



**MINIMUM CONSTRUCTION STANDARDS
AND SPECIFICATIONS**

FOR

**WATER DISTRIBUTION SYSTEMS
SEWER COLLECTION SYSTEMS
RECLAIMED WATER SYSTEMS**

Adopted April 25, 1990

Revised May 24, 2023

MINIMUM CONSTRUCTION STANDARDS AND SPECIFICATIONS TABLE OF CONTENTS

SECTION I - GENERAL

- A. INTRODUCTION
- B. ADMINISTRATION
- C. WORKMANSHIP
- D. GUARANTEE
- E. APPLICABLE CODES, STANDARDS AND SPECIFICATIONS
- F. PLANS AND SPECIFICATIONS
- G. PERMITS
- H. PRECONSTRUCTION MEETING
- I. SHOP DRAWINGS
- J. EASEMENTS
- K. CONSTRUCTION SAFETY
- L. CONSTRUCTION DEWATERING
- M. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
- N. HANDLING AND DISPOSAL OF ASBESTOS CEMENT PIPE
- O. PROTECTION OF EXISTING FACILITIES
- P. MAINTENANCE OF TRAFFIC
- Q. AUTHORITY OF INSPECTORS
- R. ELECTRIC POWER
- S. INSPECTIONS
- T. CONSTRUCTION WATER
- U. RECORD INFORMATION RESTORATION POLICY
- V. LANDSCAPE GUIDELINES

SECTION II - DESIGN/CONSTRUCTION PLAN REQUIREMENTS

- A. GENERAL DESIGN REQUIREMENTS
- B. CONSTRUCTION PLAN PREPARATION REQUIREMENTS
- C. INSTALLATION PROTOCOL
- D. LANDSCAPE GUIDELINES
- E. PLAN SUBMITTAL REVIEW PROCEDURES
- F. PLAN SUBMITTAL PREREQUISITE CHECKLIST
- G. PLAN REVIEW CHECKLIST

SECTION III - WATER DISTRIBUTION SYSTEM

- A. BASIS OF DESIGN
- B. HYDRAULIC DESIGN
- C. INSTALLATION OF WATER MAINS
- D. CLEANING AND FLUSHING
- E. TESTING
- F. DISINFECTION
- G. WATER SERVICE LINE/METER INSTALLATION
- H. INSTALLATION - VALVES AND APPURTENANCES
- I. MATERIALS

- J. FIRE HYDRANTS
- K. VALVES AND VALVE BOXES
- L. METER AND METER BOX/ENCLOSURE
- M. BACKFLOW PREVENTION DEVICES
- N. ON SITE MORTAR/CONCRETE/GROUT MIX

SECTION IV - SANITARY SEWER SYSTEM

- A. BASIS OF DESIGN
- B. HYDRAULIC DESIGN
- C. INSTALLATION OF GRAVITY SEWER MAINS
- D. MANHOLES
- E. LIFT/PUMPING STATION DESIGN
- F. INSTALLATION OF FORCE MAINS
- G. LOW PRESSURE SEWER SYSTEMS
- H. TESTING GRAVITY SEWER LINES
- I. TESTING FORCE MAINS
- J. SERVICE LATERALS
- K. MATERIALS
- L. GREASE TRAPS/INTERCEPTORS

SECTION V - RECLAIMED WATER SYSTEM

- A. GENERAL REQUIREMENTS
- B. INSTRUMENTATION AND CONTROLS SPECIFICATIONS
- C. ELECTRONIC/HYDRAULIC CONTROL VALVES
- D. INSTALLATION OF RECLAIMED WATER MAINS
- E. CLEANING AND FLUSHING
- F. TESTING

EXHIBITS

- EXHIBIT "A" PROJECT DOCUMENTATION
- EXHIBIT "B" PREREQUISITE CHECK LIST FOR PRECONSTRUCTION CONFERENCE
- EXHIBIT "C" CONTRACTOR'S LICENSE VERIFICATION
- EXHIBIT "D" SHOP SPECIFICATIONS LIST
- EXHIBIT "D - LP" SHOP SPECIFICATIONS LIST - LOW PRESSURE SEWER SYSTEM
- EXHIBIT "E" RECORD DRAWING SUBMITTAL GUIDE
- EXHIBIT "F" LIFT STATION WET WELL CAISSON CONSTRUCTION AFFIDAVIT
- EXHIBIT "G" EASEMENT DEED
- EXHIBIT "H" BILL OF SALE
- EXHIBIT "I" HANDLING AND DISPOSAL OF ASBESTOS CEMENT PIPE
- EXHIBIT "J" CONSTRUCTION DETAILS

SECTION I - GENERAL

A. INTRODUCTION

The Seacoast Utility Authority (Authority) Board has adopted these specifications, requirements and administrative protocol so that facilities dedicated to the utility are of a quality which will minimize future maintenance and replacement costs. In so doing, new facilities accepted by Authority will not burden existing customers due to premature failure. Additionally, the procedures contained herein provide a detailed description of the utility's administrative requirements. This allows projects to be completed as expediently as possible and permits the utility's staff to treat all new projects/customers in a uniform and non-discriminatory manner.

It is imperative that all developers or their representatives desiring to connect to Authority's water, sewer or reclaimed systems familiarize themselves with these specifications and procedures. Prior to beginning any design work on a project, the designated Engineer of Record (EOR) must arrange a pre-engineering meeting with Authority staff to determine feasibility, master plan ramifications and any other special project requirements which would not be covered in these general specifications and procedures. Construction plans prepared without regard to Authority's requirements will not be accepted for review.

The requirements presented in this document represent the minimum standards necessary to assure the uniformity and quality of construction of potable water mains, fire lines, gravity collection systems, force mains, lift stations, reclaimed water facilities and any appurtenances associated with the same, which fall within the service area of Authority. These specifications shall be binding in all cases where facilities are being constructed, or which will be constructed, shall be owned and/or maintained by Authority, or any construction which will be or may be directly affecting facilities owned and/or maintained by Authority. All sewer systems connecting directly or indirectly to Authority's collection system shall be bound by these specifications, regardless of ownership.

Any planned deviation from these specifications shall be clearly identified in the plans as such and shall be separately submitted for approval. General approval of plans and specifications for permitting purposes by this utility shall not be construed as an acceptance of any violations of, or diversion from, these specifications.

These specifications are binding as a minimum standard; however, Authority reserves the right to require a more stringent standard be met when unusual circumstances or conditions exist on a particular project. Authority further reserves the right to revise these specifications from time to time as new information and products become available. The requirements of the most recent edition shall apply to all projects except where revisions were approved after the preconstruction meeting for that project.

B. ADMINISTRATION

Plan review and project approval shall follow the administrative process outlined in Seacoast Utility Authority's prevailing Service Code and all other directives of Authority's Governing Board.

C. WORKMANSHIP

All Contractors performing any work on a portion of Authority facilities or facilities which will ultimately be dedicated to Authority for ownership or which directly interacts with Authority's system (such as sewer lines) shall be properly licensed to do such work and shall be able to demonstrate through past work history that the Contractor is regularly engaged in such construction activities. All work materials and equipment shall be installed in strict accordance with the manufacturers' printed instructions.

D. GUARANTEE

All materials and equipment to be furnished and/or installed on water, sewer or reclaimed facilities by the Contractor under any contract on any project for which will become facilities of Authority, shall be new and shall carry a complete, indisputable guarantee against defective materials and equipment and faulty workmanship for a period of at least one year from the date of Authority's final letter of acceptance. In the event that any defective material and/or equipment is discovered within the one year period, Authority will require the Developer or their successors or assigns to replace and/or repair said defects at no cost to Authority and said materials and equipment shall be further warranted for a period of one year from the date of written acceptance of said replacement and/or repair.

E. APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

All design, material and work shall be in strict accordance with all the applicable governmental, regulatory, and testing organizations including, but not limited to, the following:

ANSI - American National Standards Institute

ASTM - American Society of Testing and Materials

AWWA - American Water Works Association

DOH - Department of Health

EOR - Engineer of Record

FDEP - Florida Department of Environmental Protection

FDOT - Florida Department of Transportation

Florida Building Code and Companion Codes as amended.

NSF - National Sanitation Foundation

OSHA - Occupational Safety and Health Administration

PBCDERM - Palm Beach County Department of Environmental Resources Management

PBCHD - Palm Beach County Health Department

SUA - Seacoast Utility Authority

TSSS - Recommended Standards for Sewage Works

TSSW - Recommended Standards for Water Works

USEPA - United States Environmental Protection Agency

Where conflicts exist between governing agencies, the more stringent shall apply.

F. PLANS AND SPECIFICATIONS

Copies of plans and specifications for all water, sewer and reclaimed projects that will be constructed within Authority service area shall be submitted to Authority for approval and in accordance with Exhibit "A" (Project Documentation and Submittal Guidelines) as outlined within these standards.

Certain plans and certain other documents may be accepted by Authority for review provided they meet the following criteria:

- May be sent via email which must contain the name of the project, name and address of the company making the submittal, name and phone number of the person making the submittal, and a listing of attachments that are being submitted.
- Attachments must be regular PDF files in a layered format.
- Plans limited to one plan sheet per file, and no more than 5 sheets per submittal.
- Plans to print out to 24" x 36" max and include a graphical scale.
- Calculations, reports and construction phase submittals (i.e. Bill of Sale, Contractor License exhibit, Shop Specs, catalog cuts, easement deeds, etc.) must print out to 8 ½" x 11".

Any changes made subsequent to final approval of plans by Authority shall be resubmitted to, and approved in writing by Authority prior to commencement of work.

These specifications shall take precedence over any conflicts which may occur between the approved plans and these specifications or supplemental specifications which the EOR may issue.

If a Contractor in the course of their work finds any discrepancy between the approved plans and these specifications or supplemental specifications which the EOR may issue, it shall be their duty to inform Authority, as well as the EOR, in writing. Until authorized in writing by Authority, any work performed in variance of these specifications shall be performed at Contractor's risk.

It is the EOR's responsibility to ascertain adherence to these specifications. In the event that a violation is detected by an Authority representative, the representative shall notify the EOR or their representative verbally and/or in writing.

One copy of the Authority approved plans and shop drawings shall be kept on site at all times during construction. If approved plans and shop drawings are not on site of a scheduled inspection, the Authority representative may cancel the scheduled inspection.

G. PERMITS

No work shall commence until all necessary permits are obtained as required by the following agencies, including but not limited to:

- Florida Department of Environmental Protection
- Florida Department of Transportation
- Palm Beach County Department of Environmental Resources Management
- Palm Beach County Engineering Department
- Palm Beach County Health Department
- South Florida Water Management District
- Northern Palm Beach County Improvement District
- Army Corps of Engineers

Also, to include any other City, County, State, and Federal or private occupational license or permit which may be required. It shall be the responsibility of the Contractor, Developer or EOR to apply for the necessary permits.

H. PRECONSTRUCTION MEETING

It shall be the responsibility of the EOR to call for, arrange and coordinate a preconstruction meeting prior to commencement of any work on a project. The EOR shall invite the following parties to this meeting: a representative of the utility construction Contractor, power and phone, cable TV, local building department, natural gas companies, architect, developer and any other interested or necessary parties. The purpose of this meeting is to discuss and outline construction methods, scheduling, specific project problems and related items pertaining to the installation of water and sewer facilities. All preconstruction meetings will be held at the Seacoast Utility Authority Administration Building, 4200 Hood Road, Palm Beach Gardens or as otherwise agreed to by Authority. See Exhibit B "Prerequisite Checklist for Preconstruction Conference".

I. SHOP DRAWINGS

Prior to the preconstruction meeting, it shall be the responsibility of the EOR to obtain and review Authority's Shop Specifications List (See Exhibit D). After reviewing, the EOR shall forward the forms to the utility Contractor for review and signature. The Contractor shall then return them to EOR for EOR concurrence and signature. Once executed the EOR shall then return the originally signed forms to Authority. Submission of sufficient copies of the forms (Authority will retain two copies) is required to ensure all necessary parties receive a copy.

As stated on the Shop Specifications List, shop drawings need not be submitted for Authority approval if the Contractor uses products on this list. Any product anticipated to be used that is not on this list must be approved in advance by Authority. Such approval requires the submission of sufficient copies (four minimum, Authority will retain two copies) of a shop drawing for each product.

Shop drawings must be approved by the Contractor and EOR prior to submittal to Authority and are required for all non-standard items including, but not limited to, manholes, wet wells, castings, pumps and control panels and telemetry.

J. EASEMENTS

Easements of sufficient width to guarantee unhindered access and proper maintenance to all dedicated facilities and mains shall be granted or obtained by the Developer at no cost to Authority. Easements shall be granted via plat or by instrument. When provided by instrument the easement description and sketch shall be based on the State Plane Coordinate System, Florida East Zone, and North American Datum 1983 with 1990 correction. Minimum easement sizes are as follows:

- Surficial aquifer well sites - 75' x 75'
- Floridan aquifer well sites 150' x 150'
- Lift station sites - 40' x 40'
- Side lot line easements - 20' wide
- Standard easements - 12' wide
- Transmission main easements - 20' wide per pipeline

Types of facilities that require easement widths greater than those shown above include but are not limited to the following:

- Water and sewer transmission mains > 10" in diameter.
- Sewer lines with an invert deeper than 8 feet below land surface.
- Facilities installed where access is limited.
- Triplex lift station sites.
- Lift station sites that do not have street loading driveways.

Water and sewer transmission mains >10" in diameter, lift stations, reclaimed metering stations and master meter require utility easements dedicated to Authority and shall not be located in road or drainage rights-of-way except where mains cross same in the perpendicular. In all cases, Authority standard easement document forms must be satisfactorily completed and recorded before Authority will release the water and sewer certifications to the applicable permitting agencies. All off site easements must be submitted to, and approved by Authority, and recorded prior to plan approval. Each easement document must include a recordable sketch and

description and be signed by all owners, contract lessee, mortgagees and any other parties having recorded claim to the easement property.

The Developer shall at his sole expense provide title insurance in a form acceptable to Authority's legal counsel for each easement not granted via plat. A Florida registered professional surveyor and mapper (land surveyor) must provide a signed and sealed statement that the facilities being dedicated to Authority are located within the described easements and/or rights-of-way as indicated on the record drawings.

K. CONSTRUCTION SAFETY

Authority's signing as the applicant for any required permit does not and will not in any way release the Contractor from liability for any injuries, accidents, property damage or losses resulting from said construction.

All work shall be accomplished in a safe and workmanlike manner. The Contractor shall comply with all applicable laws and regulations of any public and/or private body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The responsibility for project safety rests solely and specifically with the Contractor. Authority and its employees and agents are specifically indemnified and held harmless from any actions of the Contractor relating to the safety procedures implemented during construction and from any claims brought by any persons regarding safety, personal injury or property damage.

Authority reserves the right to refuse to do inspections or site visits if in Authority's opinion the work site is not safe. Authority further reserves the right to shut down construction of water, sewer, or reclaimed water construction if unsafe conditions exist in EOR'S and or Authority's opinion.

L. CONSTRUCTION DEWATERING

Construction dewatering activities shall meet all Federal, State and Local requirements. If permits are required, the applicant shall obtain and provide copies to Authority of the appropriate permit(s) from the regulatory agencies prior to dewatering operation. In addition:

- Dewatering activities shall not interrupt site grading and drainage.
- Sub-surface soil shall not be removed by dewatering operations.
- Contractor shall dispose of water without causing damage to adjacent properties. Contractor shall filter water before disposal into a drainage system. Storm drain facilities used by the Contractor for dewatering shall be cleaned after dewatering is complete. Contractor shall monitor turbidity of discharge in accordance with regulatory requirements.
- Where structures or facilities exist adjacent to areas of proposed dewatering, reference points shall be established and observed to detect any settlement that may develop during dewatering operations.

M. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) - CONSTRUCTION SITE REQUIREMENTS

Both State and Federal (EPA) rules must be adhered to for construction activities that require an NPDES Construction Activities Permit. Applicant shall consult current State and Federal regulations to determine applicability and specific requirements.

1. A Stormwater Pollution Prevention Plan (PPP) must be prepared prior to submitting a Notice of Intent (NOI) to the FDEP/EPA. Forms can be obtained from the appropriate agency. To obtain State forms visit the Florida Department of Environmental Protection website at: www.dep.state.fl.us/water/stormwater/npdes.

N. HANDLING AND DISPOSAL OF ASBESTOS CEMENT PIPE

Federal regulations (40 CFR Part 61) classify asbestos-cement pipe (ACP) as Category II non-friable asbestos-containing material. AC pipe must be handled in a manner which will maintain this classification. Therefore, all cutting, and disposal of ACP must be performed in accordance with all Federal, State, and local laws and regulations. If during the course of the work, where ACP was not anticipated, the Contractor discovers, observes, uncovers, or otherwise becomes aware of the existence of any AC pipe, pieces, or material at the site to which the Contractor, subcontractor, or other person may be exposed, the Contractor shall immediately notify the EOR in writing. The Contractor shall ensure that all subcontractors are notified and follow proper procedures to ensure the safety of all workers.

The Contractor shall be responsible for all permits, materials, services for the safe removal, disposal, alteration, or modification of asbestos cement piping in accordance with all federal, state and local regulations.

All scrap ACP shall be properly manifested and prepared for transport. The scrap material shall be delivered to a landfill permitted for disposal of asbestos containing materials.

The Solid Waste Authority (SWA) of Palm Beach County (PBC) will accept asbestos cement pipe which is generated in PBC only if delivered to the landfill in accordance with the Asbestos NESHAP 40 CFR Subpart M, State, and Local regulations. It is the responsibility of the Contractor and transporters to be knowledgeable of, and ensure their activities are conducted in compliance with applicable regulations. The Contractor must label all disposal containers with the approximate quantity (e.g., length of pipe) of asbestos-containing waste material contained in accordance with the Solid Waste Authority of Palm Beach County – Asbestos Disposal Policy and Procedures.

The contractor shall refer to the SWA Asbestos Disposal Policy and Procedures document to ensure compliance and familiarity with their regulatory requirements.

O. PROTECTION OF EXISTING FACILITIES

1. All paved areas 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 plans or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the local jurisdictional agency. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
2. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing and striping 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.
3. Existing sidewalks, gutters, drains, fire hydrants and private drives shall be kept in condition for their intended uses. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within twenty (20) feet of any such hydrant.
4. Wherever sidewalks or private properties and driveways have been removed or damaged the Contractor shall place suitable temporary sidewalks or driveways promptly after backfilling and shall maintain them in satisfactory condition until final restoration is performed.
5. All existing traffic and street name signs shall be visible, protected and repaired if damaged.
6. Existing utility lines shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the Contractor. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility before being concealed by backfill or other work.
7. All existing utilities shall remain continuously in service during all the operations under the project, unless other arrangements satisfactory to the utility provider are made. The Contractor shall be responsible for and shall repair all damage due to its operations.
8. The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees, shrubs, or sod including those lying within street rights-of-way, private property and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the local jurisdictional agency or property owner. All existing trees and shrubs which are damaged during

construction shall be trimmed or replaced by the Contractor as applicable in accordance with the local jurisdictional agency.

9. Contractor shall provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

P. MAINTENANCE OF TRAFFIC PLAN

- Maintenance of traffic shall be in accordance with the latest edition standards of the Florida Department of Transportation, Palm Beach County, Manual on Uniform Traffic Control Devices, and the local jurisdictional agency.
- The Contractor shall provide all necessary traffic control devices in order to redirect, protect, warn or maintain existing vehicular and pedestrian traffic during the course of construction.
- 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 the work zone is accessible to the public the excavation must be backfilled or barricaded at the end of each work day to prevent hazardous condition. 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 workday or when work will be suspended for more than 8 hours.
- Where applicable the Contractor shall secure a Maintenance of Traffic permit prior to construction from the governing agency(s).
- If a MOT permit is required, the applicant shall obtain and provide copies to Authority of the appropriate permit(s) from the regulatory agencies prior to construction.

Q. AUTHORITY OF INSPECTORS

Authority representatives may inspect all construction and materials and may also inspect preparation, fabrication or manufacture of components, materials and supplies. The representative is not authorized to revoke, alter or waive any requirements of the specifications, but may call to the attention of the EOR and/or contractor any failure of work or materials to conform to the plans or specifications. The representative shall have authority to reject materials or suspend the work until questions regarding the specific issue can be referred to and decided upon by all concerned parties. Authority representatives shall in no case act as, or perform duties of the EOR and/or the contractor, nor interfere with the management of the work, and any advice which the representative may give shall in no way be construed as binding on Authority or releasing the Developer, the EOR or the contractor from performing the work according to the intent of the plans and specifications.

R. ELECTRIC POWER

Developer/Contractor shall pay for all cost associated with having electrical power designed and installed to lift stations. This shall include any and all fees including capital costs which may be required and due to Florida Power & Light Company. Developer/Contractor shall be responsible for all monthly electric bills for new lift stations until Developer receives Final Letter of Acceptance from Authority.

S. INSPECTIONS

Authority must be provided with a minimum of two full working days' notice for scheduling inspections. Inspections will be scheduled during regular working hours only, except for nights when preapproved service interruptions are involved. A minimum of five working days' notice shall be given to Authority by the EOR to schedule a required service interruption. These interruptions shall be scheduled on either a Tuesday or Wednesday whenever possible. Work will not be scheduled for weekends or holidays without Authority's written approval. Representatives will make routine passes on call to inspect such items as thrust blocks, materials on site and clearances between conflicting lines. Scheduled inspections will be required for jack and bore operations, setting of wet wells, lift station start-ups with manufacturer's representative present, connection to existing facilities, pressure tests, sanitary sewer lamping, sanitary sewer lateral televising, and any other part of construction as deemed necessary by Authority. It shall be the EOR's responsibility to coordinate inspections and their qualified representative shall be present when required by Authority.

A scheduled inspection will be canceled if said representative is not present. The EOR's representative shall arrange and observe pretesting of water mains, force mains and prelamp sanitary sewer mains to verify that these facilities are sound and ready for final testing. It shall be the Contractor's responsibility to provide the necessary equipment and personnel for all inspections, including televising the sanitary sewer laterals. This shall include all safety equipment necessary to meet OSHA requirements. Inspections will be canceled if proper testing or safety equipment is not on site and readily available at the time of the inspection.

Access to the work shall be provided by the Contractor for all required inspections. In cases where the Contractor has proceeded with work which Authority had requested to inspect or witness without said requested inspection, the Contractor shall bear all costs associated with uncovering, retesting, additional testing, or any other means necessary to provide physical evidence as to the acceptability of the work performed by the Contractor. Such costs shall be the responsibility of the Contractor regardless of whether the work is found to be defective or acceptable to Authority.

T. CONSTRUCTION WATER

Contractor/Developer shall apply for and pay the necessary installation cost and deposits to obtain a water meter from Authority for use in the two inch jumper line used at point of connection to the existing water system. This allows metering of all water used during construction of the water and sewer facilities.

Any Contractor found to be bypassing said meter provided will be subject to the penalties described in Authority's Water Service Policy.

All construction water used shall be billed at the rate approved by Authority and paid for prior to a permanent meter being set. The jumper meter shall not be used to provide water service to any buildings. Such use shall result in the immediate disconnection of the meter without notice.

U. RECORD INFORMATION

Record drawings, certified by a professional surveyor and mapper (land surveyor) registered in the state of Florida, shall be submitted to Authority 48 hours prior to the request for inspection and testing. Disclaimer statements on record drawings by the surveyor or EOR are prohibited.

Record drawings submitted with disclaimers will be returned to EOR and no further inspections or testing will be performed until proper record drawings are submitted. See Exhibit E "Required Information on Record Drawings" for the information required on record drawings. Mylars of the certified record drawing will be furnished to Authority by the EOR. The land surveyor who prepares the record drawings is required to certify on the record drawings that the constructed facilities are located in easements or rights-of-way as applicable. Once record drawings are approved by Authority, EOR shall submit record drawings in electronic PDF and CAD format with reproducible mylar. All survey points shall be provided in CSV format.

V. REPAIR TO NEW FACILITIES

Authority will not accept any type of repair including, but not limited to, bell repair clamps, wrap around repair clamps, sleeves (except at tie-ins) or fire hydrant extensions on new facilities being dedicated to Authority. Sanitary sewer structures must be new and undamaged. Connections and structures shall be leak free upon initial installation.

W. UNAUTHORIZED CONNECTIONS AND OPERATIONS OF EXISTING FACILITIES

Connections to Authority's water, sewer and reclaimed water system for any purpose whatsoever are to be made only in the presence of an Authority representative. Unauthorized connections are subject to immediate disconnection, without notice, and such connections shall not take place until it has been approved and settlement is made in full for all penalties, damages and connection charges, etc. caused by reason of such unauthorized connection. Only Authority personnel shall operate valves in the water distribution or sewage transmission systems which Authority owns and maintains. All Contractors requiring valves to be opened or closed shall contact Authority. Connections to facilities owned by Authority will not be allowed until Contractor has demonstrated to Authority that a sufficient number of competent personnel, all necessary materials, proper equipment and tools are on hand and the site has been properly prepared.

X. EXISTING UTILITY NOTIFICATION AND LOCATION

The Contractor shall notify Sunshine State One-Call of Florida, Inc. in accordance with Florida Statute 556 prior to actual commencement of work. The Contractor must specifically request any necessary staking of Authority's facilities and the Contractor must have a representative present at the time of staking. The Contractor shall also notify all the utilities in the area of impending construction prior to actual commencement of work to allow for utility locations. Moving or securing of existing utilities for the convenience of the Contractor shall be paid for by the Contractor. Drainage pipes are not located through Sunshine State One-Call of Florida, Inc. Contractor is responsible to locate all drainage facilities prior to start of construction.

Contractors and plumbers requesting water and/or sewer service line locations shall provide Authority with minimum of 48 hours advance notice. Authority will identify the general location of the water/sewer services utilizing its electronic service marker locator along with any available "record drawing" information. Developer/Customer shall be responsible for all other activities required to locate service lines.

Y. RESTORATION POLICY

Upon completion of maintenance or repairs of water and sewer lines, the affected area is backfilled, compacted and re-graded to match the original grade. Sod, asphalt and concrete sidewalks damaged by the excavation activities are replaced in kind provided their over the water and sewer lines was originally permitted by Authority. Pavers, stamped concrete, reinforced concrete and the like will not be replaced.

Z. LANDSCAPE

Seacoast Utility Authority has developed guidelines to help prevent damage to its facilities and help to limit damage to landscape plantings caused by Authority when necessary maintenance and repair activities are performed. Authority requires landscape plans be submitted as part of the construction plan review process for all projects. New water and sewer service shall not be activated if plantings are installed within the specified area of Authority's facilities without the approval of Authority.

Property owners that wish to place landscaping in Authority easements will be required to submit proposed plans for approval and to execute Authority's Encroachment Agreement. Landscaping placed near Authority's facilities is at property owner's risk.

See Section II-D for landscape guidelines and requirements of Authority.

SECTION II - DESIGN/CONSTRUCTION PLAN REQUIREMENTS

A. GENERAL DESIGN REQUIREMENTS

Prior to beginning design work on a project, the EOR shall arrange a pre-engineering meeting with Seacoast staff to determine feasibility, master plan ramifications and any other special project requirements. The EOR shall comply with the following prior to making a utility construction plan submittal to Authority:

1. Master Plan/Main Extensions Required

- a. Engineering design for all new projects will be evaluated by Authority staff for conformance with the most current Authority approved Master Plan. In areas where master plan facilities have not been constructed, the Developer will incorporate the design and construction of these facilities in the overall design of the project.
- b. Developer/Property Owner shall extend water and sewer mains to the project boundaries most remote from the current system terminus, or to a point which best facilitates service to properties as yet unconnected. The specific size and location of service extensions shall be determined by Authority. Individual residential lot owners requesting water or sewer service shall be required to extend water and sewer mains based on the developer criteria set forth above. The use of long service lines to avoid extending mains is prohibited. In instances where the residential property to be served is a corner lot and water and/or sewer lines of adequate size are located in a public road right of way or easement adjacent to a property line of that lot, service line connections to the existing mains will be permitted.

2. Piping Orientation

To the greatest extent possible, all water mains shall be designed to cross over all other pipelines i.e.: storm drainage, gas, sanitary sewer and force mains. Water mains crossing under the above referenced mains will warrant special design consideration based on actual circumstances. Force mains must be designed to be full of liquid under all operating conditions to avoid areas of gas accumulation. Special corrosion resistant linings on all ductile iron sewer pipes, fittings and valves are required. In general, the alignment of gravity sewer mains between dwelling units is not permitted.

3. Separation Requirements

- a. The Palm Beach County Health Department's requirements for design, construction, clearance and separation of water, sewer and other facilities shall be strictly observed in addition to those as outlined in these Standards.

