APPENDIX 12

MATERIALS SPECIFICATION

A. Conventional Systems

1. Disposal field pipe shall be four (4) inch corrugated polyethylene (PE) pipe perforated with one-half (½) inch holes and conform to or exceed the standards of ASTM F405, D1248 and D3350.

2. Gravity flow tight-line (where applicable) from the septic tank to the disposal field shall be three (3) inches diameter (minimum) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

3. Pressurized supply line (where applicable) from the pump tank to the disposal field shall be a minimum of one and one-half (1½) inch nominal pipe size diameter Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241.

4. Crossovers: All crossover piping between trenches shall be three (3) inches diameter (minimum) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665. All crossover fittings shall be sized the same as the piping being served and shall be Schedule 40 PVC DWV-rated conforming to or exceeding the standards of ASTM D1784, D2466 and D2665.

5. The gravel media in the disposal field trenches shall consist of crushed limestone rock and shall be size number 2, 3, 4 or 24 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a two and one-half (2½) inch screen and not more than five (5) percent may pass a one-half (½) inch screen.

6. The covering over the disposal field media shall be untreated builders paper, straw (four [4] inches thick) or other suitable material (geosynthetic or geotextile conforming to or exceeding the standard specifications as outlined in AASHTO M288), as approved by the Department, which will allow water movement yet restrict soil movement and minimize silt accumulation within the gravel media.

7. Pipe-to-pipe connections shall be as follows:

   (a) Corrugated PE - to - PVC (e.g., crossovers):

   PVC pipe shall be connected to corrugated polyethylene pipe either via special rubber shear gasket couplers (boots) with stainless steel compression band clamps designed for such purpose or via stainless steel compression band clamps. No other method of connection shall be allowed. The couplers shall be appropriately sized to fit the pipe in question.

   (b) Corrugated PE - to - Corrugated PE:

   Only couplers specifically designed to join pieces of corrugated polyethylene pipe together shall be used. Such fittings include, but are not limited to, polyethylene split couplers, polyethylene snap couplers, polyethylene internal couplers and rubber gasket-type couplers with stainless steel compression band clamps. No other method of connection shall be allowed. The couplers shall be appropriately sized to fit the pipe in question. All polyethylene couplers shall conform to or exceed the standards of ASTM F405 and F667.

   (c) PVC -to- PVC:

   Consecutive lengths of PVC pipe shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

8. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe, or equivalent, conforming to or exceeding the standards of ASTM D1784 and D1785.

9. All grade boards shall be constructed from one-by-six (1"x6") inch lumber.

10. All PVC pipe fittings shall be Schedule 40 and shall be sized and rated in accordance with the particular specification of PVC pipe to which they are to be connected (i.e. fitting size shall be the same as the nominal pipe size; DWV-rated fittings shall be installed on DWV-rated pipe applications and pressure-rated fittings shall be installed on pressure-rated pipe applications) and shall conform to or exceed the standards of ASTM D1784, D2464 and D2466.

11. All corrugated polyethylene pipe fittings shall be sized in accordance with the particular specification of corrugated PE pipe being served (i.e., fitting size shall be the same as the nominal pipe size) and shall conform to or exceed the standards of ASTM F405 and F667.

12. Where pressure distribution manifolds are utilized, the valves contained within said device shall be brass or bronze gate or ball valves of the same size as the nominal pipe size being served and shall be rated at a minimum of 100psi for water or gas. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

13. All valves shall have ground level access risers and covers. The risers shall be constructed from appropriate continuous lengths of four (4) inch diameter corrugated polyethylene pipe covered with appropriately sized polyethylene snap end-caps. All corrugated polyethylene pipe risers and snap end-caps shall conform to or exceed the standards of ASTM F405 and F667.

14. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

15. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

B. Low Pressure Pipe Systems

1. Supply line pipe and manifold pipe shall be of the same nominal pipe size and shall be a minimum of one and one-half (1½) inch nominal pipe size diameter, Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241. Lateral line pipe shall be a minimum of one (1) inch nominal pipe size diameter Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241.

