JUNCTION_FIELD
VALIDATE_ATTRIBUTE_LOOKUP	VALIDATE_ATTRIBUTE_LOOKUP
VALIDATE_ATTRIBUTES	VALIDATE_ATTRIBUTES
VALIDATE_CONNECTIVITY	VALIDATE_CONNECTIVITY
VALIDATE_DOMAIN	VALIDATE_DOMAIN
X_COORDINATE	X_COORDINATE
Y_COORDINATE	Y_COORDINATE

YesNo - Domain

DomainName YesNo
FieldType String

Domain Type CodedValue

Code	Name
Yes	Yes
No	No

PROJECT NO. 11842

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Testing Laboratory Services

1. Laboratory testing and checking and all certifications required by the Specifications, including the cost of transporting all samples and test specimens, shall be provided by the Contractor unless otherwise indicated in the Specifications. Payment for laboratory services shall be made from the Allowance item entitled “Laboratory Testing Fees”. Payment shall be made based on the actual cost of service upon submission of paid invoices.

2. The Contractor shall retain the services of an independent, certified testing laboratory to perform all testing required by the Contract Documents and by permitting agencies. The Contractor shall submit the name of the testing laboratory and evidence of all appropriate certifications for approval by the Engineer and the City.

3. In the case of a conflict between this Specification Section and the Contractor’s Quality Management Plan, the more stringent requirement between the two documents shall govern.

4. Procedure

a. The Contractor shall plan and conduct his operations to permit taking of field samples and test specimens, as required, and to allow adequate time for laboratory tests.

b. The collection, field preparation and storage of field samples and test specimens shall be performed by the Contractor as required by the Specifications and as directed by the City.

5. Supplementary and Other Testing

a. 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 no additional cost to the City.

1.02 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.

1.03 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, subgrade, base material, crushed stone or gravel and sand,
8. water during pipeline disinfection and bacteriological testing

1.04 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.

1.05 OBSERVATION AND TESTING

A. 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.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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.

1.06 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.

1.07 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 -

SECTION 01510

TEMPORARY UTILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. It shall be the CONTRACTOR's responsibility to provide equipment that is adequate for the performance of the Work under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required Work, and shall be subject to review by the City's representative at any time within the duration of the Contract. All Work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.

B. The CONTRACTOR shall provide for utilities and services for its own operations. The CONTRACTOR shall furnish, install and maintain all temporary utilities during the contract period including removal upon completion of the Work.

1.02 POWER AND LIGHTING

A. 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 the Work in a safe and satisfactory manner.

B. Construction Lighting: All Work conducted at night or under conditions of deficient daylight shall be suitably lighted to ensure proper Work and to afford adequate facilities for inspection and safe working conditions. Temporary lighting shall be maintained during nonworking periods if the area is subject to access by the public or City's personnel.

C. Electrical Connections: All temporary connections for electricity shall be subject to review by the ENGINEER and the power company representative, and shall be removed in like manner at the CONTRACTOR's expense prior to final acceptance of the Work.

D. Separation of Circuits: Unless otherwise permitted by the ENGINEER, circuits separate from lighting circuits shall be used for all power purposes.

E. Construction Wiring: All wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. All electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.

1.03 WATER SUPPLY

A. General: Except as noted otherwise, the CONTRACTOR shall make arrangements for and pay for all costs for all water used during construction including general construction used, testing, CONTRACTOR's trailer and ENGINEER's trailer. The CONTRACTOR shall provide and maintain all piping, fittings, adapters, and valving as may be required.

B. If a temporary connection is made to a potable water system on-site (e.g., a fire hydrant), the CONTRACTOR must install a back flow prevention device and a meter, obtained from the City. The CONTRACTOR shall provide temporary piping for the metering and use of potable water. The cost of the water for the testing will be charged to the CONTRACTOR at the standard City rates including deposits, monthly charges and usage charges.

C. Water Connections: The CONTRACTOR shall not make connection to, or draw water from, any fire hydrant or pipeline without first obtaining permission of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the agency owning the affected water system. For each such connection made, the CONTRACTOR shall first attach to the fire hydrant or pipeline a valve and a meter, if required by the said authority, of a size and type acceptable to said authority and agency.

D. Removal of Water Connections: Before final acceptance of the Work on the project, all temporary connections and piping installed by the CONTRACTOR shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the ENGINEER and to the agency owning the affected utility.

E. Fire Protection: The construction, and all other parts of the Work shall be connected with the CONTRACTOR's water supply system and shall be adequately protected against damage by fire. Hose connections and hose, water casks, chemical equipment, or other sufficient means shall be provided for fighting fires in the temporary structures and other portions of the Work, and responsible persons shall be designated and instructed in the operation of such fire apparatus so as to prevent or minimize the hazard of fire. The CONTRACTOR's fire protection program shall conform to the requirements of Subpart F of the OSHA Standards for Construction and all local Fire Department Requirements.

1.04 TEMPORARY SANITARY FACILITIES

A. The CONTRACTOR shall provide and maintain adequate and clean sanitary facilities for the construction work force and visitors. The facilities shall comply with local codes and regulations and be situated in an acceptable location.

1.05 CONFINED SPACES

A. The CONTRACTOR shall provide and maintain a safe working environment in confined spaces. The CONTRACTOR shall follow the applicable requirements of the OSHA Standards for Construction and NIOSH Publications for working in confined spaces.

1.06 TEMPORARY VENTILATION

A. The CONTRACTOR shall provide and maintain adequate ventilation for a safe working environment. In addition, forced air ventilation shall be provided for the curing of installed materials, humidity control and the prevention of hazardous accumulations of dust, gases or vapors.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 11842

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. Work under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the operation of existing water, wastewater, and stormwater transmission facilities and nearby residents and businesses.

C. 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 CONNECTION OF EXISTING SYSTEMS

A. All connections to existing systems shall be performed in such a manner that no damage and minimal interruption is caused to the existing installation. Any damage caused to existing installations shall be repaired or replaced by the Contractor at no additional cost to the City.

B. The Contractor shall note that some of the work in this Contract will require the Contractor to connect to existing pipelines and structures. The Contractor shall be responsible for the proper containment and disposal of wastewater, or other materials drained from existing pipelines and structures during construction, unless otherwise specifically noted to be performed by the City.

C. The Contractor shall contain such wastewater or other materials (in accordance with all applicable codes) and shall dispose of such within the existing collection system as approved by the City. The Contractor shall be responsible for the prevention of wastewater or other material spills within the Work.

1.03 OPERATION REQUIREMENTS

A. 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.

B. 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 accepted for satisfactory use, subject to the City's approval, prior to the Contractor proceeding to the next phase of construction.

C. 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.

1.04 SEQUENCE OF CONSTRUCTION

A. Mobilization / Site Preparation

1. Mobilize for work – video roadways, swales and adjacent area, establish field offices, obtain permits, develop and submit construction schedule, submit shop drawing schedule and begin shop drawing submittals and procurement of materials.

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. Project Notification shall be performed in accordance with the requirements of Section 01580.

2. The Contractor shall be responsible for all damages/claims resulting from its activities on the surrounding neighborhood and its residents.

3. The Contractor shall divide the overall project area into five contiguous areas (Work Areas), each comprising no more than 8,000 linear feet of open cut installation. The Contractor may undertake work that results in disturbance of existing conditions (e.g. any excavations, interruption of normal traffic, etc.), in only one identified Work Area at a time and must complete all work, including restoration of all utility services, driveway/sidewalk repairs, and temporary asphalt, with the exception of final milling and resurfacing of roadway pavement within that area prior to moving to the next construction area. Upon request of the Contractor, contingent upon satisfactory demonstration of timely and adequate restoration, the City and Engineer may grant approval for the Contractor to exceed the 8,000 linear feet limitation of open cut construction at any given time.

4. After proposed improvements are installed, the Contractor shall restore the first and second lifts of asphalt (temporary patch) within 14 days after installation of

buried piping/structures.

5. Final milling and resurfacing of the entire roadway (for all areas where pipe or structures are installed) shall be completed in a maximum of two sections, after completion of pipeline testing, acceptance, and complete pavement restoration of all Work Areas. These sections are defined as the area west of 4th Avenue and the area east of 4th Avenue.

6. The Contractor may choose to implement two Work Areas within the project limits at the same time. It is required that the two Work Areas must have a minimum of three City blocks separation between them until one of the Work Areas is deemed substantially complete. Additional materials and equipment required for this approach shall be the responsibility of the Contractor at no additional cost to the City.

7. The Contractor shall be responsible for all damages/claims resulting from its activities on the surrounding neighborhood, its residents, and businesses.

8. The Contractor shall provide pedestrian access to all businesses and residences within the project limits at all times.

9. Construction within a Work Area shall be scheduled so that all improvements are completed at one time and impacted residents/businesses are only disrupted for one time period.

10. The Contractor shall be responsible for the removal and replacement of miscellaneous street furnishings which shall include, but are not necessarily limited to, the following: benches, newspaper racks, telephones, bus shelters, trash receptacles, mail boxes, etc. in order to complete construction as necessary.

C. Final Site Work and Closeout

1. Final grading, milling and resurfacing, sodding, landscaping, miscellaneous work, demobilization and related closeout activities shall be as defined elsewhere in the Contract Documents.

1.05 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 Noise Ordinance.

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. Contractor shall coordinate with City of Fort Lauderdale Engineering Department prior to start of restoration.

2. At any time, the entire length of the project area shall remain unobstructed and open to through traffic for each section. Access for emergency vehicles shall be maintained at all times to all homes and businesses. Excavation must be backfilled or barricaded at the end of each work day to prevent hazardous conditions. If a trench, excavation, or structure is to be left open, it must be covered with a steel plate and barricaded at the end of each work day or when work will be suspended for more than eight (8) hours.

3. Transportation provisions for handicapped or disabled residents shall be made by the Contractor if construction temporarily prevents access to homes. Constant access shall be provided for residents on the Special Needs List.

4. The Contractor shall also make provisions with local bus, school bus, garbage collection, mail delivery, and other agencies for continuation of service. A traffic maintenance plan indicating detours, schedules, and alternate routes which has been approved by the Engineer, the City, and Broward County Traffic Engineering Division shall be submitted to all affected agencies for coordination and routing purposes.

5. Pipe and material shall not be strung out along installation routes for longer than two (2) weeks prior to installation.

6. A safe walk route for all schools within the vicinity of the construction zone shall be maintained during the arrival and dismissal of school. Contractor shall not block bus access to schools during school hours.

C. Maintenance of Existing Facilities

1. It may be necessary to interrupt the operation of the existing water and/or sewer system. In all cases where the Contractor must cause an interruption, the Contractor shall prepare and submit to the Engineer seven (7) working days prior to commencing work, a complete description of the proposed procedure and a guaranteed time schedule. At least 24 hours prior to the time proposed for starting the Work, the Contractor will be notified by the Engineer whether or not the Work will be permitted as proposed.

2. The Engineer reserves the right to require the Contractor to work 24 hours per day in all cases where interference with operation of the system may result in dangerous health hazards or offensive conditions.

3. In no case will the Contractor be permitted to interfere with the existing system until all materials, supplies, equipment, tools and incidentals necessary to complete the work are on site. Backup equipment and/or materials on key items shall be required on work necessitating interference with the existing system.

D. Mangrove Trimming and Removal

1. All work associated with mangrove trimming and removal shall be in accordance with Broward County guidelines as outlined in the Environmental Resource License.

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. 11842

SECTION 01525

MAINTENANCE OF TRAFFIC

PART 1 - GENERAL

1.01 GENERAL

A. The Contractor shall maintain pedestrian and vehicular traffic within the limits of the projects for the duration of the construction period, including any temporary suspensions of the work, construct and maintain detours, provide facilities for access to adjacent residences, schools, bus pick up and drop off locations, common grounds, businesses, etc., along the project, furnish, install and maintain traffic control and safety devices during construction, furnish and install work zone pavement markings for maintenance of traffic in construction areas and provide any other special requirements for safe and expeditious movement of pedestrian and vehicular traffic in accordance with the Contract Documents. Maintenance of Traffic includes all facilities, devices and operations as required for safety and convenience of the public within the work zones, and shall include provisions for pedestrian, residential, and school student traffic as well as vehicular traffic.

The Contractor shall not maintain traffic over those portions of the project where no work is to be accomplished or where construction operations will not affect existing roads. Do not obstruct or create a hazard to any traffic during the performance of the work, and repair any damage to existing pavement open to traffic.

B. Beginning Date of Contractor's Responsibility: The Contractor shall maintain traffic starting the day work begins on the project. No work shall commence without approved and constructed Traffic Control Plans in place.

C. Worksite Traffic Supervisor: The Contractor shall provide a Worksite Traffic Supervisor. Requirements are as follows:

1. Ensure that the Worksite Traffic Supervisor is available on a 24-hour per day basis, participates in all changes to traffic control and reviews the project on a day-to-day basis.

2. Ensure that the Worksite Traffic Supervisor is present to direct the initial setup of the traffic control plan and any changes. Provide the Worksite Traffic Supervisor with all equipment and materials needed to set up, and maintain traffic control and handle traffic-related situations.

3. Ensure that the Worksite Traffic Supervisor immediately corrects all safety deficiencies. Do not allow minor deficiencies that are not immediate safety hazards to remain uncorrected for more than 24-hours.