- b. When storm drainage piping > 15 inches is to be installed parallel to gravity sewer lines a minimum of 15 feet of separation as measured from the outside edge of the pipes is required. Large storm drainage pipe (> 24 inch) to be located parallel to deep sanitary sewer lines (> 8 foot cut) requires separation greater than 15 feet as determined by Authority.
 - c. Where drainage piping will run parallel to force or reclaimed water mains the minimum separation shall be 8 feet. When to be run parallel to water mains, the minimum separation shall be 10 feet. Greater separation may be required from drainage pipe larger than 48 inches. When storm drainage piping crosses over or under sanitary sewer lines a minimum of 9 inches of separation as measured from the outside edge of the pipes is required. The sanitary sewer must be designed with a full length of Protecto 401 lined ductile iron pipe (DIP) centered on the crossing.
 - d. Gas mains shall be 12-inches below water and sewer lines and have 6 feet clearance from fire hydrants. Gas mains to be run parallel to water and sewer lines are required to have 6 feet clearance. Conduits, irrigation, gas, or other dry utilities larger than 2-inches and any size conduits in a bank consisting of more than 2 conduits shall cross below water and sewer lines with 12-inches clearance. Conduits 2-inches and smaller, either singular or double are encouraged to be under the water and sewer lines with a minimum of 12-inches and in no case shall be less than 6-inches either below or above the water and sewer lines. Conduits, irrigation mains, FPL, or other dry utilities 2-inches and larger, running parallel to water and sewer lines are required to have 6 feet minimum clearance. Conduits, irrigation mains, FPL, or other dry utilities 2-inches and smaller, running parallel to water and sewer lines are required to have 4 feet minimum clearance.
 - e. All light poles direct bury shall be located with no less than 5 feet clearance from water, sewer, and reclaimed water lines and appurtenances. Light poles with footers require a minimum setback of 10 feet from the footers to Authority facilities.
4. Cover Requirements

Water, force and reclaimed water mains shall have a minimum cover of 30 inches and a maximum cover of 48 inches unless otherwise specifically approved by Authority in writing. Sanitary sewer mains shall have a minimum of 3.3 feet of cover. Roadway crossings shall conform to requirements of the applicable permitting agency.

5. Setback Requirements

- a. Mains (water, gravity sewer, force and reclaimed water) which are less than 9.5 feet deep, as measured from the pipe invert to finished grade, shall be installed a minimum of 15 feet horizontally from structures. This setback requirement also applies to new structures being constructed in the vicinity of existing Authority facilities. The 15 foot horizontal setback shall be as measured from the outside edge of the pipe to the nearest point of the structure, including underground (e.g. footers) or aboveground (e.g. roof overhangs) features. In addition, the 15-foot setback applies only to mains skirting a single structure. Where deep mains are installed between structures, setbacks greater than 15 feet are required on each side.

Mains deeper than 9.5 feet shall have a minimum horizontal setback calculated in accordance with the following equation:

$$S = 1 \text{ foot} + (D/0.67)$$

S = Required horizontal set back from edge of main or structure to edge of pipe

D = Depth from bottom of structure to pipe invert

- b. In general, sanitary sewer manholes shall be located in the center of roadway pavement. Manholes and sewer mains shall not be located closer than five feet to the curb line or the right-of-way line; whichever is closer, as measured from the outside edge of the manhole or pipe.

6. Replacement of Existing Facilities Required

- a. Developer is required to replace any existing Authority facilities constructed of asbestos cement (ACP), cast iron (CIP), water or reclaimed water main, or vitrified clay (VCP) within the proposed development with currently approved materials at no cost to Authority. Design for relocation of existing water and sewer facilities must provide for continuity of service to existing customers as well as verification that the relocated facilities will not cause additional operation and maintenance expense to Authority. In no event will Authority schedule a preconstruction meeting for a relocation project until replacement easements are received in proper form for the relocated facilities. Removal and proper disposal of all ACP shall be in strict accordance with all applicable regulations and shall be the responsibility of the Contractor performing same. A copy of the permit and a copy of the Solid Waste Authority (SWA) disposal ticket shall be supplied to Authority.
- b. When a development causes offsite drainage and/or road improvements to be constructed, the Developer of same shall be required to replace any existing ACP, CIP, or VCP lines located within road or drainage right-of-way/easements with approved materials as described above. All such installations, whether planned or unplanned, shall be subject to review by Authority prior to the actual commencement of any site/road work.

- c. When Developer's project causes existing Authority facilities to be overloaded or subject to risk, Developer will be required to upgrade same to comply with current Authority specifications. The intent of this requirement is to cover situations similar to the following:
 - i. project flows cause an existing lift station, gravity sewer line or force main to be overloaded.
 - ii. project fire flows cannot be delivered by existing water distribution mains.
 - iii. Changes to an existing site plan such that structures no longer meet required setbacks from Authority facilities or the location of structures and improvements limit Authority's ability to operate, maintain or replace its facilities.
 - iv. roadway or drainage improvements cause existing facilities to be at risk.
7. Projects Connecting to Existing Lift Station Basins that Discharge to a Gravity Sewer

When a development is to be located in an existing gravity sewer basin being served by a lift station that discharges to another gravity basin, the Developer will be required to upgrade the lift station and the associated force main and to convert the force main downstream to a manifold force main system eliminating the piggyback system.

8. Improvements Installed Over Water, Sewer or Reclaimed Water Facilities

No paving or sidewalks shall be permitted within 4 feet of existing ACP or thin wall PVC water mains, force mains or reclaimed water mains. No paving, sidewalk, landscaping, berms, or other improvements will be permitted over any portion of an existing utility easement (by plat or instrument), which has existing ACP, thin wall PVC or VCP water, sewer or reclaimed water lines.

- a. Water mains, force mains and reclaimed water mains shall not be constructed under existing or proposed structures, sidewalks, concrete slabs, roadways, parking lots or other paved areas, unless specifically noted on the plans and approved by Authority. Areas to be covered with either concrete or paving, parking garages, walls, landscape berms, etc. shall be clearly noted on the plans. All utility easements must be clearly depicted on the landscaping plans. The EOR shall coordinate layout of water and sewer facilities with the landscaping plans for the project such that landscaping is minimized over water, sewer and reclaimed water lines and their respective easements. In general, easements shall preclude structures, trees, shrubs, berms, etc. so that unhindered access to all such facilities and mains is available at all times.

- b. Landscaping placed within a utility easement, with or without Authority's approval, is at property owner's risk. Property owner is required to execute Authority's standard Encroachment Agreement prior to a meter being set if improvements are designed to be located over Authority facilities. This includes, but is not limited to, landscaping, walls, berms, paver block, sidewalk and the like.
- c. When a Developer's project causes grade changes at or near existing valve boxes, fire hydrants, manholes, backflow preventers, cleanouts, meter boxes or any other water, sewer or reclaimed facility the Contractor shall adjust the affected facilities to finish grade in accordance with Authority's standards.

9. Subaqueous Crossing

Design for subaqueous crossings requires the use of special materials. Water main, force main and reclaimed water mains shall be DR11, HDPE, or Class 56 DIP with ball and socket joints as approved. Gravity sewer crossings of water bodies such as canals, lakes, water management tracts, etc. require the use of C-900 DR18 PVC pipe, manhole to manhole. Any gravity sewer pipe crossing of a water body will require the gravity sewer pipe to be installed within a steel casing and installed, at a minimum, 20 feet beyond the top of each bank.

10. Service Connections

Each customer is required to have a dedicated service connection to Authority's facilities and meter. Authority will not submeter water consumption to differentiate types of water use or for any other reason. The foregoing requirement does not preclude a Developer from submetering water usage on their property for their own purposes. Similarly, sewer customers are not permitted to connect to Authority facilities if their flow is piped through facilities not owned by Authority. Residential uses shall be metered separately from non-residential uses in projects with mixed uses. Turbine meters are not permitted for any uses where low flows may occur. Permanent installations shall be metered in a manner acceptable to Authority. Authority requires that fire service lines be installed in conformance with requirements of the fire service agency of jurisdiction. Each such agency shall determine the appropriate fire flow requirements for each application and note the required fire flow in gallons per minute with their approval of the construction plans.

11. Prohibited Discharges to Sewer System

- a. New businesses that will be handling or generating any toxic/hazardous substances shall inform Authority prior to plan submittal or when requesting when service if the site currently has water or sewer service. All such applicants must provide a detailed description of their proposed activities and indicate how process waste streams or spills will be captured and/or disposed. Any proposed waste stream or process water to be disposed into the sanitary sewer system will require pretreatment prior to discharge. The applicant must submit their proposed method of pre-treatment to Authority for approval.

Untreated discharges are not permitted into Authority facilities. Pretreatment procedures shall be acceptable to Authority and shall conform to all State and Federal regulations. Affected businesses include, but are not limited to, all commercial and industrial users of Authority facilities for which Federal and/or State pretreatment standards have been promulgated. This includes businesses such as plating and metal finishing operations.

Businesses that qualify as significant users will be required to obtain a Wastewater Discharge Permit in accordance with Authority's Wastewater Pretreatment Program.

- b. Storm water, roof drains, softener brine, reverse osmosis reject water, treated groundwater or other "nondomestic sewage" are not permitted to discharge into Authority's sewer system.

B. CONSTRUCTION PLAN PREPARATION REQUIREMENTS

1. Prepare plans on 24-inch X 36-inch sheets using a scale no smaller than 1-inch=40 feet, unless specific approval for a smaller scale is obtained from Authority. Zero lot line projects (when frontage is 45 feet or less on 50% or more of the lots) require plans prepared at a scale of no smaller than 1-inch=30 feet. Plans shall be drawn to scale using a scale that appears on a standard engineer's box scale. Like scales shall be used on plan & profile submittals with correct grids. (i.e. 1 inch 40 feet horizontal 1-inch=4 feet vertical) Scales and grid count must be consistent. Computer generated scales that cannot be read with a standard engineer's box scale will not be accepted for review.
2. Plans must indicate proposed finish floor/slab elevations and finished grade for roads, catch basins and other pertinent items. Elevations must be in NAVD 1988 Datum with conversion table to NGVD 1929 noted on plan sheets. Place sanitary sewer data, including manhole invert and rim elevations, on plan sheets at each manhole; rim and invert elevations shown in tabular form only will be rejected. Profiles are required for gravity sewers and force mains (show all crossings). Profiles are also required for water mains with significant grade changes, including, but not limited to, aerial crossings, jack and bore and subaqueous crossings. When separate profile sheets are used all sewer lines must be depicted from manhole to manhole, pipe breaks between manholes will not be accepted. In addition, invert elevations must be clearly shown on profile sheets at each manhole. All profiles shall utilize the grid format. Plans utilizing the datum format shall be rejected.
3. An overall master plan sheet will be required for projects requiring more than two water and sewer plan sheets. The master plan sheet shall clearly show all water, sewer and reclaimed water mains, valves, fire hydrants, manholes, lift stations, metering facilities, connection points and existing facilities. Other information pertinent to the project such as roadway, lakes, buildings, drainage system, etc. shall also be shown.

4. All piping crossings must be clearly identified on the plan sheets (this includes but not limited to, water mains, force mains, gravity mains, reclaimed water mains, storm sewers, gas mains, underground electric, telecommunication lines and cable TV lines showing elevations of each). Clearance between the outside walls of the pipes/conduits, as well as pipe materials, must be clearly indicated on the drawings for each crossing.

Examples:

- Bottom 6 inch DIP WM = 14.73
- Top 24 inch RCP = 13.18

All sewer service crossing water mains and drainage lines shall be clearly identified on plan sheet with elevations called out in tabular form on the construction plans and on the record drawings.

5. If the project will be built in phases the limits of each phase must be clearly indicated with the initial submittal; phasing must be decided prior to review. Each phase shall be separated by a valve and/or manhole.
6. Facilities which will ultimately be dedicated to Authority which are installed on private property shall be in easements dedicated to Authority. Plans must show proposed easements by shading or otherwise easily distinguishable on plans.
7. All plans shall clearly indicate proposed driveway locations, streetlights and location of other utilities (electric, telephone, cable TV and gas). Particular emphasis must be given for proposed structures such as switch cabinets, transformers, splice boxes and signal booster stations.
8. Provide a cover sheet showing the applicable project name and project number, sheet index, category of improvements, and vicinity sketch.
9. Provide all applicable detail drawings, including special profile sheets as required to show special or unique situations.
10. Authority's details must be used where applicable and shall include approval date. If details are found to have been altered without the knowledge of Authority or without specifically stating in the transmittal which details are altered, the plans will be returned without review.
11. Obtain Fire Marshall approval of water system plans (approving fire hydrant placement and wet fireline requirements) prior to plan submission to Authority. The Fire Marshall approved set shall indicate the minimum fire flow requirement for the project.
12. Submit Fire Marshall approved set, paving and drainage plan, preliminary plat or utility easement plan at scale matching potable water, reclaimed water, and/or wastewater plans, landscaping plan, master plan, survey, cover sheet and all plan sheets with relevant and easily readable location sketch, completed wastewater survey for projects with potential pretreatment requirements, lift station calculations, canal and road permits, including preliminary FDEP forms.

13. A utility plan is required for all subdivisions. The plan shall include a typical section of the utility easement showing all proposed utilities, all utility crossings, location and size of all utility above grade infrastructure boxes. This plan shall be provided prior to Authority approving plans.
14. Prior to making plan submittal to Authority, verify all items on prerequisite checklist have been completed (see "Plan Submittal Prerequisite Checklist Water and Sewer").

C. INSTALLATION PROTOCOL (to be incorporated in construction drawings or project specifications)

1. All pipe is to be laid in a clean dry trench.
2. All muck and unsuitable materials encountered in trench bottom shall be removed and replaced with compacted granular material to 95% of maximum density per AASHTO T-180. Proctor and density test results shall be submitted to the EOR with a copy to Authority.
3. All backfill within road rights-of-way shall be placed in 12-inch lifts and compacted by mechanical means to 98% of maximum density per AASHTO T-180 or as otherwise required by the permitting agency. Proctor and density test results shall be submitted to the EOR with a copy to Authority. Flowable fill or controlled low strength material (CLSM) shall be an alternative to a compacted backfill with the approval of the permitting agency and Authority. These materials shall be used for general backfill applications for trenches and abutments. Flowable fill shall be excavatable and have a compressive strength that shall be less than 200 psi at twenty-eight (28) days.
4. Utilities crossing road rights-of-way shall be installed prior to road construction and backfilled and compacted within right-of-way limits in strict accordance with the directions of the EOR and requirements of all agencies of jurisdiction.
5. Embedment materials below pipe shall conform to Unified Soil Classification System (U.S.C.S.) Soil Classification Class I or II as noted in ASTM D2321.
6. All lines under construction shall be plugged with a wing plug, and all pressure pipes are to be plugged with a mechanical plug or cap at the end of the working day to prevent ground water and potential contaminants from entering completed lines and lines under construction.
7. Above ground piping, including but not limited to, aerial crossings, lift station piping, fire lines, meter/backflow prevention device assemblies, etc. shall be flanged and be coated in the following manner:

Sandblast and remove all paint and any loose material in accordance with SSPC-SP10 or NAPF 500-03 (ductile iron surfaces). Sandblasting shall be performed using non-silica media. Paint all exterior ferrous metal surfaces. The manufacturer's recommendations for surface preparation, priming, recoating, etc. shall be strictly followed. Do not paint or coat any nameplates, brass or stainless steel material. Contractor shall use the following paint system or approved equal.

TNEMEC for Water and Sewer

- a. Primer: TNEMEC CHEMBUILD- MODIFIED POLYAMIDOAMINE EPOXY #135 (3.0 to 5.0 mils DFT) aluminum color.
- b. Caulk all flanges with Sika Flex 1-A polyurethane caulk.
- c. Intermediate Coat: TNEMEC CHEMBUILD-MODIFIED POLYAMIDOAMINE EPOXY #135 (3.0 to 5.0 mils DFT) off white color
- d. Finish Coat: Series 1074 Endura-Shield II with 644 UV Blocker (2.0 to 3.0 mils)

TNEMEC for Reclaimed Water

- a. Primer: TNEMEC Series 1 Omnithane 2.5 – 3.5 MILS DFT.
- b. Caulk all flanges with Sika Flex 1-A Polyurethane caulking.
- c. Intermediate: TNEMEC Series 135-1243 Chembuild Aluminum at 4.0 – 6.0 MLS DFT.
- d. Finish: TNEMEC Series 1070 Fluoronar Gloss at 2.0 – 3.0 MLS DFT. (Color: Reclaimed Water Purple).

The finished coat of paint shall be black in color for sanitary sewer, safety purple (5C08) for reclaimed appurtenances and delft (6B03) blue for potable water appurtenances.

Inspections by Authority are required after sandblast and before primer, after primer and after intermediate coat.

8. All flanged pipe shall be caulked between each flange and threads with Sika 1 A urethane caulk.
9. All tie rods, bolts, nuts, etc. installed underground must be corten steel and shall be painted with Sherwin Williams TarGuard – Coal Tar Epoxy or an Authority approved equal. Brass and stainless-steel hardware is exempt from this requirement.
10. Coatings and linings damaged during construction due to field cutting, mishandling or otherwise must be repaired in strict accordance with the manufacturer's recommendations. This includes, but is not limited to; cement mortar and polyethylene pipe linings, Protecto 401, galvanized coatings, PVC fence coatings and other paint type coatings. Specific approval must be obtained from Authority prior to performing coating and lining repairs.
11. All stainless steel nuts, bolts and hardware referenced in these standards, shall be SS 316 grade and shall be so stamped by the manufacturer to verify alloy. The use of any other stainless steel alloy will require specific approval by Authority. In general, stainless steel nuts, bolts and hardware are required in and around lift stations and for facilities installed over or under brackish or marine waters. This requirement applies to flange bolts and nuts on flanged piping, mounting brackets, all thread rod, anchor bolts, washers, clamps and other miscellaneous hardware.

Anti-galling compound anti-seize lubricant shall be applied to the threads of all stainless steel bolts prior to installation. Anti-seize lubricant shall be graphite 50 anti-seize by Loctite Corporation, 1000 anti-seize paste by Dow Corning, 3M Lube and anti-seize by 3M.

12. All rubber and synthetic elastomeric components of products that come in contact with potable water shall be manufactured with chloramine resistant elastomers and shall bear NSF approval.
13. All mains, including fittings, shall be easily identifiable as to their contents and shall be color coded or marked using the universal color code of blue for water, green for sewer and lavender for reclaimed water. Pipe striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape is used to stripe pipe during installation of the pipe, the tape shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipes with an internal diameter of 24 inches or greater, tape shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe. Tape shall be vinyl plastic adhesive back with a minimum width of 6 inches. Field application of paint shall not be acceptable.
14. Fire hydrants shall be clearly identified as out of service until mains have been released for service and Authority has verified the system is fully operational.
15. Any lines taken out of service shall be either removed or grouted in place as required. Those lines grouted in place shall be grouted full with an excavatable flowable grout mixture. The grout pipe shall be 2-inch polyethylene with a compression coupling inserted into the pipe prior to installing mud plug to prevent movement during grouting. Shop drawings of the proposed mixture shall be submitted and approved prior to placement.

D. LANDSCAPE GUIDELINES

1. Authority requires landscape plans be submitted as part of the construction plan review process for all projects. Authority will not review final water and sewer plans unless the plans are accompanied by landscape plans that have been reviewed and approved by the governing municipality. These plans shall include Authority's "typical tree with root barriers" details, if applicable.

Water and sewer service shall not be activated if plantings are installed within the specified area of Authority's facilities without the express written consent of Authority. Property owners that wish to place landscaping in Authority easements will be required to submit proposed plans for approval and to execute Authority's Encroachment Agreement. Landscaping placed near Authority's facilities is at the property owners' risk.

Authority offers the following guidelines for placing landscaping near Authority facilities whether in an easement or the road right-of-way:

- a. Ground cover type plants shall not be planted within 5 feet of Authority's valve boxes, metering or pumping facilities, gravity sewer manholes, water meters, sewer cleanouts, fire hydrants, and backflow prevention devices without approval from Authority. Should ground cover be approved within 5 feet of Authority's facilities it shall not cover, block or in any way hinder access to Authority's facilities.
- b. Palm trees (other than Royal and exotic palms), shrubs, accent plants, and small trees, shall not be planted closer than 10 feet of water mains, force mains, gravity mains, reclaimed water facilities, sewer service laterals, water service lines, water meters, sewer cleanouts, fire hydrants, or any other water and sewer appurtenances owned by Authority without the approval of Authority. Authority will consider approving less than 10 feet separation, with the use of an approved root barrier, when it has been demonstrated that there are no other alternatives and Authority's facilities can be accessed and maintained and will not be at risk. Authority will not consider any landscaping in the small tree, palm category which is less than 7 feet from its facilities with the root ball being a minimum of 5 feet as measured from the outside of the root ball to the outside of the pipe. Authority will consider approving accent plants and small shrubs with less than 7 feet of clearance from its facilities, with a minimum of 5 feet from facilities when there are no other alternatives.
- c. Large trees, Royal Palms, and exotic palms are not to be planted closer than 15 feet to water mains, force mains, gravity mains, reclaimed facilities, sewer service laterals, water service lines, water meters, sewer cleanouts, fire hydrants and any other water or sewer appurtenances owned by Authority without the approval of Authority. Authority will consider approving less than 15 feet separation, with the use of an approved root barrier, when it has been demonstrated that there are no other alternatives and Authority's facilities can be accessed and maintained and will not be at risk. Authority will not consider any landscape in this category which is less than 10 feet from its facilities with the root ball being a minimum of 8 feet as measured from the outside of the root ball to the outside of the pipe.
- d. Only those plants which are classified as palm trees, shrubs, ground cover or accent plants are to be planted within 5 feet of lift station or reclaimed water metering facilities and shall not interfere with the telemetry antenna.
- e. Notorious invasive plants, nuisance and problem trees are not to be planted within 25 feet of water mains, force mains, gravity mains, sewer service laterals, water service lines, water meters, sewer cleanouts, fire hydrants or any other water or sewer appurtenances owned by Authority without the approval of Authority.
- f. Landscape berms, root barrier designation and root barrier details must be noted on all landscape and construction plans where used and shall be reviewed by Authority for acceptability on a case-by-case basis.

- g. Root barriers shall be Deep Root UB36-2, Root Solution RS-36, or approved equal. All root barriers shall be installed to a minimum depth of 36 inches and in strict accordance with manufacturer's written instructions and Authority standards. Root barriers shall be installed a minimum of 4 feet from Authority' facilities.
- h. All landscaping including accent plants shall be a minimum of 7.5 feet from fire hydrants.
- 2. Accent Plant is a plant which is not covered by any of the following definitions and is used sparingly within landscape areas.
- 3. Ground Cover is a plant in height no greater than 2 feet at maturity.
- 4. Shrubs are plants in height no greater than 3 feet at maturity.
- 5. Small Tree is a tree in height less than 20 feet at maturity.
- 6. Nuisance and Problem Trees are generally invasive in nature. The following is a partial list of trees which are in this category:

EARLEAF ACACIA	Acacia auriculiformis
AUSTRALIAN PINE	Casuarina spp.
MELALEUCA	Melaleuca quinquenervia
BRAZILIAN PEPPER	Schinus terebinthifolius
WOMAN'S TONGUE TREE	Albizzia lebeck
NORFOLK ISLAND PINE	Araucaria heterophylla
TREE BAMBOO	Bambusa vulgaris
BISCHOFIA	Bischofia javanica
SCHEFFERLA	Brassia actinophylla
EAR TREE	Enterolobium cyclocarpum
EUCALYPTUS	Eucalyptus spp.
NON-NATIVE FICUS	Ficus spp.
SILK OAK	Grevillea robusta
MAHOE	Hibiscus tiliaceus
CHINESE TALLOW TREE	Sapium sebiferum
JAVA PLUM	Syzygium cumini
CORK TREE	Thespesia populnea
ROYAL POINCIANA	Delonix regia

E. PLAN SUBMITTAL - REVIEW PROCEDURES

1. The design criteria noted in the next three (3) sections of this Construction Standards and Specifications Manual shall be used to review the utility design of the systems included in any project site development. However, when required by good engineering practice and/or economics, the design engineer shall request, in advance and in writing, deviations from these criteria. Deviations shall be approved, in writing by Authority.
2. Provide the utility plan(s) in accordance with Section II.B.
 - a. An incomplete submittal shall **NOT** be reviewed and shall be noted as **NOT APPROVED**.
 - b. If the submittal is reviewed and an excess of 20 comments are noted on the submitted plans prior to the completion of the review, the entire submittal may be returned to the design engineer as incomplete due to lack of quality assurance check and shall be noted as **NOT APPROVED**.
3. It is incumbent upon the EOR that prior to any submission, the drawings (and corresponding applications) shall be thoroughly checked and coordinated. Quality control is the responsibility of the EOR.

F. PLAN SUBMITTAL PREREQUISITE CHECKLIST

DATE: _____

Plans that were submitted on, _____20____ are not complete. The review of this project will not start until the submittal is complete with the following required items:

_____ Property Questionnaire

_____ Survey (one copy)

_____ Administrative Fee _____

DEP FORMS: 2 Copies Each

_____ Water

_____ Sewer

PLANS: Two sets of each required (no smaller than 1 inch = 40 feet, zero lot line 1 inch = 30 feet)

_____ Water and Sewer with Location Sketch/Key Map

_____ Fire Marshall approval (original indicating required fire flow)

_____ Complete Preliminary plat or easement dedication

_____ Paving and Drainage Plans

_____ Landscape Plans (utility easements and water and sewer appurtenances must be shown)

_____ Utility Plan

_____ Off Site Roadway/Drainage Improvements (or letter stating no off site roadway / drainage Improvements required for this project.

