

## SECTION 8.0

### MATERIAL SPECIFICATIONS FOR WASTEWATER SYSTEM EXTENSIONS

#### 8.1 GENERAL

The materials used for the construction of sewer extensions and all accessories and appurtenances thereof shall be new, free of defects in product workmanship and of the highest quality available in the industry. Materials not specified but deemed equal to those specified may be approved for use provided the documentation and samples necessary for approval are provided to the Commission thirty (30) days prior to the ordering of said materials. WRITTEN APPROVAL must be issued by the Commission before such material may be used in construction. Current specifications (latest revisions) shall apply in all cases where materials are described by reference to published standards such as ASTM, ANSI, etc.

#### 8.2 GRAVITY SEWER PIPE AND FITTINGS

Gravity sewers shall be constructed of ABS composite (truss) pipe, PVC composite (truss) pipe, PVC pipe (in accordance with Section 8.2.4 and 8.2.5) ductile iron pipe, or extra strength vitrified clay pipe, at the option of the Engineer or Developer, except for circumstances where the Manual or the Commission specifically requires a particular pipe material be utilized for an installation.

##### 8.2.1 ABS Composite Pipe

ABS pipe shall conform to the requirements of ASTM D2680, Standard Specification for Acrylonitrile-Butadiene-Styrene Composite pipe. Joints and fabricated fittings shall be chemically welded using a cement and primer recommended by the pipe manufacturer. The pipe shall be similar in all respects to Armco Truss Pipe as manufactured by Contech Construction Products, Inc. ABS pipe shall be supplied in 12.5-foot lengths.

##### 8.2.2 Ductile Iron Pipe

8.2.2.1 All ductile iron pipe shall be manufactured in compliance with ANSI Standard A21.51. The interior of the pipe shall be cement-mortar lined in accordance with ANSI A21.4.

The exterior of the pipe shall have a one (1) mil bituminous coating in accordance with ANSI A21.51. The thickness class for ductile iron pipe shall be Class 50 unless required otherwise by the Commission. Pipe shall be in nominal 18-20 foot laying lengths. The pipe joints for ductile iron pipe shall be "push-on" manufactured in accordance with ANSI 21.11. Where fittings are required, as in the installation of drop manholes, the fittings shall conform to the requirements of Section 7.2.3 for water main fittings.

8.2.2.2 Polyethylene encasement shall be applied to all underground ductile iron pipe installations. Materials and installation procedures shall be in accordance with ANSI/AWWA C105/A21.5.88.

### 8.2.3 Vitrified Clay Pipe

Vitrified clay sewer pipe shall be extra strength, unglazed, conforming to ASTM C700. Pipe shall have polyester joint material as manufactured by Logan Pipe or approved equal. Joints for vitrified clay pipe shall be in accordance with ASTM C425 for joints using materials having resilient properties.

### 8.2.4 Polyvinyl Chloride (PVC) Pipe 8"-15"

PVC pipe shall conform to the requirements of ASTM D3034 (SDR35). Joints and fabricated fittings shall be elastomeric (gasket) joints and shall be assembled in accordance with the pipe manufacturer's recommendations and Specification D3212. Gaskets shall meet the requirements of ASTM F477. Minimum cell class shall be 12454B. PVC pipe shall be supplied in 13.0-foot lengths.

### 8.2.5 Polyvinyl Chloride (PVC) Pipe 18" - 24"

PVC pipe shall conform to the requirements of ASTM F679 (wall thickness T-1). Joints and fabricated fittings shall be elastomeric (gasket) joints and shall be assembled in accordance with the pipe manufacturer's recommendations. Gaskets shall meet the requirements of ASTM F477. Minimum cell class shall be 12454C. PVC pipe shall be supplied in 13.0-foot lengths.

#### 8.2.6 PVC Composite Pipe

PVC composite pipe shall conform to the requirements of ASTM D2680, Standard Specification for Poly (Vinyl Chloride). Joints and fabricated fittings shall be elastomeric (gasket) joints and shall be assembled in accordance with the manufacturer's recommendations. Minimum cell class shall be 12454B. The pipe shall be similar in all respects to Armco Truss Pipe as manufactured by Contech Construction Products, Inc. PVC composite pipe shall be supplied in 12.5-foot lengths.