2. Lateral line to manifold line connections shall be constructed via either crosses or tees of the same nominal size as the pipe diameter being served. These fittings shall be Schedule 40 PVC pressure-rated fittings conforming to or exceeding the standards of ASTM D1784 and D2466. See Figure A3-10 in *Appendix 3* for proper lateral - to - manifold connections.

3. All other necessary pipe fittings shall be Schedule 40 PVC pressure-rated fittings conforming to or exceeding the standards of ASTM D1784, D2464 and D2466. The lone exception to this rule shall be the threaded galvanized iron end-cap on the turn-up assembly. This threaded galvanized iron end-cap shall be appropriately sized in accordance with the lateral line pipe size being served and shall be a Class 150 Standard Malleable Iron Pipe Fitting conforming to or exceeding the standards set forth in ASTM A197, A153, A165 and ANSI/ASME B16.3.

4. All lateral line valve assemblies and lateral line turn-ups shall be constructed in strict accordance with Figure A3-10 in *Appendix 3*.

5. All valves shall be either brass or bronze, gate or ball valves of the same size as the nominal pipe size being served (*i.e.*, the same size as the lateral line nominal pipe diameter; Example: one-inch valve used on one-inch diameter lateral line pipe). They shall also be rated at a minimum of 100 pounds per square inch (psi) for water or gas. Note: the minimum valve size shall be one (1) inch. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

6. All valves shall have ground level access risers and covers. The risers shall be constructed from appropriate continuous lengths of four (4) inch diameter corrugated polyethylene pipe covered with appropriately sized polyethylene snap end-caps. All corrugated polyethylene pipe risers and snap end-caps shall conform to or exceed the standards of ASTM F405 and F667.

7. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

8. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

9. The gravel media in the lateral line trenches shall consist of crushed limestone rock and shall be size number 5, 6 or 56 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a one (1) inch screen and not more than five (5) percent may pass a three-eighth ($^3/_8$) inch screen.

10. The covering over the lateral line trench media shall be untreated builders paper or other suitable material (geosynthetic or geotextile conforming to or exceeding the standard specifications as outlined in AASHTO M288), as approved by the Department, which will allow water movement yet restrict soil movement and minimize silt accumulation within the gravel media. Straw shall not be allowed as covering for gravel media in LPP systems.

11. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe, or equivalent, conforming to or exceeding the standards of ASTM D1784 and D1785.

C. Mound Systems

1. All material specifications outlined in for LPP Systems shall apply to Mound Systems, with the exception of the valve covers. Although ground level access covers over the valves is a recommended practice for Mound systems, it is not a requirement.

2. Additionally, the imported fill material shall consist of a predominantly (≥50%) USDA Classified medium sand texture (0.50 to 0.25 mm particle size) with no more than twenty (20) percent fine sand (0.25 to 0.10 mm particle size) and be free from silt and clay. The sand fill shall be washed and screened to the aforementioned specifications. Additionally, proof of the use of such sand shall be supplied to the Department, by the Mound installer, in accordance with the provisions outlined in *Part 2 (c) of Subsection M of Section 20* of these regulations. Furthermore, the sand shall be composed of stable materials and not subject to chemical deterioration.

3. The material utilized for the clay cap shall consist of natural soil material with a soil textural classification of clay. Clay, as defined by the USDA – Soil Survey Manual, is a soil comprised of the following ratio of soil separates: forty (40) percent or more clay; forty-five (45) percent or less sand; less than forty (40) percent silt. The clay particle constituent shall not be of a shrink-swell type of clay and the sand particle constituent shall not exceed the size limits of a very coarse sand (i.e. particle size diameter being 2.0 – 1.0 mm).

   Further, all soil materials proposed to be utilized for the construction of a clay cap shall be field inspected, verified for content and approved (either at the source site or on the Mound construction site) for use by a Department Soil Scientist in accordance with the provisions outlined in *Section 20*. Said soil materials shall not be contaminated by nor contain any man-made materials (e.g. glass, plastics, metal debris, etc.), shall be free from excessive amounts of organic materials (e.g. grass, leaves, woody materials, etc.), shall be homogenous in its content (i.e. not mixed with other types of soil materials) and shall not contain over fifteen (15) percent fragments, whether natural or man-made products, as defined (i.e. in description and quantity measuring methodologies) by the USDA – Soil Survey Manual (i.e. those pieces of rock being greater than 2.0 mm in diameter).