PROJECT SPECIFIC REQUIREMENTS

_____ Master Plan - Overall water and sewer plan (more than one plan sheet)

_____ Water Meter Sizing Calculations

_____ Engineering Calculations for Lift Station

_____ Irrigation Calculations

_____ A/C Cooling Tower Calculations

_____ Architectural/Mechanical Building Plans (nonresidential only)

_____ Grease Traps/Oil/Sand Interceptors

_____ Other

G. PLAN REVIEW CHECKLIST

PROJECT:

ENGINEER: _____

PHONE: _____

REVIEWER: _____

DATE STARTED: _____

GENERAL:

1. _____ Master Plan Requirements/Well sites required
2. _____ Authority detail sheets used
3. _____ Plat showing existing and proposed easements
4. _____ Plat has proper dedication language
5. _____ Easements shown where facilities are on private property
6. _____ Water and sewer separation statement
7. _____ Project in wellfield protection zone
8. _____ Overall Master Utility Plan
9. _____ Pipe crossings shown with clearances
10. _____ Offsite water, sewer and reclaimed appurtenances properly shown
11. _____ Replace ACP, PVC or VCP pipe
12. _____ Proper materials specified
13. _____ Clearance from buildings (15 feet minimum including footers and overhangs and other structures)
14. _____ Connections to existing facilities clearly detailed
15. _____ Operating nut on valves no deeper than 24 inches below finish grade
16. _____ Pipe/service size
17. _____ Necessary water/sewer detail sheets attached
18. _____ Each unit building served
19. _____ Utility plan showing conduit crossings and utility boxes

20. ____ Proper cover over existing water, sewer and reclaimed facilities
21. ____ Existing and proposed easements by instrument shown
22. ____ Existing water, sewer, reclaimed, drainage and large diameter irrigation
23. ____ Water and sewer mains have to be extended to furthest property line
24. ____ Plan elevations in NAVD 1988 Datum
25. ____ Notation for contractor to adjust existing valve boxes, fire hydrants, manholes, etc. to finish grade when impacted by development
26. ____ Provide project phasing plan where applicable. If phased show each phase separated by a valve and/or manhole

WATER:

1. ____ Proper backflow preventer (including auxiliary water supply user and dual backflows required for critical uses)
2. ____ Meter at property line - not in driveway or sidewalk
3. ____ Double services where possible
4. ____ Water mains looped for projects greater than 25 dwelling units and projects which Authority determines are considered critical use.
5. ____ Proper valving - two at each tee, every 1500 feet, greater than 25 dwelling units
6. ____ Double valve point of feed
7. ____ Minimum/Maximum cover 2.5 feet to 4.0 feet
8. ____ Fire hydrant spacing/provision for line flushing
9. ____ Mains in green areas
10. ____ Valve boxes for corporations where tap is under paving
11. ____ Valve & length of pipe for future extension
12. ____ Thrust blocks, tie rods, restrained joints
13. ____ Booster pump > 2 stories for domestic service
14. ____ No services greater than 75 feet long
15. ____ Fire line for building (commercial or multi-family)
16. ____ Fire line for single family home
17. ____ Large meter/backflow assemblies clearly detailed

18. ____ Bypass on meters > 2 inches and all critical installations
19. ____ Velocity less than 10 fps during fire flows
20. ____ Dead ends minimized
21. ____ Mains and services perpendicular to street where possible
22. ____ Valves in accessible locations
23. ____ Sample points shown
24. ____ Air release valves at high points

SEWER:

1. ____ Minimum depth 4 feet invert of terminal manhole
2. ____ C-900 pipe for cuts greater than 12 feet
3. ____ D.I.P. installed at crossings not meeting the separation statement
4. ____ Maximum distance between manholes 400 feet
5. ____ Mains under paving - concrete collars on manholes in green areas and in paver block areas
6. ____ Outside drop if drop is greater than 2 feet
7. ____ Minimum/Maximum slopes
8. ____ No oversized pipe
9. ____ No future stubs - terminate with manhole
10. ____ Entry to existing manhole - core only
11. ____ No services tied to manholes
12. ____ Double services where possible
13. ____ Clean out on service lines at property line and at 75 foot intervals on service laterals
14. ____ Grease trap/oil/sand interceptors
15. ____ Profile of gravity sewer mains including proposed finished grades
16. ____ Profile force main including proposed finished grade
17. ____ Valving on force main at 1,500 intervals, two at each tee
18. ____ Manholes and sewer lines designed to be a minimum of 5 feet to curb and right of way

19. ____ Sanitary sewer crossing elevations with conflicting pipe (including sewer service laterals)
20. ____ Valves and manholes in accessible locations
21. ____ Manhole flow channels 90° or greater
22. ____ Manhole depth less than 18 feet
23. ____ Sewer main from lift station to first manhole to be DR 14 C-900 PVC
24. ____ Air release valve at force main high points
25. ____ 2% maximum slope of sewer lines if connection to an existing manhole requires a steeper slope, a drop manhole must be utilized to minimize slope
26. ____ Collector manhole at lift station shall be located outside of traffic lanes
27. ____ Lift Station depth less than 26 feet
28. ____ Lift Station Calculations - Signed & Sealed by EOR
 - a. average daily flow/peak flow calculations
 - b. force main minimum velocity
 - c. manifolding force main pressures
 - d. pump cycle time
 - e. floatation calculations
 - f. 240/480 volts
 - g. 100-year flood
 - h. System curve plotted on proposed pump curve

LANDSCAPE PLANS:

1. ____ Authority details utilized
2. ____ Root barriers shown on plans
3. ____ Water and sewer lines and appurtenances shown
4. ____ Water and sewer easements shown
5. ____ Screening of backflows required by other governmental agencies

SECTION III - WATER DISTRIBUTION SYSTEM

A. BASIS OF DESIGN - Approval for construction, extension, expansion or use of any community water supply shall be based on the criteria as outlined in Palm Beach County Environmental Control Rule II and the references included therein as well as the following requirements:

1. There shall be no physical connection between a potable water supply and a questionable water supply, or a sanitary or storm sewage system by direct pressure, vacuum, gravity or any other means. All potable water services serving properties with a sewage pump station or an auxiliary water supply shall be provided with an approved reduced pressure backflow prevention device. Permanent dead ends in water mains will not be approved unless it can be demonstrated that looping the system is not feasible. When dead ends are necessary, the Authority requires that a flush hydrant and/or a permanent flush meter assembly be installed on the terminal end.
2. All water distribution systems shall be looped to the greatest extent possible. Water mains shall have a minimum nominal inside diameter of 6 inches. Water mains having an inside diameter of less than 6 inches will not normally be considered. Looping is required for mains serving 25 or more dwelling units or considered critical use. Oversized water distribution piping which causes water quality problems are prohibited. If a project requires excessive fire flow, the design of the water distribution system will require either dual systems or separate onsite private fire storage and pumping systems.
3. All buildings over two stories in height or requiring a consistent operating pressure above 40 PSI shall be provided with a domestic water service booster pump which may be located within the building. Drawings of pump and building must be submitted along with the pump calculations.
4. Single family homes of 5,000 square feet or more may be required to install a private fire line service.
5. Approved backflow prevention devices are required on all water service connections (domestic, commercial, fire, irrigation, etc.) in accordance with Authority specifications shown in standard details in this manual. New master metered non-residential accounts, new accounts servicing buildings with more than two stories, medical offices, restaurants, (50 seats or more) and all other accounts where continuity of water service is critical shall install dual backflow prevention devices or provide a second source of potable water. Backflow devices shall be installed on the outlet side of the water meter; no tees or other branch fittings are allowed between the water meter and backflow device. In the absence of special circumstances, which would cause a great degree of hazard for cross connections, the following list covers the general backflow device required by customer type;

- Residential – Individually Metered.....Dual check valve
- Residential – Individually Metered
with dock, private sewer pump station
or auxiliary water supply.....Reduced pressure zone device
- Residential – Master Metered..... Reduced pressure zone device
- Non-Residential..... Reduced pressure zone device
- Irrigation..... Reduced pressure zone device
- Fireline..... Double detector check valve
- Temporary Water..... Reduced pressure zone device

6. Valving of all systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the grid system. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. All valves shall be right hand closed operation; valves 14 inches or greater shall be butterfly valves. Valves shall generally be installed at intervals of not more than 1,500 LF on transmission mains and on all primary branches connected to these lines. In high density areas, valves shall be installed as necessary to minimize the number of customers affected by a water main break (25 dwelling units).

7. Meter Location:

- a. Meters shall be set in green area generally at a common property line. Meters and control valves shall be accessible and unobstructed for 4 feet in all directions. This shall include but not be limited to transformers, telephone junction boxes, walls, trees, etc.
- b. Meters shall not be placed in areas that can be fenced, such as backyards. Meters shall not be placed in any asphalt or concrete surfaced areas (sidewalks, curbs, driveways, etc.).
- c. In commercial or zero lot line areas when no other alternative is available, meters will be allowed in asphalt provided all of the following conditions are met:
 - i. The top of box shall be flush with asphalt surface and located outside of any drainage flowline (i.e. dry surface area).
 - ii. The box shall not be located within parking stalls.
 - iii. The box and lid shall be traffic bearing and shall be placed away from common traffic area. Pipe stanchions may be required under certain conditions.
 - iv. The curb valve box must be installed on main line connection.

8. Service lines shall not exceed 75 feet from the main to the meter. Where possible, meter shall be placed in green areas as close to the water main as possible. Service lines covered by paving between the water main and meter will not be acceptable where avoidable.

9. Polyethylene service lines shall be solid-wall blue pipe, or shall have a co-extruded blue external skin, or shall be white or black pipe with blue stripes incorporated into, or applied to, the pipe wall.

10. Water mains including fittings shall be color coded or marked with blue strips or tape. Pipe striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape is used to stripe pipe during installation of the pipe, the tape shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipes with an internal diameter of 24 inches or greater, tape shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe. Tape shall be vinyl plastic adhesive back with a minimum width of 6 inches. Field application of paint shall not be acceptable.

B. HYDRAULIC DESIGN

Hydraulic designs shall be based on pressure data relative to the water pumping facilities which will service the proposed system. Water mains shall be sized such that the maximum velocity of water in the main will not exceed 10 feet per second under fire flow conditions and 15 feet per second in fire hydrant leads without water service connections.

C. INSTALLATION OF WATER MAINS

1. Contractor shall comply with Palm Beach County Health Department Technical Memoranda regarding all water main connections to existing system or lines already bacteriologically cleared.

2. Installation and testing of water system pipe and fittings shall be in accordance with AWWA Specification C-600 Latest Revision and Authority's Construction Standards and Specifications.

3. Any pavement cut shall be replaced in accordance with requirements of the Authority's Pavement Replacement Detail Drawing and in accordance with all other applicable governing agency's permitting requirements.

4. Omni Marker #75025 or 3M 1403-1266 blue magnetic markers shall be placed above all fittings, changes in alignment, grade and water services and at the discretion of Authority's representative.

5. All loading or unloading of pipe, fittings, valves, and accessories shall be done in such a manner so as to avoid damage. The pipe shall not be skidded or rolled against pipe already unloaded.

Special precautions should be taken to avoid damage to cement lined fittings and pipe. Damage to the lining shall be cause for rejection. The interior of all pipes, fittings and other appurtenances shall be kept free of dirt and foreign matter at all times.

6. All mains, valves, bends, tees, crosses, and dead ends shall be restrained with an approved Authority restraint joint system. On mains greater than 12 inches, all valves, bends, tees, crosses and dead ends shall be restrained with 2 forms of an approved Authority thrust restraint system. Where proprietary restrained joint are not used, tie rods and megalugs are the recommended system. Where adequate space exists, Authority may approve the use of thrust blocks.

7. Tie rods used as a method of joint restraint shall be by means of steel tie back bolts, nuts, washers and all thread rods meeting ASTM A-242 requirements (corten steel or equal) and painted in accordance with the procedures described herein. Tie rods and nuts shall be equal in diameter to the tee bolts and nuts which were supplied with the applicable fittings. Two tie rods per joint are required for sizes 4 inches diameter through 10 inches diameter, four tie rods per joint for sizes 12 inches diameter through 16 inches and 6 tie rods per joint for sizes 18 inches through 24 inches.

8. Air relief valves shall be installed at the design high points. Installation of air release valves to correct high points caused by improper installation of pipe (not at design grade) will not be permitted.

9. All pipes shall be laid to line in a clean dry trench on line and grade with valves and hydrant stems plumb. All pipes shall have a minimum cover of 30 inches and a maximum cover of 48 inches unless otherwise noted on the plans or required by permit. Pipes with 12 inch gate valves shall have a minimum cover of 40 inches.

10. The trench at the top of the pipe shall be kept to a maximum width of 24 inches plus the pipe diameter. The trench shall have a flat bottom, cut true and even, so that the barrel of the pipe shall bear its full length. Pipe bells will be placed in small pockets specifically excavated to receive the bell. All excavations must be in compliance with OSHA regulations.

11. Trench backfill shall contain no rocks larger than 2 inches in diameter or other items that may damage the pipe. In the event pipe is installed in rock excavation, 6 inches of granular material will be provided for bedding under the pipe. All pipe joints, thrust blocks, conflicts and service connections shall be left exposed until visually inspected and approved by an Authority representative.

12. Tapping Sleeves

- a. Tapping sleeves and tapping crosses shall be of the heavy body ductile iron, mechanical joint type or stainless steel wrap around type as approved.
- b. All tapping assemblies installed on existing water mains shall be pressure tested and witnessed by Authority's representative prior to the actual tap of the main.

The pipe coupon shall be carefully preserved and submitted to Authority's representative. All tapping sleeves shall be installed a minimum of 6 feet from pipe joints.

- c. All field cuts and tapping operations on pipe shall require careful repair of the particular lining damaged in strict accordance with the manufacturer's recommendations. All materials utilized shall be NSF 61 approved.

13. Fire hydrants shall be dry barrel type without drain and installed true and plumb. Hydrant extensions shall not be permitted in new construction.

14. A lightweight high density polyethylene pipe plug shall be required to be on all pipes delivered to the site. The plugs shall remain on both sides of the pipe until pipe is installed to ensure that the pipe will not be contaminated.

D. CLEANING AND FLUSHING

1. Upon completion of the pipe installation for any section, the mains shall be cannon flushed to remove dirt and any other foreign matter by achieving a minimum velocity of 5 feet per second on pipe sizes up to and including 12 inches and 2.5 feet per second on pipe greater than 12 inches. The duration of the flushing shall be sufficient to provide a minimum flush volume equal to three times the internal volume of the pipeline being flushed. Temporary fittings, pipe, etc. may be used to facilitate cannon flushing.

- a. Prior to the actual line flushing operation, the Contractor shall notify Authority's representative of such intended water use. No flushing shall take place without an Authority representative present.
- b. No flushing shall take place until after the 2 inch bypass line and meter is installed and the mains have been filled utilizing the 2 inch meter.
- c. Flushing will not be scheduled until the Authority has approved preliminary record drawings, unless it is required to facilitate construction of water mains.
- d. The Contractor shall exercise due care so as to ensure that the water used in flushing does not cause a nuisance or inflict property damage.

2. Pigging is required for all water mains 16 inches and greater in diameter. The Authority may require water mains less than 16 inches in diameter be pigged if the Authority or the EOR's representative observes mains being installed under substandard conditions or the flushing cannot achieve the minimum velocity.

3. No existing valves shall be operated, except in the presence of an Authority representative.

E. TESTING

1. Unless otherwise approved, all hydrant connections, service connections to the curb stop at the meter, and all joints in the water mains shall remain uncovered for visual inspection by an Authority representative. The Contractor shall backfill only after approval by Authority's representative.

2. The Contractor shall provide all necessary equipment such as pumps, gauges and water measuring tanks and shall perform all work required for pipe pressure and leakage test. Pressure and leakage tests shall be made between valves and/or connections for each section tested using the procedure outlined in ANSI/AWWA C-600 Latest Revision and Authority requirements. Contractor shall submit preliminary record drawings to Authority for approval prior to scheduling a pressure test. A pretest of the section to be tested shall be successfully completed by the Contractor and observed by a representative of the EOR prior to scheduling the pressure test with Authority. All other tests shall be made in accordance with these specifications and observed by the EOR and Authority's representative.

3. 1,500 LF shall be the maximum length of main to be pressure and leakage tested at any one time. Testing of isolated portions between valves within the test section may be required by Authority if a portion of that line appears questionable.

- a. PRESSURE AND LEAKAGE TEST - A hydrostatic pressure of 150 psi shall be developed by the Contractor, within the section of pipeline to be tested and this pressure (150 psi) shall be held for a minimum time period of two hours.
- b. ALLOWABLE LEAKAGE - Leakage during both the pressure and leakage test shall not exceed the following formula for gasketed pipe:

$$L = (SDP^{1/2} / 148,000) \times 0.5$$

L = Allowable Leakage (gallons per hour).

S = Length of Pipe to be Tested (feet)

D = Nominal Diameter of Pipe (inches)

P = Average Test Pressure (PSIG)

There is no leakage allowance for polyethylene pipe

- c. A loss of 5 psi per hour or more during the pressure test, regardless of the amount of leakage shall be considered a failing test.
- d. A gain in pressure during the test shall be considered a failing test.
- e. The pressure test shall be considered not acceptable unless all valves servicing hydrants, services, etc. in the test section are in the open position.

The system must be completed to the full extent of the approved plans on that portion being tested. The Contractor shall provide a 1/2 inch ball valve adjacent to the test pressure gauge for installation of Authority's "check gauge". The use of PVC pipe and fittings for temporary piping for pressure testing is not permitted. Test gauge shall be in 2 pound increments with a minimum 3 inch face.

- f. Failure of the Contractor's test gauge to zero out upon completion of testing shall be cause for rejection.
- g. The Contractor shall, at their own expense, adjust or replace, at the discretion of the EOR, any component of the pipeline which fails the prescribed tests. The pipeline shall then be tested again as described above until it successfully conforms to said tests.
- h. All water utilized for the pressure and leakage test shall be potable water with an adequate chlorine residual.
- i. The Authority will not schedule the pressure test until the pipe has been properly backfilled, compacted and established final grade and preliminary as-builts accepted.

F. DISINFECTION

1. Disinfection of mains shall be in compliance with Rules 62-555.340 Florida Administrative Code (F.A.C.) and applicable American Water Works Association (AWWA) disinfection standards (AWWA Standards C651, C652, C653, and C654), which are incorporated by reference in Rule 62-555.330(4), F.A.C.. Each unit of completed supply line and distribution system shall be thoroughly flushed and then disinfected with chlorine. Chlorine may be applied by the following method: Liquid chlorine or a completely dissolved hypochlorite and water mixture. The amount of chlorine then applied shall be sufficient to provide a dosage of not less than 50 mg/l. The chlorine material shall be introduced to the water lines and distribution systems in a manner approved by the EOR and the Authority. After a contact period of not less than eight hours, the system shall be flushed with clean water until the residual chlorine content is not greater than 0.2 mg/l free chlorine. All valves in the lines being disinfected shall be opened and closed three times during the contact period. Where necessary, the Contractor shall neutralize chlorinated water which has a total chlorine residual of 0.5 mg/l or greater prior to discharging to swales, ponds, canals, storm drains, etc. to prevent environmental damage. In the event Authority's representative is not available to confirm the minimum initial 50mg/l dosage and the remaining chlorine residual after a minimum eight hours contact time, Authority will accept these results if collected and reported by the certified laboratory that is collecting the bacteriological samples for the water main clearance

2. The Contractor shall install sampling taps required to take all necessary water samples at points designated by the EOR, the Authority, Palm Beach County Health Department and FDEP.

3. The Contractor shall make all arrangements with a certified testing laboratory to take all water samples required for bacteriological tests and shall maintain continuous running bacteriological sample taps, through an Authority approved jumper which will maintain a combined chlorine residual of not less than 0.6 mg/l. Water mains being tested must remain under line pressure, through the approved jumper, after the sample taps are turned off. This procedure shall be followed until the Palm Beach County Health Department issues a release for service of the water lines and distribution system being disinfected. Bacteriological test results will be considered invalid if the results are for samples collected more than 30 days before the results are received by the Palm Beach County Health Department and/or the pressure in the mains is not maintained at 20 psi or greater after the samples are collected.

The bacteriological test result report shall have two consecutive days of satisfactory bacteriological tests.

4. Palm Beach County Health Department approval including EOR's certification shall be accomplished at the full expense of the Contractor/developer and shall be submitted through Authority for approval.

5. After release for service is received from the Palm Beach County Health Department and with approval from Authority, the Contractor shall remove the approved jumper and cap both saddles with brass plugs. The construction meter utilized for main clearance purposes shall be returned to Authority.

G. WATER SERVICE LINE/METER INSTALLATION

1. Meter curb stops shall be 8 inches below final finished grade.

2. Meter services shall be exposed and ready for the meter to be installed.

3. Service line identification

a. All water service line valves shall be exposed by the Contractor. One 4 foot high 2 inch X 2 inch pressure treated wood stake shall be put in the earth against the plug when the service connection is backfilled. The stake shall extend 18 inches minimum above grade and shall be broken off only after authorization from Authority. The top 6 inches of the stake shall be painted blue.

b. A magnetic marker for water service shall be tied to the terminal end of each water service. Markers shall be Omni Marker #75025 or 3M 1403-1266 blue water marker, or equivalent.

c. All magnetic markers shall be returned to Authority at the time of the meter being set.

4. No meter shall be put in service until the appropriate backflow preventer has been installed and is successfully tested by the Authority.

5. No meter shall be put in service in areas formerly on a private water supply system until Authority's representative verifies proper physical disconnection from the private system.

H. INSTALLATION - VALVES AND APPURTENANCES

1. Valving of all systems shall be designed to facilitate the isolation of each section of pipeline located between intersections of the grid system.

2. If a distribution system is to be constructed in phases, valves and plugs with a suitable blow-off or hydrant shall be installed at the end of each line that is to be extended.

3. All mains, valves, bends, tees, crosses, and dead ends shall be restrained with an approved Authority restraint joint system. On all mains greater than 12 inches diameter, two forms of thrust restraints or an approved Authority restrained joint system shall be utilized at each joint. Where adequate spaces exist thrust blocks may be allowed with Authority approval. Thrust blocks shall be used behind all hydrants.

4. When tie rods are used as a method of joint restraint all tie back bolts, nuts, washers and threaded rods shall be constructed of materials that meet ASTM A-242 requirements (corten steel or equal) and painted in accordance with the procedures described herein. Tie rods and nuts shall be equal in diameter to the tee bolts and nuts which were supplied with the applicable fittings. Two tie rods per joint are required for sizes 4" through 10 inch diameter, four tie rods per joint for sizes 12 inch through 16 inch diameter and 6 tie rods per joint for sizes 18 inch through 24 inch diameter.

5. All valves installed for future connections shall be restrained in accordance with Authority specifications.

6. Prior to installation, all butterfly valves shall be tested on site, above ground at 150 PSI. Both sides of disk shall be tested in the presence of an Authority representative.

I. MATERIALS (Also Refer To Exhibit D "Shop Specifications List")

1. Pressure Pipe - Water Mains

- a. All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement. All brass including, but not limited, to valves, fittings, backflow preventors, corporation stops, and curb stops shall be "no lead" type less than 0.25% lead content. All rubber parts, gaskets, etc shall be chloramine resistant pipe:

1. Pressure pipe in sizes 4 inch inside diameter and larger shall be ductile iron pipe.

2. Ductile iron pipe shall be Pressure Class 350 and shall conform to ANSI A21.51 and AWWA C-151. Pipe interior shall have a cement mortar lining.
 3. Spool pieces for MJ connections shall be a minimum of 18 inches long, outside flange to outside flange.
 4. Flanged pipe shall have a minimum wall thickness of 0.32 for 4 inch pipe and incremental increases of 0.02 in thickness for each increase in pipe size up to and including 14 inch. Flanged pipe over 14 inches shall require shop drawing submittal to Authority for approval.
 5. High Density Polyethylene Pipe (HDPE) shall conform to AWWA C 906 and ASTM F 714 with a material designation code of PE 4710 or higher. HDPE shall be a minimum of DR 11 and the outside diameter shall be based on Ductile Iron Pipe Size (DIPS).
- b. Fittings:
- i. All pressure pipe fittings of size 4 inch inside diameter and larger shall be ductile iron fittings with mechanical joints, unless the plans specifically call for flanged joints, restrained joints, etc. Mechanical joint fittings shall be used for buried installations. Flanged joints shall be used for aboveground service only.
 - ii. Mechanical joint fittings shall conform to ANSI/AWWA C-153/A 21.53. Glands for MJ fitting shall be ductile iron and tee bolts shall be corten steel unless otherwise specified. Flanged fittings shall conform to ANSI/AWWA C-110/A21.10 and lined inside and outside as specified for the pipe.
 - iii. Full face neoprene gaskets shall be used on all flanged connections. The use of other materials is prohibited.
- c. Thrust Blocks:
- i. Provide minimum 2,500 psi at 28 days concrete thrust blocks for water mains at each fitting per detail shown on construction drawings if this method of restraint is required.

2. Pressure Pipe - Water Service

- a. The minimum size for single services shall be 1 inch.
- b. The minimum size for double services shall be 1½ inch.
- c. Polyethylene tubing, SDR 9, ASTM D-2737, PE 3408, Cell Classification 355434 C - Latest Revision, copper tube size, with appropriate "Pack Joint" fittings is authorized for 1 inch, 1½ inch and 2 inch services.

- d. Copper tubing shall be type "K" roll copper and fittings shall be of the compression type.
- e. Copper services must be used if organic solvents are likely to be present (i.e. gasoline stations, etc).

3. Water Service - Fittings

- a. All fittings shall be NSF certified lead free.
- b. Only lead free solder and flux shall be used on all soldered joints.
- c. Both double strap tapping saddles and corporation stops shall have AWWA threads.
- d. "Pack Joint" fittings for use with polyethylene pipe shall be provided with stainless steel stiffeners.
- e. Both polyethylene and copper tubing shall be run in one continuous piece, from corporation stop to curb stop (i.e. no fittings between these points).
- f. Curb stops shall be 1 inch (minimum) in size. One inch curb stops with 3/4 inch valves shall not be allowed.
- g. Curb stops at the meter shall be provided with locking wings and an appropriate sized drilled swivel meter nut.
- h. Where service taps are made under paving or sidewalks special requirements apply which will permit access to the connection to the water main (curb valve boxes, 90° tap orientation).

4. Tapping Sleeves and Saddles

- a. Tapping sleeves and tapping crosses shall be of the heavy body ductile iron, mechanical joint or stainless steel wrap around, as approved by Authority.
- b. Tapping Saddles: No direct taps shall be allowed. All service line taps shall be supplied with corporation stops. Water service taps on the main shall be spaced at a minimum distance of 18 inches. All service taps must be at least 18 inches from a bell or fitting. (90° taps are required for services under paving or sidewalks). Brass double strap tapping saddles shall be used.
- c. All tapping assemblies installed on existing water mains shall be pressure tested and witnessed by Authority's representative prior to the actual tap of the main. The pipe coupon shall be carefully preserved and submitted to Authority's representative. All tapping sleeves shall be installed a minimum of 6 feet from pipe joints.

- d. Connection to existing water mains shall be double valved as approved by the Palm Beach County Health Department.
- e. Connection to existing water mains requires the approval and direct observation of Authority's representative.

J. FIRE HYDRANTS

1. Fire hydrants shall conform in all respects to AWWA C-502 (Latest Revision) and shall be of the dry barrel breakaway type with two 2½ inch hose nozzles and one 4½ inch pumper nozzle without drains. All nozzles shall be brass with National Standard hose threads. The hydrant shall be provided with an interior valve opening of 5¼ inch with a brass to brass threaded stationary seat. The centerline of the nozzles shall be 18 inches above the finish grade. In addition, the hydrant shall be fitted with a mechanical joint connection per ANSI A 21.11/AWWA C-111 (Latest Revision) with a minimum cover of 30 inches.

2. Each fire hydrant shall be capable of delivering a flow of 1,000 gallons per minute with a residual pressure of not less than 20 psi. Fire hydrant branches (from main to hydrant) shall be not less than 6 inches in diameter. Each branch shall be provided with a gate valve located as close as possible to the main and the hydrant shall be suitably restrained. Separate fire lines shall be valved as close as possible to the main and restrained with adequate thrust blocks. Hydrants shall be located at or near road right-of-way lines with pumper discharge nozzle facing the roadway. No obstruction shall be placed near the hydrant which would prevent maintenance or access. Hydrants that are installed in a vulnerable area shall be protected by 4 inch cement filled DIP stanchions.

3. All fire hydrants shall be free of corrosion and all working parts shall be properly lubricated and the hydrant painted as required by Authority.

4. The Contractor shall provide and install only fire hydrants which conform to the above specifications and are specified in Exhibit D "Shop Specifications List".

5. Fire hydrants may be inspected in the field for conformance to the above specifications by Authority and/or other regulatory agencies.

6. Fire hydrant extensions shall not be used in new construction.

7. A 7 ½ foot clear zone around the front and sides, and a 5 foot clear zone around the rear of the fire hydrant shall be maintained.

8. Maintain 15 feet minimum from fire hydrant to all structures.

K. VALVES AND VALVE BOXES

1. Valves smaller than 3 inches shall be bronze ball valves and conform to Federal Specification WW-V-35B, Type II, Class A. Valve must be rated at 600 psi WOG.

2. Valves up to and including 12 inch shall be iron body, bronze mounted, gate valves conforming to AWWA C-500 (Latest Revision) being resilient wedge, non-rising stem

type and appropriate ends for horizontal position in line, and shall open left (counter-clockwise) with 2 inch square operating nut. The coating on resilient wedges shall be chloramine resistant.

3. 12 inch valves require the water main to have a minimum of 40 inches of depth.
4. Gate valves shall be carefully inspected, opened wide, and then tightly closed, and all the various nuts and bolts thereon shall be tested for tightness. Special care shall be taken to prevent joint material, stone, or other substances from becoming lodged in the valve seat. Gate valves, unless shown otherwise, shall be set with their stems vertically above the centerline of the pipe.
5. All valves larger than 12 inches used in water mains shall be factory tested and labeled as bi-directional butterfly valves unless otherwise specified. The valves shall conform to AWWA Standard C-504, Latest Revision and shall be Class 150. All butterfly valves larger than 12 inches shall be tested on site prior to install. Each side shall be tested at 150 PSI in the presence of an Authority representative.
6. Check valves shall have a ductile iron body with a bronze or stainless steel to red rubber silicone seating arrangement, non-corrosive shaft. Fireline checks shall have a 300 psi hydrostatic test pressure rating. Check valves smaller than 4 inches shall be bronze, bronze disc, conforming to Federal Specification WW-V-51E, Type 4, Class A, 125 pressure rating.
7. Air release valves installed below grade shall be of the manual type unless otherwise specified by Authority. Air release valves shall be installed in a concrete manhole as shown in the detail and conform to manhole requirements as outlined in Section IV D.
8. Cast iron valve boxes shall be provided for all valves installed underground. The boxes shall be adjustable to fit the depth of earth cover over the valve and shall be designed and installed so as to prevent the transmission of surface loads directly to the valve or piping.
9. Valve boxes shall be carefully centered over the operating nut of the gate valves so as to permit a valve key to be easily fitted to the operating nut. The tops of valve boxes shall be set flush with finished grade, with allowance made for the settlement of surrounding backfill or surface. An 8 inch thick concrete collar shall surround the top of the valve box, as shown on Authority's Underground Valve Installation Construction Detail Drawing.

L. METER AND METER BOX

1. All meters shall be obtained from the Authority and remain the property of the Authority.
2. A meter fee shall be collected by Authority from the Developer/Customer requesting the desired service prior to the actual installation of the meter.
3. Authority shall furnish and install all meters and meter boxes for meter sizes up to and including 2 inch.

4. The Developer/Customer shall be responsible for resetting the meter box after the meter has been set initially by Authority. Any damage to the meter box or meter set shall be paid for by the Developer/Customer.

5. The design of all 3 inch and larger domestic, fire line and irrigation water meter/backflow prevention device installations shall be handled on a case by case basis. Compound water meters must be utilized for all projects that will have variable water demands. All installations shall conform to Authority's Construction Standards and Specifications. The EOR shall submit detailed drawings covering the proposed installation.

6. The above grade piping of the metering and backflow devices larger than 2 inch shall be coated as outlined in Section II.

M. BACKFLOW PREVENTION DEVICES

The Contractor shall provide and install the appropriate type backflow prevention device as specified in Exhibit D "Shop Specifications List".

N. ON-SITE MORTAR/CONCRETE/GROUT MIX

1. All concrete and/or mortar mixed on site (field mixed) for use on any component of the water distribution system shall be Contractor's responsibility. The maximum length of pipe that can be grouted shall be 300 feet.