4. Ensure that the Worksite Traffic Supervisor is available within 45 minutes after notification of an emergency situation and is prepared to positively respond to repair the work zone traffic control or to provide alternate traffic arrangements.

5. The City may disqualify and remove from the project a Worksite Traffic Supervisor that fails to comply with the provisions of this specification. The City may suspend all activities, except traffic and erosion control and such other activities that are necessary for project maintenance and safety, for failure to comply with these provisions.

6. Ensure that the Worksite Traffic Supervisor performs a drive-through inspection and observes traffic flow as soon as the work zone is activated and in each subsequent phase of work as they are opened to traffic. Provide to the Engineer and City a report that includes a listing of any deficiencies and proposed corrective measures.

7. Ensure that the Worksite Traffic Supervisor conducts within the limits of the project, daily daytime and weekly night time inspections within the limits of the project for projects with predominate daytime work activities and daily nighttime and weekly daytime inspections for projects with predominate nighttime work, of all traffic control devices, traffic flow, pedestrian, bicyclist, student, bus rider, school, residence and business accommodations.

8. Advise the project personnel of the schedule of these inspections and give them the opportunity to join in the inspection as is deemed necessary. Submit a comprehensive weekly report to the Engineer and City and include the condition of all traffic control devices (including pavement markings) being used. The inspection report shall also include assurances that pedestrians are accommodated with a safe travel path around work sites and safely separated from mainline traffic, that existing or detoured bicyclist paths and bus routes and stops are being maintained satisfactorily throughout the project limits, that existing residences in the work areas are being provided with adequate access for vehicular and pedestrian traffic at all times and that existing businesses in the work areas are being provided with adequate entrances for vehicular and pedestrian traffic during business hours. The Worksite Traffic Supervisor shall sign the report and certify that all of the above issues are being handled in accordance with the Contract Documents. If deficiencies are noted, the Worksite Traffic Supervisor shall note such deficiencies and include the proposed corrective actions in the report and implement immediate corrective action.

D. Traffic Control Plan

1. The Contractor is responsible for preparing a Traffic Control Plan (TCP) to be signed and sealed by a licensed Florida Engineer competent and trained in the preparation of TCP. The licensed Florida Engineer (TCPE) signing and sealing the Traffic Control Plan shall review all of the reports from the Worksite Traffic Supervisor and inspect the installation for compliance with his approved plan upon the initial installation and for each subsequent phase of the plan. The Contractor shall provide the Engineer and City with an inspection report from the TCPE

indicating compliance with his approved TCP. The TCP shall meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) Part VI, and the following jurisdictional agencies.

a. City of Fort Lauderdale Transportation and Mobility

b. City of Fort Lauderdale Department of Sustainable Development

c. City of Fort Lauderdale Fire Department

d. City of Fort Lauderdale Police Department

e. School Board of Broward County

2. Standards: FDOT Design Standards (DS) are the minimum standards for the use in the development of all traffic control plans. The MUTCD Part VI is the minimum national standard for traffic control for highway construction, maintenance, and utility operations. Follow the basic principles and minimum standards contained in these documents for the design, application, installation, maintenance, and removal of all traffic control devices, warning devices and barriers which are necessary to protect the public and workers from hazards within the project limits.

3. The Contractor shall provide sufficient time in the construction schedule to develop and obtain approval for each TCP.

4. The Contractor shall include provisions for detouring pedestrians and providing maintenance of traffic plans and conveyances that meet current ADA (Americans with Disabilities Act) requirements.

5. The Contractor shall submit approved maintenance of traffic plans and schedules for the development, review, approval and implementation of the maintenance of traffic plan in accordance with the Contract Documents and Section 01300, “Submittals”.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

A. Maintenance of Roadway Surfaces: Maintain all lanes that are being used for the maintenance of traffic, including those on detours and temporary facilities, under all weather conditions. Keep the lanes free of dust, dirt, muck, potholes and rutting. Provide the lanes with the drainage facilities necessary to maintain a smooth riding surface under all weather conditions.

B. Number of Traffic Lanes:

1. Maintain one lane of traffic in each direction.

2. Maintain two lanes of traffic in each direction at existing four (or more) lane cross roads.

3. Construct each lane used for maintenance of traffic at least as wide as the traffic lanes existing in the area before commencement of construction. Do not allow traffic control and warning devices to encroach on lanes used for maintenance of traffic.

4. The Engineer may allow the Contractor to restrict traffic to one-way operation for short periods of time provided that the Contractor employs adequate means of traffic control and does not unreasonable delay traffic, and conforms to the approved requirements in the TCP. The Contractor shall include as a part of the TCP the estimated periods of one-way traffic operations and estimation of reasonable time delays and shall obtain the prior approval of the City Engineer having jurisdiction for these time periods and time delays. The Contractor shall include the TCP as a part of his Plan of Operation and MOT plan and in accordance with Section 01300, “Submittals”.

C. Crossings and Intersections: Provide and maintain adequate accommodations for intersecting and crossing traffic. Do not block or unduly restrict any road or street crossing the project unless approved by the Engineer and City Engineer. Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract. Restore any loss of detection within twelve (12) hours. Use only detection technology approved by the Engineer to restore detection capabilities. Before beginning any construction, provide the Engineer a plan for maintaining detection devices for each intersection and the name(s) and phone numbers of persons that can be contracted when signal operation malfunctions.

D. Access for Residences and Businesses: Provide continuous access to all residences and all places of business, adjacent schools, common property and community facilities.

E. Safe Walk Route: The safe walk route for all school students within the vicinity of the construction zone shall be maintained during the times students are arriving at or leaving school. If the current walking surface cannot be maintained, a temporary road-rock four-ft walkway shall be created in accordance with Broward County requirements. Accommodations shall be made immediately by the Contractor for the disabled persons.

F. Protection of the Work from Injury by Traffic: Where traffic would be injurious to a base, surface course, or structure constructed as a part of the work, maintain all traffic outside the limits of such areas until the potential for injury no longer exists.

G. Flagger: Provide trained flaggers as required by approved TCPs. State certified school crossing guards or off duty police officers shall be required to cross students at any locations other than those currently used.

H. Use of High Visibility Safety: Provide personnel with appropriate high visibility safety garments. Ensure that these garments be worn whenever the workers are within fifteen (15) feet of the edge of the travel way and during nighttime operations. Workers

operating machinery or equipment in which loose clothing could become entangled during operation shall be required to wear appropriate high visibility clothing that will not be subject to entanglement such as orange shirts or jackets. Require Contractor personnel to wear reflective orange vest/garment during nighttime operations.

I. Existing Pavement Markings: Where a detour changes the lane use of where normal vehicle paths are altered during construction, remove all existing pavement markings that will conflict with the adjusted vehicle paths. Do not overpaint. Remove existing pavement markings using a method that will not damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions. Remove all pavement markings that will be in conflict with “next phase of operation” vehicle paths as described above, before opening to traffic.

J. Detours

1. General: Construct and maintain detour facilities wherever it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operations block the flow of traffic.

2. Construction: Plan, construct, and maintain detours for the safe passage of traffic in all conditions of weather. Provide the detour with all facilities necessary to meet this requirement.

3. Construction Methods: Select and use construction methods and materials that provide a stable and safe detour facility. Construct the detour facility to have sufficient durability to remain in good condition, supplemented by maintenance, for the entire period that the detour is required.

4. Removal of Detours: Remove detours when they are no longer needed and before the Contract is completed. Restore the area used for detours to a condition equal to or better than existed before beginning of construction. Take ownership of all materials from the detour and remove them.

5. Detours Over Existing Roads and Streets: When the TCP specifies that traffic be detoured over roads or streets outside the project area, do not maintain such roads or streets; however, maintain all signs and other devices placed for the purpose of the detour.

K. Traffic Control Officer.

1. Provide uniformed law enforcement officers, including marked law enforcement vehicles, to assist in controlling and directing traffic in the work zone when traffic control in a signalized intersection is necessary when signals are not in use.

L. Driveway Maintenance.

1. General: Ensure that each residence and or business has safe, stable, and reasonable access.

2. Construction Methods: Place, level, manipulate, compact, and maintain the material, to the extent appropriate for the intended use. As permanent driveway construction is accomplished at a particular location, the Contractor may salvage and reuse previously placed materials that are suitable for reuse on other driveways.

M. Temporary Traffic Control Devices.

1. Installation and Maintenance: Install and maintain adequate traffic control devices, warning devices and barriers to protect the traveling public and workers, and to safeguard the work area. Erect the required traffic control devices, warning devices and barriers to prevent any hazardous conditions and in conjunction with any necessary traffic re-routing. Immediately remove, turn or cover any devices or barriers that do not apply to existing conditions.

2. Notify the Engineer, City, and City Engineer's representative of any scheduled operation, which will affect traffic patterns or safety, sufficiently in advance of commencing such operation to permit his review of the plan for the proposed installation of traffic control devices, warning devices of barriers.

3. Ensure an employee is assigned the responsibility of maintaining the position and condition of all traffic control devices, warning devices and barriers throughout the duration of the Contract. Keep the Engineer, City, and City Engineer's representative advised at all times of the identification and means of contacting this employee on a 24-hour basis.

4. Keep traffic control devices, warning devices, safety devices and barriers in the correct position, properly directed, clearly visible and clean, at all times. Immediately repair, replace or clean damaged, defaced or dirty devices or barriers.

N. Work Zone Signs: Provide signs in accordance with the approved TCPs and Design Standards.

O. High Intensity Flashing Lights: Furnish Type B lights in accordance with the approved TCPs and Design Standards.

P. Warning/Channelizing Devices: Furnish warning/channelizing devices in accordance with the approved TCPs and Design Standards.

1. Reflective Collars for Traffic Cones: At night use cone collars, designed to properly fit the taper of the cone when installed. Place the upper 6-inch collar a uniform 3 ½ inch distance from the top of the cone and the lower 4 inch collar a uniform 2 inch distance below the bottom of the upper 6 inch collar. Ensure that the collars are capable of being removed for temporary use or attached permanently to the cone in accordance with the manufacturer's recommendations. Provide a white sheeting having a smooth outer surface and that essentially has the property of a retro-reflector over its entire surface.

2. Barrier Wall (Temporary): Furnish, install, maintain, remove and relocate a temporary barrier wall in accordance with the approved TCPs.

3. Glare Screen (Temporary): Furnish, install, maintain, remove and relocate glare screen systems in conjunction with temporary barrier wall at locations identified in the approved TCPs. Ensure the anchorage of the glare screen to the barrier is capable of safely resisting an equivalent tensile load of 600 lb/ft of glare screen, with a requirement to use a minimum of three (3) fasteners per barrier section. When glare screen is utilized on temporary barrier wall, warning lights will not be required.

Q. Guardrail (Temporary): Furnish guardrail (temporary) in accordance with the approved TCPs.

R. Advance Warning Arrow Panel: Furnish advance warning panel in accordance with the approved plans, Design Standards and approved TCPs.

S. Temporary Traffic Control Signals: furnish, install and operate temporary traffic control signals as indicated in the approved TCPs. Temporary traffic control signals will consist of either portable or fixed traffic signals. Provide certification that the portable traffic signals meet the requirements of the Design Standards. The Engineer may approve used signal equipment if it is in acceptable condition.

T. Work Zone Pavement Marking.

1. Description: Furnish and install Work Zone Pavement Markings for maintenance of traffic construction areas and in close conformity with the lines and details shown on the plans. Measure the reflectivity of white and yellow stripes in accordance with Florida Method FM 5-541. Re-stripe anytime the reflectivity falls below the final values shown in FM 5-541. Use only pavement marking materials that do not contain any lead or chromium compounds.

2. Centerlines, lane lines, edge lines, stop bars and turn arrows in work zones will be required in accordance with the MUTCD with the following additions:

a. Install edge lines on paved shoulders.

b. Place edge lines on all detours where vehicle paths are altered from normal operations and where a lane is narrowed from its normal width for any reason.

c. Apply Work zone Pavement Markings, including arrows and messages as determined by the TCPE to be required for the safe operation of the facility, before the end of the day if the highway is open to traffic. Channelizing devices may be used to direct traffic during the day before placing the Work Zone Pavement Markings.

d. Work Zone Pavement Markings shall be designated in the approval TCPs as removable or non-removable.

PROJECT NO. 11842

- END OF SECTION -

PROJECT NO. 11842

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 privately-owned 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 uninterrupted 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 Plans 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. 11842

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 HIGHWAY LIMITATIONS

A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

1.02 TEMPORARY CROSSINGS

A. General: Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 300 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

B. Emergency Access and Security: 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 accessway on one side of the trench capable of supporting a Fire Truck. CONTRACTOR shall also provide stabilized accessways 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 accessways shall be protected and delineated with lighted barricades or other such devices as approved by the regulatory agency. Both ends of the emergency accessway shall be blocked in accordance with the MOT permit approved by City with signage indicating that this accessway is to be used by emergency vehicles only.

C. 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 operating 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 operating condition. A copy of the approved MOT plans, and details, shall be on site at all times.

D. Measurement and payment for security guard services shall be included in the Mobilization unit price.

E. Temporary Bridges: Wherever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the ENGINEER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

F. Street Use: Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized WORK of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the WORK shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

G. Traffic Control: For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of City and the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1).

