

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. Industrial wastes from any source, including but not limited to, service station wash-racks, lubrication racks and shop floor drains shall not be connected into the sanitary sewer system without pretreatment specifically approved by Authority.
4. 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 traps shall be sized by the Authority in accordance with the criteria contained herein and with Palm Beach County Environmental Control Rule I.
5. 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. Availability of gravity sewer will be determined by Seacoast Utility Authority on a case by case basis.
6. 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.
7. Service laterals shall not exceed 75 feet.

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	0.40%
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.

8. Ductile Iron Pipe Lining: Whenever the use of DIP is required for gravity sewers, the pipe shall be lined with polyethylene or Protecto 401, with attention paid to repairs to the lining caused by field cutting the pipe.

9. Transition from SDR 18 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.

10. 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.

11. 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: 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. Polyethylene or Protecto 401 lined DIP force mains and fittings will be required.
- f. Where private force mains tie to the Authority's force main an approved check valve shall be installed on Developer's side of the plug valve.
- g. Pigging is required for all force mains 16" and greater in diameter. The Authority may require the force mains less than 16" in 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 with The Authority. 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 & 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 in accordance with manufacturers' instructions.

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. In lieu of Agru Sure-Grip, new manholes, which will receive direct flows from a

force main, external drops, or Lift Station collector, may have the interior surfaces properly coated with REZKLAD 125S-AR. 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. If failed, what corrective measures were taken.

11. Existing Manholes which will receive direct flows from a force main or external drop shall have the interior surface properly prepared and coated with Sewper Coat Calcium Aluminate or REZKLAD 125S-AE.

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. A station 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 his 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).
- c. Minimum depth from sewer line invert to wet well floor shall be four 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.).
- 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 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.
- 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, master lift stations that will have minimal flows for a considerable time shall be equipped with temporary pumps and/or impellers with reduced capacity, though 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 polyethylene or Protecto 401 lining from pump feet to the below grade plug valve exiting the lift station. 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' of lift station site.

Developer/Contractor shall pay for all cost associated with having electrical power designed and installed to lift station. This shall included any and all fees or CIAC which may be required and due to Florida Power and Light Company.

Developer/Contractor shall be responsible for all electric bills until Developer receives Final Letter of Acceptance from the Authority.

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 a solid state telemetry control unit. The telemetry control unit shall be programmable for duplex and triplex operation. Unit shall be equipped with integrated programming function keys for local programming; hand-off-auto selector switches and LED readout. Unit shall accept digital as well as 4-20ma signals and have the ability to interface these signals with Authority's telemetry system. Unit shall be supplied with internal radio receiver and transmitter. Telemetry control unit with internal backpack radio to be manufactured by Data Flow Inc.
- g. High level alarm light with a flashing 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.
- 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 dripshield 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 two three (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" by 1-5/8", 12-gauge stainless steel Unistrut at a height consistent with FP&L's requirement for mounting their meter. All hardware shall be 316 stainless steel. See Authority's Construction Detail Drawing No.64.
- 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 (Koppers 300-M, 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 instruction. or coated with two coats of the high solid epoxy compound REZKLAD 125S-AR in accordance with manufacturers 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 wetwells 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 - Two coats of an approved coal tar epoxy (Koppers 300-M, or equivalent) shall be applied to the interior wetwell piping in strict accordance with the manufacturer's instructions. Each coat shall be of a different color with the final coat being black and each shall be minimum 10-mils D.F.T.
- 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".

13. Wet Well - Caisson Construction:

- a. Construction of a wet well using the caisson (tremie) method shall be considered by Authority on a case by case basis.
- b. The EOR shall present in writing the following information to Authority for requesting change from standard construction:
 1. Site conditions (including hydrogeologic 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. This listing shall give the location of the wet well and the names and address of the utility company currently operating the lift station.
- c. Wet wells constructed by the caisson method which are completed out of plumb or with any visible groundwater infiltration will be rejected. The contractor must execute the affidavit which is listed herein as Exhibit F "Lift Station Wet Well Caisson Construction Affidavit" before Authority will approve lift station shop drawings.
- d. Authority's approval for the installation does not in any way guarantee the final acceptance of said lift station.
- e. 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.

14. 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

15. 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.

16. Enclosures:

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

17. 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. Force main pipe shall have green stripes applied to the pipe wall at the time of manufacturing. 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 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 (Cor-Ten 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" diameter through 10" diameter, four tie rods per joint for sizes 12" diameter through 16" and 6 tie rods per joint for sizes 18" through 24".

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. 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.

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. 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.

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 SUA representative.