SECTION IV - SANITARY SEWER SYSTEM

A. BASIS OF DESIGN

1. Sizes of gravity sewers, pumping stations and force mains will depend upon industrial and commercial requirements and peak domestic load. Sewage systems shall be designed on the basis of an average per capita daily flow of not less than 100 gallons of sewage or 275 gallons per day per ERC as defined in Authority's Uniform Extension Policy. On this basis, sewers shall be designed with capacities when running full of not less than 2.5 times the average flow. Special allowance shall be made in each case for sewage from industrial plants and other large non residential projects.
2. Force mains shall be designed to be full of liquid under all operating conditions whenever possible. Special linings will be required on all piping.
3. Force mains shall be designed utilizing 45 degree bends in lieu of 90 degree bends wherever possible.
4. Industrial wastes from any source, including but not limited to, service station wash-racks, lubrication racks, shop floor drains, dental offices, and manufacturing facilities shall not be connected into the sanitary sewer system without pretreatment specifically approved by Authority.
5. All installations where foods are prepared, processed or served shall have a grease trap of adequate capacity with a solids retention device installed through which the wastewater from the preparation area shall pass before entering the sanitary sewer system. Grease interceptors shall be sized by the Authority in accordance with the criteria contained herein and with Palm Beach County Environmental Control Rule I.
6. Sanitary sewers shall be designed to flow into the nearest possible Authority owned gravity sewer system. Private lift stations and private force mains will not be acceptable unless gravity sewer systems are not available or anticipated sewer flow is insufficient. Availability of gravity sewer will be determined by Authority on a case by case basis.
7. Valving of force mains shall be designed to facilitate the isolation of each section of pipeline. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. All below grade valves shall be side actuated. Valves shall generally be installed at intervals of not more than 1,500 LF on transmission mains and on all primary branches connected to these lines.
8. Service laterals shall not exceed 75 feet.
9. Clean outs shall not be placed in areas that will be fenced, or where they will be inaccessible.

B. HYDRAULIC DESIGN

1. Size: The minimum allowable size for a gravity sewer main shall be 8 inch.
2. Slopes: All sewers shall be constructed with hydraulic slopes sufficient to give mean velocities, using average day flow through the sewer, of not less than 2.0 feet per second, based on Manning's Formula. For 8 inch to 24-inch sewers, velocities shall be determined using a value of "manning's" of not less than 0.013. The design of oversized gravity sewer pipe to obtain additional reach to avoid deeper cuts or lift stations is strictly prohibited. The following minimum grades are required.

8 inch sewers	0.42%
10 inch sewers	0.28%
12 inch sewers	0.22%
15 inch sewers	0.15%
18 inch sewers	0.12%
21 inch sewers	0.10%
24 inch sewers	0.08%
3. Increasing Size: When sewers are increased in size, or when a smaller sewer joins a larger one, the invert of the larger sewer shall be lowered sufficiently to maintain the same energy gradient. Change in pipe size requires a manhole.
4. Alignment: Sewers of all sizes shall be laid with uniform slope and alignment between manholes. Design slopes shall be kept constant from manhole to manhole except where design considerations such as conflicts require deviating slopes. The standard design slope for 8-inch gravity sewers shall be 0.42%. Designs which incorporate excessive slopes to avoid drop manholes will not be approved.
5. Drop Through Manholes: The minimum drop through all manholes shall be 0.1 foot.
6. Minimum manhole depth from invert to finish grade shall be 4 feet. Maximum depth from invert to finish grade shall be 18 feet.
7. Maximum lift station depth to finish floor shall be 26 feet, unless specifically approved by Authority.
8. Transition from SDR 18 C-900 to SDR 26 PVC is not permitted between manholes. The total run of sanitary sewer line must be of the same class PVC pipe from manhole to manhole.

9. Gravity sewer fittings used within the SDR 26 PVC mains shall be PVC injected molded conforming to ASTM 3034 SDR 26 or SDR 35 and shall provide a smooth flow line. Gravity sewer fitting used within the C-900 PVC mains shall be SDR 18 C-900.

10. Force Mains:

- a. Design Friction Losses: Friction losses through force mains shall be based on the Hazen and Williams Formula and a "C" factor of 120 shall be used for design unless otherwise justified by the EOR.
- b. Main Sizes: Force mains shall not be less than 4 inches inside diameter and designed with a flow velocity of not less than 2.0 feet per second (fps) where possible. Maximum velocity shall not exceed 10 feet per second.
- c. Air Release Valve: An air release valve shall be placed at high points in the force main to prevent air accumulation. The force main must be designed with as few high points as possible to consistently maintain a full pipe. This must be carefully considered when designing profile for force mains.
- d. Plug Valves: Below grade plug valves shall be side actuated gear operator type.
- e. Force Mains discharging into gravity systems shall be reviewed on a case by case basis when no other alternative exists if approved. Connections to gravity lines shall require a design such that the force main remains full of liquid at all times, including when pumps are off, wherever possible.
- f. Where private force mains tie to the Authority's force main an approved check valve shall be installed on customer's side of the plug valve.
- g. Pigging is required for all force mains 14 inch and greater in diameter. The Authority may require the force mains less than 14 inch diameter to be pigged if the Authority or the EOR's representative observes mains being installed under substandard conditions.

C. INSTALLATION OF GRAVITY SEWER MAINS

1. All sewer pipes shall be true to line and grade with bells facing upstream. The sections of the pipe shall be so laid and fitted together that when complete, the sewer shall have a smooth and uniform invert. All pipe shall be free from defects. Trenches shall be kept dry while the pipe is being laid.

2. Bedding of the pipe shall be on stable materials. Bell holes shall be deep enough to insure proper bearing of the pipe barrel on the bedding.

3. All joints shall be carefully fitted together in the trench in strict accordance with the manufacturer's instructions, so as to ensure a watertight joint. Joints shall not be covered until released by the EOR's representative.

The exposed end of all pipe shall be properly plugged so as to prevent dirt or other debris from entering the pipe.

4. Backfill shall be placed in accordance with the standard trenching detail and all other permitting requirement and compacted to a level 12 inches above the top of the pipe, at which time the completed sections will be visually observed by the EOR's representative. Those portions found acceptable may then be backfilled in accordance with these specifications.

5. Upon completion of the entire system (or a large enough portion to warrant separate testing and approval of record drawing) the contractor shall perform and witness by EOR exfiltration tests, as required by FDEP. EOR shall provide the Authority with the test results prior to scheduling a lamping. All completed sections must meet the minimum requirements shown on these specifications.

6. The contractor shall ensure that all sewer mains and laterals installed are free of grit, sand, rocks, and other debris. As a minimum, all sewer lines shall be flushed clean by the high velocity water jetting method. Velocities of not less than 10 feet per second shall be generated and maintained until each section of main is visibly clear of all debris, at which time the EOR's representative will release all portions of the system which meet all visual and leakage specifications. Contractor shall also be required to vacuum all accumulated deposits from lift station wet well(s) and sewer manholes generated by the cleaning operations.

7. All PVC sewer pipe and fittings shall be green in color.

D. MANHOLES

1. Location: Manholes shall be installed at the end of each sewer; at every change in grade, size or alignment; at all sewer intersections; and at distances not greater than 400 feet for sewers of 15 inches diameter or less, and 500 feet for sewers 16 inches to 30 inches. Manholes shall be placed in accessible locations, preferably in pavement, always flush to the surface. A concrete collar shall be placed around manholes in grassed areas.

2. Drop Manholes: An outside drop pipe shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole channel invert. In cases where the elevation difference between the inverts is less than 24 inches, a channel shall be constructed to prevent solids deposition in the manhole. Concrete encasement pad for drop connection shall be poured integrally with both manhole base slab and wall.

3. Diameter: All manholes shall be a minimum interior diameter of 48 inches for pipe sizes up to and including 12 inches and a minimum interior diameter of 60 inches for pipe sizes larger than 12 inches with a 30 inch opening at the top of the concentric corbel.

4. Flow Channel: The manhole floor shall have a flow channel made to conform in shape and carrying capacity to that of the sewers. The minimum drop between inverts in all manholes shall be 0.1 foot.

5. Depth: The minimum depth allowed for sanitary manholes shall be 4 feet from finish grade elevation to invert elevation.
6. Pipe Connections: Pipe connections to manholes shall be by couplings, rubber ring water stop cast directly into manhole, or other approved method. Shop drawing of the device shall be submitted to the Authority for approval.
7. Openings in the structure shall be either cast in place or core drilled and shall be a minimum of three (3) inches from any joint in the structure.
8. Existing Manholes: After connecting to an existing manhole, the existing manhole interior surface shall be properly prepared and coated with Sewper Coat Calcium Aluminate or Strong Seal High Performance Mix in accordance with manufacturers' instructions. Agru lined manholes shall be repaired by an approved manufacturer's applicator in accordance with manufacturer's recommendation.
9. Protection Against Surface Water Inflow: When manholes are placed in areas prone to surface water ponding (e.g. roadway swales, depressed landscape areas, roadway curb areas, low spots on inverted crown roadways or parking lots), Authority will require watertight manhole inserts such as SEWER GUARD or approved equivalent to be installed in these manholes.
10. The interior of all new manholes shall be lined with Agru Sure-Grip HDPE Liner with 3M sealant type 5354 and ADEKA P-201 water stop in strict accordance with manufacturer's instructions. The surface area of the lining shall be checked for pinholes with a high voltage holiday detector at the precast yard prior to job site delivery and shall have notations on the liner the date of spark test and person performing the tests. Prior to placing manholes into service, the lining shall be retested by a certified tester. The lining shall be free of any pinholes. All linings shall have a minimum five (5) year labor and materials warranty including all costs necessary and related to the repair or replacement of the defective application. All testing shall be performed by a tester certified by Agru Liner. Test report for each manhole shall be submitted to the Authority prior to acceptance. The report shall include date of testing, equipment used, manhole location, pass or fail, project name, certified tester's name and number along with tester address and contact information.

E. LIFT/PUMPING STATION DESIGN

1. Type: All sanitary sewer lift stations with a pumping capacity of 3,000 GPM or less shall be of below-ground design. Only submersible type stations shall be acceptable.
 - a. Lift stations shall be designed to accommodate both the initial and ultimate conditions shall be engineered so that all possible ultimate components are either physically incorporated into, or provided for, in the installation; i.e. the force main, wet well, pump guides, hatch cover, electric service, panel and controls, etc. shall all be of the ultimate configuration.

- b. The EOR shall submit to Authority, with the preliminary review, a copy of their calculations (buoyancy, storage, etc.) used in sizing the pump station, pumps and force main. Design information shall indicate the present design and ultimate design information (i.e., GPM, head, pump model, impeller number, area to be serviced, pump run time, pump cycle time – peak and average). The wet well and pumps shall be designed to support a maximum of 6 pump starts per hour under normal operating conditions. These criteria shall be met for both the initial and ultimate flow conditions.
 - c. Minimum depth from sewer line invert to wet well floor shall be 4 feet, with a minimum of 1 1/2 feet of storage. High water alarm shall be set at 1/2 foot below deepest sewer invert.
 - d. The weight of the top slab, interior filleting, pumps and piping, and exterior skin friction shall not be included in the buoyancy calculations. Ground water shall be considered at ground level unless special considerations apply (on Coastal Ridge, etc.). A minimum safety factor of 1.1 shall be utilized.
 - e. Finish grade elevation for all wet well tops, pump station floor slabs, etc. shall be designed so as to meet or exceed the 100-year storm flood level for the particular area. 100-year flood elevation must be indicated on plan sheets.
2. Pumps: At least 2 pumps shall be provided. A minimum of 3 pumps, flow meter and an emergency generator shall be provided for stations handling flows greater than 700 GPM.
- a. If only 2 pumps are provided, they shall be designed to fit actual flow conditions and must be of such capacity that with any one pump out of service the remaining unit will have capacity to handle the design (peak hour) sewage flows. If Authority does not have the selected pump and impeller combination within the system, a spare pump shall be provided.
 - b. Only pumps approved by Authority shall be accepted.
 - c. Pumps shall be designed to give high wire-to-water efficiency for the service intended. Centrifugal pumps, either vertical or horizontal, shall be used.
 - d. The pumps shall be placed so that under normal operating conditions they will operate with positive suction heads. Each pump shall have an individual intake, and the wet well design shall insure that there is no turbulence near the intakes. The pump and nonclogging impeller shall be designed to pass at least 3-inch size solids.
 - e. In projects constructed by phases, lift stations that will have minimal flows for a considerable time shall be equipped with temporary pumps and/or impellers with reduced capacity, but not less than 50% of the ultimate pump. A second set of pumps or impellers may be necessary to accommodate this requirement.

3. Electrical Fixtures: Electrical fixtures in enclosed places where gas may accumulate shall comply with the National Board of Fire Underwriter's specifications for hazardous conditions. Electric service, conductors, control panel, breakers, starters, etc. shall be sized for the ultimate pump to be installed.
4. Controls: Individually wired control floats shall be the method of choice in operating the pumps. Control floats shall be located so as not to be unduly affected by flows into the wet well or by the pump suction. Controls shall automatically alternate the pumps in use.
5. Valves: Plug valves which meet Authority requirements shall be provided on the discharge line of each pump. A check valve shall be placed on each discharge line between the pump and plug valve. The effective opening on the plug valve shall be equal to a minimum 80% of the pipe size.
6. Piping: All lift station piping shall be minimum Class 53 DIP with Protecto 401 lining from the interior flanged pipe just below the access hatch to the below grade plug valve exiting the lift station. The interior piping in the wet well shall be Schedule 40 stainless steel flanged pipe. A minimum 4 inch tee and valve with 3 inch Cam-Lok fittings shall be installed on the pump station discharge (force main) as an emergency bypass. Stations where the new force main manifolds into an existing force main shall be equipped with a 6-inch Cam-Lok fittings.
7. Wet Wells: The effective capacity of the wet well or utilized capacity shall provide a holding period not to exceed 10 minutes for the design average flow. The wet well floor shall have a minimum slope of one to one to the intake.
8. Water Supply: Each lift station shall be provided with a minimum 1-inch water service with an approved reduced pressure backflow prevention device. No direct connections will be approved between any potable water supply and sewage pumps or piping.
9. Power Supply: Three-phase power shall be supplied to all stations. Minimum voltage for stations up to 20 H.P. ultimate, shall be 220 volts. For stations 20 H.P. and greater, ultimate, the voltage shall be 480 volts. Standby receptacles shall be provided, unless emergency power generation is supplied at the lift station. FP&L transformer shall be placed within 25 feet of lift station site.
10. Lift Station Control Panel Requirements: The lift station control panel shall be provided with the following features:
 - a. Main breaker and emergency breaker shall be equipped with a mechanical interlock.
 - b. Main breaker, emergency breaker and motor breakers shall be 600-volt frame, minimum and be able to interrupt the available short circuit current.
 - c. All wet well control circuitry shall be 24 volt. Floats shall be manufactured by Roto Float or approved equivalent.

- d. Lightning arrestor and surge capacitor shall be mounted outside the panel and shipped loose to prevent damage.
- e. Phase monitors, with protective fuses.
- f. Automatic pump control and alternation shall be provided via Allen Bradley MicroLogix 1400 PLC. The PLC shall be programmable for duplex, triplex and quadplex operation. PLC expansion module shall be added as required. The PLC shall communicate with Data Flow Systems TacPac Telemetry Control Unit (TCU001) using the MODBUS communications protocol.
- g. High level alarm light with a flashing alarm light in a red waterproof Lexan lens.
- h. All motor starters and breakers shall be as manufactured by the Square D Company (or approved equivalent). Motor starters shall be properly sized with 600 V rating. All motor breakers shall have an auxiliary switch contact which closes with the breaker. For all motors 20 HP and greater, starters shall be Square D (Altistart 22).
- i. Panel shall be surface wired with numbered terminals. Terminal strip shall be located at least six (6) inches from the bottom of the enclosure for accessibility.
- j. Relay contacts to be rated at 10 AMP, 24 VDC and 120 VAC.
- k. 316 Stainless steel modified NEMA 12 control panel manufactured by Hoffman or approved equal with drip shield along with complete top of the panel, no conduit penetrations in top of panel, padlocking handle with accessories and door stop kit. Panel shall have all stainless steel hardware and 3-point latch type closures. An aluminum inner-hinged door shall contain all operators' controls and provide a dead front panel. Outside door shall be blank. Provide duct seal putty on all outgoing conduits to keep out corrosive gases.
- l. Provide safety disconnect switch in NEMA 4X stainless steel enclosure outside the control panel. Switch shall be service entrance approved and provided with Square D brand circuit breakers.
- m. Control panel and junction box shall be mounted to a minimum of two 3-inch diameter aluminum pipe supports. (6061-T6-Sch. 40).

The length of the pipe supports shall be sized so as to provide for 36 inches of burial (in 2500 psi concrete), and extend to three inches above the top of the supports. The panel shall be mounted to the pipe supports with 1-5/8 inch by 1-5/8 inch, 12-gauge stainless steel strut channel Unistrut at a height consistent with FP&L's requirement for mounting their meter. All hardware shall be 316 stainless steel.

- n. Emergency generator receptacle shall be as manufactured by the Appleton Corp. Model ADJA 1034-150RS, for lift stations designed to accommodate up to 20-HP pumps or Model ADJA 20034-200RS for lift stations designed for 20 HP pumps and greater. The receptacle shall be mounted on the side of the panel approximately four (4) feet above finish grade.
 - o. Telemetry hardware and conduit will conform as specified to control panel requirements. Telemetry system shall be compatible with Authority's central receiving station manufactured by Data Flow, Inc.
 - p. Inner panel component layout and back mounting panel drawings shall be part of the submittal. Fifteen (15) percent of panel space located into the lower left corner shall be reserved for future use. Allocated space for starters and breakers shall be such that the next higher NEMA size starter and corresponding breakers including main and emergency shall properly fit if required in the future.
 - q. An 11-inch X 17-inch electrical schematic and pump data sheet encased in plastic shall be permanently affixed to the interior of the enclosure door.
 - r. All applicable electrical codes must be adhered to including the N.E.C. and FP&L Company requirements.
 - s. Control panel and junction box shall be built by an U.L. approved shop and adhere to U.L. 508 requirements. Panel shall have an U.L. 508 label.
11. Lift/Pumping Station Wet Well Equipment Required:
- a. Airtight aluminum hatch cover and frame with stainless steel hardware and non-corrosive locking bar.
 - b. Stainless steel upper guide bar brackets and cable holder.
 - c. Stainless steel guide rails, continuous, no welds.
 - d. Stainless steel lift cable with stainless steel crimps and stainless steel lifting hoops 4 feet on center.
 - e. All wet well hardware, including guide rails, etc. shall be 316-grade stainless steel and shall be so stamped by manufacturer to verify alloy.
12. Wet Well: Built-In-Place and Precast:
- a. Type II Acid Resistant Portland cement conforming to ASTM C-150 shall be used for all built-in-place wet wells. Concrete for built-in-place and precast wet wells shall develop a minimum of 4,000 psi at 28 days. Precast wet wells shall conform to ASTM C-76 - latest revision, Class II, Wall B, Type II Portland Cement. Steel reinforcement shall conform to ASTM A-185 - latest revision. Wall thickness shall be 8-inch minimum.

- b. The base slab and the first ring of the precast wet well shall be cast monolithically.
 - c. Two coats of an approved coal tar epoxy (Sherwin Williams TarGuard Coal Tar Epoxy, or equivalent) shall be applied to the exterior surfaces of all wet wells in strict accordance with the manufacturer's instructions (i.e. concrete, grout, etc. shall be thoroughly cured, cleaned and dry). Each coat shall be of a different color, with the final coat being black and each shall be minimum 10-mils D.F.T.
 - d. The interior of the wet well shall be lined with Agru Sure-Grip Polypropylene in strict accordance with the manufacturer's recommendation. The lining shall be checked for pinholes with a high voltage holiday detector prior to job site delivery and shall have notations on the liner the date of spark test at the precast and person performing these tests. Prior to placing wet wells into service, the lining shall be retested by a certified tester. The lining shall be free of any pinholes. Test results are to be submitted to the Authority at the lift station startup. All linings shall have a minimum five (5) year labor and materials warranty including all cost necessary and related to the repair and replacement of the defective application. All testing shall be done by a tester certified by Agru Liner.
 - e. The exterior piping for the lift station shall be coated as outlined in Section II.
 - f. Interior Wet Well Piping shall be Schedule 40 flanged 316 stainless steel.
 - g. Any visible reinforcing wire, steel or honeycombs on precast structures shall be cause for rejection.
 - h. Precast structure shall meet all applicable requirements as outlined in Section IV-D, "Manholes" and wet wells in Section IV-E #12.
13. Lift Station Shop Drawing Submittal Requirements:
- a. Lift station wet well structure
 - b. Telemetry with accessories
 - c. Submersible pumps
 - d. Electrical control panel
 - e. Mercury liquid level control switches
 - f. Aluminum wet well access hatch
 - g. Force main pressure gauges
 - h. Guide bar brackets

- i. Lifting cables
- j. Main electrical disconnect switch
- k. Junction box
- l. Antenna
- m. Ground system

14. Easement Requirements:

Authority shall be provided with a perpetual easement to all lift station sites. The minimum size shall be 40 feet x 40 feet. Dedicated easements for ingress and egress shall also be provided, where necessary, to service said stations.

15. Enclosures:

All lift stations shall be enclosed by fencing of the chain link design. See Exhibit "I" Typical Lift Station Site Plan.

16. Driveways:

All lift stations shall be provided with a concrete driveway connected to a paved road which will support all anticipated loads and will allow routine access to the station. The length and width shall be of sufficient size to safely accommodate any vehicle which will require access to the lift station for maintenance purpose. All concrete shall develop a minimum of 4,000 PSI at 28 days.

F. INSTALLATION OF FORCE MAINS

1. Contractor shall comply with Palm Beach County Health Department Technical Memoranda and FDEP.
2. Installation and testing of force main pipe and fittings shall be in accordance with AWWA Specification C-600 Latest Revision and Authority's Construction Standards and Specifications.
3. Any pavement cut shall be replaced in accordance with requirements of the Authority's Pavement Replacement Construction Detail Drawing and in accordance with all other applicable governing agency's permitting requirements.
4. Omni Marker #75027 green or 3m 1404-XR green shall be placed above all fittings, changes in alignment, grade, sewer services and at the discretion of Authority's representative.
5. All loading or unloading of pipe, fittings, valves and accessories shall be done in such a manner so as to avoid damage. The pipe shall not be skidded or rolled against pipe already unloaded. Special precautions should be taken to avoid damage to linings and coatings of fittings and pipe. The interior of all pipe, fittings and other appurtenances shall be kept free of dirt and foreign matter at all times.

6. PVC and HDPE force main pipes shall have green walls or have green stripes integral to the pipe wall at the time of manufacturing.

DIP pipe shall have green tape applied to the pipe wall and located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape is used to stripe during installation of the pipe, the tape shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipes with an internal diameter of 24 inches or greater, tape shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe. Field application of paint shall not be acceptable. Tape shall be vinyl plastic adhesive back with a minimum width of 6 inches. Field application of paint shall not be acceptable.

7. All mains, valves, bends, tees, crosses, and dead ends shall be restrained with an approved Authority restrained joint system. On mains greater than 12 inch diameter, 2 forms of an approved Authority thrust restraint system shall be utilized at each joint per restraint table. Where adequate spaces exist thrust blocks may be allowed with Authority's approval.

8. When tie rods are used as a method of joint restraint they shall be by means of steel tie back bolts, nuts, washers and all thread rods meeting ASTM A-242 requirements (corten steel or equal) and painted in accordance with the procedures described herein. Tie rods and nuts shall be equal in diameter to the tee bolts and nuts which were supplied with the applicable fittings. Two tie rods per joint are required for sizes 4 inch diameter through 10 inch diameter, four tie rods per joint for sizes 12 inch diameter through 16 inch and 6 tie rods per joint for sizes 18 inch through 24 inch.

9. Air release valves shall be installed at the designed high points. Installation of air release valves to correct high points caused by improper installation of pipe (not at design grade) will not be permitted.

10. All pipe shall be laid in a clean dry trench and on line and grade with valves plumb. All pipe shall have a minimum cover of 30 inches and a maximum of 48 inches unless otherwise noted on the plans or required by permit.

11. The trench at the top of the pipe shall be kept to a maximum width of 24 inches plus the pipe diameter. The trench shall have a flat bottom, cut true and even, so that the barrel of the pipe shall bear its full length. Pipe bells will be placed in small pockets specifically excavated to receive the bell. All excavations must be in compliance with OSHA regulations.

12. Trench backfill shall contain no rocks larger than 2 inches in diameter or other items that may damage the pipe. In the event pipe is installed in rock excavation, 6 inches of granular material will be provided for bedding for under the pipe. All pipe joints, thrust blocks, conflicts and service connections shall be left exposed until visually inspected and approved by an Authority representative.

13. All joints, thrust blocks and conflicts in the force mains shall remain uncovered for visual inspection by Authority's representative. The contractor shall only backfill after approval by Authority's representative.

14. Tapping Sleeves

- a. Tapping sleeves and tapping crosses shall be of the heavy body ductile iron, mechanical joint type or 316 stainless steel wrap around type as approved.
- b. All tapping assemblies installed on existing force mains shall be pressure tested and witnessed by Authority's representative prior to the actual tap of the main.
- c. The pipe coupon shall be carefully preserved and submitted to Authority's representative. All tapping sleeves shall be installed a minimum of 6 feet from pipe joints.
- d. All field cuts and tapping operations on pipe shall require careful repair of the particular lining damaged in strict accordance with the manufacturer's recommendations.

15. Prior to installation, plug valves 10 inch and larger shall be tested on site above ground at 150 PSI. Both sides of plug valve shall be tested individually in the presence of an Authority representative.

G. LOW PRESSURE SEWER SYSTEMS - (PRIVATELY OWNED)

1. Low pressure pumping units and force mains shall not be owned, operated or maintained by the Authority. The entity responsible for such shall enter into the Authority's pro forma Low Pressure Sewer System Maintenance Agreement, unless a separate Health Department permit is required and obtained for the pump station.

2. If a low residential pump station serves more than one unit, the pump station must be a duplex pump station. All water meter(s) serving the property must be in the name of the property owner.

3. Low pressure pumping units shall be located so that surface water runoff shall not interfere with electrical components, nor be located under roof overhangs or downspouts.

4. Site drainage must be directed away from wet well. Wet well lid shall be set at minimum 100-year flood elevation and shall be 0.25 foot minimum above surrounding ground. All vents shall be set 6 inches above 100-year flood elevation.

5. Lift stations and control panel shall be located so that both are accessible for maintenance and the panel is in full view of the wet well. Manufacturer shall supply and attach electrical control panel schematic to inside face of control panel door.

6. Plans including the lift station and force main construction shall be submitted and approved by the Authority prior to construction. The wet well shall be inspected by the Authority prior to installation. Inspections shall include water leakage test, with zero leakage allowable. Additional inspections are required prior to back-fill and start-up.
7. A shut-off ball valve in a separate valve box within 5 feet of each lift station is required. This requirement may be waived for simplex residential pump stations with an easily accessible ball valve in the wet well.
8. The Homeowners Association (where applicable), shall be responsible to provide a generator that can handle the electrical rating and load amperage of the lift station for every 20 private lift stations, and to maintain the generators (on site) in an accessible location and in working order at all times. This provision must be included in the HOA documents and a copy provided to the Authority with contact numbers and information, along with a copy of the service maintenance contract.
9. Property owner shall provide a water hose bibb with a backflow preventor for maintenance operations (or a vacuum breaker for single-family residential stations) within 25 feet of the wet well. The property owner shall be required to install an Authority approved RPZ backflow device on the downstream side of the water meter serving the property.
10. Detectable marking tape must be installed over all low-pressure PVC force mains from the private lift station to the Authority's point of service.
11. Non-detectable, stretch type underground marking tape (Proline-Safety) shall be installed over all SUA owned force mains, valves, and services, 12 inch maximum buried depth.
12. 3M EMS warning tape 7900 series shall be installed directly above all PVC force mains owned by the Authority for use in tracing the pipe in the future.
13. Force mains from the right-of-way line to the low-pressure pumping unit shall be the ownership and maintenance responsibility of the entity responsible for the pump station.
14. In master metered developments, the low-pressure force main from the Authority's point of connection to each pump station shall be the ownership and maintenance responsibility of the entity executing the sewer service agreement.
15. Prior to placing the lift station into service, the lift station shall be started up to ensure its performance. The startup shall include starting the station on permanent power and on generator power.
16. Lift Stations shall conform to all Palm Beach County Health Department requirements. Duplex stations are required for non-residential installations and residential dwelling units larger than 3,000 square feet or serving more than one unit. Wet wells shall be constructed of precast concrete, High Density Polyethylene (HDPE), or rotational molded polyethylene.

Wet wells constructed from rotational mold polyethylene shall be constructed of high environmental stress crack resistant walls and will be acceptable only for residential applications.

Approved low-pressure lift station manufacturers or equal:

- 1) Atlantic Environmental Systems, Inc.
- 2) Southeastern Pump
- 3) E-one W-Series with Sentry Plus Panel – Residential less than 3,000 square feet.

Buoyancy calculations shall be submitted demonstrating the wet well will not float during the 100 year flood and shall exclude the weight of the top slab, interior filleting, pumps and piping, soil above an extended base, and exterior skin friction. Ground water shall be considered at ground level unless special considerations apply (on Coastal Ridge, etc.).