#### 8.2.7 Sewer Service Pipe

Sewer service pipe shall be Schedule 40 PVC-Drain, Waste and Vent (DWV) pipe in accordance with ASTM D2665 and ASTM D1785. Cleanouts shall be constructed of pipe and fittings which also meet the ASTM requirement for Schedule 40 PVC-DWV pipe. Cleanout caps shall be Charlotte 110 or Jones BP134CSK flush cap. Cleanouts located in traffic or paved areas shall be installed with a sewer cleanout box set to finished grade as shown in the standard details.

#### 8.2.8 Service Fittings

8.2.8.1 Service saddles for use with ABS composite sewers shall be ABS saddle wyes as manufactured by Contech Construction Products, Inc. or approved equal. Wyes shall be chemically welded using the manufacturer's recommended primer, cement, and stainless steel bands.

8.2.8.2 Services from vitrified clay sewers shall be made by means of wye branches conforming to ASTM 700.

8.2.8.3 Service from ductile iron pipe less than 18" in diameter shall be provided by means of ductile iron wyes meeting the requirements for water main fittings as given in Section 7.2.3 of the Manual. Services from ductile iron pipe 18" in diameter and larger shall be provided by ductile iron wyes unless an alternate method, acceptable to the Commission, offers significant economy without sacrificing performance.

- 8.2.8.4 Service fittings for use on PVC composite pipe shall be PVC standard gasketed wyes manufactured or approved by the pipe manufacturer and shall conform to the requirements of ASTM D2680.
- 8.2.8.5 Service fittings for use on PVC (SDR35) pipe shall be a standard gasketed wyes, manufactured or approved by the pipe manufacturer and shall conform to the requirements of ASTM D3034.
- 8.2.8.6 Service fittings for use on PVC pipe sizes 18 to 27 inches shall be standard gasketed wyes manufactured or approved by the pipe manufacturer and shall conform to the requirements of ASTM F679.

#### 8.2.9 Manhole Vent Piping

Pipe and fittings used on manhole vents shall be Ductile Iron in accordance with Section 8.2.2.

#### 8.2.10 Transition Couplings For Gravity Sewers

- 8.2.10.1 The preferred transition connection between different sewer line materials shall be a standard manhole installation.
- 8.2.10.2 Pipe material changes between manholes may be permitted provided there is not a substantial difference in inside diameters, a smooth uniform flow line is maintained, and a watertight rubber sleeve or mechanical coupler conforming to ASTM C-425 is used to make the transition. All metal hardware shall be stainless steel. Transition sleeves shall be manufactured by Fernco or Indiana Seal.

### 8.3 STEEL ENCASEMENT PIPE

Steel encasement pipe shall be of ASTM A139 Grade B Steel. The encasement pipe shall meet the requirements of Section 7.9 of the Manual.

## 8.4 MANHOLES

- 8.4.1 Manholes shall be precast and have a monolithic bottom section unless otherwise approved by the Commission in writing. Manholes with a depth greater than 6 feet shall have eccentric cones, manholes with a depth of 6 feet or less shall have a concentric cone. Manholes shall conform to ASTM C-478. Joints shall be water tight and conform to the ASTM C478 standard for section joints designed for cold applied sealing compound. The sealing compound shall be CPS-210, Concrete Products Supply Company, Concrete Sealants or approved equal.
- 8.4.2 Flat top manholes for gravity sewers shall be used only when approved in writing on a case by case basis by the Commission. Manholes of depth less than four feet (4') as measured from the top of the ring and cover to the lowest pipe invert shall require special design considerations. Shop Drawings shall be submitted to the Commission for such manholes.
- 8.4.3 The minimum inside diameter of manholes shall be 4.0 feet. Larger manholes shall be required for gravity sewers twenty inches (20") in diameter and larger. See the Standard Details.
- 8.4.4 Manholes more than twelve feet (12') in depth, as measured from the top of the ring and cover to the lowest invert, or as measured from surrounding finished ground elevation at the manhole location to the lowest manhole invert, whichever is greater, shall have an integral precast extended base as shown in the Standard Details.
- 8.4.5 Points of exit and entry for all pipe including services; shall be provided with flexible manhole sleeves and all stainless steel take up clamps in accordance with ASTM C-923. Manholes exceeding twenty-three feet in depth shall require a certification from the manufacturer that the flexible sleeves provided are capable of withstanding a hydrostatic pressure equal to the depth of the installed manhole. Points of entry for mains or services which are added after fabrication of the manhole shall be provided by coring and installation of a flexible sleeve. All pipes shall extend through the manhole walls a minimum of 2 inches. Core holes, factory or field installed, shall be surrounded by no less than four inches (4") of full wall cross-sectional thickness.