D. Soil Drainage Improvement Systems

1. The pipe placed in interceptor, curtain and/or drawdown drain trenches shall be a minimum of four (4) inches in diameter (nominal pipe size). The pipe shall be slotted corrugated polyethylene (PE) pipe and conform to or exceed the standards of ASTM F405, D1248 and D3350. The circular slotted perforations shall be placed in the outside valleys of the corrugations and have minimum dimensions of one-eighth (⅛") inch wide by seven-eighths (⅞") inch long.

2. All sections of tight-line pipe shall be either non-perforated Schedule 40 PVC DWV-rated pipe or non-perforated corrugated polyethylene (PE) pipe, a minimum of four (4") inches in diameter (nominal diameter). The non-perforated Schedule 40 PVC DWV-rated pipe shall conform to or exceed the standards of ASTM D1784, D1785 and D2665. The non-perforated corrugated polyethylene (PE) pipe shall conform to or exceed the standards of ASTM F405, D1248 and D3350.

3. Drain outlet pipe shall be non-perforated Schedule 40 PVC DWV-rated pipe, a minimum of four (4") inches in diameter (nominal diameter) and conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

4. All pipe-to-pipe connections shall be the same as outlined in *Subsection A* of this Appendix.

5. All sleeved sections of drainage system pipe shall be in accordance with those provisions outlined *Subsection A* of this Appendix.

6. The impervious barrier utilized in curtain drains and interceptor drains shall be in the form of six (6) to eight (8) mil plastic liner or other suitable impermeable material as approved by the Department. The material shall be strong enough to withstand installation conditions and be able to provide a long service life.

7. The sealing of a breached impervious barrier shall be accomplished with PVC tape specifically made for bonding or repairing plastic materials.

8. The gravel media in the drainage trenches (i.e., curtain drain, interceptor drain and drawdown drain) shall be consistent with the gravel media specified for conventional disposal field trenches. Thus, it shall consist of crushed limestone rock and shall be size number 2, 3, 4 or 24 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a two and one-half (2½) inch screen and not more than five (5) percent may pass a one-half (½) inch screen.

E. Pump Installation Components

This includes all piping and other components located inside the pump tank, required to properly connect the pump to the supply line as it exits the side of the pump tank. See Figure A14-6 in *Appendix 14* for an assembly diagram of pump tank components.

1. ~~The~~ Submersible centrifugal style pumps shall rest on two eight (8") inch (minimum) concrete blocks set tightly side-by-side, or a concrete pad of equivalent dimensions, on the bottom of the tank. Alternatively, submersible centrifugal style pumps may be housed in an appropriately sized approved filter vault in accordance with the provisions outlined in *Section 37, Subsection D, Part 2*.

2. Vertical turbine style pumps shall be housed in an approved filter vault in accordance with the provisions outlined in *Section 37, Subsection D, Part 2*.

3. For Submersible Centrifugal Style Pumps

   (a) All piping components (i.e., pipe and fittings) shall be sized in accordance with the supply line nominal pipe diameter (*i.e.*, all piping components shall be of the same nominal size as the supply line nominal pipe diameter). Bushings or reducers may be required to adapt the pump discharge flange size to the supply line size. Additionally, all piping components, with the exception of the threaded union (or similar device) and all valve(s), shall be Schedule 40 pressure-rated PVC conforming to or exceeding the standards of ASTM D1784, D1785, D2241, D2464 and D2466.

   (b) The gate, globe or ball valve shall be either brass or bronze, and shall be rated at a minimum of 100 pounds per square inch (psi) for water or gas. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

   (c) The check valve shall be either PVC, brass or bronze, and shall be appropriately sized for the intended application. These valves shall conform to or exceed the standards of ASTM D1784, D2464 and D2467, for PVC, or conform to or exceed the standards of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

   (d) The threaded union shall be, as a minimum, Schedule 40 pressure-rated PVC conforming to or exceeding the standards of ASTM D1784 and D2466. All Schedule 80 pressure-rated PVC threaded unions, and all Schedule 80 PVC components of threaded unions, shall conform to or exceed the standards of ASTM D1784, D2464 and D2467. In lieu of PVC threaded unions, all other similar connecting devices shall be approved by the Department on an individual basis, prior to its use.