Precast concrete wet wells shall be a minimum of 4' diameter and shall conform to the minimum of ASTM C478 and ASTM C-76, latest revision, Class II, Wall B, Type II Portland Cement, 4,000 PSI. Steel reinforcement shall conform to ASTM A185.

Wall thickness shall be 8-inch minimum for non-residential wet wells. Concrete residential wet wells may be 42 inches in diameter with 6 inch thick walls. Scheduled openings in the precast concrete wet wells shall be either cast in place or core drilled and shall be a minimum of three (3) inches from any joint of the structure. The Authority shall not be responsible for the location, elevation, size etc. of these openings.

Precast concrete wet wells shall have a minimum 7-day "yard" cure time before delivery to the site, shall be inspected and approved by the Authority UPON delivery to the site and prior to placement. Any visible reinforcing wire, steel, honeycombing, patchwork or oversized openings on precast structures shall be cause for rejection. The base slab and first ring (minimum wall height is 18 inches) shall be cast monolithically.

Use only Type II Portland Cement/sand mortar and potable water for mud work on joints, lifting holes, and inverts, etc. When an accelerator is necessary, "Anti Hydro®"-NC is the only product approved.

The interior of precast wet wells shall be coated with Bitumastic 300M Coal Tar Epoxy. HDPE or rotational mold Polyethylene shall be a minimum of 3' diameter or have a basin capacity greater than 225 gallons. Openings shall be precast and water tight.

17. Control Panels - must be equipped with weatherproof generator receptacle in approved Nema 4X enclosure. Audible warning alarms must be provided. Simplex station generator receptacle shall be equipped with an approved 30 AMP 3 pole twist lock receptacle. Duplex station generator receptacle may require 60 AMP Crouse Hinds AR631S22.

Control panel must have sticker with emergency service and maintenance interruption in accordance with Palm Beach County Health Department on outside cover of panel.

18. Refer to Exhibit "A" – Project Documentation and submittal guidelines for installation sequencing.

19. Low Pressure Sewer System Materials

- a. Pipe: Sch 80 gray bell joint PVC, 350 psi (Charlotte Pipe).
- b. Fittings up to 2 inch: Sch 40 PVC (Spears Manufacturing Company or approved equal).
- c. Fittings 3 inch: MJ Ductile Iron Class 350 with Polybond or Protecto 401 lining.
- d. Gravity piping to wet well: Sch 40 PVC, Sch 80 PVC, SDR 26, or equal piping with Sch 40, SDR 26, SDR 35, or equal fittings.
- e. Valves 1 ¼ inch, 1 ½ inch, and 2 inch Ford Meter Box full port ball valves, PVC Pack Joint x PVC Pack Joint B77-555, B77-666, and B77-777.
- f. Valves 3 inch: Milliken Millcentric Eccentric Plug Valves, MJ body with stainless steel bolting, nickel seat, Nitrile (Buna) Elastomer trim, with 2 inch square operating, bi-directional shut off.
- g. Valve boxes for 3 inch: Ametek 5 ¼ inch plastic valve box with cast iron cover and ring with "sewer" designation.
- h. Valve Boxes for up to 2 inch valves: Russco VB2607S with "sewer" designation with 6 inch SDR 35 PVC riser.
- i. Clean out Boxes: Carson Plastic #MSBCF1118-12XL with EBBA Iron Lid #MKSCBC1118.
- j. Pipe Tracing Wire: Continuous (no breaks) #6 AWG stranded copper conductor Type THWN with a 30 mil thick green HDPE insulation rated for 30 volts, Proline Safety #7401205 or equal, fastened with 11 inch cable ties and Dryconn Direct Bury lugs #90120 for directional drills. All direct bury shall be 3M EMS warning tape 7900 series.
- k. PVC Primer Cement: Hercules Purple, medium bodied.
- l. Thread Sealing Compound: PTFE paste (LA-CO Slic-tite or Hercules Real-tuff).
- m. 2 inch and smaller plugs: Sch 40 red brass, solid type with square head (Lee).
- n. Underground Marking Tape for Authority owned piping: Non-detectable type polyethylene 6 inch width, 11 mil thick, working: "Caution: Buried Sewer Line Below" in black lettering with green background, 3M EMS warning tape, 7900 Series.
- o. Underground Marking Tape for privately owned piping: Metallic detectable tape, Terra Tape #540 or equal, marked Caution: "Sewer Line Below".

H. TESTING GRAVITY SEWER LINES

1. Required tests for gravity sewers are: Density Test; Lamp mains; Laser Profile mains that are deemed questionable; Televisé laterals; Exfiltration tests. The maximum allowable exfiltration rate measured by test shall be 50 gallons per inch of pipe diameter per mile per 24 hours for gravity sewer pipe: Infiltration test. Any infiltration or visible leakage, including damp areas on the walls of manholes, will be cause for rejection of these facilities. The infiltration test can be accomplished at the same time as the lamping. All sections of gravity sewer mains and laterals, not meeting these specifications shall be repaired by the contractor and retested at their expense to assure full compliance with these specifications. The repair method to be used shall be approved, in advance by Authority.

I. TESTING FORCE MAINS

1. The contractor shall provide all necessary equipment such as pumps, gauges and water measuring tanks and shall perform all work required for pipe pressure and leakage test. Pressure and leakage tests shall be made between valves and/or connections for each section tested using the procedure outlined in ANSI/AWWA C-600 Latest Revision and Authority requirements. A pretest shall be successfully completed by the contractor and observed by a representative of the EOR prior to scheduling the pressure test with Authority. All tests shall be made under the supervision of the EOR and Authority's representative. The use of PVC pipe and fittings for pressure testing is not permitted.

2. 1,500 LF shall be the maximum length of main to be pressure and leakage tested at any one time. Testing of isolated portions between valves within the test section may be required by Authority, if a portion of that line appears questionable after testing.

a. Pressure And Leakage Test - hydrostatic pressure of 150 psi shall be developed by the Contractor, within the section of pipeline to be tested and shall be held for a minimum time period of two hours. All visible leaks, including damp spots shall be corrected regardless of the results of the pressure and leakage tests.

b. Allowable Leakage - Leakage during both the pressure and leakage test shall not exceed the following formula for gasketed pipe:

$$L = (SDP^{1/2} / 148,000) \times 0.5$$

L = Allowable Leakage (gallons per hour).

S = Length of Pipe to be Tested (feet).

D = Nominal Diameter of Pipe (inches).

P = Average Test Pressure (PSIG).

- i. There is no leakage allowance for polyethylene pipe or solvent weld pipe.
- ii. Private low pressure residential force main shall be tested at a minimum of 100 PSI for one hour with no loss in pressure.
- c. A loss of 5 psi or more during the 150 psi test regardless of the amount of leakage shall be considered a failing test.
- d. A gain of pressure during the test shall be considered a failing test.
- e. The pressure test shall be considered not acceptable unless all valves in test section are in the open position. The system must be completed to the full extent of the approved plans on that portion being tested. The contractor shall provide a 1/2 inch ball valve adjacent to the test pressure gauge for installation of Authority's "check gauge". The use of PVC pipe and fittings for temporary piping for pressure testing is not permitted. Test gauge shall be in 2-pound increments with a minimum 4-inch face, Class A1 glycerin filled.
- f. Failure of the Contractor's test gauge to zero out upon completion of test shall be cause for rejection.
- g. The contractor shall, at their own expense, adjust or replace, at the discretion of the EOR, any component of the pipeline which fails the prescribed tests. The pipeline shall then be tested as described above until it successfully conforms to said tests.
- h. Special testing requirements in accordance with FDEP and Palm Beach County Health Department will be necessary for force mains and gravity sewer systems installed within public water supply well zones of influence.
- i. Water for testing force main shall be clean fresh water. In no case shall it be tested with saline, brackish or turbid water.
- j. The Authority will not schedule the pressure test until pipe has been properly backfilled, compacted, finish grade established, and as-builts accepted.

J. SERVICE LATERALS

1. Sanitary service laterals shall have a slope of 1.0%.
2. No sanitary services shall connect directly into a manhole.
3. Service laterals shall be no longer than 75 feet from main to property line.
4. Clean outs will be required at the property line. Additional clean outs will be required at changes in direction over 45°, every 75 feet or as required by the appropriate plumbing code or applicable agency.
5. All lateral connections which are for future use shall be properly capped.
6. Clean out stacks shall be continuous pipe with no joints from wye to clean out cap.
7. The upper end of residential service connections shall be laid at a depth not less than 30 inches or more than 48 inches below the finished grade elevation.
8. Service line identification:
 - a. One 4-foot high 2-inch X 2- inch pressure treated wood stake shall be put in the earth against the plug when service connection is backfilled. The stake shall extend 18 inches minimum above grade and shall be broken off only by authorization from Authority. The top 6 inches of the stake shall be painted red.
 - b. A magnetic marker (EMS) for sewer service shall be tied to the terminal end of each sanitary service. Markers shall be either Omni Marker #75027 or 3M 1403-1265 green sanitary marker, or equivalent.
 - c. EMS markers shall be returned to Authority at the time of sewer tie-in inspections.
9. Minimum size pipe for a single residential service lateral is 4 inch and the minimum size pipe for a double residential service lateral is 6 inch. Minimum size pipe for non-residential service lateral shall be 6 inch.
10. Sewer Tie-in connections - Flexible rubber type connectors (Fernco Couplings with stainless steel stiffener) are permitted only on existing VCP laterals and mains.
11. Clean out at property line shall be accessible and unobstructed for 4 feet in all directions. This shall include but not be limited to transformer, telephone junction box, wall, trees, etc.

K. MATERIALS - (ALSO REFER TO "SHOP SPECIFICATIONS" LIST)

1. Precast Manholes

- a. Precast manholes shall conform to ASTM C478 and ASTM C-76, Latest Revision, Class II, Wall B, Type II Portland Cement, 4,000 PSI.

Steel reinforcement shall conform to ASTM A185. Wall thickness shall be 8-inch minimum.

- b. Precast manholes shall have a minimum 7-day cure time before delivery to the site.
- c. Any visible reinforcing wire, steel or honeycombs on precast structures shall be cause for rejection.
- d. The base slab and first ring of the precast manhole shall be cast monolithically and have a minimum height of 26 inches.
- e. Only concentric corbels shall be used on manholes.
- f. The minimum diameter of manholes shall be 48 inches with an opening of 30 inches at the top of the corbel.
- g. The exterior walls of manholes, which do not have the interior lined with Agru- Sure - grip, shall have the exterior walls coated with two coats of an approved coal tar epoxy (Kop-Coat 300-M or equivalent) applied in strict accordance with the manufacturer's instructions. Each coat shall be a different color, with the final coat being black and each shall be a minimum of 10-mils D.F.T.

2. Manhole Cover and Frame

The frame shall have a 30-inch opening. The cover shall be two pieces and shall have the words "sanitary sewer" cast into it. Cover and frame shall be U.S. Foundry & Mfg. Corp. Model #230-AB-M; Vulcan Foundry Model #VM-101 or approved equivalent.

3. Gravity Sewer Main and Services

- a. PVC pipe shall conform to ASTM D-3034, SDR 26 (Latest Revision) and shall also meet the requirements of ASTM D-3212 (Latest Revision) on joints for drain and sewer pipe using flexible elastomeric seals.
- b. For finish pipe depths greater than 12 feet utilize AWWA SDR 18 C-900 pipe.
- c. Fittings shall be compatible with the type of pipe used.
- d. PVC fittings with solvent weld or clamped connections are not permitted.
- e. Flexible rubber type connectors (Fernco Couplings) are permitted only on existing VCP, Cast Iron, Ductile Iron, or other non-PVC laterals and mains.

- f. Clean outs are required at the property line. Where clean outs fall in paving, parking lots or sidewalks a 9 inch cast iron ring and cover is required with the letter "S" cast into it. See Authority's Construction Drawing.
 - g. All PVC pipe and fittings shall be factory color coded green.
4. On Site Mortar/Concrete/Grout Mix
- a. All concrete and/or mortar mixed on site (field mixed) for use on any component of the sanitary sewer collection/transmission system shall be made with Type II Portland cement conforming to ASTM C 150, clean, uniformly graded, ASTM C 33 or ASTM C 404, masonry sand, clean properly sized aggregate (if required) and clean potable water. In no case shall local on-site sand/dirt, rock, stones or water be used.
 - b. Prior to placing any mortar/concrete/grout mix the new/repaired opening shall first be thoroughly prepared.
 - c. No Portland cement accelerators shall be used without written approval from the Authority.
5. Pressure Pipe - Force Main

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

a. Pipe:

- 1. All pipe under paved areas (roadway, parking lots, etc.); within public rights-of-way or privately dedicated roadway easements shall be SDR 14 C-900 PVC pipe, green in color.
- 2. Flanged pipe shall be Protecto 401, or Permox CTL lined and shall have a minimum wall thickness of 0.32 for 4 inch pipe and incremental increases of 0.02 inch thickness for each increase in pipe size up to and including 14 inch.

Flanged pipe over 14 inches shall require shop-drawing submittal to Authority for approval. Pipe shall not be stored in an outside yard more than 1 year from the date the lining was installed.
- 3. Spool pieces for MJ connections shall be a minimum of 18 inches long, outside flange to outside flange.

b. Fittings:

- 1. All pressure pipe fittings of size 4 inch inside diameter and larger shall be ductile iron fittings with mechanical joints, unless the plans specifically call for flanged joints, restrained joints, etc.

Mechanical joint fittings shall be used for buried installations. Flanged joints shall be used for wet well and above ground service only. Fittings shall conform to requirements of ANSI A21.20 and AWWA C-110 and lined inside and outside as specified for the pipe. Fittings shall not be stored in an outside yard more than 1 year from the date the lining was installed.

2. Full-face neoprene gaskets shall be used on all flanged connections. The use of other materials is not permitted.
- c. Thrust Blocks:
 1. Provide 2,500 psi at 28 days minimum concrete thrust blocks for force mains at each fitting per detail shown on construction drawings if this method of restraint is required.
6. Valves:
 - a. Adjustable cast iron valve boxes with covers marked "sewer" shall be provided for all valves installed underground.
 - b. Plug valves for pipe 4 inches and greater shall have a ductile iron body with a minimum 80% port opening and bi-directional pressure rating.
 1. Below grade installation shall be mechanical joint only with side actuated gear operator with 2 inch operating nut and standard valve box.
 2. Above grade installations shall be flanged with standard 1/4 turn operators.
 3. Resilient seat (wedge) valves shall be used with all tapping tees on existing force main installations.
 4. Wet taps on polyethylene lined DIP will not be permitted.
 - c. Air release valves shall be of the automatic type as specified by Authority.
 - d. Check valves and swing check valves shall have a ductile iron body with a bronze or stainless steel to neoprene seating arrangement, a non-corrosive shaft with attachment of an outside lever and weight, and a 300-psi hydrostatic test pressure rating.
 - e. The valve boxes shall be adjustable to fit the depth of earth cover over the valve and shall be designed and installed so as to prevent the transmission of surface loads directly to the valve or piping.
 - f. Valve boxes shall be carefully centered over the operating nuts of the plug valves so as to permit a valve key to be easily fitted to the operating nut. The tops of valve boxes shall be set flush with finished grade, with allowance made for the settlement of surrounding backfill or surface.

An 8-inch thick concrete collar shall surround the top of the valve box, as shown on Authority's Underground Valve Installation Construction Detail Drawing.

L. GREASE INTERCEPTORS/ TRAPS

1. General

- a. All non-residential food preparation and/or dining facilities are required to install a grease interceptor. Only kitchen wastes are to be directed through the grease interceptor. Other sanitary wastes shall bypass the tank.
- b. The size, type and location of each interceptor together with both site and shop drawings including all pertinent information, shall be submitted to Authority for approval. Interceptors for oil, sand or lint will be considered on an individual basis.
- c. Interceptors shall be designed and installed such that they will not become air bound if closed covers are used.
- d. Interceptors shall be designed and installed such that they will not float after being pumped out during periods of high groundwater elevation.

BACKGROUND INFORMATION/DOCUMENTATION

In determining whether a grease interceptor shall be required and what type, size and location will be acceptable, the Authority shall consider the following, listed in priority order:

1. Information obtained from zoning, building and other permit/approval processes.
2. Information from marketing, advertising, menus and website relevant to the application.
3. Project site plan/layout.
4. Information provided by the service applicant.
5. Other information deemed relevant by the Authority.

INSTALLATIONS FOR WHICH GREASE INTERCEPTORS ARE REQUIRED

At minimum, the Authority shall require the installation of a grease interceptor for any non-residential food preparation or food service facility within which any one of the following equipment items, devices, or installations is known to exist or is proposed:

- Stove, range, cooktop
- Range hood
- Deep fat fryer or other equipment used for frying

- Dishwasher
- Garbage disposal
- Yogurt, smoothie, ice cream or frozen yogurt machines

This list is not exhaustive. Irrespective of whether a given installation/application includes any of the listed equipment or devices, the Authority's determination of whether a grease interceptor is required, as well as the size, type and location of the interceptor, shall be final.

2. Construction/Installation

- Grease interceptors shall be rectangular in shape with inside length between two and three times the inside width, or shall be of a shape approved by the Florida Department of Health.
- Grease interceptors shall be constructed of pre-cast concrete with the base and walls poured monolithically. All concrete used in the construction of grease interceptors shall have a strength of not less than 3,000 psi at 28 days. Tests to determine water tightness may be required by Authority and where required shall be made by filling tank with water to the overflow point at the time of inspection. Metal, block, brick, fiberglass or sectional tanks of any description are not permitted. The interior wall of grease interceptors shall be finished smooth and impervious. Voids, pits, or protrusions on or in the inside walls of grease interceptors are prohibited. Authority may require that plans for proposed grease interceptor bear a statement by a registered engineer as to the character of the soil and the sufficiency of the support for the tank.
- Precast concrete grease interceptors shall have a minimum wall and bottom thickness of 4 inches. Tops shall have a minimum thickness of 4 inches when installed in non-traffic areas and a minimum of 8 inches when installed in traffic areas. Precast tanks shall be sufficiently reinforced to resist cracking during handling or installation with a minimum reinforcement of 6 x 6 ten-ten wire mesh or equivalent area.

Precast grease interceptors shall not be located where vehicular traffic or other overburden loads are anticipated unless the design is approved by a registered engineer certifying that the tank will support the anticipated loads bearing on the tank.

- Interceptors shall be so located and installed as to provide ready accessibility to the tank's covers, and interior for ease in inspection, operation and maintenance of said tank.
- Clean outs shall be provided and installed in conformance with Authority's specifications at both the inlet and outlet to the tanks(s).
- Access to the tanks(s) for cleaning and inspection shall be provided via a minimum of two 24 inch diameter ring and covers. Located at each end (inlet

& outlet) of the tank. The 24 inch cast iron covers shall have the words GREASE cast into them.

- g. Minimum inlet and outlet piping size is 6 inch, unless connecting to an existing downstream 4-inch lateral.
- h. Minimum slope for all tank inlet and outlet piping is 1/8 inch per foot.
- i. All openings shall be cast in place or core drilled in the presence of an Authority representative by a company that has previous experience and shall be sealed with a waterproof, non-shrinking grout, brushed smooth inside and outside.
- j. Tanks located in areas of questionable drainage are required to have a waterproof type frame and cover. A SEWER GUARD or approved equal may be required by Authority.
- k. Precast tank and covers shall have a minimum 7 days yard cure time prior to delivery on site.
- l. Precast structures shall be inspected by an Authority representative prior to being set into the ground. Any visible reinforcing wire, steel or honeycomb shall be cause for rejection.
- m. Tanks shall be installed in a dry excavation. Dewatering shall be employed as necessary to maintain dry conditions. Tanks shall be inspected for leakage upon completion of backfilling.
- n. The installation of interceptors constructed of HDPE may, at the Authority's sole discretion, be permitted.

Approved HDPE tanks shall be Shier GB series or approved equal. The Shier GB services model shall be based on the number of seats or other criteria as deemed appropriate by the Authority.

For food establishments the GB model 50 can be used for 5 to 15 seats, GB model 75 for 15 to 30 seats, GB model 250 for 30 to 100 seats, GB model 500 for 100 to 150 seats, and the GB 1,000 for 150 to 300 seats.

Take-out food establishments and other establishments having the potential to generate grease having seats will be reviewed on a case by case basis to determine acceptability and size.

- o. Installation of the tank, interior piping etc. shall conform to the details on the plans and Authority's Construction Drawings and shall be inspected by Authority's representative prior to being placed into service.

3. Maintenance

- a. Interceptors shall be maintained in an efficient operating condition by periodic removal of accumulated contents by the owner/operator of the facility being serviced.
- b. Recommended pump-out frequency for all tanks is once every calendar month. Actual pump-out frequency will depend on flow and grease generation.
- c. Authority shall periodically inspect the devices to confirm their proper operation. The owner/operator of the facility shall be responsible for taking any and all necessary steps to rectify any deficiencies found.
- d. Use of chemical degreasers is prohibited. Biological agents are permitted only upon approval by Authority.

4. Sizing Procedures

- a. Sizing of grease traps/interceptors shall be calculated as follows:

Determine the number of gallons of wastewater generated using the following criteria:

$$(D) \times (GL) \times (ST) \times (HR/2) \times (LF) = \text{Gallons}$$

Where:

D = Number of seats

GL = Gallons of wastewater per meal (normally 5 gallons)

ST = Storage capacity factor - minimum of 2.7

HR = Number of hours open

LF = Loading factor

1.25 Interstate freeways

1.0 Other freeways

1.0 Recreational areas

0.8 Main highways

0.5 Other highways

- b. Once the gallonage has been obtained use that figure to select the appropriately sized grease interceptor from the following chart:

Wastewater Gallons	Grease Interceptor Capacity-Gallons
2,600	750*
3,600	1,050
4,900	1,250**
7,200	1,600
9,500	2,000**
11,800	2,400
14,100	2,800

*Minimum size

**Above 2,500 gallons multiple interceptor tanks in series must be used. The tanks shall be of the same size.

- c. When wastewater gallonage figures exceed the figures shown, select the next larger structure, i.e. wastewater gallonage = 2,800, use 1,050-gallon interceptor.
- d. When tanks are approved to be installed in a series all tanks must be of the same size.

5. Under Counter Grease Traps - Special Approval Required

The installation of interior grease traps may, at the Authority's sole discretion, be permitted when all of the following conditions exist:

- Retrofits for previously occupied floor space
 - None of the following equipment is to be used:
 - Stove, range or cooktop
 - Range hood
 - Deep fat fryer or other equipment used for frying
 - Dishwasher
 - Garbage disposal
 - Business not to have more than 20 seats or 1,000 square feet total area.
 - Business not to have three-compartment sinks with bowls greater than 15" x 15" x 14" (L x W x D).
 - Authority determines that the proposed interceptor is properly sized, of sufficiently durable materials and construction, and is readily accessible for maintenance.
- a. A properly sized flow control device and solids interceptor are required upstream of the grease interceptor.
 - b. Authority approved manufacturers are Josam, Jay R. Smith Manufacturing Companies, Zurn Commercial (NOT Zurn Light Commercial), and Schier GB1 and GB2.
 - c. Owner/Operator of the facility must provide appurtenances and methods for routine grease removal from single unit installations and demonstrate means which will preclude periodic discharge of accumulated grease to the sanitary sewer.
 - d. A clean out shall be installed on the sewer service line serving the single unit interceptor no further than five feet from the outside of the building.

6. The following submittals are required for all interior grease interceptors:

- a. Cut on three-compartment sink showing size and water level.
- b. Catalog cuts on flow control devices and solids interceptor to be supplied with grease interceptor.
- c. Complete shop cut on interceptor. Minimum grease capacity permitted is fifty pounds. In addition, the interceptor must be cast iron construction or fabricated steel with chemical (acid, base, etc.) resistant coating inside and outside. Interceptor must be certified by PDI to meet standard G101.
- d. Building plans showing plumbing lay out.

SECTION V - RECLAIMED WATER SYSTEM

A. GENERAL REQUIREMENTS

The design and construction of reclaimed water facilities shall be based on the criteria outlined in Chapter 62-610 Florida Administrative Code.

1. PIPE

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

- a. All PVC pipe and fittings shall be factory color-coded lavender.
- b. All pipe under paved areas (roadway, parking lots, etc.); within public rights-of-way or privately dedicated roadway easements shall be ductile iron pipe. All below grade DIP shall have lavender stripes applied to the pipe wall. Pipe striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape is used to stripe pipe during installation of the pipe, the tape shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipes with an internal diameter of 24 inches or greater, tape shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe. Field painting is not acceptable.
- c. Ductile iron pipe shall be Pressure Class 350 and shall conform to ANSI A21.51 and AWWA C-151. Pipe interior shall have a cement mortar lining.
- d. Flanged pipe shall be cement lined and shall have a minimum wall thickness of 0.32 inches for 4-inch pipe and incremental increases of 0.02 inches thickness for each increase in pipe size up to and including 14 inches. Flanged pipe over 14 inches shall require shop-drawing submittal to Authority for approval. All above ground DIP shall be painted as outlined in Section II.
- e. In some installations the use of PVC pipe for underground installation will be acceptable. PVC pipe shall conform to the requirements of SDR 18, ASTM D 2241/AWWA C-900, Latest Revision and shall be lavender in color. Joints shall be rubber gasket type. Solvent welds will not be permitted on PVC pipe four inches and larger. #6 AWG stranded copper type THHN wire with purple insulation shall be installed over the PVC main for use in tracing the pipe in the future.
- f. Contractor shall maintain a minimum of ten feet separation between reclaimed mains and force mains or potable water mains.

- g. Where reclaimed mains cross over water mains, that portion of the reclaimed main shall be constructed of ductile iron pipe and centered so that joints are a minimum of ten feet away.
- h. Contractor shall install a locating tape, capable of being located with standard metal locating devices. Tape shall be installed twenty-four inches above reclaimed lines and shall have the words "reclaimed water printed thereon at one foot intervals. Tape shall be continuous between fittings, valves, etc.

2. FITTINGS

- a. All pressure pipe fittings of size four inch inside diameter and larger shall be ductile iron fittings with mechanical joints, unless the plans specifically call for flanged joints, restrained joints, etc. Mechanical joint fittings shall be used for buried installations. Flanged joints shall be used for above ground service. Fittings shall conform to requirements or ANSI A21.20 and AWWA C-110 and lined inside and outside as specified for the pipe.
- b. Full-face neoprene gaskets shall be used on all flanged connections. The use of other materials is not permitted.

3. VALVES

- a. Above ground valves on metering facilities shall be non-rising stem resilient seat gate valves with hand wheel gear operator. Below grade valves larger than 12 inches shall be side actuated butterfly valves with a 2 inch square operating nut in accordance with AWWA Standard C-504 and shall be Class 150A.
- b. Adjustable cast iron valve boxes with covers marked "reclaimed water" shall be provided for all valves installed underground. The boxes shall be adjustable to fit the depth of earth cover over the valve and shall be designed and installed so as to prevent the transmission of surface loads directly to the valve or piping. Valve boxes shall be carefully centered over the operating nuts of the plug valves to permit a valve key to be easily fitted to the operating nut. The tops of valve boxes shall be set flush with finished grade, with allowance made for the settlement of surrounding backfill or surface. An 8-inch thick concrete collar shall surround the top of the valve box, as shown on Authority's Underground Valve Installation Construction Detail Drawing.
- c. Where valves are deeper than 36 inches an extension is required to bring the operating nut within 24 inches of finished grade.
- d. Air release valves shall be installed as shown on the approved plans unless otherwise specified by the Authority. Below grade air release valves (see Exhibit "D" shop specs) shall be installed in a concrete manhole as shown in the detail and conform to manhole requirements as outlined in Section IV D.

4. METERS

- a. Meters shall be magmeter style Rosemount #8750 sensor unit with a Rosemount #8712 E remote mount transmitter, sensor liner material to be PTFE and electrodes to be stainless steel.
- b. Transmitter shall be housed in an aluminum sun shield with a local display and 4-20 MA analog output.

5. TELEMETRY

- a. Telemetry hardware and conduit will conform as specified in control panel requirements. Telemetry system shall be compatible with Authority's 4G LTE cellular central control receiving station.
- b. RTU antenna requirements shall be as shown on Authority's Construction Details.

6. CONTROL PANEL

- a. 316 Stainless steel modified NEMA-12 control panel manufactured by Hoffman or approved equal with dripshield along complete top of panel. Provide 3 point padlocking handles with accessories and doorstop kit. Provide two extra bolted clips on front edge of door panel with all stainless steel hardware. An aluminum inner-hinged door shall contain all operators' controls and the dead front panel outside door shall be blank. Provide duct seal putty on all outgoing conduits to keep out corrosive gases.
- b. Control panel shall be mounted to a minimum of two three 3 inch diameter aluminum pipe supports (6061-T6-Sch 40). Length of the pipe supports shall be sized so as to provide for 36 inches of burial (in 2500 psi concrete), and extend to three inches above the top of the supports. The panel shall be mounted to the pipe supports with 1 5/8 inch x 1 5/8 inch 12 gauge stainless steel unistrut at a height consistent with FP&L's requirements for mounting their meter. Paint below ground portion of supports with asphalt based paint to 3 inches above grade. All hardware shall be stainless steel.
- c. Panel shall be surface wired with numbered terminals. Terminal strip shall be located at least 4 inches from the bottom of the enclosure for accessibility.
- d. All wiring shall be copper THWN. Shielded cable shall be Belden 8760 or approved equal.
- e. Panel shall be built by U.L. approved shop and adhere to U.L. label 508. Panel shall have a U.L. 508 label.
- f. Provide circuit breaker disconnect in NEMA-4X stainless steel enclosure outside the control panel. Disconnect shall be service entrance rated.
- g. Submit shop drawings on panel showing electrical schematics, layout, and parts list.
- h. Panel components shall be as listed. No substitutes shall be made without the pre-approval of the Authority.

