

GLOBAL WATER RESOURCES (GWR)**CODE OF PRACTICE****GWR-CP-EX-008****ACCEPTANCE OF UNDERGROUND FACILITIES****BACKGROUND**

This Code of Practice details the requirements for acceptance of builder/contractor-deployed infrastructure into the Utility's inventory.

GENERAL

No new utility improvements shall serve a customer until Global Water is satisfied that all of the facilities have been properly installed, constructed and/or disinfected.

No untreated sewage or inadequately treated wastes shall be discharged to a ditch, stream or lake without a written permit from the applicable regulatory agencies prior to the time of discharge.

No other utility lines or systems are to be placed in the same trench as sewer lines, reclaimed water lines or potable water lines without the prior written authorization from Global Water.

No person shall install, permit to be installed or maintain an interconnection or other connection between any part of the sewerage or the reclaimed water systems and a potable water supply or a public water supply in such manner that sewage, waste or reclaimed water may find its way into or otherwise contaminate any potable or public water supply. The developer shall provide an approved backflow prevention device for any water connection to the potable water system that will be used for any construction purposes. The Utility, at its discretion, may require the use of a Utility-owned and maintained back-flow prevention device, the cost of which shall be borne by the Contractor. An air gap between the potable water supply and any water or wastes on site shall be maintained at all times.

FINAL APPROVAL/ACCEPTANCE OF UTILITIES

No new utilities will be accepted by Global Water until the following has occurred:

1. All installed facilities have been inspected, tested, and approved.
2. A video survey of all sewer infrastructure has been completed.
3. A copy of all test reports, including trench compaction tests, and inspections has been provided to Global Water.
4. All punchlist items required by the Global Water inspector have been addressed.
5. A signed ADEQ or MCESD "Certificate of Approval of Construction" has been provided to Global Water.
6. A Letter of "Provisional Completion" has been issued by Inspection Services
7. Record drawings (as-builts) have been supplied to Global Water by the Engineer-of-Record including AutoCAD files.
8. The developer has furnished copies of the contract, and UNCONDITIONAL LIEN WAIVERS from the Contractor.
9. Any other outstanding issues have been addressed.

Three 11x17 half size black line sets of as-built drawings and one electronic set on CD-R disk shall be provided with at least two points referenced to Global Water's GIS system. Drawings shall be supplied in a file format compatible with AutoCAD and ESRI.

CRITERIA

This Code of Practice is divided into four Appendices:

- A. Inspection, Testing, Approval and Acceptance of Gravity Flow Sanitary Sewers
- B. Inspection, Testing, Approval and Acceptance of Sewer Force Mains
- C. Inspection, Testing, Approval and Acceptance of Water Mains
- D. Inspection, Testing, Approval and Acceptance of Reclaimed Water Mains

Appendix A**INSPECTION, TESTING, APPROVAL AND ACCEPTANCE OF
GRAVITY FLOW SANITARY SEWERS**APPLICATION

This section applies to the inspection, testing, approval and acceptance of gravity flow sanitary sewers, including appurtenances normally installed as part of the system. The work includes leakage testing, deflection testing of flexible pipe system and video inspection of the interior of the sewer pipe system including services.

MATERIALS

Equipment necessary for any of the tests shall be of the type, quality and capacity to perform the operations required and to execute the tests specified, and shall be furnished by the Contractor, including all labor and materials.

INSPECTION

Global Water's Inspector or authorized representative shall inspect and approve all work per approved plans and specifications signed and sealed by a Registered (Civil) Engineer. Any substantial change to the scope of work shall require a re-approval of plans.

CLEANING

Prior to testing any section of sewer, the Contractor shall remove all foreign matter from the interior of the system. Flushing a cleaning ball, pressure jetting or other appropriate cleaning method approved by Global Water's Inspector may be used. Watertight plugs or other methods approved by Global Water's Inspector shall then be used to prevent dirt or debris from entering the system.

Debris shields shall be installed within all manholes prior to paving/grading operations and removed after final adjustments to finished grade.

The material jetted downstream shall be intercepted and removed by a hydro-vac truck. Under no circumstances shall material be allowed pass into the Utility's existing infrastructure.

TESTING

Testing shall be conducted by the Contractor and at his own expense. Testing shall be conducted after the dry utilities have been installed and prior to paving operations. The following tests are required:

1. Deflection Test
2. Watertight Integrity Test
3. Video Survey

All testing shall be accomplished in the presence of the Global Water Inspector or his authorized representative.

Global Water shall be notified 48 hours in advance of the testing.

Testing shall not commence on any portion of the pipeline, until all field placed concrete in contact with the pipe, fittings or appurtenances is adequately cured.

DEFLECTION TEST

All sewer pipe made of flexible materials shall be subjected to a deflection test according to MAG Specification 615.11(C)

WATERTIGHT INTEGRITY

The Contractor shall test 100% of the sewer line for leakage using MAG specifications 615.11 or ASTM F 1417-92 as required by the approving authority.

Water used for watertight integrity tests shall be potable water, reclaimed or raw water or as otherwise approved by the Global Water Inspector.

VIDEO INSPECTION

All sewer lines shall be inspected by video camera after installation of dry utilities and prior to curb and gutter operations. The costs incurred in making inspections by video camera shall be borne by the Contractor. Global Resources Inspector shall be notified 24 hours in advance of video inspection. Global Resources reserves the right to video sewer lines after pavement. The cost will be the responsibility of Global Resources.