G. LOW PRESSURE SEWER SYSTEMS

1. Low pressure pumping units shall not be owned, operated or maintained by the Authority. The entity responsible for such shall enter into the Authority's pro forma sewer service maintenance agreement, unless a separate Health Department permit is required and obtained for the pump station.
2. Low pressure pumping units shall be located so that surface water run off shall not interfere with electrical components, nor be located under roof overhangs or downspouts.
3. Site drainage must be directed away from wet well. Wet well lid shall be set at minimum 100 year flood elevation and shall be 3" minimum above surrounding ground. All vents shall be set 6" above 100 year flood elevation.
4. 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.
5. The lift station location is to be approved by the Authority prior to installation. The wet well must 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.
6. Manufacturer shall supply and attach electrical control panel schematic to inside face of control panel door.
7. A shut-off ball valve is required outside and within 5' of each lift station and shall be accessible in the valve box. This requirement may be waived only for simplex

residential pump stations with an easily accessible stainless steel 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. The inside of control panel shall provide information on the location of these generators and contact phone numbers.
9. Property owner shall provide a water hose bibb with backflow preventor for maintenance operations located within 15 feet of wet well. The property owner shall be required to install an Authority approved RPZ backflow device on the downstream side of water meter.
10. A Metallic detectable tape (Terra Tape #540-green, marked "Caution Sewer Line Below", or an Authority approved equal) must be installed over all low pressure PVC force mains from the private lift station to the Authority's point of service.
11. Authority approved non detectable, stretch type underground marking tape (Proline-Safety) shall be installed over all SUA owned force mains, valves, and services, 12" maximum buried depth.
12. A #10 AWG, solid copper, Type THNN, green insulation tracer wire shall be installed directly under all PVC force mains owned by the Authority.
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 start up shall include starting the station on permanent power and also on generator power.

NON RESIDENTIAL LOW PRESSURE SEWER SYSTEM

1. **Main and Service Pipe-** Sch 80 gray bell joint PVC, 350 psi. 1 ½", 2" and 3". (Charlotte Pipe) - Note: No slip x slip couplings are allowed.
2. **Main and Service Fittings-** Spears Manufacturing Company only, Sch 40 PVC

Note: No DWV fittings are allowed nor are Sch 40 male adapters, slip couplings or slip bushing. No Sch 80 PVC fittings are allowed.

3. **3" Main Fittings-** MJ Ductile Iron Class 350 with Polybond or Protecto 401 lining.
4. **Valves-** 3" Milliken Millcentric Eccentric Plug Valve, MJ body with stainless steel bolting, nickel seat, Nitrile (Buna) Elastomer trim, with 2" square operating, bi-directional shut off.
5. **Service Valves-** 1 1/2" and 2" full port ball valves-Ford Meter Box Company only, PVC Pack Joint x PVC Pack Joint B77-666 and B77-777
6. **Valve Boxes (3" Valves) -** Amtek 5 1/4" plastic valve box with cast iron cover and ring with "sewer" designation.
7. **Valve and Clean Out Boxes 1 1/2"-2"-** Russco VB2607S valve box with "sewer" designation with 6" SDR 35 PVC riser.
8. **Tracer Wire-** Continuous (no breaks) #10 AWG, solid copper, Type THHN with green insulation; 11" cable ties.
9. **PVC Primer and Cement-** Oatey All Purpose.
10. **Thread Sealing Compound-** PTFE paste (LA-CO Slic-tite or Hercules real-tuff).
11. **2" or Smaller Plugs-** Sch 40 red brass, solid type with square head (Lee).
12. **Underground Marking Tape-** Vinyl plastic tape PVC backing material with rubber based adhesive minimum 6 inch width, 0.006 inch thickness, and 20.0 lbs per inch tensile strength.

Wording - "Caution Sewer Line Below" minimum 5/8 inch in height.

Color - Wording in black with green background, Proline-Safety or SUA approved equal.

Lift Station- Shall conform to all Palm Beach County Health Department requirements. Duplex station required. Wet wells shall be 4' diameter concrete with 8" thick walls and shall meet Section IV-D "manholes" precast requirement or SUA approved HDPE with only fusion welded fittings through the walls. All lift stations shall be equipped with exterior shut-off valves and by-pass pump out with SUA approved strainers.