- i. Breakers shall be Square D Type QO.
- j. Pilot lights, selector switches and push buttons shall be Square D type K.
- k. Surge arrestor for power and lighting shall be Square D SDSA1175.

7. METERING FACILITY

- a. Metering facility shall be laid out in accordance with Authority specifications and details.
- b. Authority shall be provided with a perpetual easement to all metering sites. The minimum size shall be 25 feet by 12 feet. Dedicated easements for ingress and egress shall also be provided where necessary.
- c. All metering facilities shall be enclosed by fencing of the chain link design as shown on Authority's Typical Lift Station Site Plan Construction Detail Drawing.

B. INSTRUMENTATION AND CONTROLS SPECIFICATIONS

1. SCOPE OF WORK

- a. The Contractor shall furnish, install and place into service operating process instrumentation, control systems, and panels including accessories related to this project, all as shown on plans and specified herein.

2. INSTRUMENTATION AND CONTROLS

- a. The Contractor shall be responsible for the functional operation of all new instrumentation systems. The Contractor shall perform all engineering necessary in order to select, furnish, program, supervise installation, connect, calibrate, and place into operation all sensors, instruments, control panels, accessories, and all other equipment as specified herein and as shown on Authority's details.
- b. The PLC and radio shall be mounted inside the control panel on the back mounting plate. There shall be sufficient input and output cards to provide the specified monitoring and control signals. The control panel shall be provided with a battery backup.
- c. The plug valve shall be an eccentric, quarter-turn flanged plug valve with a ductile iron body and 316 stainless steel screw caps, shaft bearing, retaining washers, and fasteners. The plug valve shall be operated with an Auma actuator. The actuator shall have a modulating duty operating mode and housed in a NEMA type 4X enclosure. Valve shall be digitally modulated by 110 VAC, single-phase signal from the PLC. The actuator motor production shall be a W-1T-O140 single phase thermal switch with class F insulation. The actuator shall be mounted to the plug valve with a 316 stainless steel or epoxy coating steel adapter plate.
- d. Flow rate indicator/totalizer shall be included in the panel.
- e. The lake or control structure level detector shall be a Blue Ribbon Model BC 001

transmitter giving a 4-20mA output to the panel. Provide Blue Ribbon Model BCP 3000 surge protector at the stilling well.

- f. The incoming line pressure transmitter shall be Rosemount 3051 or approved equal. It shall provide a 4-20mA signal using the panel 24 volt power supply. Surge protection shall be provided using ASCO Model 157.
- g. Contractor and panel supplier shall adhere to all applicable local codes and the National Electrical Code.

3. INSTALLATION

- a. The specifications shall not be construed as requiring the Contractor to utilize personnel supplied by their assigned instrument manufacturer's organization, or any division thereof, to accomplish the physical installation of any elements, instruments, accessories or assemblies specified herein. However, the Contractor shall employ installers who are skilled and experienced in the installation and connection of all elements, instruments, accessories and assemblies.

4. SHOP DRAWING SUBMITTALS

- a. The Contractor shall submit detailed shop drawings and data. Interface between instruments, control panel and PLC shall be included in the shop drawing submittal. These drawings and data shall be submitted as a complete bound package and shall include:
- b. Drawings showing definite diagrams are required for every instrumentation loop system.
- c. Data sheets for each component must be submitted together with a technical product brochure or bulletin (this includes electronic indicator, manual setpoint station, helical wire resistance level system, panel enclosure and all other devices or equipment which will be used).
- d. Drawings showing both schematic and wiring diagrams are required for all control circuits.

5. ADDITIONAL TECHNICAL SERVICES

- a. The Contractor shall provide the services of a qualified technical representative to supervise installation and connection of all instruments, elements, and components of every system, including connection of instrument signals to primary measurement elements and to final control elements such as; valves, level sensors, and flow meters.
- b. Instruct plant operating and maintenance personnel on instrumentation. This time shall be in addition to whatever time is required for other facets of work at the site, and shall be during Authority's normal working days and hours.
- c. Supply four (4) copies of the Operations and Maintenance manuals on all components.

6. METER STATION TESTING AND STARTUP

- a. After all systems specified in this section are installed, connected, calibrated and tested, the Contractor shall schedule a start up of the metering facility with EOR, Authority and all necessary manufacturer's representatives.
- b. All systems shall be exercised through operational tests in the presence of the EOR and Authority to demonstrate achievement of the specified performance. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by incomplete work.

C. INSTALLATION OF RECLAIMED WATER MAINS

1. Contractor shall comply with Palm Beach County Health Department Technical Memoranda and FDEP.
2. Installation and testing of reclaimed water system pipe and fittings shall be in accordance with AWWA Specification C-600 Latest Revision and Authority's Construction Standards and Specifications.
3. Any pavement cut shall be replaced in accordance with requirements of the Authority's Pavement Replacement Construction Drawing Detail and in accordance with all other applicable governing agency's permitting requirements.
4. Omni Marker #75027 green or 3M 1404 - XR green magnetic markers shall be placed above all bends, changes in alignment, grade, reclaimed services and at the discretion of Authority's representative.
5. All loading or unloading of pipe, fittings, valves and accessories shall be done in such a manner to avoid damage. The pipe shall not be skidded or rolled against pipe already unloaded. Special precautions should be taken to avoid damage to cement lined fittings and pipe. The interior of all pipe, fittings and other appurtenances shall be kept free of dirt and foreign matter at all times.
6. All mains, valves, bends, tees, crosses, and dead ends shall be restrained with an approved Authority restrained joint system in accordance with the joint restraint table. On mains greater than 12" in diameter, two forms of an approved Authority thrust restraint system shall be utilized at each joint. Where adequate space exists, thrust blocks may be allowed with Authority approval.
7. When tie rods are used as a method of joint restraint the tie-back bolts, nuts, washers and all-thread rods shall be constructed of materials meeting ASTM A-242 requirements (corten steel or equal) and painted in accordance with the procedures described herein. Tie rods and nuts shall be equal in diameter to the tee bolts and nuts which were supplied with the applicable fittings. Two tie rods per joint are required for sizes 4 inch through 10 inch diameter, four tie rods per joint for sizes 12 inch through 16 inch diameter and 6 tie rods per joint for sizes 18 inch through 24 inch diameter.

8. Air release valves shall be installed at the designed high points. Installation of air release valves to correct high points caused by improper installation of pipe (not at design grade) will not be permitted.

9. All pipe shall be laid to line in a clean dry trench on line and grade with valves and hydrant stems plumb. All pipe shall have a minimum cover of 30 inches and a maximum cover of 48 inches unless otherwise noted on the plans or required by permit.

10. The trench at the top of the pipe shall be kept to a maximum width of 24 inches plus the pipe diameter. The trench shall have a flat bottom, cut true and even, so that the barrel of the pipe shall bear its full length. Pipe bells will be placed in small pockets specifically excavated to receive the bell. All excavations must be in compliance with OSHA regulations.

11. Trench backfill shall contain no rocks larger than 2 inches in diameter or other items that may damage the pipe will be permitted over the pipe. In the event pipe is installed in rock excavation, 6 inches of granular material will be provided for bedding for under the pipe. All pipe joints, thrust blocks, conflicts and service connections shall be left exposed until visually inspected and approved by an Authority representative.

12. Tapping Sleeves

- a. Tapping sleeves and tapping crosses shall be of the heavy body ductile iron, mechanical joint type or stainless steel wrap around type as approved.
- b. All tapping assemblies installed on existing reclaimed water mains shall be pressure tested and witnessed by Authority's representative prior to the actual tap of the main. The pipe coupon shall be carefully preserved and submitted to Authority's representative. All tapping sleeves shall be install a minimum of 6 feet from pipe joints.

13. All field cuts and tapping operations on pipe shall require careful repair of the particular lining damaged in strict accordance with the manufacturer's recommendations.

D. CLEANING AND FLUSHING

1. Upon completion of the pipe installation for any section, the mains shall be cannon flushed to remove dirt and any other foreign matter by achieving a minimum velocity of 2.5 feet per second in the pipe. The duration of the flushing shall be sufficient to provide a minimum flush volume equal to three times the internal volume of the pipeline being flushed. Temporary fittings, pipe, etc. may be used to facilitate cannon flushing.

- a. Prior to the actual line flushing operation, the Contractor shall notify Authority's representative of such intended water use. No flushing shall take place without an Authority representative present.
- b. The Contractor shall exercise due care to ensure that the water used in flushing does not cause a nuisance or inflict property damage.

2. No existing valves shall be operated, except observed by Authority personnel.

3. Pigging is required for all water mains 16 inches and greater in diameter. The Authority may require water, sewer or reclaimed water mains less than 16 inches in diameter to be pigged if Authority or EOR representatives observe mains being installed under substandard conditions.

E. TESTING

1. All joints, thrust blocks and conflicts with other mains shall remain uncovered for visual inspection by Authority's representative. The Contractor shall only backfill after approval by Authority's representative.

2. The Contractor shall provide all necessary equipment such as pumps, gauges and water measuring tanks and shall perform all work required for pipe pressure and leakage test. Pressure and leakage tests shall be made between valves and/or connections for each section tested using the procedure outlined in ANSI/AWWA C-600 Latest Revision and Authority requirements. A pretest shall be successfully completed by the Contractor and observed by a representative of the EOR prior to scheduling the pressure test with Authority. All tests shall be made under the supervision of the EOR and Authority's representative. The use of PVC pipe and fittings for pressure test temporary piping is not permitted.

3. 1500 LF shall be the maximum length of main to be pressure and leakage tested at any one time. Testing of isolated portions between valves within the test section may be required by Authority, if a portion of that line appears questionable after testing.

- a. PRESSURE AND LEAKAGE TEST - A hydrostatic pressure of 150 psi shall be developed by the Contractor, within the section of pipeline to be tested and this pressure (150 psi) shall be held for a minimum time period of two hours.
- b. ALLOWABLE LEAKAGE - Leakage during both the pressure and leakage test shall not exceed the following formula for gasketed pipe:

$$L = (SDP^{1/2} / 148000) \times 0.5$$

L = Allowable Leakage (gallons per hour)

S = Length of Pipe to be Tested (feet).

D = Nominal Diameter of Pipe (inches).

P = Average Test Pressure (PSIG).

There is no allowance leakage for polyethylene or solvent weld pipe.

- c. A loss of 5 psi during the 150 psi test regardless of the amount of leakage shall be considered a failing test.
- d. A gain of pressure during the test shall be considered a failing test.
- e. The pressure test shall be considered not acceptable unless all valves in test section are in the open position. The system must be completed to the full extent of the approved plans on that portion being tested. The Contractor shall provide a 1/2" ball

valve adjacent to the test pressure gauge for installation of Authority's "check gauge". The use of PVC pipe and fittings for temporary piping for pressure testing is not permitted. Test gauge shall be in 2-pound increments with a minimum 3-inch face.

- f. Failure of the Contractor's test gauge to zero out upon completion of testing shall be cause for rejection.
- g. The Contractor shall, at his own expense, adjust or replace, at the discretion of the EOR, any component of the pipeline which fails the prescribed tests. The pipeline shall then be tested as described above until it successfully conforms to said tests.
- h. Special testing requirements in accordance with FDEP and Palm Beach County Health Department will be necessary for reclaimed mains installed within public water supply well zones of influence.
- i. Water for testing reclaimed water main shall be clean fresh water. In no case shall it be tested with saline, brackish or turbid water.
- j. The Authority will not schedule the pressure test until pipe has been properly backfilled, compacted, established finish grade and as-builts accepted.

EXHIBIT "A"

PROJECT DOCUMENTATION AND SUBMITTAL GUIDELINES

A. SERVICE AVAILABILITY

1. Property Questionnaire.
2. Boundary survey of property.
3. Site plan.
4. Fee simple titleholder authorization letter

B. INITIAL SUBMITTAL

1. Documents are not required to be signed and sealed.
2. Preliminary plat with dedication sheet (2 sets).
3. Landscape plans (2 sets) utility easements and water and sewer facilities must be shown.
4. Fire Marshall approval (1 set) including desired fire flow rate must be shown.
5. Fire flow calculations.
6. Construction Drawings:
 - a. Paving and Drainage (2 sets).
 - b. Water and Wastewater (2 sets).
7. Plumbing, mechanical and HVAC plans for multi-story buildings and non-residential buildings.
8. F.D.E.P. Permit Applications - Water and Wastewater (2 each-draft copies).
9. Right-of-Way Utility Permit Applications (2 each-draft copies).
10. Topographical survey of property.
11. Utility Plan

C. FINAL PLAN SUBMITTAL FOR AUTHORITY FILES (All documents shall be fully executed, signed and sealed. Number of sets noted below reflects number of sets which will be retained by Authority. Additional sets required for permitting).

1. Water and Wastewater Permit Applications - (2 each signed by EOR).
2. Paving and Drainage Plans (1 set)
3. Water and Wastewater Plans (3 sets)
4. Recorded plat if available, otherwise proposed with dedication sheet (1 each).
5. Recorded off site easements and title insurance commitment.

6. Provide survey of existing facilities (above and below ground) within the parameters of the project including but not limited to water, sewer, drainage, electric, telephone, cable, etc.
7. Developer Agreement and associated items.
8. Landscape plans with municipal approval (2 sets).

D. PRIOR TO PRECONSTRUCTION MEETING (see Exhibit “B” for detailed description of requirements)

1. Right-of Way utility permit(s).
2. Contractor's licenses.
3. Water and Wastewater system Permits.
4. Shop Drawings and Shop Specifications

E. FINAL DOCUMENTATION

1. Reproducible mylar of recorded plat and a digital copy of the plat rotated and translated to State plane coordinates NAD 83, Florida east zone in a DWG and PDF format.
2. Request for Release - Water System with Bacteriological Results (2 sets of originals) less than 30 days from first sample, including two sets of record drawings highlighting all sample points.
3. Certification of Completion (2 sets) - Wastewater System.
4. Two sets record drawings prints signed and sealed by PLS (see Exhibit "E").
5. Notarized Bill of Sale.
6. Recorded On-site easements including title commitment.
7. Other documentation as may be pertinent to the particular project such as sign off on road permits, pump station start up reports and Encroachment Agreements.
8. Exfiltration test results from EOR.

F. PRIOR TO CONSTRUCTION METER BEING SET

1. Release for service by Health Department
2. Receipt of final documentation items number 2, 4 and 7 listed in Section E above.
3. Inspection of water and sewer system.
4. Submittal of construction meter application.

G. PRIOR TO PERMANENT METER BEING SET OR SEWER SERVICE PROVIDED

1. Completion of all items listed above in Sections D and E.
2. Inspection of water and sewer system to verify punch list items were properly corrected.
3. Inspection of sewer lateral tie in and backflow preventer installation.
4. Submittal of meter application and payment of required fees.
5. Submit request and payment to Authority for 3" meters and Eight (8) weeks in advance of requested meter set date.
6. Reproducible Mylar of record drawings.
7. DWG and PDF file of record drawings.

H. PROJECT CLOSEOUT

1. Inspection of concrete collars on sewer cleanouts and meter set.
2. Final inspection of water and sewer system after the last lift of asphalt is installed.
3. Once all the above have been completed then service approval will be released to the appropriate building department.

Exhibit “A – LPFM – N”

Project Documentation for Residential Sewer System Connections to Seacoast Utility Authority Low Pressure Force Mains (new construction)

1. Initial Submittal:

- ☐ Property Questionnaire
- ☐ \$570.00 Administration Fee (\$2,300 if Right-of-Way utility permit required if not part of Low Pressure Master Plan)
- ☐ Boundary Survey of Property
- ☐ 2 copies of a Site Plan showing property lines, existing & proposed easements, force main and other utilities, driveways, landscaping, water meter or well and service lines, irrigation well, drainage including roof runoff, gutters and downspouts, other significant topographical features, and proposed locations of grinder pump station, piping, control panel, disconnect switch, hose bibb with backflow near wet well, and reduced pressure zone backflow after water meter
- ☐ \$1200.00 Connection Fee
- ☐ Easement sketch & legal description if easement is required
- ☐ Draft Right of Way Utility Permit Application if required

2. Prior to Preconstruction Meeting:

- ☐ Address comments, if any, from initial submittal and resubmit 4 copies of Site Plan
- ☐ 4 copies of Shop Drawings of grinder pump station, other materials, and buoyancy calculations
- ☐ AUTHORITY Exhibit “C” – Contractor Verification with copy of Contractor’s License
- ☐ Executed Sewer Service Agreement
- ☐ copy of R/W Permit if required
- ☐ easement & title commitment

3. Field Preconstruction Meeting

4. Inspections:

- ☐ On-site materials inspection including wet well prior to excavation
- ☐ Wet well (prior to backfill)
- ☐ Lateral connection to wet well
- ☐ Force main installation from wet well and connection to Authority force main
- ☐ Force main pressure test (submit Site Plan marked up to show as-built conditions prior to scheduling)
- ☐ Tracer wire continuity test
- ☐ Backflow Preventer Installation
- ☐ Lift Station Start-Up
- ☐ Generator Test (If required)

5. Final Documentation:

- ☐ Start-Up Report
- ☐ Copy of Maintenance/Service Agreement
- ☐ R/W permit release
- ☐ Bill of Sale

6. Final Inspection & Acceptance by Authority

- ☐ After complete site restoration and placing grinder pump station into service
- ☐ Before meter release

Exhibit “A – LPFM – E”

Please note that all other requirements listed in Seacoast Utility Authority’s Service Code, including Minimum Construction Standards and Specifications (available online at www.sua.com) will also apply.

Project Documentation for Residential Sewer System Connections to Seacoast Utility Authority Low Pressure Force Mains (septic tank replacement)

1. Initial Submittal:

- ☐ Property Questionnaire
- ☐ \$570.00 Administration Fee (\$2,300 if Right-of-Way utility permit required if not part of Low Pressure Master Plan)
- ☐ Boundary Survey of Property
- ☐ 2 copies of a Site Plan showing property lines, existing & proposed easements, force main and other utilities, driveways, landscaping, water meter or well and service lines, irrigation well, drainage including roof runoff, gutters and downspouts, other significant topographical features, and proposed locations of grinder pump station, piping, control panel, disconnect switch, hose bibb with backflow near wet well, and reduced pressure zone backflow after water meter
- ☐ \$1200.00 Connection Fee
- ☐ easement sketch & legal description if easement is required
- ☐ draft Right of Way Utility Permit Application if required
- ☐ buoyancy calculations

2. Prior to Preconstruction Meeting:

- ☐ Address comments, if any, from initial submittal and resubmit 4 copies of Site Plan
- ☐ 4 copies of Shop Drawings of grinder pump station and other materials
- ☐ AUTHORITY Exhibit “C” – Contractor Verification with copy of Contractor’s License
- ☐ Executed Sewer Service Agreement
- ☐ copy of R/W permit if required
- ☐ easement & title commitment
- ☐ copy of septic tank abandonment permit

3. Field Preconstruction Meeting

4. Inspections:

- ☐ On-site materials inspection including wet well prior to excavation
- ☐ After station is set (prior to backfill)
- ☐ Force main installation from wet well and connection to Authority force main
- ☐ Force main pressure test (submit Site Plan marked up to show as-built conditions prior to scheduling)
- ☐ Tracer wire continuity test
- ☐ Backflow Preventer Installation
- ☐ Lift Station Start-
- ☐ Generator Test (If required)

5. Final Documentation:

- ☐ Start-Up Report
- ☐ Copy of Maintenance/Service Agreement
- ☐ R/W permit release
- ☐ Bill of Sale

Exhibit “A – LPFM – E”

6. Final Inspection & Acceptance by Authority

- ☐ Inspect lateral connection to wet well
- ☐ Place grinder pump into service
- ☐ Septic tank abandonment permit release
- ☐ Final Inspection after complete site restoration

Please note that all other requirements listed in Seacoast Utility Authority's Service Code, including Minimum Construction Standards and Specifications (available online at www.sua.com) will also apply.

EXHIBIT "B"

PRECONSTRUCTION MEETING PREREQUISITE CHECKLIST

No preconstruction meeting may be scheduled until all of these items are in hand and approved by Authority.

1. FDEP, PBCHD, and all other applicable permits and approved plans
2. Four (4) copies of Authority's "Shop Specifications" (see Exhibit "D") with selected items highlighted and acknowledged/approved by the Contractor and Engineer.
3. Four (4) copies of shop drawings for manholes and any other appurtenances not covered by "Shop Specifications" requiring submittals approved by the Contractor and Engineer.
4. Completed Contractor's License Verification form (see Exhibit "C") along with copy of license.
5. Contractor's work history, if applicable.
6. Lift Station Wet Well Caisson Construction Affidavit, if applicable (see Exhibit "G").
7. All other applicable permits, including but not limited to road right-of-way construction permits, railroad crossing permits, and dewatering permits.

The EOR shall notify in writing and forward a copy of said notification to SUA, all applicable utility companies and agencies of jurisdiction whose presence will be required at the meeting. A copy of this notice must be received by the Authority 72 hours prior to the pre-construction meeting.

EXHIBIT "C"
CONTRACTOR'S LICENSE VERIFICATION

DATE: _____

PROJECT NAME: _____

Name of Company: _____

Address: _____

Telephone No.: _____

Fax No.: _____

The undersigned does hereby certify that the above named company is licensed by the State of Florida **TO PERFORM UNDERGROUND WATER AND SEWER UTILITY INSTALLATIONS** as required by Florida Statutes and as defined in Florida Administrative Code.

Licensee _____
(Signature)

President _____
(Signature)

Name _____
Please Type

Name _____
Please Type

State License No. _____

Attach copy of license:

EXHIBIT "D"

**SEACOAST UTILITY AUTHORITY
4200 HOOD ROAD
PALM BEACH GARDENS, FL 33410**

(PHONE: 561-627-2900)

"SHOP" SPECIFICATIONS

Project Name: _____

Concurrence of Utility Contractor: _____
Signature Date

Firm

Concurrence of the Engineer: _____
Signature Date

Firm

By signature above, the utility contractor and engineer for referenced project agrees to adhere to both the following product specifications and Authority's Construction Standards and Specifications (latest edition). It is understood that Authority will reject construction not in accordance with this document.

Basis: The following products and specifications have been found to be acceptable and/or desirable in their respective groups. Shop drawings need not be submitted for Authority's approval if the contractor uses products on this list. Any product that is not on this list must be approved in advance by Authority. Such approval requires the submission of sufficient copies (Authority will retain two copies) of a shop drawing for each product that has been approved by the EOR. Shop drawings will also be required for all non-standard items including, but not limited to all precast concrete structures, manholes, exterior joint wrap, wet wells, grease interceptors, oil separators, castings, pumps and electrical panels. All material for use in a potable water system shall be NSF61 certified.

CIRCLE ITEMS OF CHOICE

I. MAIN LINE CONSTRUCTION FOR WATER, SANITARY SEWER, AND RECLAIMED WATER

A. Pipe - All pipe must be properly labeled.

1. Water Main/Reclaimed Water Main

a. Push on and mechanical joint-DIP, Class 350, Cement mortar lining AWWA C-151 and C-104. MJ pipe shall require ductile iron glands and corten steel tee bolts.

1. American 2. U.S. Pipe 3. Griffin 4. Clow 5. McWane

b. Flanged DIP Class 53, Cement mortar lining AWWA C-151 and C-104, flanges must be ductile iron.

1. American 2. U.S. Pipe 3. Griffin 4. Clow 5. McWane

2. Sanitary Force Main

a. Direct bury pipe shall be C-900, SDR 14 PVC

b. Subaqueous crossing pipe shall be push on and mechanical joint-DIP, Pressure Class 350, Protecto 401 lined, AWWA C-151 and C-104. MJ pipe shall require ductile iron glands and Cor-Ten Tee Bolts.

1. American 2. U.S. Pipe 3. Griffin 4. Clow 5. McWane

c. Above grade lift station piping and canal crossing pipe shall be flanged DIP Class 53, Polyethylene Protecto 401, or Permax CTF lined AWWA C-115 and C-104. Flanges must be ductile iron.

1. American 2. U.S. Pipe 3. Griffin 4. Clow 5. McWane

d. The lining must be installed at pipe manufacturing plant or at approved applicator facility.

3. Gravity Sewer Main

a. Pipe

1. PVC - ASTM D-3034, SDR 26, For 12' and deeper cut or where plans require use SDR 18 AWWA C-900. Transition from SDR 18 to SDR 26 not permitted in run between manholes, Factory color coded green.

b. Manhole Cover

1. U. S. Foundry Model #230-AB-M

2. Vulcan Foundry Model #VM-101

B. Valves and Fittings - All rubber and synthetic elastomeric components of products that come in contact with potable water shall be manufactured with chloramine resistant elastomers.

1. Resilient Seat Gate Valves AWWA C-509, C-515 for water valves up to and including 12 inch. (Wedge material to be EPDM. EPDM to be clearly stamped on wedge)

- a. American
- b. U.S. Pipe
- c. Mueller
- d. Clow
- e. Kennedy

2. Butterfly Valves C-504 14 inch and larger (Ductile iron body, bi-directional, and seat material shall be EPDM. Valve shall clearly identify that seat material is EPDM and is bi-directional)

- a. Mueller Linesal
- b. Pratt
- c. M&H 4500 12"-24" 1450-30"+
- d. GA Series 800

3. OS & Y Valves (Flanged - Above ground fire line use only - wedge material to be EPDM. EPDM to be clearly stamped on wedge)

a. Valves shall be resilient seat and equipped with bronze follower packing gland and bronze follower studs and nuts. (Cast iron and/or cadmium-plated steel are not acceptable). AWWA C-509.

- 1. U. S. Pipe
- 2. American
- 3. Kennedy
- 4. Clow

4. Plug Valves (Minimum 80% port opening, bi-directional Ductile Iron Body)

a. Below grade - mechanical joint, side actuated with 2" square operating nut

- 1. Kennedy
- 2. GA Eco-Centric

b. Above grade - flanged 4" to 8" - top activated with 2" square operating nut. Ten inch and larger, wheel operated

- 1. Kennedy
- 2. GA Eco-Centric

5. Tapping sleeve and valve

a. Tapping sleeves for water mains and reclaimed mains.

1. For use on 4" to 24" cast iron, ductile iron, and cement asbestos mains. 304 or 316 stainless steel construction required, including outlet flange.

- a. Ford FTSS
- b. JCM 432
- c. Mueller H304
- d. Cascade CST-EX
- e. JCM 452

2. For use on 30" cast iron, ductile iron, or cement asbestos mains. 304 or 316 stainless steel construction required, including outlet flange.
 - a. JCM 452
 3. For use on 12" and larger cast iron or ductile iron mains.
 - a. Mueller H-615
 - b. American Series 2800-C
 4. Sanitary Sewer Force Main (316 stainless steel body, bolts and outlet).
 - a. JCM 432
- b. Tapping Valves
- 1) Water (Resilient seat - Wedge material to be EPDM. EPDM to be clearly stamped on wedge).
 - a. Mueller b. American
 - c. Kennedy d. Glow
6. Check Valves
- a. Lift Station - outside lever and weight only AWWA C-508, neoprene seat
 1. Mueller 2602-6-01 3. Kennedy Style 106 LW
 2. APCO 250 LW 4. VSI Series CVI
7. Air Release Valves
- a. Potable main, Reclaimed Water Main 1" Inlet
 1. Val-Matic Model #25
 2. Crispin Model # PL10
 3. APCO Model #200A
 - b. Force Main 2" Inlet
 1. Val-Matic Model #48 A with 316 stainless steel internal hardware
 2. APCO Model #400
8. Fittings, AWWA C-104 AWWA C-110, Mechanical joint fitting to be compact ductile iron (Class 350 AWWA C-153) only. Glands for MJ fittings shall be ductile iron and tee bolts shall be corten steel. Flange fittings AWWA C104 AWWA C110. Epoxy coated fittings shall also meet or exceed ANSI/AWWA C550 and C116/AZI 116.

- a. Cement lined for water main and reclaimed water main use
- b. Protecto 401, or Permax CTF lined for force main use
- c. Full face neoprene gaskets shall be required on all flanged fittings.
- d. Flange bolts on flanged connections inside lift station wet wells shall be 316 stainless steel.

