SECTION 02616

POLYVINYL CHLORIDE (PVC) PIPE

PART 1 – GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. The extent of PVC pipe is shown on the drawings.

B. Reference to standard specifications herein shall be construed as to be in reference to the latest revision or edition.

1.02 SUBMITTALS

A. One original certified test report and two copies of all required test reports shall be submitted to the County with each shipment of pipe. Certification shall include all test results required by AWWA. The Contractor shall include the following data:

1. Quick Burst Test, ASTM D1599
2. Drop Impact Test, ASTM D2444
3. Pipe Impact Test, CSA B137.3
4. Physical and chemical properties of all pipe
5. Maximum allowable deformation and penetration of the pipe wall
6. Hydrostatic test reports
7. Manufacturer's affidavit that the pipe furnished complies with all applicable provisions of these specifications and all applicable AWWA, CSA, ISO, and ASTM standards

1.03 DELIVERY AND STORAGE

A. Upon delivery and before unloading, the Contractor must inspect the pipe for any damage occurred in transit and note such damage on the delivery ticket.

B. In storing pipe, units shall be protected by dunnage in the same way they were protected while loaded on the truck. Pipe shall be stored flat to protect against bending. If pipe is to be stored outside longer than 7-days the pipe shall be covered with canvas or other opaque material to protect it from prolonged exposure to the sun.

PART 2 – PRODUCTS

2.01 PVC PIPE (4-INCHES AND LARGER)

A. Uses of Pipe:

1. WATER:

a. Unless otherwise shown on the plans, PVC water pipe 4" through 12" shall be DR-18, Class 150 and meet the requirements of AWWA C900 for PVC pipe in ductile iron pipe equivalent O.D., having elastomeric gasket bell ends and elastomeric seals.

b. Pipe shall be blue in color for water.

c. PVC water pipe 14" and greater shall conform to the requirements of AWWA standard C905, DR-18, with working pressure rating of 235 psig.

2. SEWER:

a. Force main pipe from 4" up to 12" shall be DR-25, Class 100 and meet the requirements of AWWA C900 for PVC pipe in ductile iron pipe equivalent O.D. Pipe shall be furnished in standard 20' lengths.

b. Gravity sewer pipe shall be SDR-26, D-3034 ASTM.

c. Pipe shall be green in color for sewer pipe.

d. PVC sewer force main pipe 14" and greater shall conform to the requirements of AWWA standard C905, DR-18, with a working pressure rating of 235 psig.

3. RECLAIM:

a. Unless otherwise shown on the plans, PVC reclaimed water pipe 4" through 12" shall be DR-18, Class 150 and meet the requirements of AWWA C900 for PVC pipe in ductile iron pipe equivalent O.D., having elastomeric gasket bell ends and elastomeric seals.

b. PVC pipe 14" and greater shall conform to the requirements of AWWA standard C905, DR-18, with a working pressure rating of 235 psig.

c. Pipe shall be purple in color for reclaimed water.

4. GENERAL:

a. PVC pipe diameters of 4" to 12" shall conform to the requirements of AWWA standard C900, DR-14, with a working pressure rating of 200 psig as shown on the drawings and shall be color coded to meet County's standards.

B. The joints for PVC pipe shall be rubber ring type consisting of integral, thickened, solid wall bells which maintain the same standard dimension ratio as the pipe barrel. Joint lubrication shall be as furnished by the manufacturer of the pipe and joints made in accordance with the manufacturer's instructions and recommendations. Joint restraints for PVC pipe shall be EBAA Series 2800 or equal. Restraints for PVC pipe to mechanical joint fittings shall be EBAA Series 2000PV or equal.

C. Solid long pattern sleeves or adapter fittings shall be furnished and installed where plastic pipe is connected to pipes or fittings of other materials. When pipe material changes from one type to another, long pattern solid repair sleeves shall be used to transition.