H. The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of the Florida Department of Transportation.

I. The CONTRACTOR shall submit a traffic control plan to the City of Fort Lauderdale and/or the Broward County Traffic Engineering Division as required for approval prior to construction. The CITY reserves the right to observe these traffic control plans in use and to make any changes as field conditions warrant. Any changes shall supersede these plans and be done solely at the CONTRACTOR's expense.

J. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

K. Temporary Driveway Closure: The CONTRACTOR shall notify the CITY of the closure of the driveways to be closed more than one eight-hour work day at least 2 weeks prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the CITY/occupant how long the WORK will take and when closure is to start.

1.03 CONTRACTOR'S WORK AND STORAGE AREA

A. The CONTRACTOR shall designate and arrange for the use of a portion of property, adjacent to the WORK for its exclusive use during the term of the Contract as a storage and shop area for its construction operations relative to this Contract. This shall include but not be limited to interim storage of suitable materials for fill or backfill. Storage areas shall be fenced for the safety of the surrounding neighborhood (minimum 6 foot chain link fence).

B. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK. This shall include but not be limited to interim storage of suitable materials for fill or backfill.

C. The CONTRACTOR shall construct and use a separate storage area for hazardous materials used in constructing the WORK.

1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: Warning, Caution, Poisonous, Toxic, Flammable, Corrosive, Reactive, or Explosive. In addition, whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.

2. Hazardous materials shall be stored in groupings according to the Material Safety Data Sheets.

3. The CONTRACTOR shall develop and submit to the ENGINEER a plan for storing and disposing of the materials above.

4. The CONTRACTOR shall obtain and submit to the ENGINEER a single EPA number for wastes generated at the site.

5. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.

6. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.

1.04 PARKING

A. The CONTRACTOR shall:

1. Provide temporary parking areas as follows:

a. 4 spaces for the CITY and ENGINEER

b. 1 space designated for the handicapped or as required by regulatory agencies

2. The CONTRACTOR shall direct its employees to park in designated areas secured by the CONTRACTOR.

3. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 11842

SECTION 01560

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.01 EXPLOSIVES AND BLASTING

A. The use of explosives on the Work will not be permitted.

1.02 DUST ABATEMENT

A. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary (as determined by the Engineer) to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer. No separate payment will be allowed for dust abatement measures and all costs thereof shall be included in the Contractor's bid price.

1.03 RUBBISH CONTROL

A. During the progress of the Work, the Contractor shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.04 SANITATION

A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. Such facilities shall be made available when the first employees arrive on the Work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.

C. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition

at all time and shall enforce their use. It shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the City, or on adjacent property.

D. The City and the Engineer shall have the right to inspect any building or other facility erected, maintained, or used by the Contractor, to determine whether or not the sanitary regulations have been complied with.

E. Sanitary and Other Organic Wastes: The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto.

1.05 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, paint, fuel, solvent or reactant of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. The handling, storage, use and disposal of all such chemicals and disposal of residues shall be in strict accordance with all applicable rules and regulations of Federal, State and local jurisdictional agencies and the printed instructions of the manufacturer and all regulatory requirements. Copies of antidote literature shall be kept at the storage site and at the Contractor's job site office. A supply of antidotes shall be kept at the Contractor's office.

1.06 NOISE CONTROL

A. Noise resulting from the Contractor's work shall not exceed the noise levels and other requirements stated in local ordinances. The Contractor shall be responsible for curtailing noise resulting from its operation. It shall, upon written notification from the Engineer or noise control officers, make any repairs, replacements, adjustments, additions and furnish mufflers when necessary to fulfill requirements.

1.07 EROSION ABATEMENT AND WATER POLLUTION

A. It is imperative that any Contractor dewatering operation not contaminate or disturb the environment of the properties adjacent to the Work. The Contractor shall, therefore, schedule and control its operations to confine all runoff water from disturbed surfaces, water from dewatering operations that becomes contaminated with silt, muck and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

B. The Contractor shall comply with the requirements of the section entitled “Erosion and Sedimentation Control – Stormwater Pollution Prevention”.

1.08 MANATEE CONDITIONS FOR IN WATER WORK

A. The Contractor shall comply with the conditions outlined in the “Standard Manatee Conditions for In-Water Work” as published by the Florida Fish and Wildlife Conservation Commission. See the attached document at the end of this specification section for additional information.

1.09 PRECAUTIONS DURING ADVERSE WEATHER

A. During adverse weather, and against the possibility thereof, the Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building paper shelters, or other acceptable means. The Contractor shall be responsible for all changes caused by adverse weather.

B. The City may suspend construction operations at any time when, in its judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather conditions may be, in any season.

1.10 HURRICANE PRECAUTIONS

A. The requirements of Article 8.24 of the Contract Documents apply to the work of this section.

B. The Contractor shall take all precautions necessary to protect the job site during hurricane and tropical storm watches and warnings.

C. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and City a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the City. The Plan shall be provided for informational purposes only and will not be reviewed by the Engineer or City.

1.11 PERIODIC CLEANUP AND BASIC SITE RESTORATION

A. During construction, the Contractor shall regularly remove from the site all accumulated debris and surplus materials of any kind which results from its operations. Unused equipment and tools shall be stored at the Contractor's yard or base of operations for the project.

B. The Contractor shall perform the cleanup work on a regular basis and as frequently as ordered by the Engineer. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the Engineer, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

C. Upon failure of the Contractor to perform periodic clean-up and basic restoration of the site to the Engineer's satisfaction, the Engineer may, upon five days prior written notice to the Contractor, employ such labor and equipment as it deems necessary for the purpose, and all costs resulting therefrom shall be charged to the Contractor and deducted from amounts of money that it may be due.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK
2011

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or in Vero Beach (1-772-562-3909) for south Florida, and emailed to FWC at ImperiledSpecies@myFWC.com.

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8½ " by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. These signs can be viewed at http://www.myfwc.com/WILDLIFEHABITATS/manatee_sign_vendors.htm. Questions concerning these signs can be forwarded to the email address listed above.

CAUTION: MANATEE HABITAT

All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:

Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC

PROJECT NO. 11842

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish, install and maintain project identification signs and provide temporary on-site informational signs to identify key elements of construction facilities. Signs shall be removed upon completion of construction.

B. The Contractor shall notify property owners that may be affected by construction operation at least five (5) working days in advance.

1.02 RELATED REQUIREMENTS

A. All applicable sections of the Technical Specifications.

B. Conditions of the Contract.

1.03 PROJECT IDENTIFICATION SIGN

A. Up to two (2) painted signs, of not less than 32 square feet area each, with painted graphic content. Signs shall be in accordance with the General Conditions. Project signs must be submitted to the City for approval prior to fabrication and installation.

B. Graphic design, style of lettering, and colors: As designated by Engineer.

C. Erect on the site at a lighted location of high public visibility at a location outside the public Right-of-Way, as approved by Engineer.

D. An example project sign is provided at the end of this section.

1.04 INFORMATIONAL SIGNS

A. Painted signs and painted lettering, or standard products:

1. Size of signs and lettering: As required by regulatory agencies, or as appropriate to usage.

2. Colors: As required by regulatory agencies, otherwise of uniform colors throughout project.

B. Erect at appropriate locations to provide required information.

1.05 PROPERTY OWNER NOTIFICATION

A. All homes and businesses affected by construction activities shall be notified by use of a “doorhanger” type announcement describing at a minimum, the nature of the Work, the proposed schedule, and the Contractor’s contact information. An example door hanger

is provided at the end of this section.

B. Door hangers shall be submitted to the City for approval prior to use.

C. Door hangers shall be printed and distributed by the Contractor.

1.06 QUALITY ASSURANCE

A. Sign Painter: Professional experience in type of Work required.

B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to Work and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

C. Thickness: As required by standards to span framing members, to provide even, smooth surface without wave or buckles.

D. Rough Hardware: Galvanized.

E. Paint: Exterior quality:

1. Use Bulletin colors for graphics.

2. Colors for structure, framing, sign surfaces and graphics: As selected by Engineer.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Paint exposed surfaces of supports, framing and surface material; one coat of primer and one coat of exterior paint.

B. Paint graphics in styles, sizes and colors selected.

3.02 INFORMATIONAL SIGNS

A. Paint exposed surfaces: One coat of primer and one coat of exterior paint.

B. Paint graphics in styles, sizes and colors selected.

C. Install at a height for optimum visibility, on ground-mounted poles or attached to temporary structural surfaces.

3.03 MAINTENANCE

A. Maintain signs and supports in a neat, clean condition; repair damages to structure, framing or sign.

B. Relocate informational signs as required by progress of the Work.

3.04 REMOVAL

A. Remove signs, framing, supports and foundations at completion of project.

3.05 MEASUREMENT AND PAYMENT

A. There shall be no special measurement or payment for the Work under this section, it shall be included in the lump sum price bid for item ‘Mobilization’.

- END OF SECTION -

City of Fort Lauderdale

Stormwater Master Plan Improvements

Creating a resilient and safe coastal community

What's Happening?

What's Happening: The City of Fort Lauderdale is proactively preparing for the future by investing in new stormwater infrastructure to reduce flooding throughout our community.

(954) 828-8000
www.fortlauderdale.gov

WE BUILD COMMUNITY

Planned Improvements

- Installing a tidal valves
- Installing a new seawall
- Pavement Restoration
- Landscaping Restoration
- Installing new drainage pipe
- Installing new drainage structures

Cost

Expected Completion

Project Number

Contractor

Fort Lauderdale City Commission

Dean J. Trantalis Mayor	Heather Moraitis Commissioner, District I	Steven Glassman Commissioner, District II	Robert L. McKinzie Vice Mayor, District III	Ben Sorensen Commissioner, District IV	Chris Lagerbloom, ICMA-CM City Manager

[CONTRACTOR'S NAME]

[CONTRACTOR'S STREET ADDRESS]

[CONTRACTOR'S CITY, STATE AND ZIP]

[CONTRACTOR'S TELEPHONE NUMBER]

[CONTRACTOR'S FAX NUMBER]

MEMORANDUM

TO: **RESIDENTS OF [LOCATION OF CONSTRUCTION]**

DATE: **[CURRENT DATE]**

RE: **CONSTRUCTION IN YOUR AREA**

FROM: **[CONTRACTOR'S NAME}**

Construction in your area will commence on [date of construction commencement].

The construction area is from [boundary #1] to [boundary #2].

Access to the area will be limited at certain times due to the construction activities. We apologize for any inconvenience and we will do our best to accommodate access to residents.

Thank you,

[Contractor Name]

PROJECT NO. 11842

SECTION 01590

FIELD OFFICE, EQUIPMENT AND SERVICES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install one field office trailer for its own use at the project site, during the entire time of construction beginning at the commencement date stated in the second Notice to Proceed until the date of final acceptance of the Work by the CITY. A field trailer for the ENGINEER's use shall be fully equipped, furnished, stocked and ready for occupancy at the project site designated location beginning within fifteen (15) days after the Notice to Proceed. The field trailer shall be occupied by the ENGINEER until the date of final acceptance of the Project Closeout by the CITY.

B. The CONTRACTOR shall locate the field offices in the location approved by the City and Engineer. The field offices shall remain the property of the CONTRACTOR and shall be removed (including mountings, connections and hookups) from the site upon completion of the Work, returning the site and all improvements to their pre-Notice-To-Proceed condition.

C. No invoice for mobilization will be recommended for payment for any work done under the Contract until all field office facilities specified herein have been provided and accepted by the ENGINEER.

1.02 SUBMITTALS

A. Submit shop drawings and other information as required demonstrating that the ENGINEER's field office meets the requirements of this Section.

B. Prior to installation of the field trailer, CONTRACTOR shall submit a certification from the supplier indicating that trailer walls, floor, and ceiling are free from mold.

1.03 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. The 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 at the location approved by the City and Engineer.

PROJECT NO. 11842

1.04 ENGINEER'S OFFICE

A. The CONTRACTOR shall furnish a field office for the use of the ENGINEER. The field office shall be new, or like new, and consist of a nominal 56-foot by 12-foot single wide (or equivalent) trailer with two private offices and conference area, each separated by walls and with an interior door. A unisex restroom shall be provided. Floor plan subject to acceptance by ENGINEER.

B. The structure shall be watertight with suitable windows and doors with substantial locks. All windows shall have venetian blinds and aluminum screens. Adequate lighting shall be furnished with wall switches provided for all ceiling lighting fixtures which shall either be installed flush or recessed into the ceiling.

C. The trailer shall conform to HUD requirements. Minimum ceiling height shall be 7 foot 6 inches. The interior shall have vinyl tile floor covering, wall paneling, 100 amp electrical service, copper wiring, 20-gallon electric water heater, copper water piping, a six cubic foot refrigerator, 600 watt microwave oven and two wall mounted fire extinguishers. Washroom shall be equipped with a flush toilet, cabinet mounted wash basin and medicine cabinet complete with supplies. Plumbing fixtures shall be acceptable house type, trapped and vented.

D. Air conditioning shall be provided which is capable of lowering the temperature to 72 degrees Fahrenheit in South Florida, worst case, summer heat and humidity conditions. Heating shall be provided which is capable of raising the temperature to 78 degrees Fahrenheit in cold weather. CONTRACTOR shall be responsible for providing a new air filter once every month for the duration of the project.