Approved lift station or equal:

- 1) Atlantic Environmental Systems, Inc.
- 2) Southeastern Pump

RESIDENTIAL LOW PRESSURE SEWER SYSTEM

1. **Main and Service Pipe**- Sch 80 gray bell joint PVC, 350 psi. 1 ¼", 1 ½" and 2". (Charlotte Pipe).
Note: No slip x slip couplings are allowed.
2. **Main and Service Fittings**- Spears Manufacturing Company only, Sch 40 PVC
Note: No DWV fittings are allowed nor are Sch 40 male adapters, slip couplings or slip bushing. No Sch 80 PVC fittings are allowed.
3. **3" Main Fittings**- MJ Ductile Iron Class 350 with Protecto 401 lining.
4. **Valves**- 3" Milliken Millcentric Eccentric Plug Valve, MJ body with stainless steel bolting, nickel seat, Nitrile (Buna) Elastomer trim, with 2" square operating nut, bi-directional shut off.
5. **Service Valves**- 1 ¼" , 1 ½", and 2" full port ball valves-Ford Meter Box Company only, PVC Pack Joint x PVC Pack Joint B77-555, B77-666, and B77-777.
6. **Valve Boxes (3" Valves)** - Amtek 5 ¼" plastic valve box with cast iron cover and ring with "sewer" designation.
7. **Valve and Clean Out Boxes 1 ¼"-2"**- Russco VB2607S valve box with "sewer" designation with 6" SDR 35 PVC riser.
8. **Tracer Wire**- Continuous (no breaks) #10 AWG, solid copper, Type THHN with green insulation; 11" cable ties.
9. **PVC Primer and Cement**- Oatey All Purpose.
10. **Lift Station**- Shall conform to all Palm Beach County Health Department specifications as well as the following SUA minimum requirements: Wet wells shall be HDPE and have only fusion welded fittings through the walls or concrete structure with 6" walls and shall meet Section IV-D "manholes" precast requirements. Lids and access doors shall be gas tight.

Houses < 5,000 square feet may be simplex stations.

Houses > 5,000 square feet must use duplex stations.

Approved lift station or equal:

- 1) Southeastern Pump
- 2) Atlantic Environmental Systems, Inc.

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 30 AMP 3 pole twist lock 2713 Leviton or approved equal. Duplex station generator receptacle shall be 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.

11. **Service Disconnect-** Separate fused service disconnect required in Nema 4X box (knife type).
12. **Underground Marking Tape-** Vinyl plastic tape PVC backing material with rubber based adhesive minimum 6 inch width, 0.006 inch thickness, and 20.0 lbs per inch tensile strength.

Wording - "Caution Sewer Line Below" minimum 5/8 inch in height.

Color -Wording in black with green background, Proline-Safety or SUA approved equal.

H. TESTING

1. Gravity Sewer

a. Required tests for gravity sewers are: (1) Density Test; (2) Lamp mains; (3) Laser Profile mains that are deemed questionable; (4) Televising laterals; (5) 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. (4) 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 his expense to assure full compliance with these specifications. The repair method to be used shall be approved, in advance, by Authority.

2. Force Main

a. 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.

b. 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.

1. PRESSURE AND LEAKAGE TEST - 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 one hour.

After successfully completing the pressure test, pressure in the pipeline being tested shall be reduced to 100 psi and that pressure shall be held for an additional one hour time period. All visible leaks, including damp spots shall be corrected regardless of the results of the pressure and leakage tests.

2. 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).

No allowable leakage for polyethylene pipe or glued joint pipe.

- c. Private low pressure residential force main shall be tested at a minimum of 100 PSI for one hour with no loss in pressure.
- d. A loss of 5 psi or more during the 150 psi testing, regardless of the amount of leakage shall be considered a failing test. A loss of 5 psi or more during the 100 psi testing, regardless of the amount of leakage shall be considered a failure. A total loss of 10 psi or more for both test combined shall be considered a failing test.
- e. A gain of pressure during the test shall be considered a failing test.
- f. 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.
- g. Failure of the test gauge to zero out upon completion of test shall be cause for rejection.
- h. 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.

- i. 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 potable water well zones of influence.
- j. Water for testing force main shall be clean fresh water. In no case shall it be tested with saline, brackish or turbid water.
- k. The Authority will not schedule the pressure test until pipe has been properly backfilled, compacted, finish grade established, and as-builts accepted.

I. 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 service connections shall be laid at a depth not less than 30 inches nor 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 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.

J. 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 C-900 SDR 18 pipe.
- c. Ductile iron pipe shall conform to ANSI A21.51 and AWWA C-151 Class 51 for sizes up to and including 12 inch and Pressure Class 350- for pipe sizes larger than 12 inch and shall conform to ANSI A21.51 and AWWA C-151. Pipe interior shall have polyethylene lining. Wherever polyethylene or Protecto 401 lined ductile iron pipe is field cut or tapped the damaged lining shall be repaired in strict accordance with the manufacturer's recommendation. Authority's representative shall be notified when repairs are to be made and shall have the option of being present during repairs.
- d. Fittings shall be compatible with the type of pipe used.