2.02 PVC PIPE (SMALLER THAN 4-INCHES)

A. PVC pipe two inches (2”) and three inches (3”) in diameter shall conform to the requirements of ASTM D2241, Class 1120 or 1220 (SDR 21) with a working pressure rating of two hundred (200) psig with integral bell gasketed joints. Pipe is to be manufactured to I.P.S. (steel) standard pipe equivalent outside diameters. Pipe shall be marked NSF-PW approved.

B. Schedule 40 PVC, when requested and approved, may be used as an alternative to A. above for pipe diameters of two inches (2”) and three inches (3”). Schedule 40 shall conform to the requirements of ASTM 1785. Pipe joints shall be solvent welded in accordance with ASTM D 2672 or ASTM D 2466 and D 2564. Pipe is to be manufactured to I.P.S. (steel) standard pipe equivalent outside diameters. Pipe shall be marked NSF-PW approved.

PART 3 EXECUTION

3.01 EXAMINATION

A. Excavation. Excavate trenches as specified in Section 02222 – Trenching, Compacting and Backfilling.

B. All pipe and appurtenances shall be examined at the point of delivery. Material found to be defective due to manufacture or damage in shipment shall be rejected. Tests as specified in the applicable material standard may be performed to ensure conformance with the standard.

3.02 TRENCH CONSTRUCTION

A. Alignment and Grade. The pipelines shall be laid maintained to the lines and grades established by Drawings and Specifications, with fittings, valves hydrants at the required locations unless otherwise approved by the Engineer. Valve-operating stems shall be oriented to allow proper operation. Hydrants shall be installed plumb.

B. Underground Conflicts. Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground structures and conflicts. Care shall be exercised to avoid damage to existing structures. When obstructions that are not shown on the drawings are encountered during the progress of work and interfere so that an alteration of the plans is required, the County will alter the Drawings or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions. When crossing existing pipelines or other structures, alignment andgrade shall be adjusted as necessary, with the approval of the County, to provide clearance as required by the County to prevent future damage or contamination of either structure.

C. Trench Construction. The trench shall be excavated to the required alignment, depth, and width. Trench preparation shall proceed in advance of pipe installation for only as far as necessary to allow proper pipe installation. The width of the trench at the top of the pipe shall be ample to permit the pipe to be laid and joined properly and allow the backfill to be placed as specified.

D. PVC pipe shall be installed with pipe bedding and backfill as shown on the drawings.

E. Holes for the bells shall be provided at each joint but shall not be larger than necessary for joint assembly and assurance that the pipe barrel will lie flat on the trench bottom. Other than noted previously, the trench bottom shall be true and even in order to provide support for the full length of the pipe barrel, except that a slight depression may be provided to allow withdrawal of pipe slings or other lifting tackle.

F. When excavation of rock is encountered, all rock shall be removed to provide a clearance of at least 6-inches below and on each side of all pipe, valves and fittings. When excavation is completed, a bed of sand, crushed stone or earth that is free from stones, large clods, or frozen earth, shall be placed on the bottom of the trench to the previously mentioned depths; leveled, and tamped. These clearances and bedding procedures shall also be observed for pieces of concrete or masonry and other debris of subterranean structures, such as masonry walls, piers, or foundations that may be encountered during excavation. This installation procedure shall be followed when gravel formations containing loose boulders greater than 8-inches in diameter are encountered. In all cases, the specified clearances shall be maintained between the bottom of all pipe and appurtenances and any part, projection, or point or rock, boulder, or stones of sufficient size and placement which, in the opinion of the Engineer could cause a fulcrum point.

G. Should the trench pass over a sewer or other previous excavation, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil or conform to other regulatory requirements in a manner that will prevent damage to the existing installation.

H. When the subgrade is found to be unstable or to include ashes, cinders, refuse, organic material, or other unsuitable material, such material shall be removed, to a minimum of at least 4-inches, or to the depth ordered by the Engineer and replaced under the

directions of the Engineer with clean, stable backfill material. The bedding shall be consolidated and leveled in order that the pipe may be installed as specified.

I. When the bottom of the trench or the subgrade is found to consist of material that is unstable tosucha degree that, in the judgment of the Engineer it cannot be removed, a foundation for the pipe and/or appurtenance shall be constructed using piling, timber, concrete, or other materials at the direction of the Engineer.