E. The CONTRACTOR shall install the field office trailer and provide services for the specified project duration as follows and as identified on the Drawings:

1. The CONTRACTOR shall furnish and install necessary sanitary, water, electric, and telephone connections between the source and its trailer as shown on the drawings. In addition, the CONTRACTOR shall coordinate with the local utility to arrange for startup and invoicing of electric and telephone services accordingly. The CONTRACTOR shall make arrangements for and pay for all costs for all water used during construction as specified in the Section entitled “Temporary Utilities.”

2. The CONTRACTOR shall provide and maintain adequate and clean sanitary facilities for the construction work force and visitors. The facilities shall comply with local codes and regulations and be situated in an acceptable location.

3. The CONTRACTOR shall furnish the ENGINEER’s field office with voice over internet protocol phone, high speed Wi-Fi internet services and a 4-port DSL router. The trailer shall be provided with seven (7) two-line speaker/intercom telephones. All jack locations shall be subject to review and acceptance by the ENGINEER.

4. The CONTRACTOR shall permit the ENGINEER, the CITY, or their authorized representatives or employees free and unlimited use of said telephone facilities for all calls that do not involve published toll charges. Calls originated by the ENGINEER, the CITY, the authorized representative or employees which involve toll or message unit charges shall be billed to the CITY by the CONTRACTOR at the rates charged by the telephone company.

5. The CONTRACTOR shall furnish and replace electric bulbs and/or fluorescent tubes, toilet paper, towels and soap, water cooler with reusable jugs, cups, and maintain the office copiers, telecopiers and other equipment in first-class condition, including all paper, ink, and repairs until final acceptance of the work under this Contract. Single-use plastic water bottles are not acceptable.

6. The CONTRACTOR shall provide fire insurance, extended coverage and vandalism, malicious mischief and burglary and theft insurance coverage for the ENGINEER'S field office trailer in the amount of $100,000 and for field office equipment in the amount of $50,000.

7. The CONTRACTOR shall furnish a free standing electric water cooler to dispense hot and cold water from 5-gallon bottles with regular water bottle delivery service.

8. The CONTRACTOR shall furnish weekly janitorial service to the ENGINEER’S trailer.

9. The CONTRACTOR shall provide 500 feet of Category 6E Ethernet Cable for computer network wiring to the ENGINEER’s field office. Layout of the cable shall be subject to comment and revision by the ENGINEER prior to acceptance. The CONTRACTOR shall install cables to approved locations. Terminations shall be furnished by the CONTRACTOR as directed by the ENGINEER.

10. The CONTRACTOR shall provide monthly pest control services covering both the interior and exterior areas of the trailer.

F. The field office trailer shall remain the property of the CONTRACTOR and shall be removed upon completion of the work. All affected work areas shall be restored to their original condition.

G. The CONTRACTOR shall furnish and install/arrange new or like new office furniture for the ENGINEER's field office. Model numbers listed below are to establish minimum product quality. Office furniture shall consist of the following:

1. Two double-pedestal desks, Hon Metrostandard Series No. HON-34961-WP with 60 inches x 30 inches top size, or equal.

2. Two conventional office chairs HON HVL702 mesh chair, United Chari Co. Model No. UP13, or equal.

3. Two four-drawer letter size (52 inches high) filing cabinets, with lock HON 510 series, Steelmaster, or equal.

4. One 72 inch high storage cabinet with five adjustable shelves 36W x 24D HON model HSC2472, or equal.

5. Two 30 inches x 60 inches reference tables HON UTM 3060, or equal.

6. Two bookcases - 60 inches high x 36 inches wide x 11 inches deep with five shelves, HON Model No. H1895, or equal.

7. Two desk lamps with two 15-watt tubes, Dazor Model 2324, LUDU F 30L, or equal.

8. Ten conventional office chairs, HON Model HLV702, United Chair Co. Model No. UP12, or equal.

9. One dry erase "white board" 4 feet x 6 feet wall mount type Quartet Aluminum Frame QRT-S537, full length marker rail, two erasers and two boxes of four color dry erase markers, or equal.

10. Three wastepaper baskets.

11. One aluminum framed cork faced bulletin board 36 inch x 60 inch wall mount type.

12. Lease one Xerox WorkCentre 7800i series color copier complete with scanner, fax and email including Wi-Fi, automatic document feeder, stapling**,** sorter, stand, service contract should include a minimum of 2500 copies per month for duration of Project, consumables and other necessary accessories, or equal. Copier shall be set and provided with trays to print copies on 8-1/2 x 11 inches, 8-1/2 x 14 inches and 11 x 17 inches paper.

13. Two Canon Powershot cameras or equal, built in flash, minimum 20 Megapixel, 1280 x 720 image resolution, 5x optical plus 4x digital zoom with auto focus, 1080p video. Provide a 16 GB memory card, spare battery pack, and battery charger.

14. One first aid cabinet conforming to OSHA requirements for an office up to 5 persons or a construction site of up to 5 persons.

1.05 UTILITIES FOR FIELD OFFICES

A. The CONTRATOR shall arrange with Florida Power and Light (FPL) for construction power service and pay all costs for the Work and power necessary for the field offices. The CONTRACTOR shall be responsible for all connections and wiring to and from the point of service. In addition, the CONTRACTOR shall coordinate with the local utility to arrange startup and invoicing for service.

B. 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 carrier service point and the field office. In addition, the CONTRACTOR shall coordinate with the local phone company to arrange startup and invoicing for service.

C. Contractor shall supply water service to the field office. Water supply shall be in accordance with the Section entitled “Temporary Utilities.” Cleaning, flushing, and related permit requirements for all connections are the Contractor's responsibility.

D. Contractor shall supply sanitary service to the field office. The Contractor shall be responsible for connection and piping requirements between municipal collection system and its office trailer to meet all applicable code and regulatory requirements.

E. The CONTRACTOR retains responsibility for procuring all necessary permits for the installation of field offices at the approved location.

F. The CONTRACTOR shall familiarize itself with the existing power, telephone, water and sewer connections. All costs associated with “hooking-up” to these existing items shall be included in the CONTRACTOR’s base bid.

PART 2 -- PRODUCTS

(Not Used)

PART 3 -- EXECUTION

(Not Used)

- END OF SECTION -

PROJECT NO. 11842

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The word "Products," as used herein is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for project or taken from Contractor's stock of previously purchased products.

B. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of Work.

C. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items).

D. Definitions in this Section are not intended to negate the meaning of other terms used in Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," “special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

1.02 QUALITY ASSURANCE

A. Source Limitations: To the greatest extent possible for each unit of Work, the Contractor shall provide products, materials, or equipment of a singular generic kind from a single source.

B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product, material, or equipment, the Contractor shall select an option which is compatible with other products, materials, or equipment already selected. Compatibility is a basic general requirement of product/material selections.

1.03 DESIGN

A. Equipment and appurtenances shall be designed in conformity with the ASME, AIEE, NEMA and other generally accepted applicable standards and shall be of rugged construction and sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation and all conditions of operation. All bearings and moving parts shall be adequately protected by bushings or other acceptable means against wear, and provision shall be made for adequate lubrication by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, etc., shall be finished in appearance.

B. All exposed welds on machinery shall be ground smooth and the corners of structural shapes shall be rounded or chamfered.

1.04 PRODUCT DELIVERY-STORAGE-HANDLING

A. The Contractor shall deliver, handle, and store products in accordance with supplier's written recommendations and by means and methods that will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the Contractor shall provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

1.05 TRANSPORTATION AND HANDLING

A. Products shall be transported by methods to avoid product damage and shall be delivered in undamaged condition in supplier's unopened containers or packaging, dry.

B. The Contractor shall provide equipment and personnel to handle products, materials, and equipment including those provided by City, by methods to prevent soiling and damage.

C. The Contractor shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.06 STORAGE AND PROTECTION

A. Products shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight enclosures and temperature and humidity ranges shall be maintained within tolerances required by supplier's written instructions.

B. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.

C. Loose granular materials shall be stored on solid surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

D. Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure products are undamaged and are maintained under required conditions.

E. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

1.07 MAINTENANCE OF STORAGE

A. Stored products shall be periodically inspected on a scheduled basis.

B. The Contractor shall maintain a log of inspections and make said log available to the Engineer on request.

C. The Contractor shall verify that storage facilities comply with supplier's product storage requirements.

D. The Contractor shall verify that supplier-required environmental conditions are maintained continually.

E. The Contractor shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.

1.08 MAINTENANCE OF EQUIPMENT STORAGE

A. For mechanical and electrical equipment in long-term storage, the Contractor shall provide a copy of the supplier's service instructions to accompany each item, with notice on enclosed instruction shown on exterior of package.

B. Equipment shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document to the Engineer.

1.09 LUBRICANTS

A. During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this Contract.

1.10 SPECIAL TOOLS

A. For each type of equipment furnished by it, the Contractor shall provide a complete set of all special tools (including calibration and test equipment) which may be necessary for the adjustment, operation, maintenance and disassembly of such equipment.

B. Special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such special tools until completion of the Work, at which time they shall be delivered to the City.

1.11 PROTECTION AGAINST ELECTROLYSIS

A. Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

1.12 FASTENERS

A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor in accordance herewith.

B. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

C. All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be Type 316 stainless steel unless otherwise specifically indicated or specified.

D. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

1.13 SALVAGED AND EXCAVATED MATERIALS

A. In the absence of special provisions in other Sections of the Specifications, salvage materials, equipment or supplies that occur are the property of the City and shall be cleaned and stored as directed by the Engineer.

B. All excavated materials needed for backfilling operation shall be stored on site. Where additional area is needed for stockpiling, it shall be obtained by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 11842

SECTION 01660

EQUIPMENT TESTING AND STARTUP

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Equipment testing and startup are requisite to satisfactory completion of the contract and, therefore, shall be completed within the contract time. The Contractor shall allow sufficient time in its construction schedule to complete testing, trouble shooting and start-up activities.

B. As construction 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. Schedule equipment manufacturer's visits to site.

2. Calibration of instruments and controls.

3. Perform required testing, adjusting and balancing of project components.

4. Schedule start-up and initial operation.

5. Furnish skilled personnel during initiation operation to provide back-up maintenance services to equipment, as necessary.

6. Furnish operation and maintenance training to City's personnel per requirements of the Contract documents.

1.02 EQUIPMENT TESTING

A. 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. The Contractor shall provide effective coordination of all parties necessary for complete system testing, including Suppliers, subcontractors, the Engineer, and the City.

B. 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 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.

C. The Contractor shall be responsible for scheduling all operations testing. The Contractor is advised that the Engineer and the City's operating personnel will witness operations testing.

D. The supplier's representative shall instruct the City's operating personnel in correct operation and maintenance procedures. The instruction shall demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment. Such instruction shall be scheduled at a time arranged with the City at least 2 weeks in advance and shall be provided 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 in the plant. The Contractor shall have submitted, and had accepted, the O&M Manuals (specified in the Section entitled "Submittals") prior to commencement of training.

E. The Contractor shall notify the Engineer at least 14 days in advance of each equipment test or City training session.

F. Training shall be provided to two separate shifts of the City's personnel. Training may occur anytime over a 24-hour period.

G. 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 except as otherwise accepted by the Engineer.

1.03 STARTUP

A. The Contractor shall provide the effective coordination of all parties necessary for the successful startup, including suppliers, subcontractors, the Engineer, and the City.

B. It is not the intent of the Engineer to instruct the Contractor in the startup of the facilities; however, the Engineer will be available prior to and during startup to provide technical support to the Contractor.

C. The Contractor shall be required to startup the equipment, under direction of the Engineer and City, and operate it for a continuous 7-day (24 hours per day) period at design conditions. The Contractor shall be available at all times during this period to provide necessary maintenance support services as may be deemed necessary by the City and/or Engineer. This 7-day period must be successfully completed prior to the issuance of Substantial Completion.

D. Not less than 3 months prior to startup, the Contractor shall submit to the Engineer for

review, a detailed schedule of operations which will be necessary for a successful initial operation and sustained period of operation for the duration of the required startup period as specified in the Section entitled "Submittals."

E. The startup shall not be commenced until all required leakage tests, disinfection, and equipment tests, as applicable, have been completed to the satisfaction of the Engineer.

F. All defects in materials or quality which appear during this startup period 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 startup test duration or beginning the startup test period again.

G. During the startup, the Contractor shall provide the services of authorized representatives of the suppliers, in addition to those services required under operations testing, as necessary, to correct faulty equipment operation.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 11842

SECTION 01770

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 THE REQUIREMENT

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

1.02 RELATED REQUIREMENTS

A. All applicable sections of the Technical Specifications.

B. Conditions of the Contract

1.03 SUBSTANTIAL COMPLETION

A. When CONTRACTOR considers the WORK is substantially complete, the CONTRACTOR shall submit to ENGINEER:

1. A written notice that the WORK, or designated portion thereof, is substantially complete.

2. A list of items to be completed or corrected.

3. Final as-builts per requirements of Section 01320 and City of Fort Lauderdale As-Built Plan Requirements.

B. Within a reasonable time after receipt of such notice, City and ENGINEER will make an inspection to determine the status of completion.

C. Should ENGINEER determine that the WORK is not substantially complete:

1. ENGINEER will promptly notify the CONTRACTOR in writing, giving the reasons therefore.

2. CONTRACTOR shall remedy the deficiencies in the WORK, and send a second written notice of substantial completion to the ENGINEER.