- | | | |
|----------------|------------|--------|
| 1. Tyler/Union | 2. Sigma | 5. SIP |
| 3. Star | 4. Griffin | |

9. Transition Couplings - Ductile iron body and glands only with ductile iron or stainless steel nuts and bolts and EPDM gaskets.

a. Ford FC2A-EPDM-SH

b. Mueller Maxi-Range

10. Fire Hydrants (AWWA C-502 "traffic type" break away flange, no cut bolts; non-rising stem; dry barrel; 5-1/4 inches main valve opening; bronze to bronze seating) no drain

- a. Mueller Super Centurion
- b. Kennedy K-81 D (Guardian)
- c. American Flow Control B-84-B
- d. Clow Medallion F-2545 No Drain

11. Flushing Hydrant - post type, 3" mechanical joint connection rated working pressure of 150 PSI

- a. M & H 2 -1/4"

12. Tie Rods - all valves, hydrants, tees, joints and other appurtenances which are restrained by means of tie back bolts, nuts, washers and all thread rods shall meet ASTM A-242 requirements (corten steel or equivalent) and painted in accordance with Authority's specifications. Tie back bolts shall be Star Model SST 753 of corten steel or approved equivalent. All tie rods shall be a minimum 3/4" diameter; the use of rebar with welded thread is prohibited. Two tie rods are required per joint for pipe sizes 4" through 10". A minimum of four tie rods are required per joint for pipe sizes 12" and larger.

13. Self restraining gaskets for push on DIP

- a. U.S. Pipe - "Field Lok"
- b. American - "Fast Grip"
- c. McWane - "Sure Stop 350"

14. Restrained mechanical joint gland

- a. EBBA Iron - "Megalug" (all sizes)
- b. Sigma – One Lok (all sizes)
- c. Star Pipe – Stargrip 3000 (sizes through 24")
- d. TUF Grip - (4" through 12")
- e. SIP – EZ Grip

II. SERVICE LINE CONSTRUCTION

A. Pipe

- 1. Water Service – 1", 1 ½", or 2"
 - a. Driscopipe 5100, Endot Endopoly, ADS polyethylene tubing
 - b. Type "K" copper tubing
- 2. Sanitary Sewer Service Lateral – factory color coded green
 - a. PVC (conforming to ASTM D3034, SDR 26)
 - b. SDR 18 AWWA C-900 PVC pipe shall be required for services connecting to deep sanitary sewer mains

B. Fittings

- 1. Water Service - Standard (Service under paving requires shop drawing submittal on corporation stop, and curb valve box, curb and corporation stops shall be same manufacturer).
 - a. Polyethylene tubing - "Pack-Joint" fittings, or equal with stainless steel inserts.
 - b. Type "K" copper tubing
 - 1. Cast brass solder joint fittings, or equal for above ground backflow prevention device installation.
 - 2. Both lead free solder and flux shall be used on all solder joints.
 - c. Service Saddles (Brass double strap saddle only, AWWA Threads)
 - 1. Mueller
 - 2. Ford 202B
 - 3. Romac Style 202B
 - 4. A.Y. McDonald 3825 Series
 - 5. Smith-Blair 325
 - d. Corporation Stops (AWWA Inlet Threads x compression, lead free)

1. A.Y. McDonald Mfg. Co. Model #4101B-22
2. Ford - FB 1000 - 4 NL for 1" inlet & outlet
FB 1000 - 6 NL for 1 1/2"
FB 1000 - 7 NL for 2"

3. Mueller Co. Model # P25008

e. Curb Stops (Locking wings & drilled meter nut, lead free)

1. Ford Straight Ball Meter Valves
2. Mueller Model #300
3. McDonald Model 6100 MW-22

2. Gravity Sewer Service Fittings – factory color coded green or white

- a. PVC injection molded conforming to, and compatible with ASTM 3034 SDR 26 or SDR 35 PVC pipe
- b. SDR 18 AWWA C-900 PVC pipe shall be required for services connecting to deep sanitary sewer mains

III. BACKFLOW PREVENTION DEVICES

1. Reduced Pressure Backflow Preventer – Residential sewer systems connected to low pressure force mains, Non-residential, multi-family, or residential with three or more units.

- Size 3/4" – 2" with standard ball valves – supply with chloromine resistant elastomers and lead free brass.
 - a. Ames Model LF 4000 B
 - b. Apollo Model RPLF 4A
 - c. Watts Model LF 919
 - d. Zurn Wilkins 975XL2
- Size 3/4" – 2" with union ball valves – supply with chloromine resistant elastomers and lead free brass for dual backflow installations.
 - a. Apollo Model RPLF 4A with union ball valves
 - b. Zurn Wilkins 975XL2U
- Size 4" – 8", supply with chloromine resistant elastomers, grooved stainless steel body, lead free components and flange x groove non-rising stem gate valves.
 - a. Apollo Model RPLF 4A
 - b. Zurn Wilkins 375 AST

2. Double Check Valve Backflow Preventer.

- Size $\frac{3}{4}$ " – 2" - supply with chloramine resistant elastomers and lead free brass for residential fire lines.
 - a. Apollo DCLF 4A
 - b. Watts LF 719
 - c. Zurn Wilkins 950XLT2
- Size 4" – 8", supply with chloramine resistant elastomers, grooved stainless steel body, lead free components and flange x groove non-rising stem gate valves for large meter bypass lines.
 - a. Apollo DCLF 4A
 - b. Zurn Wilkins 350 AST

3. Double Detector Check Valves with detector bypass meter and check valve assembly. Sensus meter required which must be purchased from Authority. Supply with chloramine resistant elastomers, grooved lead free stainless steel body, lead free components and flange and groove rising stem gate valves.

- Size 4" – 8"
 - a. Ames Deringer 30G
 - b. Apollo Model DCDALF 4A
 - c. Zurn Wilkins 350 AST DA

IV. PIPELINE MARKING TAPE

1. Vinyl plastic tape PVC backing material with rubber based adhesive, minimum 6 inch width, 0.006 inches in thickness, 20.0 lb inch Tensile strength. Wording, minimum $\frac{5}{8}$ inch in height. Wording and color according to application.

- a. Proline Safety for Ductile Iron Pipe
- b. 3M 7900 EMS Warning Tape for PVC and Polyethylene Pipe

V. ADJUSTABLE VALVE BOX (2 piece – 5' 4")

- 1. Tyler
- 2. Proselect

EXHIBIT "D - LP"

**SEACOAST UTILITY AUTHORITY
4200 HOOD ROAD
PALM BEACH GARDENS, FL 33410**

(PHONE: 561-627-2900)

"SHOP" SPECIFICATIONS FOR LOW PRESSURE SEWER SYSTEMS

Project Name: _____

Concurrence of Utility Contractor: _____

Signature

Date

Firm

Concurrence of the Engineer: _____

Signature

Date

Firm

By signature above, the utility contractor and engineer for referenced project agrees to adhere to both the following product specifications and Authority's Construction Standards and Specifications (latest edition). It is understood that Authority will reject construction not in accordance with this document.

Basis: The following products and specifications have been found to be acceptable and/or desirable in their respective groups. Shop drawings need not be submitted for Authority's approval if the contractor uses products on this list. Any product that is not on this list must be approved in advance by Authority. Such approval requires the submission of sufficient copies (Authority will retain two copies) of a shop drawing for each product that has been approved by the EOR. Shop drawings will also be required for all non-standard items including, but not limited to all precast concrete structures, lift station shut-off valve and valve box, hose bibb, backflow or vacuum breaker, pre-assembled lift stations, control panels, and electrical panels. All material for use in a potable water system shall be NSF61 certified.

CIRCLE ITEMS OF CHOICE

- a. Pipe: Sch 80 gray bell joint PVC, 350 psi (Charlotte Pipe).
- b. Fittings up to 2 inch: Sch 40 PVC (Spears Manufacturing Company or approved equal).
- c. Fittings 3 inch: MJ Ductile Iron Class 350 with Protecto 401 lining.
- d. Gravity piping to wet well: Sch 40 PVC, Sch 80 PVC, SDR 26, or equal piping with Sch 40, SDR 26, SDR 35, or equal fittings.
- e. Valves 1 ¼ inch, 1 ½ inch, and 2 inch Ford Meter Box full port ball valves, PVC Pack Joint x PVC Pack Joint B77-555, B77-666, and B77-777.

- f. Valves 3 inch: Milliken Millcentric Eccentric Plug Valves, MJ body with stainless steel bolting, nickel sear, Nitrile (Buna) Elastomer trim, with 2 inch square operating, bi-directional shut off.
 - g. Valve boxes for 3 inch: Ametek 5 ¼ inch plastic valve box with cast iron cover and ring with "sewer" designation.
 - h. Valve Boxes for up to 2 inch valves: Russco VB2607S with "sewer" designation with 6 inch SDR 35 PVC riser.
 - i. Clean out Boxes: Carson Plastic #MSBCF1118-12XL with EBBA Iron Lid #MKSCBC1118.
 - j. Pipe Tracing Wire: Continuous (no breaks) #10 AWG stranded copper conductor Type THWN with a 30 mil thick green HDPE insulation rated for 30 volts, Proline Safety #7401205 or equal, fastened with 11 inch cable ties and Dryconn Direct Bury lugs #90120.
 - k. PVC Primer Cement: Hercules Purple, medium bodied.
 - l. Thread Sealing Compound: PTFE paste)LA-CO Slic-tite or Hercules Real-tuff).
 - m. 2 inch and smaller plugs: Sch 40 red brass, solid type with square head (Lee).
 - n. Underground Marking Tape for Authority owned piping: Non-detectable type polyethylene 6 inch width, 11 mil thick, working: "Caution: Buried Sewer Line Below" in black lettering with green background, 3M EMS Warning Tape 7900 series.
 - o. Underground Marking Tape for privately owned piping: Metallic detectable tape, Terra Tape #540 or equal, marked Caution: "Sewer Line Below".
 - p. Reduced Pressure Backflow Preventer - Located at water meter. Sizes ¾" - 2" with standard ball valves. Supply with chloramine resistant silicone rubber seal rings or disks and lead free brass.
 - a. Ames Model LF 919
 - b. Apollo Model RPLF 4A
 - c. Watts Model LF 919
 - d. Zurn Model 975XL2
-

EXHIBIT "E"
SEACOAST UTILITY AUTHORITY
RECORD DRAWING SUBMITTAL GUIDE

The following shall be used as a guide for submittal of record drawings to Authority

1. Two (2) sets of prints shall be submitted by the EOR to Authority for review prior to scheduling inspections such as, but not limited to, pressure test, sanitary sewer lamping or any other element of the system which is determined necessary by the Authority. The drawings shall have been reviewed by the EOR for deficiencies.
2. The drawings will be reviewed by the Authority for deficiencies. Deficiencies will be indicated on one (1) set of prints which will be returned to the EOR for necessary corrective action.
3. Elevations shall be provided in NAVD 1988 Datum. A conversion table to NGVD 1929 shall be provided on each plan sheet of the drawing set.
4. After final inspection and upon acceptance of as-built data, two (2) prints (signed and sealed by a Florida registered land surveyor) one set of mylars and a PDF file and a CADD file (DWG or DXF) of the record drawing rotated and translated to state plane coordinates to the nearest hundredth's (2 decimal places) NAD 83, Florida East Zone.
5. No disclaimers on drawings will be accepted.
6. Surveyor's Certification must be included on Final Prints and Mylars (See Page 4).

The attached list of required information is to be used as guide for submittal of Record Drawings to the Authority. Additional information may be required by the Authority if it is determined by the Authority that the information supplied would be insufficient for a utility worker, with no surveying experience, to be able to locate mains, fittings, etc. The submittal record drawings shall meet Chapter 61 G17-6 Minimum Technical Standards. As noted in Section 61 G17-6.003, the public must be able to rely on the accuracy as noted in Section 61 G17-6.005

- (a) When performing as-built or record surveys, the surveyor and mapper shall obtain field measurements of vertical or horizontal dimensions of constructed improvements so that the constructed facility can be delineated in such a way that the location of the construction may be compared with the construction plans, and when the surveyor and mapper prepares as-built maps they will clearly show by symbols, notations, or delineations, those constructed improvements located by the survey. All maps prepared shall meet applicable minimum technical standards.
- (b) The vertical and horizontal accuracy shall be such that it may be determined whether the improvements were constructed consistent with planned locations.
- (c) Northerly and Easterly coordinates on all field obtained measurements and provided on all record drawing submittals.

REQUIRED INFORMATION ON RECORD DRAWINGS

GENERAL

1. Drawings on 24" x 36" 3-mil mylar that will reproduce legibly.
2. Label drawings "Record Drawings" with date.
3. Complete title block with current file name.
4. Location sketch.
5. Correct Street/Road names.
6. Surveyor's Certification.
7. GPS collected as-built information to be in DFX file format.
8. All record information shall be denoted by either a cloud or bold print. Design information shall be crossed out.
9. Profile as-builts required on projects where profiles were part of approved construction plans.
10. Utility Easements – with ties of facilities to easement lines.

GRAVITY SEWER

1. As-built distance of gravity main from centerline of road or easement right-of-way line, buildings, or as determined by Authority. Extensions of an imaginary line will not be acceptable as reference points.
2. Type of materials installed - mains and services.
3. Stationing of each manhole.
4. Stationing of each sewer service wye from sewer nearest manhole and off set distance and stationing of cleanout from sewer main.
5. As-built elevations - each invert.
6. As-built rim elevation.
7. As-built sewer slope.
8. As-built sewer inverts and finished grade at clean outs.
9. As-built crossing elevations including sewer service lines.
10. Complete lift station including details.
11. Grease traps sizes in gallons.
12. As-builts information shall include plan and profile.

PRESSURE PIPE

1. As-built distance of mains at 100' intervals from centerline of paved road, and rights of way, 50' intervals at edge of easements, rights-of-way, buildings, sewer main, or as determined by Seacoast Utility Authority. Extensions of an imaginary line will not be acceptable as reference points.
2. As-built elevations at 100' intervals as well as any change in direction and/or elevation. Elevations shown at these intervals and changes must show top of pipe elevation and finished grade elevation at that location.
3. Stationing offset, top of pipe, and finished grade of each valve, fitting, air release valve, service line, taps, plugs, etc. and radial dimensions from a nearby permanent object.
4. Type of materials installed - pipe and appurtenances. Indicate all locations of change of material including joint type (MJ, slip, restrained).
5. Valve type (butterfly, gate, and plug).
6. As-built length of all jack and bore casings indicating distance from centerline of paving to each end of casing. As-built invert and top of casing elevation of each end of casing as-built finish grade of each end of casing. As-built distance from each end of casing to limits of mechanical joint pipe is also required.
7. As-built all crossing information between utilities including bottom of pipe, top of pipe, size and type.
8. Provide as-built information on plan and profile when profile is included in original plans.
9. As-built lengths of water service lines.
10. As-built fire hydrant locations and type of hydrant used including flange grade.
11. As-built all flush hydrants and size, if any.
12. Size of mains, service lines, backflows, meters, etc.
13. As-built blow up detail may be required of congested areas to ensure legibility.

SURVEYOR'S CERTIFICATION

KNOWN ALL PERSONS BY THESE PRESENTS, that the undersigned, _____ has prepared the record drawings for water, sewer and reclaimed facilities and does hereby CERTIFY, in their professional opinion, that the water, sewer, and/or reclaimed water mains and related appurtenances shown on the RECORD DRAWINGS, sheets _____ dated _____ and observed by _____ in their constructed locations at the project known as _____ being dedicated to SEACOAST UTILITY AUTHORITY for ownership and maintenance, were installed within the limits of the following parcels of land:

Easements and/or Tracts as dedicated for utility purposes on the Plat of _____.

Plat Book _____, Pages _____, Public Records of Palm Beach County, Florida

Easement as dedicated to Authority in Official Record Book _____, Pages _____, Public Records of Palm Beach County, Florida

and that the facilities that have been located and depicted on the record drawings do not encroach onto adjacent parcels of land or outside the boundaries of easements.

Signed _____ Florida Registration No. _____

Name _____ AFFIX SEAL
(Please Type)

Company Name: _____

Address: _____

Telephone: _____

The above **must** appear on the Final Record Drawings and Mylars.

EXHIBIT "F"
LIFT STATION WET WELL CAISSON
CONSTRUCTION AFFIDAVIT

DATE: _____

PROJECT NAME: _____

ENGINEER: _____

The undersigned Engineer hereby acknowledges that by electing to utilize the caisson method of lift station wet well construction that engineer proceeds at its own risk.

The EOR shall present in writing the following information to Authority for requesting change from standard construction:

1. Site conditions (including hydrogeological conditions)
2. Equipment conditions
3. Monetary considerations
4. Contractor experience - List lift station wet wells successfully completed using the caisson (tremie) method by the contractor.
5. This listing shall give the location of the wet well and the names and address of the utility company currently operating the lift station.

The undersigned contractor also acknowledges receipt of Caisson Construction Causes for Rejection (page F-2) and Caisson Construction Requirements (page F-3) and understands and will comply with same without exception.

Type Name

Signature

Name of Firm

(President or two officers of the company must execute)

CAISSON CONSTRUCTION

CAUSES FOR REJECTION DURING OR AFTER INSTALLATION

1. Well sections installed in improper sequence (keyways not in correct position).
2. Leaks (including continually damp areas) in wall sections, tremie seal or in joints of precast sections.
3. Wet well installed out of plumb, **maximum deviation** shall be 1/8" per foot for each precast section with the completed cylindrical structure no more than two inches out of level prior to setting the top slab. The bottom (first) and second section of the structure shall be set level and plumb prior to beginning the clamming operation and shall be so maintained until the addition of the third section.
4. Structural damage, gouges, cracks, etc. in wet well sections caused by damage during construction (hit by clam bucket, crane boom, settling, etc.).
5. Settlement of structure after completion of tremie seal and or secondary pour/top slab installation.
6. Wet wells completed deeper than design due to over excavation.

CASSION CONSTRUCTION

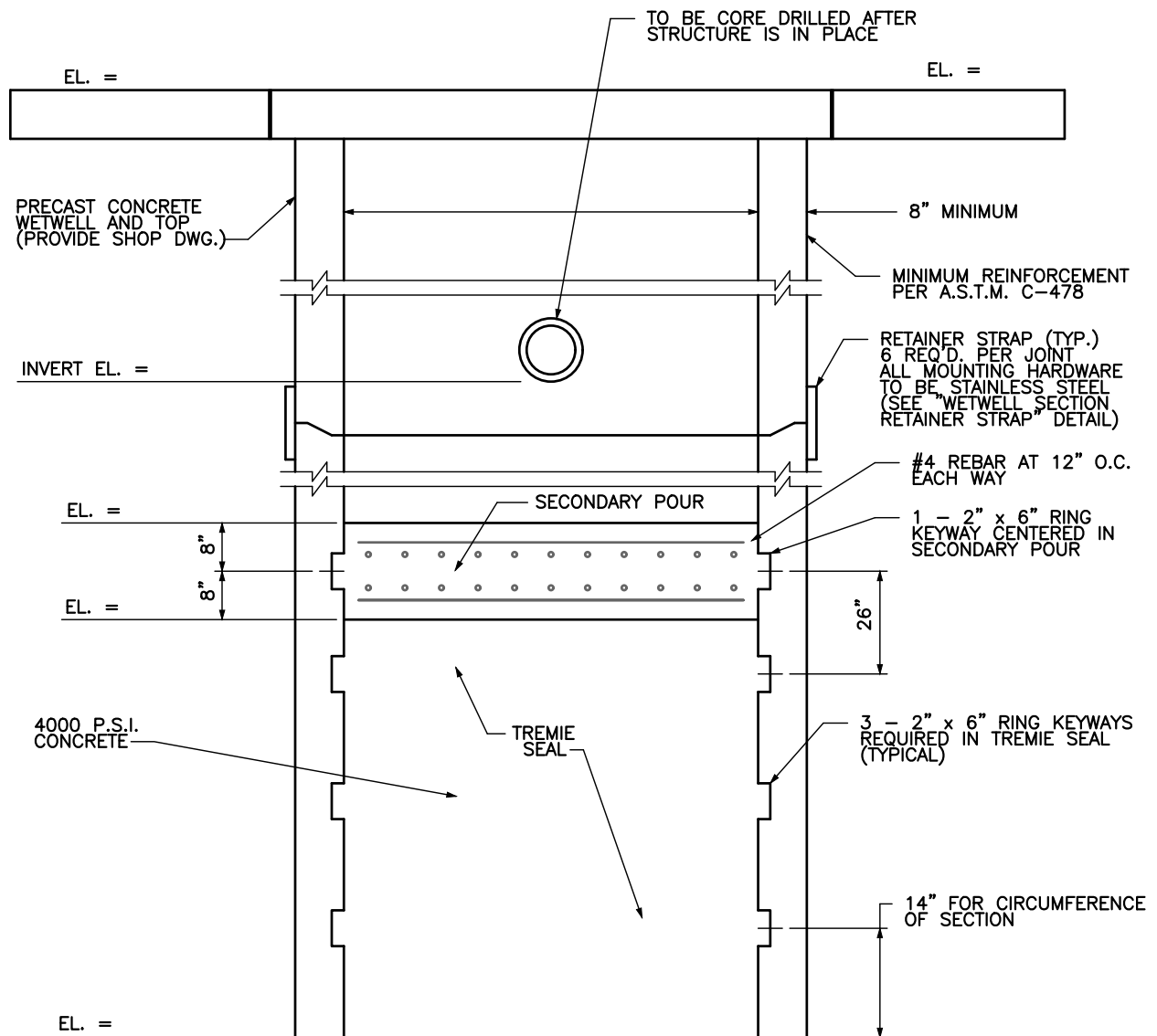
CONSTRUCTION REQUIREMENTS (ALSO SEE DETAIL SHEET)

1. Structures and sections shall be inspected by Authority prior to installation.
2. Structures shall be design to minimize the numbers of sections within the structure; i.e.: 6 or 8 foot sections where possible.
3. No section joints permitted within limits of secondary pour.
4. No more than one layer of RAM-NEK permitted on each joint.
5. RAM-NEK between joints shall be fully compressed prior to retainer straps being installed.
6. Top of tremie seal must be clean, dry and inspected by Authority prior to placement of secondary pour.
7. All section joints shall be leak free prior to secondary pour.
8. If approved by SUA, leak repair of tremie seal will be by pressure injected epoxy only. Lead wool, water plug, acrylamide grout, etc. are not permitted.
9. Tremie seal concrete shall have a minimum compressive strength of 4,000 psi at seven (7) days and testing laboratory results shall be submitted to Authority for approval prior to placement of the secondary pour.

10. Secondary concrete shall have a minimum compressive strength of 4000 psi at twenty-eight (28) days and testing laboratory results shall be submitted to Authority for approval before completion of lift station.

11. Authority's approval for the installation does not in any way guarantee the final acceptance of said lift station.

12. Other than the method of caisson versus built-in-place construction all other components of a wet well shall comply with Authority's Construction Standards and Specifications.



NOTES: (PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. CONCRETE USED FOR TREMIE SEAL AND SECONDARY POUR MUST BE 4000 P.S.I. AT 28 DAYS WITH TYPE II PORTLAND CEMENT. SECONDARY POUR SHALL NOT OCCUR UNTIL WETWELL IS WATER TIGHT ON ALL SIDES AND BOTTOM.
2. MINIMUM OF FOUR 2" x 6" RING KEYWAYS REQUIRED WITH TOP KEYWAY CENTERED IN THE SECONDARY CONCRETE POUR.
3. TREMIE SEAL REQUIRED TO BE A MINIMUM OF 36" THICK AND SECONDARY CONCRETE POUR 16" THICK.
4. TREMIE SEAL TO CURE 48 HOURS PRIOR TO PUMPING OFF WATER TO PREPARE FOR SECONDARY CONCRETE POUR.
5. E.O.R. SHALL SUBMIT SIGNED AND SEALED BUOYANCY CALCULATIONS TO SUA FOR REVIEW AND APPROVAL.
6. WEIGHT OF TOP SLAB, SECONDARY CONCRETE POUR, PUMPS AND EXTERIOR SKIN FRICTION SHALL NOT BE INCLUDED IN BUOYANCY CALCULATIONS. GROUNDWATER SHALL BE CONSIDERED AT GROUND LEVEL FOR BUOYANCY CALCULATIONS UNLESS SPECIAL CONSIDERATIONS APPLY (ON COASTAL RIDGE, ETC.).

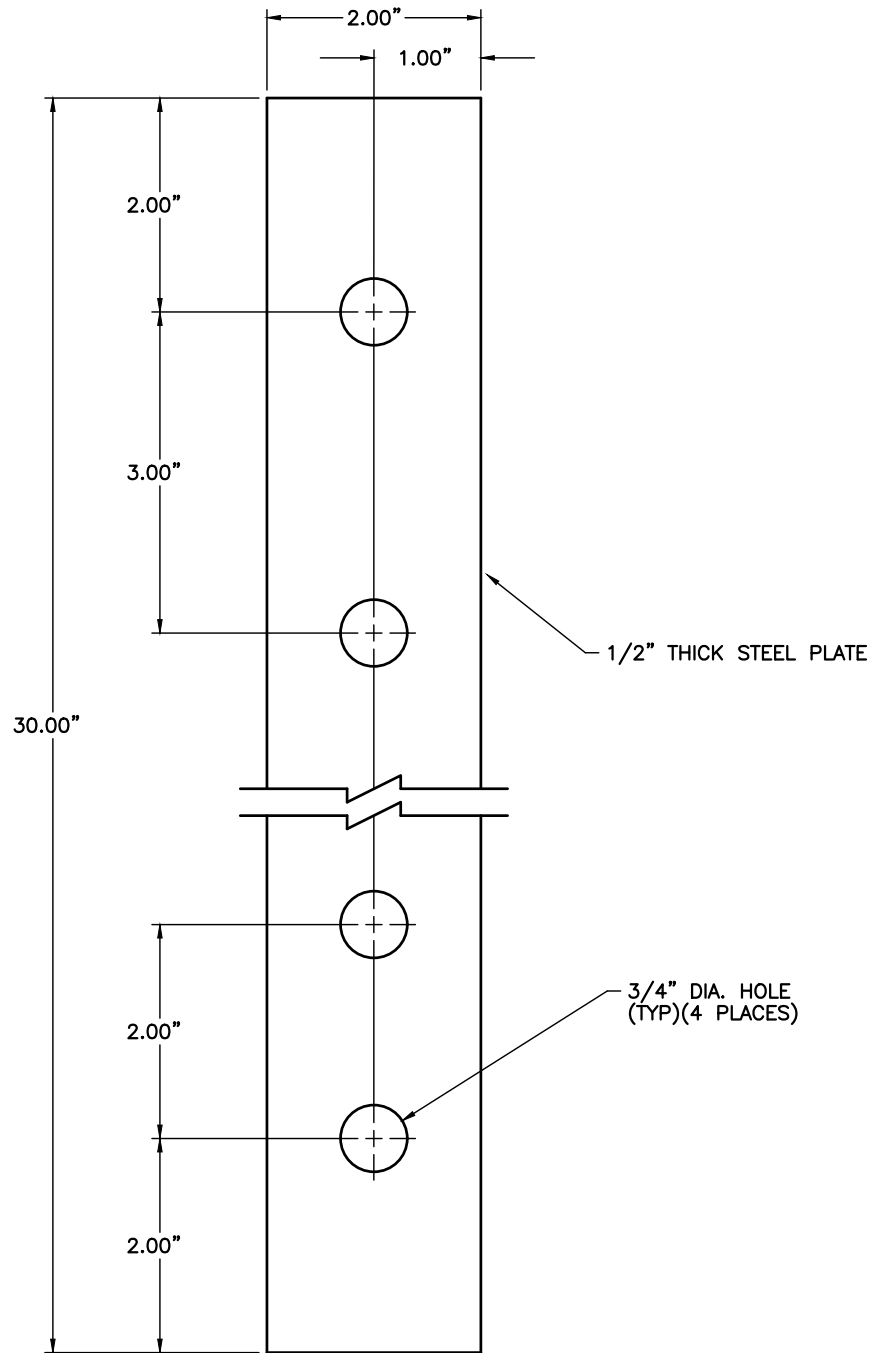
Wet Well Installation (Caisson Construction)

SEACOAST UTILITY AUTHORITY
CONSTRUCTION STANDARDS AND DETAILS

DATE APPROVED:
MAY 24, 2023

Exhibit F

Revision C-23



PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS

Wet Well Section Retainer Strap

SEACOAST UTILITY AUTHORITY
CONSTRUCTION STANDARDS AND DETAILS

DATE APPROVED:
MAY 24, 2023

Revision B-23

Exhibit F

Prepared by:
Return To:
Seacoast Utility Authority
4200 Hood Road
Palm Beach Gardens, Fl 33410

EXHIBIT "G"

EASEMENT DEED

THIS EASEMENT DEED made and entered into this ____ day of _____, 20__, between _____ (hereinafter referred to as "Grantor") whose address is _____, and **Seacoast Utility Authority** (hereinafter referred to as "Grantee") whose address is 4200 Hood Road, Palm Beach Gardens, Florida, 33410.