4. For Vertical Turbine Style Pumps

(a) In lieu of the individual pump discharge piping components listed above in *Part 3, (a) thru (d)* of this *Subsection E*, a pre-manufactured discharge assembly, specifically designed for use with vertical turbine pumps housed inside filter vaults, may be used.

(b) Pre-manufactured discharge assemblies must contain a gate, globe or ball valve, a check valve, a threaded union and the necessary piping and fittings to connect to both the pump discharge flange and the supply line.

(c) Pre-manufactured discharge assemblies shall be pre-assembled and solvent welded at the factory.

(d) Pre-manufactured discharge assemblies shall be from the same manufacturer or supplier as the vertical turbine pump intended to serve and shall be specifically sized for the vertical turbine pump intended to serve (*i.e.*, as a matched package) so as to ensure proper compatibility, operation, installation and performance.

(e) The entire pre-manufactured discharge assembly shall be constructed from proven durable materials typically used in wastewater applications, which resist both decay and the corrosive nature of the sewage effluent environment.

(f) Pre-manufactured discharge assemblies shall be approved by the Department prior to installation.

(g) Appropriate bushings or reducers may be required to adapt the pre-manufactured discharge assembly size to the supply line size. Said components shall adhere to the specifications outlined above in *Part 3, (a)* of this *Subsection E.* This connection to the supply line may be done immediately outside the pump tank (*i.e.*, the pre-manufactured discharge assembly may exit the side of the pump tank or pump tank riser and then connect to the supply line).

5. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

6. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

7. The pump control system shall be adjustable to meet recommended loading rates for different sizes and shapes of pump tanks. The controls shall also be sealed against entry of corrosive effluent and/or corrosive/explosive gases from the effluent and should have NEMA (National Electrical Manufacturing Association) approval. Further, the pump controls shall be either sealed mercury float switches or sealed, self-contained mechanically-activated float switches. Mercury switches are activated by a sealed float which contains a tube of mercury in contact with power leads. The only approved mechanically-activated type switches shall be of the same design principle as that of the mercury-type switches. Instead of a tube of mercury, these mechanical switches employ a steel ball to activate the electrical contacts. Diaphragm switches or vertically rising mechanical-type float switches shall not be accepted. All float switches shall be of a sufficient quality and material so as to perform under turbulent conditions and be resistant to the corrosive nature of the wastewater.

8. Non-corrodible clamps or brackets shall be utilized to securely fasten the pump control cables to the pump outlet standpipe. Pre-manufactured float tree assemblies may be used.

9. All in-line pressure filters shall conform to the provisions as set forth in *Section 37, Subsection D, Part 1*.

F. Pumps

1. Centrifugal Pumps

(a) The pump shall be UL-listed and/or CSA certified and shall be rated for effluent or sewage applications by the manufacturer.

(b) The pump shall be submersible.

(c) The pump shall have a cast iron housing around the motor.

(d) The motor shall be oil filled and hermetically sealed with automatic reset thermal overload protection.

(e) All exposed fasteners shall be a minimum of 300-series stainless steel or brass.

(f) The pump shall be independently supported by legs.

(g) The pump shall not contain screened or strained inlets.

(h) The pump shall be capable of passing a one-half (1/2) inch spherical solid.

(i) The pump shall be a minimum of 0.3 horsepower (Hp).

(j) The pump shall be sufficiently sized so as to meet and/or exceed the design capacity (*i.e.*, the flow and total dynamic head requirements) stipulated for the specific system and site it is intended to serve.

(k) All power cords shall be water resistant and UL-listed.

(l) The on/off pump activation device (*i.e.*, float controls) shall be adjustable to meet the specific application requirements (*i.e.*, it shall not be an integral part of the pump; it must be separate from the pump); See Subsection E of this Appendix.

(m) The pump shall be covered by a manufacturer's warranty for a period of at least one year from the date of installation.

2. Vertical Turbine Pumps

(a) The pump shall be UL-listed and/or CSA certified and shall be rated for wastewater effluent applications by the manufacturer.