3. ENGINEER will reinspect the WORK.

D. When ENGINEER concurs that the WORK is substantially complete, ENGINEER will:

1. Prepare a Certificate of Substantial Completion accompanied by CONTRACTOR's list of items to be completed or corrected, as verified and amended by the ENGINEER.

2. Submit the Certificate to the CITY and the CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.

1.04 FINAL INSPECTION

A. On completion of the WORK, the CONTRACTOR shall submit written certification that:

1. Contract Documents have been reviewed.

2. WORK has been inspected for compliance with Contract Documents.

3. WORK has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the ENGINEER and are operational.

5. WORK is completed and ready for final inspection.

B. ENGINEER will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should ENGINEER consider that the WORK is incomplete and defective:

1. ENGINEER will promptly notify the CONTRACTOR, in writing, listing the incomplete or defective WORK.

2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies, and send a second written certification to ENGINEER that the WORK is complete.

3. ENGINEER will reinspect the WORK.

D. When the ENGINEER finds that the WORK is acceptable under the Contract Documents, the ENGINEER shall request the CONTRACTOR to make closeout submittals.

1.05 REINSPECTION FEES

A. Should CITY or ENGINEER perform reinspections due to failure of the WORK to comply with the claims of status of completion made by the CONTRACTOR:

1. CONTRACTOR will compensate CITY or ENGINEER for such additional services, and/or.

2. CITY will deduct the amount of such compensation from the final payment to the CONTRACTOR.

1.06 CONTRACTOR'S CLOSEOUT SUBMITTALS TO CITY’s REPRESENTATIVE

A. Evidence of compliance with requirements of governing authorities:

1. Certificate of Occupancy

2. Permit Closeout Certification

3. Certificates of Inspection

   a. Mechanical

   b. Electrical

   c. Other, as may be required

B. Project Record Documents: To requirements of Section 01320

C. Operating and Maintenance Data, Instructions to City's Personnel: To requirements of Section 01300

D. Guarantees and Bonds: To requirements of Section 01300

E. Evidence of Payment and Release of Liens: To requirements of General and Supplementary General Conditions

F. Certificate of Insurance for Products and Completed Operations

1.07 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to ENGINEER.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum

2. Additions and deductions resulting from:

   a. Previous Change Orders

   b. Allowances

   c. Unit Prices

   d. Deductions for uncorrected WORK

   e. Penalties and Bonuses

   f. Deductions for liquidated damages

   g. Deductions for reinspection payments

   h. Other adjustments

3. Total Contract Sum, as required

4. Previous payments

5. Sum remaining due

C. ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.08 FINAL APPLICATION FOR PAYMENT

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

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

PROJECT NO. 11842

SECTION 02015

MOBILIZATION 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 entitled "CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS".

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.

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 -

PROJECT NO. 11842

SECTION 02100

EROSION AND SEDIMENTATION CONTROL – STORMWATER POLLUTION PREVENTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all work and take all measures necessary to control soil erosion resulting from construction operations, prevent flow of sediment from construction site, and contain construction materials (including excavation and backfill) within protected working area as to prevent damage to any stream or wetlands.

B. The Contractor is responsible for creating a Stormwater Pollution Prevention Plan (SWPPP) for regulatory approval and enforcing its requirements in accordance with applicable Federal, State, and local regulations. The complete SWPPP shall be submitted by the Contractor and approved by the regulatory agencies having jurisdiction before the start of construction. The Contractor shall provide all labor, materials, and equipment required in the prevention of environmental pollution and degradation and thereby for the protection of all environmental resources encountered during construction.

C. The Contractor is responsible for all permitting and reporting forms as required through the Florida Department of Environmental Protection (FDEP) – National Pollutant Discharge Elimination System (NPDES) program for construction activities.

D. Temporary erosion controls may include, but are not limited to, mulching, netting, and watering on site surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations that will ensure erosion during construction will be either eliminated or maintained within acceptable limits as established by the City.

E. Temporary sedimentation controls may include, but are not limited to, silt dams, barriers, turbidity curtains, hay bales, drop inlet protection, curb inlet protection, and appurtenances at the foot of sloped surfaces and other areas that will ensure sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the City.

1.02 REFERENCE

A. “Guidelines for Erosion and Sediment Control, Planning and Implementation” published by the United States Environmental Protection Agency.

B. “Processes, Procedures and Methods to Control Pollution Resulting from all Construction Activity”, published by the United States Environmental Protection Agency.

C. “The Florida Stormwater, Erosion, and Sedimentation Control Inspector’s Manual” published by the Florida Department of Environmental Protection.

D. NPDES Stormwater Program: www.dept.state.fl.us/water/stormwater/npdes/

1.03 SUBMITTALS

A. Contractor shall provide a copy of all permit applications, approvals, and reporting documentation submitted in support to SWPPP.

B. Contractor shall submit a copy of the SWPPP in accordance with Section 01300.

1.04 QUALITY ASSURANCE

A. Operations restricted to areas of work indicated on drawings and area which must be entered for construction of temporary or permanent facilities.

B. Engineer has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct immediate permanent or temporary pollution control measures to prevent contamination of any stream or wetlands, including construction of temporary berms, dikes, dams, sediment basins, sediment traps, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.

PART 2 - PRODUCTS

2.01 GENERAL

A. All products shall be in accordance with Drawings and approved SWPPP.

PART 3 - EXECUTION

3.01 GENERAL

A. Prior to the start of work, provide and install the site sedimentation and erosion control as indicated on the Drawings and the Contractor prepared SWPPP and as required by applicable regulations. Maintain such system for the duration of the project.

B. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results that comply with the requirements of the City or SWPPP, Contractor shall immediately take any and all necessary steps to correct the deficiency at his own expense.

C. Construct earth berms or diversions to intercept and divert runoff water from critical areas.

D. Discharge silt-laden water from excavations onto filter fabric mat and/or baled hay or straw sediment traps to ensure that only sediment-free water is returned to watercourses.

E. Do not place excavated soil material adjacent to watercourse in manner that will cause it to wash away by high water or runoff.

F. Prevent damage to vegetation by excessive watering or silt accumulation in the discharge area.

G. Do not dump soiled material into any streams, wetlands, surface waters, or unspecified locations.

H. Do not pump silt-laden water from trenches or excavations into surface waters, streams, wetlands, or natural or man-made channels leading thereto.

I. Prevent damage to vegetation adjacent to or outside of construction area limits.

J. Do not dispose of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in streams, wetlands, surface waters, or natural or man-made channels leading thereto, or unspecified locations.

K. Do not alter flow line of any stream unless indicated or specified.

L. All exposed graded, cleared, filled, etc. land to remain shall be stabilized with sod, filter fabric, and/or vegetation acceptable to the Owner.

- END OF SECTION -

PROJECT NO. 11842

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 Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.03 SCHEDULING AND SEQUENCING

A. Prepare site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to 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. All branches potentially interfering with construction operations shall be pruned prior to starting work and following approval of the City and the City of Fort Lauderdale Urban Forester.

3.02 LIMITS

A. As Follows, but not to extend beyond project limits.

1. Excavation Including Trenches: 5 feet beyond 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, plants, and ground covers, shrubs and trees 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.

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.
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 TOPPING

A. Top trees designated by the City 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.

B. Treat wounds resulting from topping in accordance with standard horticultural practice to preserve the natural character of the tree.

3.10 PRUNING

A. 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 only after planting and in accordance with standard horticultural practice to preserve the natural character of the plant. Perform in presence of the Engineer. 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 Engineer.
2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

- END OF SECTION -

PROJECT NO. 11842

SECTION 02220

DEMOLITION

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Removal and disposal of structures, pavement surfaces, sidewalks, underground obstructions, and other facilities necessary to prepare the area for construction of proposed facilities.

PART 2 - MATERIALS

(NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Utilities:

1. 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.

2. Remove utility lines exposed by demolition excavation.

3. Remove electric, sanitary, and storm drainage adjacent to buildings to be demolished.

4. Excavate utility lines serving buildings to be demolished and provide a permanent leak-proof closure for water and gas lines.

5. Plug sewerlines 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.

B. Removal and Storage of Equipment for Reuse:

1. Do not remove equipment and materials without approval of Engineer.

2. Properly store and maintain equipment and materials in same condition as when removed.

3. Engineer will determine condition of equipment and materials prior to removal.

3.02 DEMOLITION

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 2 inches below final finished surface.

G. Extract existing piling, which conflict with new piles, prior to driving new piles.

3.03 DISPOSAL

A. Dispose of debris and other nonsalvaged materials offsite in licensed landfills.

3.04 BACKFILLING

A. Demolished Areas: Backfill to existing ground level or foundation level of new construction.

B. Backfill Material and Compaction:

1. Conform to Sections 02222 and 02224.

2. 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.

C. Fire Hydrants:

1. Salvage for future use by City.

2. Remove and leave for City in location directed by the City.

- END OF SECTION -

PROJECT NO. 11842

SECTION 02222

EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Excavate, grade and backfill as required for underground piping systems and appurtenances as shown on the Drawings and specified herein.

B. All excavation for the project is unclassified.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Division 15

B. Division 16

C. Division 2, Specification Section entitled “Earthwork”

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: All codes, as referenced herein, are specified in Section 01090, "Reference Standards".

B. Commercial Standards:

ASTM D 422	Standard Test Method for Particle-Size Analysis of Soils.
ASTM D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
ASTM D 1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
ASTM D 1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
ASTM D 2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.04 SUBMITTALS

A. General: Submit information and samples to the Engineer for review as specified herein in accordance with the Section entitled "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 entitled "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: Refer to specification section entitled "Earthwork".

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 - PRODUCTS

2.01 MATERIALS

A. General: Materials shall be furnished as required from on-site excavations or from acceptable off-site sources as required. 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.

2.02 BEDDING

A. Pipe Bedding: In general, clean sandy materials excavated from the utility trench, that is free from organics, clay and construction debris, can be used as pipe bedding when construction is in a dry condition and when the bedding is not sided by muck. Pipe bedding material shall be able to pass through a 3/4-inch sieve. Separation of suitable material for pipe bedding from other material shall be made during the excavation.

B. Sand shall be used for all copper and other service lines.

C. In the case of a “dry” installation, sand shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

D. In the case of a “wet” installation, pearock shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

E. Precast concrete items shall use crushed stone.

2.03 PEAROCK

A. Pearock shall consist of hard, durable particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. Refer to specification section entitled “Earthwork” for size and gradation conformance requirements.

2.04 CRUSHED STONE (3/4-INCH ROCK)

A. Crushed stone shall consist of hard, durable, subangular particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. Refer to specification section entitled “Earthwork” for size and gradation conformance requirements.

2.05 SAND

A. Sand shall be used for bedding polyvinyl chloride, fiberglass, HDPE and other plastic pipe when installed under dry trench conditions. Refer to specification section entitled “Earthwork” for size and gradation conformance requirements.

2.06 SELECT BACKFILL

A. Select Backfill: It is the intent of these specifications to obtain clean sandy material passing through a 3/4-inch sieve as select backfill material for utility and structural applications.

B. At locations where subsurface preparations for structures have been performed under this or other previous construction contracts, clean excavated material (structural fill) may be used as select backfill. Any excess fill shall be disposed of off-site by the Contractor.

2.07 GENERAL BACKFILL

A. General backfill (for grading applications) shall be placed above the select backfill. General backfill shall be clean granular soil, free of organics or other deleterious material. Refer to specification section entitled “Earthwork” for size and gradation conformance requirements.

B. General backfill used under roadways shall be compatible with the materials and compaction specified under the Sections entitled “Asphaltic Pavement” and “Concrete Curb and Sidewalk”.

PART 3 - EXECUTION

3.01 EXCAVATION

A. The Contractor shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades and depths shown on the Drawings, or as directed. For projects within the right-of-way, unless shown otherwise on the Drawings, all excavations shall be made by open cut, except for service connections to houses located across the road from the watermain, where directional boring shall be used. All existing utilities such as pipes, poles and structures shall be carefully located, supported and protected from injury; in case of damage, they shall be restored at the Contractor's expense.

B. Pipe trenches for piping shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation, or sheeting if used as defined in specification section entitled “Earthwork”. Excavation depths in other types of materials and conditions shall be made as hereinafter specified.

C. In areas where trench widths are not limited by right-of-way and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, the trench sides may be sloped to a stable angle of repose of the excavated material but only from a point one foot above the crown of the pipe. A substantially and safely constructed movable shield, "box" or "mule" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.

D. Ladders or steps shall be provided for and used by Workmen to enter and leave trenches, in accordance with OSHA requirements.

E. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches.

F. Excavated unsuitable material shall be removed from the site and disposed of by the Contractor. Materials removed from the trenches shall be stored and in such a manner that will not interfere unduly with any on-site operations, traffic on public roadways and sidewalks and shall not be placed on private property. In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to other convenient places of storage acceptable to the City at the Contractor's expense.

G. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of backfill requirements shall be either used on the site as directed by the Engineer or disposed of the Contractor.

H. Barriers shall be placed at excavations in accordance with OSHA requirements.

3.02 SHEETING AND BRACING

A. The Contractor shall furnish, place and maintain sheeting and bracing to support sides of the excavation as necessary to provide safe working conditions in accordance with OSHA requirements, and to protect pipes, structures and other Work from possible damage. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level of 2 feet above the top of the installed pipe and that portion below the level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished without disturbing the bedding, pipe or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed utility caused by the removal of sheeting shall be cause for rejection of the affected portion of the work. The City may permit sheeting to be left in place at the request and expense of the Contractor, or the City may order him in writing to leave in place, for the preventing of damage to structures or property. Payment for sheeting ordered to remain in place shall be paid for at a negotiated price.