8.4.6 Manholes with preformed invert channels and benches may be utilized. Preformed invert channels must conform with Section 4.2.6.5 of the Manual. Points of pipe exit and entry shall conform with Section 8.4.5 of the Manual. Manholes with inverts that are field constructed shall be done in accordance with the Standard Details.

8.4.7 Manhole rings and covers shall be manufactured in the USA of Class 30, gray cast iron conforming to the requirements of ASTM-A48 (latest revision thereof). The manufacturer's name and part number shall be cast into each component and the words "Sanitary Sewer" shall be cast into the cover. Pick holes shall be the non-penetrating type. Bearing surfaces of both ring and cover shall be machined to insure proper fit and to prevent rattling.

**APPROVED MANHOLE RING AND COVERS**

	Model No.	Manufacturer
Standard	V-1384	East Jordan Iron Works/Vulcan Foundry
	USF 669 Frame & KLCover	US Foundry
Low Profile	V-1384-3	East Jordan Iron Works/Vulca Foundry
	USF 664 Frame & KL Cover	US Foundry
Watertight	202701	East Jordan Iron Works/Vulca Foundry
	USF 710 Frame & LJ-SSG Cover	US Foundry
Locking	202704	East Jordan Iron Works/Vulca Foundry
	USF 710 Frame & LJ-SSG-LOC Cover	US Foundry

Watertight units, when required to be lockable, shall contain a locking device comprised of a stainless steel pentagon head bolt locking device which functions in the manner of a quarter turn fastener, as a part of the cover. The low profile ring is to be used only when grades will not allow use of a standard height casting. All castings shall meet industry standards in regard to appearance and tolerances for dimensions and weight.

8.4.8 Manhole steps shall be constructed of 1/2" Grade 60 steel bars with a plastic coating and shall meet Federal

Specification RR--F-621C. Maximum vertical step spacing shall be sixteen inches (16") on center.

## 8.5 FORCE MAIN PIPE AND APPURTENANCES

8.5.1 Sewer force main pipe shall be a minimum of Class 200 PVC pipe or Class 50 ductile iron pipe.

8.5.1.1 PVC shall be Class 200 SDR 21 conforming to ASTM D1784 and ASTM D2241 (latest revisions). Fittings for PVC force main shall be ductile iron meeting the requirements of ANSI A21.10 and shall be designed for a minimum working pressure of 150 psi plus 100 psi surge pressure. The interior of all fittings shall be cement-mortar lined in accordance with ANSI 21.4 and the exterior of the fittings shall be bituminous coated in accordance with ANSI 21.51.

8.5.1.2 Ductile iron force main and fittings shall meet the requirements for ductile iron water main set forth in Section 8.2.2.

8.5.1.3 All force mains shall include installation of a tee and valve with 6" quick connect and cap outlet to allow for future temporary bypassing of the pump station. This arrangement shall be installed on the discharge side of the pump station concrete valve vault.

## 8.5.2 Force Main Valves

8.5.2.1 Plug valves for sewage service shall be non-lubricated eccentric type plug valves, with cast iron body, resilient faced plug suitable for sewage service. Valves shall utilize a corrosion resistant seat material of ninety percent (90%) welded nickel machined to a smooth surface as per AWWA C-507-. All valve parts and surfaces shall be of corrosion resistant materials or have an epoxy coating sufficient to prevent corrosion. Bearings shall be sleeve-type, replaceable, stainless steel per AWWA C-507. Valve packing area shall comply with AWWA C-507 by using a multi V-ring configuration that is adjustable and field replaceable. Valves shall have flanged faces drilled in accordance with American Standard for

125 pounds and shall be suitable for an operating pressure of 175 psi.

Plug valves eight inches (8") and larger shall be geared to provide suitable operation of the valve. Plug valves shall be as manufactured by Dezurik or approved equal.

- 8.5.2.2 Resilient seated gate valves shall comply with the requirements of AWWA. The valve body shall be ASTM A-126 Class B cast iron. All valve parts and surfaces shall be of corrosion resistant materials or have an epoxy coating sufficient to prevent corrosion. The valves shall open counterclockwise and have non-rising stem operation with 2-inch square operating nuts. The stem shall be of corrosion resistant material and have "O" ring seals. Valves shall provide zero leakage at a working pressure of 200 psi in either direction of line flow. Valves shall be manufactured by American Flow Control, Clow, or Mueller.