WITNESSETH:

That Grantor, for and in consideration of the sum of Ten Dollars (\$10.00) in hand paid by the Grantee, the receipt and sufficiency of which is hereby acknowledged, does hereby grant to the Grantee, its successors and assigns, a perpetual non-exclusive utility easement which shall permit the Grantee to enter upon the property herein described at any time to install, operate, maintain and service water and sewer lines and appurtenant facilities (the "Improvements") in, on, over, under and across the easement premises. The easement hereby granted covers a parcel of land lying, situate and being in Palm Beach County, Florida, and being more particularly described as follows:

SEE EXHIBIT "A", ATTACHED HERETO
AND MADE A PART HEREOF

Grantor shall not grant additional easements or similar interests in, on, over, under, or across said easement premises without Grantee's prior written consent, which will not be unreasonably withheld. Neither Grantor, nor any other person claiming an interest through Grantor, shall interfere with Grantee's utilization and enjoyment of the easement, including the construction, preservation, maintenance or replacement of Grantee's Improvements. Further, Grantor or any other person claiming an interest through Grantor shall remove any structure, obstruction, improvement or impediment which, at any time, interferes with Grantee's utilization and enjoyment of this easement.

Grantor hereby covenants with Grantee that it is lawfully seized and in possession of the real property herein described and that it has good and lawful right to grant the aforesaid easement free and clear of any mortgages that are prior in right and dignity to this Easement Deed. Furthermore, Grantor covenants that there are no encumbrances of any kind that would prevent Grantee's full enjoyment of the easement.

This Easement Deed, and the covenants contained herein, shall be deemed covenants running with the land, and shall be binding on the parties hereto and their successors and assigns.

IN WITNESS WHEREOF, the Grantor has hereunto set its hand and affixed its seal as of the date first above written.

WITNESSES:

GRANTOR:

Signed, sealed and delivered
in the presence of:

Witness Signature

By: _____
Signature

Print Name

Print Name

Witness Signature

Title

Print Name

STATE OF)
COUNTY OF)

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20____, by _____ of who is personally known to me or who has produced _____ as identification.

Notary Signature

Print Name
Notary Public - State
Commission No:
My Commission Expires:

MORTGAGEE JOINDER AND CONSENT

The undersigned Mortgagee does hereby join in and consent to the granting of this Easement Deed across the lands herein described, and agrees that its mortgage, which is recorded in Official Record Book _____, Page _____, of the Public Records of Palm Beach County, Florida shall be subordinated to this Easement Deed.

IN WITNESS WHEREOF, _____ has caused these presents to be executed in its name this ____ day of _____, 20__.

WITNESSES:

Mortgagee

Signed sealed and delivered
in the presence of:

Lender: _____

Witness Signature

By: _____

Print Name

Print Name

Witness Signature

Title: _____

Print Name

STATE OF _____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20__, by _____ of who is personally known to me or who has produced _____ as identification.

Notary Signature

Print Name
Notary Public - State
Commission No:
My Commission Expires:

EXHIBIT "H"
BILL OF SALE

KNOW ALL PERSONS BY THESE PRESENTS that _____
(hereinafter referred to as the "Grantor"), for and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable considerations to it paid by Seacoast Utility Authority, (hereinafter referred to as Authority), the receipt of which is hereby acknowledged, has granted, bargained, sold, transferred, set over and delivered, and by these presents does grant, bargain, sell, transfer, set over and deliver unto Authority, its successors and assigns, all those certain goods and chattels described as follows:

Potable water lines and sanitary sewage collection lines and/or lift stations and related facilities constructed within the right-of-way and/or property of _____, which system is more completely described in the attached Exhibit "1 A" and/or "1 B".

TO HAVE AND TO HOLD the same unto Authority, its successors and assigns forever.

And the GRANTOR, for itself and its successors, hereby covenants to and with Authority, its successors and assigns, that it is the lawful owner of the said goods and chattels, that they are free from all liens and encumbrances, that it has good right to sell the same as aforesaid, and that it will warrant and defend the same against the lawful claims and demands of all persons whomsoever.

In addition, the GRANTOR hereby warrants said potable water systems and/or sanitary sewage collection systems and/or lift stations and related facilities to be free from defects due to installation and/or materials for a period of twelve (12) months from the date of execution of this document and GRANTOR further agrees to reimburse Authority in full for reasonable and necessary repairs (as determined by Authority), due to said defects during the twelve (12) month period; cost of same shall be set out on an invoice from the person performing the repairs.

GRANTOR:

By: _____

By: _____

Print Name

Print Name

Title: _____

Title: _____

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20____, by _____ of who is personally known to me or who has produced _____ as identification.

Notary Signature

Print Name

Notary Public - State of Florida

Commission No:

My Commission Expires:

Project Name: _____

Exhibit "1 A"
Water System being dedicated to Seacoast Utility Authority

Quantity(1)	Material	Diameter	Unit	Unit Price(2)	Extended Price
Fire Hydrant Assembly (3)					
Quantity(1)	Make	Unit Price(2)		Extended Price	
Back Flow Devices					
	Reduce Pressure		Double Detector Check (Fireline)		
Make					
Size					
Model					
Serial					
Price(2)					
Bldg Served					

- (1) To include all main materials, valves, fittings, air release valve and manhole etc. up to either the corp stop/ meter (for domestic/irrigation service or backflow device (fireline)).
- (2) Unit prices shall include all material and labor as installed.
- (3) Fire Hydrant assemblies shall include tee, valves, pipe and hydrant.

Project Name: _____

Exhibit "1 B"
Sanitary Sewer System being dedicated to Seacoast Utility Authority

Quantity (1)	Material	Diameter	Unit	Price	Unit Price (2)	Extended Price
Manholes						
Force Main(2)						
Lift Station Complete						

(1) To include all valves, fittings and air release valves.

(2) Unit prices shall include all material and labor as installed.

**BILL OF SALE
RECLAIMED SYSTEM**

KNOW ALL PERSONS BY THESE PRESENTS that _____
(hereinafter referred to as the "Grantor"), for and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable considerations to it paid by Seacoast Utility Authority, (hereinafter referred to as Authority), the receipt of which is hereby acknowledged, has granted, bargained, sold, transferred, set over and delivered, and by these presents does grant, bargain, sell, transfer, set over and deliver unto Authority, its successors and assigns, all those certain goods and chattels described as follows:

Reclaimed water lines, metering facilities, and related appurtenances constructed for the Project known as _____, which are more completely described in the attached Exhibit "A"

TO HAVE AND TO HOLD the same unto Authority, its successors and assigns forever.

And the GRANTOR, for itself and its successors, hereby covenants to and with Authority, its successors and assigns, that it is the lawful owner of the said goods and chattels, that they are free from all liens and encumbrances, that it has good right to sell the same as aforesaid, and that it will warrant and defend the same against the lawful claims and demands of all persons whomsoever.

In addition, the GRANTOR hereby warrants said potable water systems and/or sanitary sewage collection systems and/or lift stations and related facilities to be free from defects due to installation and/or materials for a period of twelve (12) months from the date of execution of this document and GRANTOR further agrees to reimburse Authority in full for reasonable and necessary repairs (as determined by Authority), due to said defects during the twelve (12) month period; cost of same shall be set out on an invoice from the person performing the repairs.

GRANTOR:

By: _____

Print Name

By: _____

Print Name

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20____, by _____ of who is personally known to me or who has produced _____ as identification.

Notary Signature

Print Name

Notary Public - State of Florida

Commission No:

My Commission Expires:

Project Name: _____

Exhibit "A"
Reclaimed Water System being dedicated to Seacoast Utility Authority

Quantity(1)	Material	Diameter	Unit	Unit Price(2)	Extended Price

Fire Hydrant Assembly (3)			
Quantity(1)	Make	Unit Price(2)	Extended Price

Metering Facility(3)				
Meter Mfg.	Area Served	Size	Unit Price(2)	Extended Price

- (1) To include all main materials, valves, fittings etc. up to either the corp stop/meter (for domestic/irrigation service or backflow device (fireline).
- (2) Unit prices shall include all material and labor as installed.
- (3) Metering facility prices shall include telemetry and fencing.

EXHIBIT "I"

HANDLING AND DISPOSAL OF ASBESTOS CEMENT PIPE

Federal regulations (40CFR Part 61) classify asbestos cement pipe (ACP) as Category II non-friable asbestos containing material. ACP must be handled in a manner which maintains this classification. Therefore, all cutting and disposal of ACP must be preformed in accordance with all Federal, State, and Local laws and regulations. If during the course of the work, where ACP was not anticipated, the contractor discovers, observes, uncovers, or otherwise becomes aware of the existence of any AC pipe, pieces, or material at the site to which the Contractor, Subcontractor, of other person may be, or have been exposed, the Contractor shall immediately notify the Engineer in writing. The Contractor shall ensure all subcontractors are notified and follow the proper procedures to ensure the safety of all workers and the general public.

The Contractor shall be responsible for all permits, materials, and services for the safe removal, disposal, alteration, or modification of the AACCP in accordance with all Federal, State, and Local regulations. Contractor shall contact the Asbestos Program Coordinator with Palm Beach County for the most recent state and local requirements for handling and disposal of ACP.

All scrap ACP shall be properly manifested and prepared for transport. The scrap material shall be delivered to a landfill permitted for the disposal of asbestos containing materials.

The Solid Waste Authority (SWA) of Palm Beach County (PBC) will accept ACP which is generated in PBC only if delivered to the landfill in accordance with the Asbestos NESHAP 40 CFR Subpart M, State and Local regulations. It is the responsibility of the Contractor and transporter to be knowledgeable of, and to ensure their activities are conducted in compliance with applicable regulations. The Contractor must label all disposal containers with the approximate quantity (i.e. length of pipe) of the asbestos containing waste materials contained in accordance with the SWA Asbestos Disposal Policy and Procedures. The Contractor shall refer to the SWA Asbestos Disposal Policy and Procedures document to ensure compliance and familiarity with their regulatory requirements.

The Contractor, or Asbestos Contractor, as waste generator, shall complete a Waste Shipment Record (WSR) for each shipment of ACP disposed. Refer to 40 CFR Part 61, Revision Final Rule for an example of WSR.

The Contractor or its designated Subcontractor will submit the follow documents to Authority and to Project Engineer:

1. A copy of the WSR prior to shipment
2. A copy of the WSR signed by the disposal facility within 30 days of shipment and prior to requesting a final field walk through.

WORKER PROTECTION: Contractor shall comply with the requirement of OSHA 29 CFR 1926.1101 concerning worker protection.

EXECUTION OF WORK:

- A) ACP will be kept wet during all phases of removal. No visible emissions are permitted. Wet the pipe using an airless sprayer or utilize available water.
- B) Apply drop cloth of 6-mil polyethylene to the areas beneath and a minimum of 3 feet beyond the section of pipe to be cut.
- C) Break or snap pipe into sections suitable in size to the disposal facility. Abrasive disk saws are prohibited.
- D) Apply lockdown encapsulant to exposed edges of pipe. Pick up all pipe debris that may have fallen outside of the drop cloth.
- E) Use of compressed air to clean the ACP is prohibited.
- F) At no time shall ACP or pieces be mixed in with the fill material.

DISPOSAL:

- A) Wrap pipe in the existing drop cloth. Transfer pipe to a clean drop cloth outside the trench and wrap and secure in a second layer of 6-mil polyethylene.
- B) Affix the following labels to the exterior of each separately wrapped section of pipe. Labels are to be waterproof, legible, and large enough in size to be readily visible:

First Label: CAUTION Contains asbestos fibers, Avoid opening or breaking container.

Second Label: DANGER Contains asbestos, avoid breathing dust, Cancer and Lung Disease Hazard.

Third Label: HAZARDOUS SUBSTANCE, Solid NOS ORM-E, NA9188 (asbestos).

Fourth Label: Label each container with the name of the generator (owner), the location where the waste was generated, and the quantity (length).

In lieu of the above bagging procedure the contractor may utilize "Asbestos Disposal Bags" which meet the necessary labeling requirements.

Properly wrap, bag, and label all disturbed ACP generated by the end of each day. All wrapped sections may be stored in a secure, locked enclosure pending disposal. At no time are sections or pieces of ACP to be left on the project site unwrapped and unsecured at the end of the day. All vehicles and/or containers used to haul asbestos containing waste materials shall be lined with a minimum of 6-mil polyethylene layer. Label trucks used to transport asbestos waste materials with DANGER Asbestos Dust, Cancer and Lung Disease Hazard, Authorized Personnel Only, refer to 29 CFR 1910.145 (d) for sign format.

The above is provided as general information guideline for the handling and disposal of ACP and should not be considered as a full, comprehensive, all inclusive guide to handling of ACP and other hazardous materials. It shall and is the responsibility of the Contractor(s) to ensure any handling of hazardous materials meet all Federal, State, and Local requirements.

Project Name

Contractor

Contractor's signature

Date

EXHIBIT "J"

CONSTRUCTION DETAILS GENERAL DETAILS

Symbols.....	1
Water, Reclaimed Water and Sewer Separation Statement.....	2
Tapping and Main Clearing Procedure	3
Standard Trenching Procedure.....	4
Pavement Replacement.....	5
Pipe Restraint Table	6
Casing Installation	7
Pipe Casing Spacers	8
Thrust Blocks	9
Typical Underground Valve Installation.....	10
Subaqueous Crossing	11
Canal Crossing	12
Typical Fan Guard	13
Pressure Pipe Deflection.....	14
Pipe Installation Protocol.....	15
Valve Extension	16
Fence Detail	17
Pipe Abandonment	18
Stabilized SUA Easement Section	19

WATER DETAILS

Sample Point In-Line	20
Sample Point Fire Hydrant.....	21
Flushing Hydrant.....	22
Temporary Blow Off with Restraint Block.....	23
Cannon Flushing Procedure	24
Sampling / Flushing Station.....	25a
Sampling / Flushing Station with Discharge to Sanitary Sewer.....	25b
Sampling/Flushing Water Sign.....	25c
Typical Fire Hydrant Installation.....	26
Water Service Installation - Angle Meter Stop.....	27
Typical Water Service.....	28
Typical Water Service Installation	29
Water Service Tap Under Pavement	30
Protective Enclosures for Above Ground Devices.....	31
Pipe Support	32
Meter and Backflow Assembly (3" and Larger)	33
Above Ground Fireline	34
Fireline with 1" to 2" Domestic Supply	35
Water Meter and Backflow Device 3/4" to 2"	36
Water Meter and Dual Backflow Device 3/4" to 2"	37

Lift Station Backflow Preventer Assembly	38
Private Auxiliary Water Supply Backflow Prevention Device	39
Single Family Residential Fire Line – Single Service	40
Single Family Residential Fire Line – Double Service (Short Side Only).....	41
Manual Air Release Valve (Underground Water Main).....	42
Automatic Air Release Valve (Underground Water Main).....	43
Tracer Wire Access Box.....	44
Future Detail	45

SEWER DETAILS

Oil Separator	46
Concrete Grease Interceptor.....	47
Polyethylene Grease Interceptor	48
Manhole Frame and Cover (30" Opening) in Pavers	49
Manhole, Frame and Cover (30" Opening)	50
Flow Patterns for Invert Channels	51
Standard Precast Manhole.....	52
Precast Manhole - Drop Connection Type A.....	53
Precast Manhole - Drop Connection Type B.....	54
Air Release Valve (Underground Force Main)	55
Aggru Sure Grip Liner Details.....	56
Sewer Service Connection (Wye Branch)	57
C-900 Sewer Service Transition	58
Sanitary Service Clean Out.....	59
Clean Out Connection to Existing Lateral	60
Typical Lift Station Site Plan.....	61
Telemetry Antenna General Requirements.....	62a
Lift Station Remote Telemetry (RTU) Panel Layout.....	62b
Lift Station Detail wetwell.....	63
Pressure Transducer	64
Lift Station Control Panel (Single Door)	65a
Lift Station Conduit	65b
Lift Station Control Panel Dead Front Layout.....	65c
Duplex Lift Station Control Panel J-Box	66a
Triplex Lift Station Control Panel J-Box.....	66b
Lift Station Control Panel Schematic – Duplex – 230V/3PH.....	67a
Lift Station Control Panel Schematic – Duplex – 230V/3HP	67b
Lift Station Control Panel Materials List.....	67c
Duplex Lift Station Control Panel 480V/3HP, 20HP	68a
Duplex Lift Station Panel Subplate View – 480V/3PH, 20HP and up	68b
Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68c
Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68d
Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68e
Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68f
Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68g

Duplex Lift Station Control Panel Schematic – Duplex – 480V/3PH and up.....	68h
Duplex Lift Station Control Panel – Duplex – 480V/3PH and up	68i
Duplex Lift Station Control Panel – Duplex – 480V/3PH and up	68j
Lift Station Yard Light.....	69
Future Detail	70
Future Detail	71
Low Pressure Sewer Service	72
Low Pressure Sewer Terminal/In-Line Cleanout Port with Valve	73
Low Pressure Sewer Cleanout Port with Valve	74
Low Pressure Force Main Into Manhole Connection.....	75
Low Pressure Sewer Simplex Grinder Pump and Control Panel Layout (Residential).....	76
Future Detail	77-79

RECLAIMED WATER DETAILS

Reclaimed Metering Facility Section	80
Reclaimed Metering Facility Plan	81
Stilling Well Detail	82
Future Detail	83
Reclaimed Water Control Schematic	84
Reclaimed Water Control Panel and Conduits.....	85
Reclaimed Water Control Cabinet Plan and Elevation	86
Future Detail	87
Reclaimed Water Signs	88
Air Release Valve (Underground Reclaimed Water Main).....	89

LANDSCAPE DETAILS

Typical Shrub, Small Tree or Palm Tree with Root Barrier	90
Typical Canopy Tree, Large Palm Tree or Exotic Palms with Root Barrier	91
Private Utilities Setback, Small Tree, Small Palm Tree and Shrubs with Root Barrier.....	92
Private Utilities Setback Typical Canopy Tree, Large Palm or Exotic Tree with Root Barrier	93

Index – Minimum Construction Standards & Specifications

accent plants, II-9 and II-11
access for inspections, I-7
Agru Sure-Grip HDPE Liner, IV-4 and Construction Detail #61
air conditioning condensate, II- 5
air release valves for force mains, IV- 12 and Construction Detail #58
air release valves for reclaimed water system, V-7 and Construction Detail #89
air release valves for sanitary, IV- 3
air release valves for water system, III-3, III- 12, Construction Detail #40 and #41
allowable leakage, reclaimed water mains, V-9
allowable leakage, water mains, III-5

backfill gravity sewer mains, IV-3
backfill, II- 7
backflow prevention devices required, III-1
backflow prevention devices, III- 13
bacteriological tests, III- 7
ball valves for water system, III- 12
bill of sale, Exhibit “H”
blow off, temporary, Construction Detail #23
booster pump required, III-1
buoyancy calculations, IV-5
butterfly valves for reclaim water system, V-2
butterfly valves for water system, III- 12
butterfly valves testing, III- 8

caisson construction, wet well, IV-9 and Exhibit “F”
canal crossing, Construction Detail #12
cannon flushing procedure, Construction Detail #24
cannon flushing, reclaimed water mains, V- 8
cannon flushing, water mains, III-4
casing installation, Construction Detail #7
casing spacers, Construction Detail #8
cement mortar lining of water mains, III- 9
check valves for water system, III- 12
chemical degreasers, IV- 25
cleaning reclaimed water mains, V- 8
cleaning water mains, III-4
clean out, Construction Detail #57
coating and lining repairs, II-8
compound water meter, III- 13
concrete, sanitary system, IV- 21
concrete, water system, III- 13

Minimum Construction Standards & Specifications

construction dewatering, I-5
construction plan preparation requirements, II-5
construction safety, I-5
construction water, I-7
contractor's license verification, Exhibit "C"
control panel, lift station, IV-7
control panel, reclaimed water system, V-3
cooling tower blowdown, II- 5
copper tubing for water service, III- 10
copper water services, III- 10
cover requirements, II-2
cover sheet, II-6
curb stops for water services, III- 10

defective materials, I-2
degreasers, IV- 25
disinfection of water mains, III-6
driveways to be shown on plans, II- 6

easement, lift station, IV- 11
easement, reclaimed water metering facility, V-4
easements, I-4, II-3, II-4,II- 6 and Exhibit "G"
electrical power, lift stations, IV-6
electrical power, reclaimed water, V-4
embedment materials, II- 7
Encroachment Agreement, II-3
exfiltration rate, gravity sewer mains, IV- 17
exfiltration test, IV- 3 and 17
existing utility notification, I- 6

fan guard, Construction Detail #13
faulty workmanship, I-2
Fernco couplings, IV- 20
finish floor elevations, II-5
finished grade, II- 4
fire flow requirements, II-4 and II- 7
fire hydrant extensions, III- 12
fire hydrant installation, Construction Detail #25
fire hydrant tee installation, Construction Detail #27
fire hydrants, III-4, III- 11
fireline, above ground, Construction Detail #34
fireline with domestic supply, Construction Detail #35

Minimum Construction Standards & Specifications

Fire Marshall approval, II-6
flanged pipe for water system, III- 9
flow rate indicator, reclaimed water, V- 5
flushing hydrant, Construction Detail #22
flushing, reclaimed water mains, V- 8
flushing water mains, III-4 and III-5
force mains, installation, IV- 11
force mains, IV-2 and IV-3
force mains, private, IV-1

gate valves for water system, III- 12
gravity sewer mains between dwelling units, II-1
grease interceptors, IV- 23
grease trap, IV-1, IV- 23 to IV-27, and Construction Detail #59
ground cover type plants, II- 9 and II- 10
grout, water system, III- 13
grout mixture design, II- 9
grout, sanitary system, IV- 21
guarantee, I-2

hazardous substances, II- 5
hydrant extensions, III-4 and III-12
hydraulic design, water system, III-2
hydraulic design, sanitary system, IV-1

improvements installed over water or sewer facilities, II- 3
industrial wastes, IV-1
infiltration test, IV- 17
inspections, I-6
inspectors, authority, I-6
installation of reclaim system instrumentation, V-5
installation of water mains, III- 3
installation protocol, II-6 and Construction Detail #15
instrumentation & controls, reclaimed water, V-4
invasive plants, II- 10

lampposts, sewer mains, IV-3
landscape guidelines, I-7, II- 9 and Construction Detail #90 and #91
landscaping in authority easements, I-8, II- 9
landscaping plan, II- 9 and II-12
laterals, sanitary service, IV- 19
leakage test, reclaimed water mains, V-8

Minimum Construction Standards & Specifications

leakage test, water mains, III-5
lift station backflow assembly, Construction Detail #38
lift station calculations, II- 16
lift station control panel, IV-6 and Construction Detail #64a to #66
lift station depth, IV-2
lift station design, IV- 8 and Construction Detail #63 to #70
lift station power supply, IV-6 and 7
lift station telemetry, IV-7
lift station wet wells, IV- 4, IV- 9, and IV- 10
lift stations, private, IV-1
looping of water mains, III-1
low pressure sewer systems, IV- 13 and Construction Detail #71 to #75

main extensions required, II-1
manhole cover and frame, IV- 20 and Construction Detail #50
manhole depth, IV-2
manhole inserts, watertight, IV-4
manhole invert channels, Construction Detail #51
manholes, drop through, IV- 4
manholes, drop, IV-4, Construction Detail #53 and #54
manholes, IV- 4 and Construction Detail #52
master plan sheet, II-5
master plan, II-1
materials, reclaimed water system, V-1
materials, sanitary system, IV- 20
materials, water system, III- 9
maximum cover, II-2
mechanical joint fittings for water system, III- 9
megalugs, III-3
metering facility, reclaimed water, V-4 and Construction Detail #80 to #87
meter, reclaimed water, V-3
meter and backflow assembly, Construction Detail #33, #36, and #37
meter box, water, III- 13
meter enclosure, water, III- 13
meter fee, water, III- 13
meter location, water, III- 2
minimum cover, II-2
mortar, sanitary system, IV- 21
mortar, water system, III- 13
mortgagee joinder and consent, Exhibit "G"
muck, II- 7

Minimum Construction Standards & Specifications

NPDES Construction Activities Permit, I-5
nuisance trees, II- 11

oil separator, Construction Detail #60
Omni marker, force mains, IV- 11
Omni marker, reclaimed water system, V- 7
Omni marker, Sanitary Laterals IV-19
Omni marker, water system, III-3 and III-8
operation & maintenance manual, reclaimed water system, V-6
operations of existing facilities, I-6

pack joint fittings for water services, III- 10
paint system for above ground piping, II- 8
paint, above grade reclaim water piping, V-1
paint, above grade water piping, III- 13
paint, lift station, IV-9
palm trees, II- 9
pavement replacement, Construction Detail #5
paving and drainage plan, II-6
permits, I-3
pigging, force mains, IV-3
pigging, reclaimed water mains, V- 8
pigging, water mains, III- 5
pipe casing spacers, Construction Detail #8
pipe deflection, Construction Detail #14
pipe plug, polyethylene, III-4
pipe restraint table, Construction Detail #6
pipe support, Construction Detail #32
piping crossings, II- 6
piping orientation, II-1
plan availability, I-3
plan submittal prerequisite checklist, II- 12
plan submittal review procedures, II- 11
plans and specifications, I-3
plans on 24" x 36" sheets, II-5 and II-6
plans, scale, II-5 and II-6
plat, I-4
plat, preliminary, II-6
plans kept on site, I-3
plug valves, sanitary, IV- 3 and IV- 22
polyethylene tubing for water service, III- 10
preconstruction meeting, I-3

Minimum Construction Standards & Specifications

pre-engineering meeting, I-1 and II-1
pressure test, force mains, IV- 13
pressure test, reclaimed water mains, V-8 and V-9
pressure test, water mains, III- 5 and III- 6
pretreatment procedures, II- 5
problem trees, II- 10
profiles, II-5
prohibited discharges to sewer system, II- 5
project built in phases, II- 6
protective enclosures, Construction Detail #31
pumping station design, IV-5

record drawing submittal guide, Exhibit “E”
record drawings, I-7
refrigeration condensate, II- 5
repair to new facilities, I- 8
replacement of existing facilities required, II- 3
resilient seat valves, sanitary, IV- 22
restraint joint system, force mains, IV- 12
restraint joint system, reclaimed water, V- 7
restraint joint system, water, III-3
reverse osmosis reject water, II- 5
root barriers, II- 10

sample point, fire hydrant, Construction Detail #21
sample point, in-line, Construction Detail #20
sample taps, III- 7
sandblasting above ground piping, II-7
sanitary service clean out, Construction Detail #57
sanitary system materials, IV- 20
screening of backflows, II- 16
separation requirements, II-1 and Construction Detail #2
separation requirements, reclaim water, V-1
service connections, II-4
service interruption, scheduling, I-6
service laterals, IV-1, IV-19 and Construction Detail #55
service line identification, sanitary, IV- 19
service line locations, I-6
setback requirements, II-2
sewer alignment, IV-2
sewer fittings, gravity, IV-2
sewer service transition from C-900, Construction Detail #56

Minimum Construction Standards & Specifications

Sewer Guard, IV-4
sewer maximum slope, II- 16
sewer slopes, IV-1
sewer systems, low pressure, IV- 13
sewer systems, non residential low pressure, IV-14
sewer systems, residential low pressure, IV- 16
Sewper Coat, IV-4
shop drawings, I-4
shop drawings, reclaim system instrumentation, V-5
shop specifications, I-4 and Exhibit "D"
shrubs, II- 4 , II-9 and II-10
signs for reclaimed water, Construction Detail #88
softener brine, II- 5
solids interceptor, IV- 26
solids retention device, IV-1
special project requirements, I-1
steel casing installation, Construction Detail #7
Stormwater Pollution Prevention Plan (PPP), I-5
streetlights to be shown on plans, II- 6
subaqueous crossings, II- 5 and Construction Detail #11
submetering, II-4
Sunshine State One-Call, I- 6
survey, II-6
surveyor's certification, Exhibit "C"
switch cabinets to be shown on plans, II-6

tapping and main clearing procedure, Construction Detail #3
tapping saddles for water services, III- 10 and III-11
tapping sleeves for force mains, IV- 13
tapping sleeves for reclaimed water, V-7
tapping sleeves for water services, III- 4 and III- 10
telemetry, reclaimed water, V-3
telemetry, sanitary, IV-7 and IV-8
telephone signal booster stations to be shown on plans, II-6
telephone splice boxes to be shown on plans, II-6
televising sewer laterals, I-7
testing, reclaimed water system, V-6
testing, sanitary, IV- 17
testing, water mains, III- 5
thrust blocks, Construction Detail #9
thrust blocks for water system, III-3, III-8
thrust restraint system, III-3

Minimum Construction Standards & Specifications

tie rods, III-3
title insurance, I-5
totalizer, reclaimed water, V-5
toxic substances, II- 5
transformers to be shown on plans, II-6
treated groundwater, II- 5
trenching procedure, Construction Detail #4
tree, small, II- 10

unauthorized connections, I-6
unsuitable materials, II- 7
utilities to be shown on plans, II-5
utility plan, II- 7

valve boxes, reclaim water system, V-2
valve boxes, sanitary system, IV- 22
valve boxes, water system, III-10 and III- 12
valve extension, Construction Detail #16
valve installation, Construction Detail #10
valves, water system, III- 12

water meter installation, III- 7
water service line identification, III-7
water service line installation, III- 7, Construction Detail #28 and #29
water service magnetic marker, III- 8
water service tap under pavement, Construction Detail #30
water system installation of valves, III- 8
water system materials, III- 9
water system restraint joint system, III- 8
wet wells, IV-6
wing plug on lines under construction, II-7
workmanship, I-2