B. If the Engineer is of the opinion that at any point sufficient or proper supports, have not be provided, he may order additional supports put in at the Contractor’s expense. The Contractor shall be responsible for the adequacy of all sheeting used and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

3.03 REMOVAL OF WATER

A. General: It is a basic requirement of these Specifications unless otherwise authorized per Article 3.10 that excavations shall be free from water before pipe or structures are installed.

B. The Contractor shall provide pumps, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in a dry condition. The Contractor shall continue dewatering operations until backfilling has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench or so that it is above the water table. If at any point during the dewatering operation it is determined that fine material is being removed from the excavation sidewalls, the dewatering operation shall be stopped. If any of the subgrade or underlying material is disturbed by movement of groundwater, surface water, or any other reason, it shall be replaced at the Contractor's expense with crushed stone or gravel.

C. 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.

D. Disposal: Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the Work completed or in progress, to the surface of the streets, cause any interference with the use of the same by the public, or cause pollution of any waterway or stream. The Contractor shall submit his proposed methods of handling trench water and locations at which the water will be disposed of to the Engineer for review and shall receive acceptance before starting the excavation. Disposal to any surface water body will require silt screens to prevent any degration in the water body. The Contractor shall have responsibility for acquiring all necessary permits for disposal.

3.04 TRENCH STABILIZATION

A. No claim for extras, or additional payment will be considered for cost incurred in the stabilization of trench bottoms which are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist and the Contractor shall correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the City before placing the pipe or structures.

3.05 PIPE BEDDING

A. Pipe trenches shall be excavated as described in specification section entitled "Earthwork". The resulting excavation shall be backfilled with acceptable pipe bedding material, up to the level of the centerline of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

B. Any over excavation below the levels required for installation of the pipe shall be backfilled with acceptable bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at the Contractor's expense.

3.06 BACKFILL

A. Pipeline trenches shall be backfilled to a level 12 inches above the top of the pipe with select backfill. When placed in the dry, such material shall be placed in 6-inch layers, each compacted to the densities specified in Article 3.07. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe.

B. After the initial portion of backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the remainder of the trench may proceed. The remainder of the backfill shall be selected material obtained from the excavation and shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed, and in no event shall exceed a depth of 9 inches. Each layer shall be moistened, tamped, puddled, rolled or compacted to the densities specified in Article 3.07.

3.07 COMPACTION AND DENSITIES

A. Compaction of backfill shall be per specification section entitled “Earthwork”. 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 described in specification section entitled “Earthwork”.

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.

3.08 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 City.

3.09 FINE GRADING

A. After piping trenches backfilled, the disturbed areas of the site shall be fine graded. Any lumber, undesirable materials and rocks larger than the 3-inch size shall be removed from the surface. The completed surface shall be to the preconstruction elevation unless otherwise directed by the City. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

3.10 ALTERNATE METHOD OF CONSTRUCTION

A. Use of This Method: A combination of conditions in the substrate, water table, or method of disposal may be encountered during the course of the work which makes dewatering impossible, or only possible through the use of unusual methods, the cost of which is excessive. When such conditions are encountered, but only after all reasonable means (pumps, well points, etc.) to dewater the excavation have been employed without success, the Contractor, may request to employ the following Alternate Method of Construction. The concurrence of the Engineer shall be obtained in writing and shall limit the use of the alternate method of construction to such specific portions of the Work as the Engineer shall determine.

B. The requirements set forth in other sections of these Specifications shall establish the required standards of construction quality for this work. Use of the alternate method of construction described hereinafter shall in no way be construed as relieving the Contractor of the work. No additional payment will be made to the Contractor for excavation, backfill, sheeting or any cost incurred for Work or materials, or any other costs incurred as a result of the use of this alternate method of construction. The prices established in the Proposal shall be for full payment for the various items of work.

C. Subject to all the requirements stated herein, including written acceptance of the Engineer, construction will be permitted in accordance with the following specifications. All requirements of these Specifications shall apply to this construction unless otherwise specifically modified herein.

D. Removal of Water: The installation of pipe and appurtenances under water will be permitted and the requirements of Article 3.03 will be waived.

E. Excavation shall be performed in accordance with Article 3.01.

F. Pipe Bedding: Pipe bedding shall be placed from 6 inches below the outside bottom of the proposed pipe barrel up to the centerline of the pipe barrel. The bedding material

shall be pearock as specified in Article 2.03 "Pearock". Limerock screenings, sand or other fine organic material shall not be used.

G. The bedding material shall be placed and then be shaped to receive the pipe at the intended elevation. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

H. Backfill: After the pipe is installed, backfilling shall proceed in accordance with the provisions of Article 3.06 "Backfill" and 3.07 "Compaction and Densities". Select backfill material shall be used to backfill around the pipe and to a level one foot above the crown of the pipe. Under no circumstances will material other than select backfill or specified pipe bedding material be considered satisfactory for this purpose.

I. If the Alternate Method of Construction is used, all backfill material, including specified pipe bedding material, shall be carefully lifted into the trench and not released to fall freely therein until the bucket or container is at or just above water level. Under no circumstances will backfill material be dumped or pushed into the trenches containing water. Below existing water level, the backfill material shall be carefully rammed into place in uniform layers, of equal depth on each side of the pipe, up to the water level. Above the water level, backfill material shall be placed and compacted for normal backfill as previously specified.

3.11 RESTORATION OF EXISTING SURFACES

A. Restore all grassed areas disturbed by the trenching operations by resodding in accordance with the Section entitled “Sodding” or the Section entitled “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 entitled “Concrete Curbs and Sidewalks”.

- END OF SECTION -

PROJECT NO. 11842

SECTION 02224

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. This Section includes, except as elsewhere provided, excavation, filling and compacting within the limits defined on the Contract Drawings for complete construction of structures for this project.

B. All excavation for the project is unclassified.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Division 2, Specification Section entitled “Earthwork”

1.03 QUALITY CONTROL

A. Codes and Standards: Excavation and backfill work shall be performed in compliance with applicable codes, standards and requirements of governing authorities having jurisdiction in the area.

B. Testing and Inspection Service: An independent testing laboratory shall be retained by the City to conduct appropriate soils and other testing in accordance with the Contract Documents.

1.04 JOB CONDITIONS

A. General

1. 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 unless specifically referenced by the Contract Documents.

2. 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 report or undertake its own subsurface investigation prior to submitting its bid, taking into consideration all conditions that may affect its work.

B. Existing Utilities

1. Locate existing underground utilities in the areas of work. Accurate "As Built” Information describing existing pipelines and underground utilities is not available.

Test pits and hand excavation in critical areas will be required prior to initiating work.

2. All existing utilities including piping, electrical conduits, electric duct banks and telephone cables that are shown on the Contract Drawings to be relocated, shall be relocated prior to initiating earth work. Excavation and backfill for relocation of existing utilities shall conform to the requirements of Section 02222. 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 of such piping or utility immediately for directions.

3. The Contractor shall cooperate with the City and utility companies in keeping respective services and facilities in operation.

1.05 PROHIBITION OF BLASTING

A. The use of explosives for excavation work is strictly prohibited on this project.

1.06 SUBMITTALS

A. The Contractor shall submit information and samples to the Engineer for review as specified herein in accordance with Section 01300. The information shall include:

1. Detailed description of dewatering method chosen and sequence of dewatering operations.

2. 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.

3. Lists of materials and equipment to be used. Detailed description of the method(s) of excavation, fill and compaction to be used.

4. Plans of open cut excavations showing side slopes and limits of the excavation at grade where not shown on the Contract Drawings.

5. Design computation of sheeting system. Sheeting and shoring plans shall be designed and sealed by a Professional Engineer registered in the State of Florida. Submittals shall indicate depth of penetration.

6. The Contractor shall furnish the Engineer, for approval, a representative sample of structural fill material from off-site sources at least ten calendar days prior to the date of anticipated use of such material. The sample shall be delivered to the site at a location determined by the Engineer. The submittal shall identify the source of the material.

1.07 PROTECTION OF PROPERTY AND STRUCTURES

A. The Contractor shall, at its own expense, sustain in place and protect from direct and indirect injury, its work at all times as well as 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 property in the vicinity of 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 pipes, 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 and lights shall be placed at all excavations in accordance with OSHA requirements.

C. Safe and suitable ladders for access to trenches shall be provided in accordance with OSHA requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. Specific locations/areas of work where these materials shall be utilized are defined on the Drawings.

2.02 STRUCTURAL FILL

A. Fill material shall be noncohesive, nonplastic, granular mixture of local clean sand or local clean sand and limerock free from vegetation, organic material, muck or deleterious matter per specification section entitled “Earthwork”. Broken Portland cement or asphaltic concrete shall not be considered an acceptable fill material. Fill material containing limerock shall have sufficient sand to fill the voids in the limerock. All structural fill materials shall be obtained from off-site sources.

2.03 CRUSHED LIMESTONE

A. 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. Refer to specification section entitled “Earthwork for additional information.

2.04 OTHER MATERIALS

A. Requirements for any other fill material, if needed, are defined in the Drawings and under specification section entitled “Earthwork”.

PART 3 - EXECUTION

3.01 CONTRACTOR INSPECTIONS

A. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Examine and accept existing grade of the project site walkways, pavements, etc., prior to commencement of work and report to Engineer if elevations of existing subgrade substantially vary from elevations shown on the Drawings.

3.02 EXCAVATION FOR STRUCTURES

A. Unless otherwise indicated on the Drawings, 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 proper handling of storm water runoff. The Contractor shall intercept and collect surface run off both at the top and bottom of cut slopes. The excavating equipment shall operate in an organized fashion so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area.

B. Where required on the Drawings, unsuitable material (silt layer) beneath the groundwater encountered at the site shall be removed using a drag line or hydraulic excavator, as approved by the Engineer. The equipment shall operate in an organized manner so as to remove silt from one edge of the excavation to the other so as not to trap silt within the undercut area. Unsuitable material shall be hauled to and stockpiled temporarily by the Contractor at the “Temporary Muck Storage” location defined on the Drawings. Once drained, and during “dry” weather as determined by the Engineer in the field, the Contractor shall remove and dispose of it off-site. The Contractor shall be responsible for managing and maintaining the temporary muck storage area and shall ensure impact of this area, including providing dust control, runoff control, etc. is minimized. Also, the Contractor shall clean all roadways impacted by his demucking, hauling, temporary stockpiling and removal operations at a frequency as determined by the Engineer in the field.

C. In excavating for footings, structures, and foundations, the Contractor shall take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete.

D. 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.

E. All excavated soil material, removed underground utilities including pipes and fittings, electrical conduits and duct banks, and other undefined materials removed within the limits of the excavation, shall be disposed off-site by the Contractor.

F. Refer to the Drawings for additional requirements for excavation for specific locations/areas of work.

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 its own expense with structural fill, as directed by the Engineer. Where, in the judgement of the Engineer, such over-excavation requires use of lean concrete or crushed stone, the Contractor, at its expense, shall furnish and place such materials.

3.04 SHEETING AND BRACING

A. The term "sheeting" shall represent any type of shoring used to support sides of the excavation. Walls of the excavation shall be kept vertical where open cut is not practical and, if required to protect the safety of workmen, the general public, this or other work or structure, or excavation walls, the excavation shall be properly sheeted and braced for conditions encountered and OSHA requirements. Excavation for the structures shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation, sheeting, or bracing, of not less than two feet, unless otherwise indicated on the Drawings. 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 sheeting, stabilization, grouting or other acceptable methods.

B. Minimum length of embedment below the deepest part of the excavation shall be 0.3 times the depth of excavation being supported or greater depending on the sheeting. The design of the sheeting arrangement shall be the responsibility of the Contractor.

C. Sheeting shall be removed provided its removal will not jeopardize pipes or structures. Any sheeting left in place shall be cut-off two feet below finished grade, or as directed. The Contractor will not receive extra compensation for sheeting left in place or the cut off work required.

3.05 REMOVAL OF WATER

A. <u>General</u>

1. The Contractor shall provide pumps, well points, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in the dry where defined on the Drawings. The ground water 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 in the dry.

2. 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.

3. If excavations to be dewatered cannot be maintained dry by the Contractor's dewatering efforts, then 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.

B. Disposal: The Contractor shall be responsible to dispose of water from the dewatering operation in accordance with the Contract Documents and shall obtain all necessary permits and conform to all local regulations and codes. Water from the excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the work completed or in progress, to the surface of the streets, will not cause any interference with the use of the same by the public, or will not cause pollution of any waterway or stream. Water from dewatering operation may be disposed at locations directed by the City with the proper installation of siltation screens and operation of the dewatering system in accordance with all local regulations and codes. The Contractor shall submit its dewatering method and point(s) of discharge to the Engineer for review at least twenty (20) days prior to any dewatering activities. The Contractor shall provide maintenance of canal(s) and drainage ditches to which it discharges. The cost of maintaining drainage ditches and canal(s) shall be included in the bid price. The Contractor shall remove siltation and haul, and dispose of this material on a regular basis to maintain the original base conditions at all time, so as not to impact drainage in the general area.