### 8.5.3 Check Valves

Check valves, unless otherwise directed by the Commission, shall be lever and spring type, iron body, bronze mounted with pin, seat ring and disc of brass or bronze designed for working pressure of not less than 150 pounds per square inch. Valves shall have a suitable opening for cleaning without disconnection from the pipe. Valves shall be manufactured by American Flow Control, Mueller or Clow.

### 8.5.4 Air Relief Valves

Air relief valves shall be manually operated unless otherwise required by the Commission.

- 8.5.4.1 Manual air relief valves shall be identical to the valve described in Section 7.8.1 of the Manual, except that 1) the control valve shall be installed in a standard manhole, and 2) the service tubing shall be SDR 9 polyethylene in lieu of copper.

- 8.5.4.2 The design and selection of automatic air release valves shall be in accordance with the direction of the Commission and shall be handled on a case by case basis.



## 8.6 WASTEWATER PUMP STATIONS

- 8.6.1 Pumping stations shall be of the submersible pump type, unless specifically approved otherwise by the Commission. The stations shall be equipped with a minimum of two (2) pumps, each capable of pumping at a rate equal to the peak design flow. The pumps installed in duplex pumping stations shall be of equal capacity.
- 8.6.2 Sewage pumping stations, structures, controls, and appurtenances shall withstand the 100-year flood without physical damage. Pumping stations shall not be located in areas subject to frequent flooding (areas inundated by the 10-year or greater frequency flood).
- 8.6.3 All sewage pump stations which are adjacent to streams classified as A-I, A-II or B waters shall be equipped with an alternate power source. Alternate power sources include on site standby power, dual power feed from separate electric substations, or portable generator.
- 8.6.4 All pump stations shall include a separate concrete valve vault suitable for an H-20 highway loading which shall house a lever and spring type check valve and pressure gauge for each pump discharge line. These valves shall be of the same size as the discharge pipes and shall meet the requirements of Section 8.5.
- 8.6.5 Wet wells shall be constructed of precast reinforced concrete manhole sections unless otherwise directed by the Commission. The sections shall conform to ASTM Specification C 478. The inside diameter of the wet well shall be no less than that required for installation and removal of the pump equipment and in no case less than 6.0 feet inside diameter. Wet wells shall be provided with base slabs meeting all applicable requirements of the ACI Code and of sufficient dimensions to protect the wet well from settlement and from flotation. Top slab shall be suitable for H-20 highway loading. Joint sealant shall be in conformance with Section 8.4.1. of this Manual. The interior of the wet well shall receive two (2) coats of Koppers "Super Service Black", or a suitable coal tar epoxy of at least 24-mil thickness. Wet wells shall be properly vented. Pipe and fittings used on vents shall be Ductile Iron in accordance with Section 8.2.2.

Reinforced concrete used in the construction of slabs and other structures related to wet wells shall conform to applicable sections of the NCDOT Standard Specifications for Roads and Structures. Concrete used in structures shall be Class A, 4,000 psi compressive strength, in accordance with Section 900. Reinforcing steel shall conform to ASTM A615 (Grade 60). Steel-mesh reinforcement shall conform to A185. Cover slabs for wet wells and valve vaults shall be specially reinforced at hatch openings.

Mortar shall meet the requirements of ASTM C144 for aggregate and strength. No mortar shall be used which has been mixed longer than forty-five (45) minutes.

#### 8.6.6 Pumps

Pumps shall be as manufactured by Flygt, Hydromatic, or Fairbanks Morse. The pumps shall be suitable for pumping raw, unscreened sewage. The discharge connection elbow shall be permanently installed in the wet well along with the discharge piping. The pump(s) shall be automatically connected to the discharge connection elbow when lowered into place, and shall be easily removed for inspection or service. There shall be no need for personnel to enter pump well. Sealing of the pumping unit to the discharge connection elbow shall be accomplished by a simple linear downward motion of the pump. A sliding guide bracket shall be an integral part of the pump unit. The entire weight of the pumping unit shall be guided by no less than two (2) guide bars and pressed tightly against the discharge connection elbow with metal-to-metal contact. Sealing of the discharge interface by means of diaphragm, O-ring, or other devices will not be acceptable. No portion of the pump shall bear directly on the floor of the wetwell. The pump, with its appurtenances and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of sixty-five feet (65').