- e. PVC fittings with welded or clamped connections are not permitted.
- f. Flexible rubber type connectors (Fernco Couplings) are permitted only on existing VCP, Cast Iron, Ductile Iron, or other non PVC laterals and mains.
- g. 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 Detail Drawing No. 57.
- h. 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 C33 or ASTM C404, 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 ductile iron pipe.
 - 2. Ductile iron pipe shall be Class 51 for sizes up to and including 12 inch and Pressure Class 350 for pipe sizes larger than 12 inch and shall conform to ANSI A21.51 and AWWA C-151. Pipe and fittings must have polyethylene or Protecto 401 lining. Whenever lined ductile iron pipe is field cut or tapped the damaged lining shall be repaired in strict accordance with the manufacturer's recommendations. Authority's representative shall be notified when repairs are to be made and shall have the option of being present during repairs.
 - 3. Flanged pipe shall be polyethylene lined or Protecto 401 and 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.

4. 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 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 wet well and above ground service only. Fittings shall conform to requirements or ANSI A21.20 and AWWA C-110 and lined inside and outside as specified for the pipe.

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.

K. GREASE TRAPS/INTERCEPTORS

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. Interceptors shall be as sized herein with the minimum capacity being 750 gallons and a maximum of 1,250 gallons.
- c. 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.
- d. Interceptors shall be designed and installed such that they will not become air bound if closed covers are used.
- e. Interceptors shall be designed and installed such that they will not float after being pumped out during periods of high groundwater elevation.

2. Construction/Installation

- a. 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.
- b. 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.
- c. Precast concrete grease interceptors shall have a minimum wall and bottom thickness of four inches. Tops shall have a minimum thickness of four inches when installed in non traffic areas and a minimum of 8" 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. Where support is provided without bearing on the tank, bearing shall be on the soil independent from the grease interceptor and reinforced as specified by the engineer.

- d. 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.
- e. Clean outs shall be provided and installed in conformance with Authority's specifications at both the inlet and outlet to the tanks(s).
- f. Access to the tanks(s) for cleaning and inspection shall be provided via a minimum of two (2) 24-inch diameter ring and covers. Located at each end (inlet & outlet) of the tank.
- g. Minimum inlet and outlet piping size is six (6) inch.
- 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 a Seacoast Utility 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 seven (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. The 24-inch cast iron covers shall have the words GREASE cast into it.
- n. 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.
- o. Installation of the tank, interior piping etc. shall conform to the details on the plans and Authority's Construction Detail Drawing No. 59 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 2-4 weeks. Actual pump-out frequency will depend on flow and grease generation.
- c. Authority shall periodically inspect the devices to insure their proper operation. The owner/operator of the facility shall be responsible for taking any and all necessary steps to rectify any discrepancies found.
- d. Use of chemical degreasers is prohibited. Biological agents are permitted upon approval by Authority.

4. Sizing Procedures

- a. Authority shall calculate the size of the grease trap/interceptors based on the following:

Multi Unit Installation (Restaurants)

1. 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 1.7

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

2. Once the gallonage has been obtained use that figure to select the appropriate sized grease interceptor from the following chart:

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

*Minimum size

**Above 1,250 gallons multiple interceptor tanks in series must be used. The tanks shall be of the same size.

3. When wastewater gallonage figures exceed the figures shown, select the next larger structure, i.e. wastewater gallonage = 2,600, use 1,250 gallon interceptor.

Single Unit Installation - Special Approval Required

(1) Grease interceptors may, on a case by case basis, be allowed to be installed on a specific fixture(s) within a building. Normally these installations would be limited to one or two sinks and no dishwashing machines.

(2) The installation of a compatible flow control device shall be mandatory and no installation shall be approved without it.

(3) A solids interceptor will be required to be installed upstream of the grease interceptor.

(4) Consult the manufacturer's catalogs for the appropriate sized interceptors and flow control device. Interceptor shall not be approved without the installation of the device and its appropriate vent.

(5) Authority approved manufacturers are Josam, Jay R. Smith Manufacturing Companies, and Zurn.

(6) 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.

(7) 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.

(8) The following submittals are required for all interior grease interceptors:

- a. Shop cut on three compartment sink showing size and water level.
- b. Shop cut on flow control device to be supplied with 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 acid resistant coating inside and outside. Interceptor must be certified by PDI to meet standard G101.
- d. Building plans showing plumbing schematic.