(b) The attached electrical cord shall be UL-listed and/or CSA certified, and shall be a wastewater safe jacketed cord as certified by the manufacturer.

(c) The pump shall be submersible.

(d) All pump components (including, but not limited to, the case/housing, screened inlet, impeller, discharge, and all exposed fasteners, etc.) shall be constructed from proven durable materials typically used in wastewater applications, which resist both decay and the corrosive nature of the sewage effluent environment.

(e) The motor shall be oil filled or water filled with propylene glycol, and hermetically sealed with thermal overload protection (either automatic internal reset with lower horsepower pumps or external manual reset associated with the starting components with higher horsepower pumps).

(f) The pump shall contain a screened inlet and shall be restricted to passing spherical solids less than ⅛-inch (0.125" or 3-mm).

(g) All new pumps shall come complete from the manufacturer with all necessary starting components (including capacitor box) when applicable. Existing pumps may be repaired by replacing either the defective motor portion or defective wet-end portion, as applicable. When replacing either end of the pump, the replacement component must be from the same manufacture as the other pump end so as to ensure compatibility, performance and warranty. There shall be no mix and match of pump components from different manufacturers.

(h) The pump shall be sufficiently sized so as to meet and/or exceed the design capacity (*i.e.*, the flow and total dynamic head requirements) stipulated for the specific system and site it is intended to serve.

(i) The pump shall be covered by a manufacturer's warranty for a period of at least one year from the date of installation.

3. Grinder Pumps and Macerator Pumps

Grinder and/or macerator pumps shall not be used in any aspect of a subsurface sewage disposal system. This includes in the use of any type of basin pump system where wastewater is pumped from inside a dwelling or structure to the septic system.

Important Note: The Department retains the authority to require the use of a different pump (*i.e.*, regarding size, horsepower, pumping capacity, etc.), for a site/installation, in lieu of any previously specified or installed pump, as it deems necessary.

G. Tank Components

1. All piping entering, exiting and connecting tanks, with the exception of the pressure piping exiting a pump tank (refer to *Subsections A and E* of this Appendix), shall be unobstructed and shall be, as a minimum, three (3) inch diameter (i.e., minimum effective cross-sectional area of 7.4 in^2) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

2. All pipe fittings shall be sized the same as the piping being served and shall be Schedule 40 PVC DWV-rated conforming to or exceeding the standards of ASTM D1784 and D2665 or D2466.

4. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

4. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

5. All materials and methodologies/techniques used in sealing the pipes entering and exiting the tank openings shall provide a watertight seal and shall be approved by the Department.

6. All ground-level access risers and their covers (or lids) shall be approved by the Department.

7. All effluent filters shall conform to the provisions as set forth in *Section 37*.

H. Electrical Components

All electrical components shall conform to the provisions as set forth in *Section 16*.

I. Alternating Valves

Alternating valves shall conform to the provisions as set forth in *Section 15, Subsection D, Part 6.*

J. Effluent Brake Devices

Effluent brake devices shall be constructed of Schedule 40 pressure-rated PVC pipe and fittings conforming to or exceeding the standards set forth in ASTM D1784, D1785, D2241, D2464 and D2466 and shall conform to the provisions as set forth in *Section 15, Subsection D, Part 5*.

K. Advanced Treatment Systems (ATS)

All components of an ATS device shall be designed and manufactured to resist the corrosive effects of wastewater and household chemicals, meet applicable ASTM standards, be in accordance with industry standards, conform to the provisions outlined in *Section 38* and, as applicable, be in accordance with the ATS manufacturer's specifications, guidelines, recommendations and requirements.

1. All piping going to an ATS device, leaving an ATS device or connecting multiple ATS devices shall be Schedule 40 PVC and shall be sized in accordance with the applicable provisions of these *Regulations*, the ATS manufacturer's guidelines or the design engineer's specifications, depending on ATS device classification.

   (a) Gravity flow pipe shall be Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

   (b) Pressurized pipe shall be Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241.

2. All PVC pipe fittings shall be Schedule 40 and shall be sized and rated in accordance with the particular specification of PVC pipe to which they are to be connected (*i.e.*, fitting size shall be the same as the nominal pipe size); DWV-rated fittings shall be installed on DWV-rated pipe applications and pressure-rated fittings shall be installed on pressure-rated pipe applications) and shall conform to or exceed the standards of ASTM D1784, D2464 and D2466.

3. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

4. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

5. All materials, media (gravel, sand, etc.) and components used in the construction of an engineered, non-proprietary ATS shall be approved by the Department.

6. All ground-level access risers, valve boxes, sampling chambers and their covers (or lids) shall be approved by the Department.

7. All disinfection devices shall conform to the provisions outlined in *Section 12, Subsection D, Part 3, Subpart (b)*.

8. All control panels, electrical components and monitoring devices shall conform to the provisions as set forth in *Sections 16 and 38*.

9. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe, or equivalent, conforming to or exceeding the standards of ASTM D1784 and D1785.

L. Subsurface Drip Disposal Systems (SDD or Drip)

All components of a Drip system shall be designed and manufactured to resist the corrosive effects of wastewater and household chemicals, meet applicable ASTM standards, be in accordance with industry standards, conform to the provisions outlined in *Section 39* and be in accordance with the Drip manufacturer's specifications, guidelines, recommendations and requirements.

1. Supply line pipe, return line pipe and manifold pipe shall be a minimum of one and one-quarter (1¼) inch nominal pipe size diameter, Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241. The manifold pipe shall be of the nominal pipe size to that which it serves (*i.e.*, either the supply line pipe or the return line pipe).

2. All necessary PVC pipe fittings shall be Schedule 40 PVC pressure-rated fittings conforming to or exceeding the standards of ASTM D1784, D2464 and D2466.

3. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

4. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

5. Drip tubing shall be specifically manufactured for wastewater applications and color coded (per industry standards) for non-potable water use.

6. All drip tubing connection fittings, barbed fittings, etc. (*e.g.*, couplers, elbows, tees, crosses, wyes, male/female adapters, etc.) shall be from the same manufacturer as the drip tubing and shall be those specifically recommended by the Drip manufacturer for the intended use.

7. All flexible hose/tubing shall be Iron Pipe Size (I.P.S.) flexible PVC pipe and shall typically be the same size as the drip tubing. Alternatively, flexible, heavy-walled polyethylene (PE) pipe may be used as approved by the Drip manufacturer. Other Drip manufacturer-specific flexible tubing may be used in accordance with their guidelines.

8. All I.P.S. flexible PVC pipe and associated fittings shall be joined (including joined to rigid PVC pipe and fittings) via the solvent welding technique as prescribed above in *Part 3*; or, otherwise in accordance with the pipe manufacturer's guidelines/recommendations.

9. All flexible, heavy-walled polyethylene (PE) pipe shall be joined using standard barbed connections/fittings (in accordance with industry standards and in compliance with the pipe manufacturer's guidelines/recommendations) rather than solvent welding.

10. The drip tubing shall be secured to the I.P.S. flexible PVC pipe (or to the flexible, heavy-walled PE pipe) using fittings manufactured for that purpose. Said fittings shall be from the same manufacturer as the drip tubing and be in accordance with the drip tubing manufacturer's guidelines/recommendations.

11. All miscellaneous Drip system components shall be supplied from the same drip tubing manufacturer (or be an approved equivalent certified by the Drip manufacturer) or, otherwise, be in accordance with industry standards and be in compliance with the Drip manufacturer's guidelines/recommendations. Said miscellaneous Drip system components shall include, but not be limited to:

    (a) Air/vacuum relief valves

    (b) Check valves

    (c) Flush valves

    (d) Zone valves and solenoid control valves

    (e) Schrader valves

    (f) Flow meters

    (g) Pressure regulators and pressure reducing valves

    (h) Pressure gauges

    (i) Filter assembly (*i.e.*, spin disc filters, vortex screen filters, etc. and their housing components)

    (j) Headwork assembly; headwork boxes/containers and lids

    (k) Valve boxes and lids

12. All ground-level access risers, valve boxes, headwork boxes and their covers (or lids) shall be approved by the Department.

13. All control panels and electrical components shall conform to the provisions as set forth in *Sections 16 and 39*.

14. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe, or equivalent, conforming to or exceeding the standards of ASTM D1784 and D1785.