#### 8.6.7 Pump Construction

Major pump components shall be of gray cast iron, Class 30, with smooth surfaces devoid of blow holes and other irregularities. All exposed nuts and bolts shall be of stainless steel 300 series .

All surfaces coming into contact with sewage other than stainless steel or brass, shall be protected by an approved sewage resistant coating (Tnemec series epoxy or approved equal). All mating surfaces where watertight sealing is required shall be machined and fitted with rubber O-rings.

Discharge fitting shall be such that sealing is accomplished by metal-to-metal contact between machined surfaces. No secondary sealing compounds, rectangular gaskets, elliptical O-rings, grease or other devices shall be used.

#### 8.6.8 Cable

The cable entry shall be an integral part of the stator casing. As a minimum the cable entry shall be comprised of a single cylindrical elastomer grommet, flanked by washers and a ferrule designed with close tolerance fit against the cable outside diameter and the entry inside diameter, or shall be triple protected with a compression fitting and two epoxy potted areas at the power cord entry to the pump.

#### 8.6.9 Motor

Pump motor shall be squirrel-cage, induction, shell type design, housed in a watertight chamber. The stator winding and stator leads shall be insulated with moisture resistant Class F insulation which will resist a temperature of 155 degrees C (311 F). The stator shall be dipped and baked three (3) times in Class F varnish. The motor shall be designed for continuous duty, capable of sustaining a minimum of ten (10) starts per hour and shall be thermally protected. Motor shall be NEMA design B. Each unit shall be provided with an adequately designed cooling system. Thermal radiators (cooling fins) integral to the stator housing, shall be adequate to provide the cooling required by the motor. Water jackets or other devices shall not be necessary for continuous pumping at sump liquid levels below midpoint of stator housing.

#### 8.6.10 Shaft

The pump shaft shall be of stainless steel 300 or 400 series. The shaft shall be designed with a constant outside diameter for its entire length and without machined shoulders for bearings.

Sleeve spacers between rotor and bearings shall be sufficient to provide shoulder function for the bearings. A surface finish with minimum roughness values of 12 micro-inches shall be required.

#### 8.6.11 Seals

Each pump shall be provided with two separate tandem mechanical rotating shaft seal system. Seals shall run in an oil reservoir. Seal failure sensors shall be included. Lapped seal faces shall be hydrodynamically lubricated at a constant rate. The seal units shall contain one (1) stationary carbon and one (1) positively driven rotating tungsten carbide or ceramic ring. Each interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Each pump shall be provided with an oil chamber for the shaft sealing system. The oil chamber shall be designed to assure that air is left in the oil chamber, to absorb the expansion of the oil due to temperature variations. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside.

#### 8.6.12 Bearings

The pump shaft shall rotate on two (2) permanently lubricated bearings or continuously lubricated in an oil bath with a minimum B-10 life expectancy rating. The upper bearing shall be a single row ball bearing and the lower bearing a two (2) row angular contact ball bearing.

#### 8.6.13 Impeller

The impeller shall be of gray cast iron, Class 30, dynamically balanced, double shrouded non-clogging design having a long throulet without acute turns. The impeller shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in normal sewage applications. The impeller shall be of a single or two vane design. The pump manufacturer shall, upon request, furnish mass moment of inertia data for the proposed impeller. The impeller shall be capable of passing a minimum 3" solid sphere. The fit between the impeller and the shaft shall be a sliding fit on a key with a impeller nut which can be tightened and locked down with a set screw or a nylok keeper.

#### 8.6.14 Volute

The volute shall be of single piece design and shall have smooth fluid passages large enough at all points to pass any size solids, which can pass through the impeller.

#### 8.6.15 Wearing Ring

A wearing ring system shall be installed to provide efficient sealing between the volute and impeller. The stationary wear ring shall be made of stainless steel or nitrile rubber. The rotating wear ring shall be made of stainless steel. The wear rings are to be drive fitted to the impeller and volute inlet.

#### 8.6.16 Power Cord

The electrical power cord shall be water resistant, rated 600 volt, 60° C, be UL and CSA approved. Cable sizing shall conform to NEC specifications for pump motors. The pump motor cable, installed, shall be continuous without splices and shall be suitable for submersible pump application which shall be indicated by a code or legend permanently embossed on the cable.

#### 8.6.17 Guide Bars

Lower guide bar holders shall be integral with discharge connection. Guide bars shall be of at least standard weight galvanized steel pipe. The guide bars shall not support any portion of the weight of the pump.