3.03 PIPE INSTALLATION

A. The Contractor shall install all pipe inaccordance with the recommendations of the pipe manufacturer and as specified herein.

B. The Contractor shall take care in handling, storage and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installation and pipe which is deemed to be defective by the County shall not be installed.

C. The Contractor shall thoroughly clean and keep thoroughly clean, all pipe and fittings prior to during and after installation.

D. The Contractor shall lay the pipe to the lines and grades shown on the Contract Drawings with bedding and backfill as shown on the Drawings or called out in the Contract Documents. Blocking under the pipe shall not be permitted except through casing sleeves.

E. The Contractor shall keep the open ends of all pipe closed with a tightly fitting plug when installation is not in progress or the potential exists for dirt or debris to enter the pipe.

F. The pipe or accessories shall not be dropped into the trench under any circumstances.

G. The Contractor shall construct all water mains pursuant to the provisions of "Recommended Standards for Water Works", Part 8, incorporated by reference in Rule 17-555.330(3), F.A.C.

H. Proper implements, tools, and facilities shall be provided and used for the safe and convenient performance of the work. All pipe, fittings, and valves, and hydrants shall be lowered carefully into the trench by means of suitable tools or equipment in such a manner as to prevent damage to pipeline materials. Under no circumstances shall pipeline materials be dropped or dumped into the trench. The trench shall be dewatered prior to installation of the pipe.

I. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

J. Trench width at the top of pipe, bedding conditions, and backfill placement and compaction shallbe such that design loadings on the pipe will not be exceeded.

K. Joint Assembly. Pipe joints shall be assembled in accordance with the manufacturer's instructions.

L. Pipe Deflection. When it is necessary to deflect pipe from a straight line in either the vertical or horizontal plane, or where long radius curves are permitted, the amount of deflection shall not exceed 75% of the amount recommended by the manufacturer.

M. Pipe Cutting. Cutting pipe for the insertion of valves, fittings, or closure pieces shall be done in a neat, workmanlike manner without creating damage to the pipe. Ends shall be cut square and perpendicular to the pipe axis.

N. Burrs shall be removed from spigots and ends shall be smoothly beveled. Field cut ends shall be marked for proper depth of joint assembly.

O. Locator Tape. Install all plastic pipe with a locator tape of the type specified.

P. Thrust Restraint. All plugs, caps, tees, and bends, unless otherwise specified, shall be provided with reaction backing, or restrained joints as specified.

Q. Thrust-restraint design pressure shall be equal to 1.5 times the design pressure of the line.

3.04 TESTING

A 48-hour notice is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests.

B. The County and Contractor must be present for all testing, except for testing tapping valves and sleeves.

C. Testing shall be in accordance with Section 01666 - Testing Piping System.

D. All digging on the job site in the right-of-way must be completed before any testing of water or sewer. Any digging or boring across water or sewer lines after they have been tested may result in a retest of the lines at the Engineer's request.

E. If any revisions or changes are made after initial testing, lines will be re-tested at the Engineer's request.

F. Disconnect water supply during test.

G. All force mains will be tested from the valves in the valve vault at the lift station to the point of connection whether it be against a valve on another force main or into a manhole.

H. All services to be above ground during test. The services should be the correct length so they will be one (1) foot inside right-of-way line.

I. All fire hydrant gate valves to be open during test.

J. All visible leaks are to be repaired, regardless of the amount of leakage.

K. After the line passes the test, the pressure will be blown off from the opposite end of line from the gauge location. Fire hydrants, services and end-of-line blow offs will be opened to demonstrate they were on line during the test.

L. At end of test, the test gauge must return to zero. The pressure gauge must read 0 psi to a maximum of 300 psi in 2 psi increments.

M. The section of line being tested must be identified on the charge sheet. The length and size of pipe, the exact area being tested and the valves being tested against, must be identified. Use Station numbers if available.

O. A copy of the charge sheet will be given to the County and the Contractor at the end of the test.

END OF SECTION