3.06 FILL PLACEMENT AND COMPACTION

A. General

1. Fill material (including structural fill and other fill material) shall be placed within the limits of excavations as shown on the Drawings. When placed in the wet, fill material shall be placed in standing groundwater to a level one foot above stabilized groundwater. The material shall be placed at one edge of the excavation and pushed to the other so as to move residuals across the bottom of the excavation. The leading edge of the fill should be cleaned regularly to remove it of the advancing residuals. All residuals shall be disposed at off-site locations shown on the Drawings or specified herein.

2. Once fill materials have been placed one foot above the stabilized groundwater, then the entire lift should be rolled with six passes from an 10-ton roller. The coverages shall be overlapping and shall occur while the compactor operated at a travel speed of not more than two feet per second. If a vibratory compactor is used, it should be operated with the vibrator off so as not to induce capillary moisture into the dry fill soils.

3. Fill materials placed following this initial lift shall be placed in the dry with loose lift thickness of eight inches or less. Refer to specification section entitled “Earthwork” for additional information. Fill materials shall be placed within two percent of optimum moisture content.

B. Inspection and Testing: The fill placement and compaction shall be observed by the Engineer. Refer to specification section entitled “Earthwork for in-place density testing requirements. The Contractor shall coordinate and cooperate with the testing laboratory.

C. Final Grades: Final structure fill grades shall be within 0.1 feet of elevations shown. Where shown on the Drawings, surfaces shall be sloped for drainage or other surfaces.

D. Refer to the Drawings for additional fill and compaction requirements for specific locations/areas of work.

3.07 BACKFILL AGAINST STRUCTURES

A. Backfill against nonwater holding structures shall not be performed until the concrete has been inspected by the Engineer. 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. Partial backfilling against adequately braced walls 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 manufacturers instructions before backfilling.

B. Backfill against tanks and other structures which are to retain liquids shall not be performed until leakage tests are completed and accepted by the Engineer.

- END OF SECTION -

PROJECT NO. 11842

SECTION 02225

CONTAMINATED SOILS AND GROUNDWATER

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. This Section includes, except as elsewhere provided, the work necessary to remove, transport, and properly dispose of contaminated soils and groundwater required for complete construction of structures and underground piping systems and appurtenances as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02222 – Excavation and Backfill for Utilities

B. Section 02224 – Excavation and Backfill for Structures

1.03 QUALITY CONTROL

A. Codes and Standards: All work associated with dewatering, excavation, removal, transportation and disposal of contaminated soils and groundwater shall be performed in compliance with applicable codes, standards and requirements of governing authorities having jurisdiction in the area.

B. Testing and Inspection Service: A testing laboratory certified by the Broward County Environmental Protection and Growth Management Department (BCEPGMD) and the State of Florida shall be retained by the Contractor to conduct appropriate soils and groundwater testing in accordance with regulatory requirements and the Contract Documents.

1.04 SUBMITTALS

A. The Contractor shall submit information and samples to the City for review as specified herein in accordance with Section 01300. The information shall include:

1. Detailed description of the proposed methods for temporary stockpiling, transportation, and disposal of all contaminated soils and groundwater.

2. Copies of permits for all disposal facilities.

3. Copies of all manifest and documentation for handling and disposing of all contaminated soil and groundwater in full compliance with local, state and federal requirements. This documentation must be provided prior to requesting payment under this Bid item.

4. Copies of all laboratory analyses required for transportation and disposal of all contaminated soils and groundwater in full compliance with local, state and federal requirements.

5. Names, addresses and contact numbers of all subcontractors.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 CONTAMINATED SOILS

A. The Contractor shall retain a laboratory certified by the BCEPGM and the State of Florida to sample the groundwater in the excavation, the stored soil and soil samples in the perimeter of the excavated hole for petroleum contamination (EPA Methods 601, 602, 610). The number of samples shall be sufficient to comply with the requirements of the Contractor's approved Dewatering Plan and all local, state and federal regulations. The results of the tests shall be forwarded to the City.

B. Excavated materials which are deemed to be contaminated shall be removed, treated and disposed of by the Contractor in accordance with all applicable regulatory requirements. The soil may be contaminated with petroleum product which may be partly or entirely diesel fuel or gasoline. When such soil conditions are encountered, they shall be brought to the City's attention. The extent of excavation shall be determined in the field by the City. Payment for this work shall be in accordance with the allowance bid item for excavation, treatment and disposal of contaminated soil, included in the Schedule of Prices Bid.

C. All contaminated soil which is excavated shall be stockpiled in an area designated for contaminated soils. The Contractor shall take whatever precautions are necessary to ensure that contaminated soils are not co-mingled with non-contaminated stockpiled soils and/or mucks.

D. Contaminated soils must be placed on an impermeable barrier when temporarily stockpiled and must be covered with visquine to prevent runoff. All stockpile leachate or runoff must be collected for disposal in accordance with federal, state and local regulations.

E. Contaminated soils shall be processed and treated at a state licensed facility. These soils shall be transported and disposed of in accordance with federal, state and local regulations.

F. The Contractor shall be responsible for testing soil which has been treated to certify treated soil meets applicable federal, state, and local regulations for final disposal.

3.02 CONTAMINATED GROUNDWATER

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 in accordance with local, state and federal regulations and the requirements of the Contract Documents. If groundwater

contamination is identified at any time during the performance of the Work, Contractor shall immediately notify the City.

B. If contaminated groundwater in the dewatering excavation area is encountered, the contaminated groundwater shall be removed, treated and discharged by the Contractor in accordance with all applicable regulatory requirements. Payment for this work shall be in accordance with the allowance bid item for treatment and discharge of contaminated groundwater, included in the Schedule of Prices Bid.

C. Treatment of contaminated groundwater will include the following options, depending on the magnitude of the contamination in the trench: Granular Activated Carbon (GAC) Treatment vessels, mobile air stripping units, vacuum truck removal and disposal or other method as approved by the City and regulatory agencies with jurisdiction.

D. If contaminated groundwater is encountered during construction, Contractor shall provide reference information for the qualified groundwater remediation subcontractor to be utilized, including phone number, contact name, and address. The selected groundwater treatment/recycling facility for hauling contaminated groundwater shall also be identified.

E. Effluent water from the treatment system will be analyzed by the certified laboratory to confirm that concentrations are below regulatory limits. Effluent water will then be directed to a pre-approved location as determined by local regulatory agencies and/or the City.

3.03 TRANSPORT AND DISPOSAL

A. Transport Regulations: The Contractor shall be responsible for the loading, labeling, placarding, marking, weighing, and transporting of all waste materials in accordance with the Florida Department of Transportation Regulations, and U.S. Department of Transportation Regulations. The Contractor shall use only transporters that are licensed and competent to haul these wastes.

3.04 WASTE CONTAINERS

A. Each transport container of waste shall be visually inspected by the Contractor for leaks, drips, or container damage prior to being loaded. Containers which are found to be leaking or damaged shall not be loaded until the damage is repaired. The Contractor shall prepare the transport container to prevent spillage or contamination. The Contractor shall notify the City two hours before any loaded transport leaves the site.

B. All transport containers leaving the site shall be inspected by the Contractor to ensure that no waste material adheres to the wheels or undercarriage.

C. All vehicles on which waste is adhering shall be cleaned by sweeping tires and undercarriage or by other dry methods prior to leaving the site.

3.05 SHIPPING RECORDS

A. The Contractor shall prepare accurate shipping records for any wastes leaving the site in accordance with applicable federal and state regulations. The Contractorengin shall be responsible for providing copies of the records to the City and shall immediately notify the City of any problems in completing shipments and disposal of wastes.

B. The CONTRACTOR shall:

1. Be responsible for appropriate measurement of unit quantity (weight or volume) of waste material removed from the site.

2. Coordinate vehicle inspection and recording of quantities leaving the site with the City. These quantities shall be compared to recorded quantities received at the treatment or disposal facilities. The Contractor shall resolve any discrepancies occurring immediately, determining the probable cause for the discrepancy.

3. Be solely responsible for any and all actions necessary to remedy situations involving waste spiked in transit.

C. The Contractor shall ensure that a copy of the manifest is returned to the City by the designated treatment or disposal facility within 14 days of receipt of the material to be disposed.

- END OF SECTION -

PROJECT NO. 11842

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).

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:

1. Holding tanks of adequate size and volume.
2. Wellpoint systems.
3. Sump pumping systems.
4. Chemical precipitation of particulates.

5. Filter systems and siltation controls.
6. 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.

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 or the maximum permitted by the agency having jurisdiction, whichever is less.
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 Engineer. 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 Engineer. 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 for review. The Contractor is advised that the SFWMD, 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, 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. 11842

SECTION 02300

EARTHWORK

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. Provide all labor, materials, necessary equipment and services to complete the Earthwork, as indicated on the Drawings, as specified herein or both, except as for items specifically indicated as "Not in Contract (N.I.C.) Items"

B. Including but not necessarily limited to the following:

1. Excavation, including demucking.

2. Backfilling.

3. Filling.

4. Grading, general site and building pads.

5. Compaction.

6. Coordination with Engineer for offsite disposal of all excess materials and stock piling of suitable materials to be used as fill or backfill.

C. Cutting, proof rolling, filling and grading to required lines, dimensions, contours and elevations for proposed improvements as shown and implied on the Drawings and required by these specifications.

D. Scarifying, compaction, moisture content conditioning and control, and removal of unsuitable material to ensure proper preparation of areas for the proposed improvements.

E. Undertake any special construction procedures for the site recommended in the geotechnical report for preparation of building and pavement areas.

F. There shall be no classification of excavation for measurement of payment regardless of materials encountered.

G. The Work of this Section includes all earthwork required for construction of the Work. Such earthwork shall include, but not be limited to, the loosening, removing, loading, transporting, depositing, and compacting in its final location of all materials wet and dry, as required for the purposes of completing the Work specified in the Contract

Documents, which shall include, but not be limited to, the furnishing, placing, and removing of sheeting and bracing necessary to safely support the sides of all excavation; all pumping, ditching, draining, and other required measures for the removal or exclusion of water from the excavation; the supporting of structures above and below the ground; all backfilling around structures and all backfilling of trenches and pits; the disposal of excess excavated materials; borrow of materials to makeup deficiencies for fills; and all other incidental earthwork, all in accordance with the requirement of the Contract Documents.

1.03 RELATED WORK

A. All applicable sections of Technical Specifications.

1.04 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: All codes, as referenced herein, are specified in Section 01090, "Reference Standards".

B. American Society for Testing and Materials (ASTM) – latest edition

1. ASTM D 422 - Method for Particle-Size Analysis of Soils.

2. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, using 5.5-lb (2.49-kg) Rammer and 12-in (304.8- mm) Drop.

3. ASTM D 1556 - Test Method for Density of Soil in Place by the Sand Cone Method.

4. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in (457- mm) Drop.

5. ASTM D 1633 - Test Method for Compressive Strength of Molded Soil-Cement Cylinders.

6. ASTM D 2216 - Laboratory Determination of Moisture content of Soil.

7. ASTM D 2419 - Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

8. ASTM D 2487 - Classification of Soils for Engineering Purposes.

9. ASTM D 2901 - Test Method for Cement Content of Freshly-Mixed Soil-Cement.

10. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

11. ASTM D 3017 - Test for Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

12. ASTM D 4253 - Test Methods for Maximum Index Density of Soils Using a

Vibratory Table.

13. ASTM D 4254 - Test Methods for Minimum Index Density of Soils and Calculation of Relative Density.

14. ASTM D 4318 - Test for Plastic Limit, Liquid Limit, and Plasticity Index of Soils

15. ASTM D 4429 - Standard Test Method for CBR (California Bearing Ratio) of Soils in Place

C. American Association of State Highway and Transportation Officials (AASHTO) - latest edition

1. T 88 Particle Size Analysis of Soils

1.05 SUBSOIL INFORMATION

A. Refer to the Appendix for the Geotechnical Investigation report.

1.06 SITE INSPECTION

A. The Contractor shall visit the site and acquaint themselves with all existing conditions. Make their own subsurface investigation to satisfy themselves as to site and subsurface conditions, but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the City and Engineer.

1.07 TOPOGRAPHIC INFORMATION

A. The existing grades shown on the Drawings are approximate only and no representation is made as to their accuracy or consistency. The Contractor shall verify all existing grades to the extent necessary to ensure completion of the job to the proposed grades indicated on the Drawings.

1.08 DISPOSAL OF SURPLUS OR UNSUITABLE MATERIAL

A. Unsuitable material encountered during the course of construction shall be removed from the construction site at the expense of the Contractor. Unsuitable material shall not be stockpiled on-site. All suitable material shall be stockpiled at areas approved by the Engineer.

1.09 BENCHMARKS AND MONUMENTS

A. Contractor shall employ a registered Professional Surveyor and Mapper to lay out lines and grades as indicated. Benchmarks shall be established by a Professional Surveyor and Mapper registered in the State of Florida. Benchmarks shall be permanent and easily accessible and maintained and replaced if disturbed or destroyed. All benchmarks shall be North American Vertical Datum 1988 (NAVD).

1.10 UTILITIES

A. Before starting site operations, disconnect or arrange for the disconnection of all utility services designated to be removed.

B. Locate all existing active utility lines traversing the site and determine the requirements for their protection. Preserve in operating condition all active utilities adjacent to or traversing the site and/or designated to remain.

C. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from damage, remove or replace as indicated, specified or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of all utilities.

1.11 QUALITY ASSURANCE

A. A geotechnical engineer may be retained by the City to observe performance of Work in connection with excavating, filling, grading, and compaction. This inspection will not relieve the Contractor from responsibility to complete the Work in accordance with the Drawings and specifications. The Contractor shall re-adjust all Work performed that does not meet technical or design requirements but make no deviations from the Contract documents without specific and written acceptance of the Engineer.

B. Visual field confirmation and density testing of subgrade preparation and fill placement procedures shall be performed by the field geotechnical engineer as part of the construction testing requirements. The Contractor shall be informed as soon as possible of the test results.

C. The Engineer shall prepare field reports that indicate compaction test location, elevation data, testing results and acceptability. The City and Contractor shall be provided with written copies of the results within 24 hours of time test was performed.

D. All costs related to reinspection, due to failures, shall be paid for by the Contractor at no additional expense to City. The City reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

E. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with ASTM D 1557. Where cohesionless, free draining soil material is required to be compacted to a percentage of relative density, the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 1556, ASTM D 2922, or by such other means acceptable to the Engineer.

F. In case the tests of the fill or backfill show non-compliance with the required density, the Contractor shall accomplish such remedy as may be required to insure compliance. Subsequent testing to show compliance shall be by a testing laboratory selected by the City and shall be at the Contractor's expense.

G. Particle size analysis of soils and aggregates will be performed using ASTM D 422.

H. Determination of sand equivalent value will be performed using ASTM D 2419.

I. Unified Soil Classification System: References in these specifications are to soil classification types and standards set forth in ASTM D 2487. The Contractor shall be bound by all applicable provisions of said ASTM D 2487 in the interpretation of soil classifications.

J. Comply with requirements of all applicable building codes and other public agencies having jurisdiction upon the Work.

1.12 SUBMITTALS

A. Within 10 days after Notice to Proceed (NTP), the Contractor shall submit to the City, a schedule detailing the sequence, and time of completion of all phases of Work under this section.

B. At least 2 weeks in advance of imported fill use, the Contractor shall submit the following laboratory test data to the Engineer for each type of imported soil/gravel material to be used as compacted fill.

1. Moisture and Density Relationship - ASTM D1557 or D698 as required by project geotechnical engineering study;

2. Mechanical Analysis - AASHTO T-88; and,

3. Plasticity Index - ASTM D 4318.

C. Together with the above test data, the Contractor shall submit a 5-pound sample of each type of off-site fill material in an air tight container for the approval of the Engineer and City.

D. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type throughout the job requires approval of the City and the Engineer.

PART 2 - PRODUCTS

2.01 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

A. General: Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, free from grass, roots, brush, or other vegetation.

B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 2 inches.

C. Suitable Materials: Soils not classified as unsuitable as defined in Paragraph entitled, "Unsuitable Material" herein, are defined as suitable materials and may be used in fills, backfilling, and embankment construction subject to the specified limitations. In addition,

when acceptable to the Engineer, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.

D. Suitable materials may be obtained from on-site excavations, may be processed on-site materials, or may be imported. If imported materials are required to meet the requirements of this Section or to meet the quantity requirements of the project the Contractor shall provide the imported materials at no additional expense to the City, unless a unit price item is included for imported materials in the bidding schedule.

E. On-site fill

1. On-site materials for use as fill shall consist of excavated soil from other portions of the site;

2. The Contractor shall use the on-site soil judiciously to facilitate the construction schedule including the use of the most readily compactable soil for fill in building areas and as fill within 2 feet of pavement subgrade;

3. Topsoil shall not be utilized as engineered fill;

4. Excavated material containing rock, stone or masonry debris smaller than 2 feet in its largest dimension, may be mixed with suitable material and utilized up to 3 feet below proposed subgrade;

5. Excavated material containing rock, stone or masonry debris smaller than 6 inches in its largest dimension may be mixed with suitable material and utilized up to 18 inches below proposed subgrade;

6. No material greater than 2 inches in its largest dimension may be utilized within 18 inches of proposed subgrade;

7. No material greater than 2 inches in its largest dimension may be utilized as backfill for storm drainage or utility trenches.

8. Prior to placement, on-site material to be used as fill shall not contain:

a. Debris other than crushed concrete and brick meeting the above requirements.

b. Timber or railroad ties.

c. Other deleterious materials such as steel rails, rebar, trash, etc.

d. Hazardous material - Unsuitable and deleterious materials and debris shall be disposed of off-site in accordance with all applicable regulations.

F. Off-site imported fill

1. If necessary, off-site fill shall be obtained and provided by the Contractor;

2. Fill shall be clean, well graded granular soil which is non-expansive and non-

collapsible and shall have less than 20% by weight passing the #200 sieve. The portion passing the #200 shall be non-plastic.

3. Fill with less fines (less than #200) may be required on project specific basis and as required by Engineer. Likewise, fill with more than 20% fines may be acceptable on a project specific basis or as identified in a geotechnical engineering study;

4. Imported fill shall be free of all hazardous substances. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the City and Engineer by the Contractor not less than one week prior to its intended use;

5. The City reserves the right to test off-site fill material for conformance with these specifications; and,

6. The Contractor shall be responsible for all permits and regulatory requirements associated with offsite borrow sources.

G. The following types of suitable materials are designated and defined as follows:

1. Type 1 (one inch minus granular backfill): Crushed rock, gravel, or sand with 100 percent passing a 1-inch sieve and a sand equivalent value not less than 50.

2. Type 2 (one half inch minus granular backfill): Crushed rock, gravel, or sand with 100 percent passing a 1/2-inch sieve and a sand equivalent value not less than 50.

3. Type 3 (sand backfill): Sand with 100 percent passing a 3/8-inch sieve, at least 90 percent passing a number 4 sieve, and a sand equivalent value not less than 30.

4. Type 4 (coarse rock backfill): Crushed rock or gravel with 100 percent passing a 1- inch sieve and not more than 10 percent passing a Number 4 sieve.

5. Type 5 (pea gravel backfill - ASTM #89): Crushed rock or gravel with 100 percent passing a 1/2-inch sieve, 90 percent passing a Number 8 sieve and not more than 10 percent passing a Number 4 sieve.

6. Type 6 (coarse drainrock - ASTM #4): Crushed rock or gravel meeting the following gradation requirements:

Sieve Size	Percentage Passing
2-inch	100
1 1/2-inch	90 - 100
1-inch	20 - 55
3/4-inch	0 - 15
No. 200	0-3

7. Type 7 (graded drainrock): Crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the following gradation requirements.

Sieve Size	Percentage Passing
1-inch	100
3/4-inch	90 - 100
3/8-inch	40 - 100
No. 4	25 - 40
No. 8	18 - 33
No. 30	5 - 15
No. 50	0 - 7
No. 200	0 - 3

8. The drainrock shall have a sand equivalent value not less than 75. The finish graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth surface upon which to construct reinforced concrete floor slabs.

9. Type 8 (Ballast Rock / ¾ inch Rock): Crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the following gradation requirements.

Sieve Size	Percentage Passing
1-inch	100
3/4-inch	40 - 60
No. 4	0 - 3
No. 8	0 - 3

10. Type 9: (Bedding rock - ASTM #67): Well graded crushed rock or gravel meeting the following gradation:

Sieve Size	Percentage Passing
1-inch	100
3/4-inch	98 - 100
1/2-inch	55 - 70
3/8-inc	30 - 40
No. 4	0 - 6

11. Type 10 (Class I crushed stone - ASTM #57): Manufactured angular, granular

crushed stone, rock, or slag, with 100 percent passing a 1-inch sieve and less than 5 percent passing a Number 4 sieve.

12. Type 11 (aggregate base): Crushed rock aggregate base material of such nature that it can be compacted readily by watering and rolling to form a firm, stable base for pavements. At the option of the Contractor, the grading for either the 1-1/2-inch maximum size or 3/4-inch maximum size shall be used. The sand equivalent value shall be not less than 22, and the material shall meet the following gradation requirements.

Sieve Size	1-1/2-inch Max. 3/4-inch Max.	Percentage Passing
2-inch	100	--
1-1/2-inch	90 – 100	-
1-inch	--	100
3/4-inch	50 - 85	90 - 100
No. 4	25 - 45	35 - 55
No. 30	10 - 25	10 - 30
No. 200	2 - 9	2 - 9

13. Type 12 (aggregate subbase): Crushed rock aggregate subbase material that can be compacted readily by watering and rolling to form a firm stable base. The sand equivalent value shall be not less than 18 and shall meet the following gradation requirements.

Sieve Size	Percentage Passing
3-inch	100
2 1/2-inch	87 - 100
No. 4	35 - 95
No. 200	0 - 29

14. Type 13 (cement-treated backfill): Material which consists of Type 7 material, or any mixture of Types B, C, G and H materials which has been cement-treated so that the cement content of the material is not less than 5 percent by weight when tested in accordance with ASTM D 2901. The ultimate compressive strength at 28 days shall be not less than 400 psi when tested in accordance with ASTM D 1633.

15. Type 14 (topsoil): Stockpiled topsoil material which has been obtained at the site by removing soil to a depth not exceeding 2 feet. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris as specified.

16. Type 15 (trench plug): Low permeable fill material, a nondispersible clay material having a minimum plasticity index of 10.

H. If approved by the Engineer, any bituminous concrete on the site shall be milled/removed prior to placing any fill and shall be reused only onsite immediately below the pavement stone base course.

2.02 UNSUITABLE MATERIAL

A. Unsuitable soils for fill material shall include soils which, when classified under ASTM D 2487, fall in the classifications of Pt, OH, CH, MH or OL.

B. In addition, any soil which cannot be compacted sufficiently to achieve the percentage of maximum density specified for the intended use shall be classed as unsuitable material.

2.03 USE OF FILL, BACKFILL, AND EMBANKMENT MATERIAL TYPES

A. The Contractor shall use the types of materials as designated herein for all required fill, backfill, and embankment construction hereunder.

B. Where these Specifications conflict with the requirements of any local agency having jurisdiction, or with the requirements of a material manufacturer, the Engineer shall be immediately notified. In case of conflict therewith, the Contractor shall use the most stringent requirement, as determined by the Engineer.

C. Fill and backfill types shall be used in accordance with the following provisions:

1. Embankment fills shall be constructed of any mixture of Type 1 through Type 11 materials.

2. Pipe zone backfill, as defined under Paragraph 3.15 "Pipe and Utility Trench Backfill" herein, shall consist of the following materials for each pipe material listed below. Where pipelines are installed on grades exceeding 4 percent, and where backfill materials are graded such that there is less than 10 percent passing a Number 4 sieve, trench plugs of Type 13 or 14 materials shall be provided at maximum intervals of 200 feet or as shown on the Drawings.

a. Mortar coated pipe, concrete pipe, and uncoated ductile iron pipe shall be provided Type 1, 2, 3, 4, 5, 9 or 10 pipe zone backfill materials.

b. Coal tar enamel coated pipe, polyethylene encased pipe, tape wrapped pipe, and other non-mortar coated pipe shall be backfilled with Type 3 pipe zone backfill material.

c. Plastic pipe and vitrified clay pipe shall be backfilled with Type 9 or 10 pipe zone backfill material.

3. Trench zone backfill for pipelines as defined under Paragraph 3.15 "Pipe and Utility Trench Backfill" shall be or any of Types 1 through 11 backfill materials or any mixture thereof, except that Type K material may be used for trench zone

backfill in agricultural areas unless otherwise shown or specified.

4. Final backfill material for pipelines under paved area, as defined under Paragraph 3.15 "Pipe and Utility Trench Backfill" shall be Type 11 backfill material. Final backfill under areas not paved shall be the same material as that used for trench backfill, except that Type K material shall be used for final backfill in agricultural areas unless otherwise shown or specified.

5. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.

6. Aggregate base materials under pavements shall be Type 11 material constructed to the thicknesses shown or specified. Where specified or shown, aggregate subbase shall be Type 12 Material.

7. Backfill around structures shall be or Types 1 through Type 11 materials, or any mixture thereof.

8. Backfill materials beneath structures shall be as follows:

9. Drainrock materials under hydraulic structures or other water retaining structure with underdrain systems shall be Type 7 or Type 8 material.

10. Under concrete hydraulic structures or other water retaining structures without underdrain systems, Types 7, 8 or 11 materials shall be used.

11. Under structures where groundwater must be removed to allow placement of concrete, Type 6 material shall be used.

12. Under all other structures, Type 4, 5, 6, 7, 8, 9 or 11 material shall be used.

13. Backfill used to replace pipeline trench over-excavation shall be a layer of Type 6, 7, 8, 9 or 10 materials. This backfill material shall be wrapped with filter fabric to prevent migration of fines for wet trench conditions. The same material as used for the pipe zone backfill may be used if the trench conditions are not wet. Filter fabric shall be Mirafi 140 N, Mirafi 700 X, or equal.

14. The top 6 inches of fill on reservoir roofs, embankment fills around hydraulic structures, and all other embankment fills shall consist of Type 14 material, topsoil.

2.04 EMBANKMENT

A. The maximum sizes of rock which will be permitted in the completed fill areas are as follows:

Depth Below Finish Grade	Maximum Allowable Diameter
Top 4-inches	1-inch