#### 8.6.18 Controls

For each pump motor, there shall be included: a combination overload breaker, with manual reset for dual protection against current overloads and short-circuit protection, overload relay to be precalibrated to match motor characteristics and factory sealed to insure trip setting is tamper proof; across-the-line magnetic starter and hand/off/automatic selector switch. Soft starts are not acceptable on applications under 25 horsepower. Variable frequency drives may be required on certain applications as deemed necessary by the Commission.

A twenty-four (24) volt control circuit transformer with disconnect circuit breaker and overload protection shall be included with an automatic, electric alternator for a duplex station (providing alternating operation of pumps under normal conditions, or in cases of high level, allowing both pumps to operate simultaneously). A terminal board for connection of level sensors shall be provided. All items inside or on the panel shall be adequately labeled. Provisions shall be made to provide the following signals to an autodialer:

- (1) Wet well high water alarm
- (2) Phase failure or unbalance
- (3) Pump motor overload 1 & 2
- (4) Pump seal failure 1 & 2
- (5) Pump runtime status 1 & 2
- (6) Entry alarm

The following items shall be provided with the panel:

- (1) NEMA 4 watertight, lockable enclosure with swing out panel allowing access to terminal board.
- (2) High Level Alarm
  - (a) Alarm light with cage protector
  - (b) Alarm bell
  - (c) Panel powered contact
  - (d) Unpowered contact
- (3) Condensation heater
- (4) Running time meter(s)
- (5) Pump run light(s)
- (6) Lightning arrestor
- (7) Pedestal mounting
- (8) Pole mounting bracket
- (9) 110V GFI protected duplex receptacle - minimum 25A rating
- (10) Autodialer (Raco Verbatim) Series VSS eight channel minimum capable of tracking run time, Royce eight channel minimum capable of tracking run time or as approved by GUC.

#### 8.6.19 Liquid Level Sensors

Level sensors shall be mercury switches encapsulated in a buoyant waterproof housing with a two (2) conductor, 16 AWA, Type SJO cable. A chain and anchor assembly of noncorrosive materials shall be provided.

#### 8.6.20 Piping and Valves

Discharge piping shall be ductile iron pipe meeting the requirements of Section 7.2.4 of the Manual. Fittings for discharge piping shall comply with all applicable provisions of ANSI 21.10 and have a cement-mortar lining in accordance with ANSI 21.4. Joints for discharge piping shall be flanged and shall comply with ANSI B16.1. Discharge piping shall include swing check valve(s) of the outside lever and spring type, eccentric plug valves(s) or gate valve(s) and all necessary fittings and tees. Where piping passes through a wall, nonshrink grout or other approved means shall be used to make a watertight joint.

#### 8.6.21 Access Hatches

Access hatches, hinged and lockable, shall be provided for wet well and valve vault. The frames shall be a continuous aluminum or stainless steel frame, with a continuous concrete anchor. The doors shall be ¼" thick aluminum diamond plate. The doors shall be lift assisted and shall open to 90 degrees and lock automatically in that position. All hardware and hinges shall be stainless steel. Access door shall have a minimum live load capacity of 300 lbs. per SF. Access hatches shall be as manufactured by Bilco, U.S. Foundry, Halliday Products or approved equal. Hatches shall be provided with factory installed padlock hasps.

##### 8.6.21.1 Safety Net

Pump access hatches shall be provided with a rail mounted safety net system for fall through protection. The safety net shall be designed to slide on guide rails to facilitate entry and repositioning. Slide rails and hooks shall be constructed of aluminum with stainless steel corner hooks and eyebolts. Netting material shall be polyester. The safety net system shall be Hatch Net as manufactured by Safe Approach, Inc., or approved equal.

#### 8.6.22 Screening Basket

When required by the Commission, pump stations will be provided with one (1) type 304 stainless steel or basket of a design approved by the Commission.

The basket shall be tract mounted and retrievable from a dedicated access hatch conforming to Section 8.6.21 of this Manual.

#### 8.6.23 Emergency Transfer Switch

Provide at the electrical service entrance a power supply transfer switch for portable generator hookup. Switch unit shall have a watertight, NEMA 4 enclosure and shall be sized to carry the maximum station load. Connection shall be Crouse Hinds, Appleton or approved equal and shall be compatible with the Commission's existing emergency generator connection.

#### 8.6.24 Odor Control

The need for odor control shall be evaluated and the provisions for such, if required, approved by the Commission.