Video equipment expressly designed for pipeline inspection purposes and operated by experienced and qualified personnel shall be operated through the entire pipeline, including service laterals. The video operator shall maintain a log noting location of all sewer taps, type and extent of any deficiencies. The video operator shall also photograph all deficiencies.

Inspector shall monitor the placing of water through out the system one hour in advance of video camera. A mechanical gauge will be mounted in front of the camera to show the depth of any standing water. The gauge shall clearly indicate markings of .05 (5/8") for pipe 8" through 15" and .10 (11/4") for pipe 15" and larger. Ponding water in excess of the allowable tolerance will be cause for rejection.

The video shall verify the uniform slope of the entire system length, including any installed laterals. The picture shall be clear and concise to provide a view that is acceptable.

The Contractor shall bear all costs incurred in correcting deficiencies found during the video inspection, including cost of additional video inspection required to verify correction of noted deficiencies.

A copy of the completed video in DVD format and report log sealed and signed by a Registered Engineer (Civil) with key map showing the entire system, shall be submitted to the Global inspector for review and approval. Excessive dirt or debris in pipe shall be cause for rejection of video tape and log.

PROVISIONAL ACCEPTANCE

A PRE-FINAL walk thru will be conducted after paving and parkway grading has been completed. A punch list will be generated noting any deficiencies. A copy will be provided to the Developer/Contractor.

Manholes and sewer lines will be cleaned by flushing and hydro-vac prior to scheduling a walk through. Sewer service shall have an 'S' stamped in the concrete at the top of curb location as a condition of acceptance. A Video inspection of manholes and adjoining lines will be conducted at each manhole for debris or dirt.

The Developer/Contractor shall remedy, at his own expense, any defects in workmanship or materials revealed by the walk-thru inspection.

Provisional acceptance will be based on re-inspection of outstanding punch list items after the appropriate repairs and corrections are completed.

Flow of any kind into the existing sewerage system shall not be allowed until the sewer has been approved and accepted for use by Global Water.

Portions of the work completed may be placed in operation after all cleaning, testing and inspection requirements have been fulfilled. Such partial use or partial acceptance shall be subject to the approval of Global Water Resources.

Under no circumstances shall any portion of the sewer collection system be placed in operations unless the pipeline is able to discharge directly to the Utility's backbone system. Upstream collection, hauling or pumping of raw wastewater will not be allowed.

Appendix B**INSPECTION, TESTING, APPROVAL AND ACCEPTANCE OF
SEWER FORCE MAINS**APPLICATION

This section applies to the inspection, testing, approval and acceptance of sewer force mains, including appurtenances normally installed as part of the system. The work includes pressure and leakage testing.

MATERIALS

Water employed in testing of sewer force mains shall be potable water, reclaimed water or raw water as determined by Global Water's Inspector.

Equipment necessary for any of the tests shall be of the type, quality and capacity to perform the operations required and to execute the tests specified, and shall be furnished by the Contractor, including all labor, materials and water.

INSPECTION

Global Water's Inspector or authorized representative shall inspect and approve all work accomplished per approved plans and specifications signed and sealed by a Registered (Civil) Engineer. Any substantial change to the scope of work shall require a re-approval of plans.

CLEANING

Prior to testing any section of sewer force main, the Contractor shall remove all foreign matter from the interior of the system. Flushing a cleaning ball, pig, pressure jetting or other appropriate cleaning method approved by Global Water's Inspector may be used. Watertight plugs, isolation valves or other methods approved by Global Water's Inspector shall then be used to prevent dirt or debris from entering the system.

The material jetted downstream shall be intercepted and removed by a hydro-vac truck. Under no circumstances shall material be allowed pass into the Utility's backbone infrastructure, including lift stations and receiving man-holes.

TESTING

Testing shall be conducted by the Contractor at his own expense. The following tests are required:

1. Pressure Test
2. Leakage Test

All testing shall be accomplished in the presence of the Global Water Inspector or his authorized representative.

Global Water shall be notified 48 hours in advance of the testing.

Testing shall not commence on any portion of the pipeline, until all field placed concrete in contact with the pipe, fittings or appurtenances is adequately cured.

PRESSURE TEST

The line shall be tested at a pressure of 50 psi (or more) above the design working pressure for the pipeline.

The duration of each pressure test shall be as directed by the Global Water Inspector.

Each valved section of pipe shall be slowly filled with water at the specified test pressure measured at the point of lowest elevation. Pressure shall be applied and maintained by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus except meters shall be furnished by the contractor, and the contractor shall furnish all necessary labor for connecting the pump, meter, and gages.

As the line is being filled and before applying the test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation. After the test, the taps shall be tightly plugged.

During the time the test pressure is on the pipe, the line shall be carefully checked at regular intervals for breaks or leaks. Any joints showing appreciable leaks shall be repaired and any cracked or defective pipes or fittings shall be removed and replaced with sound material in the manner provided and the test shall be repeated until satisfactory results are obtained.

LEAKAGE TEST

After all defects have been satisfactorily repaired and all visible leaks stopped, a leakage test shall be made on each valved section of the lines to determine the quantity of water lost by leakage. The contractor shall furnish all labor, material, and equipment required for making the test. The leakage shall be determined by measuring the quantity of water supplied to each valved section of the lines, during the test period, when the various sections of the lines are under pressure. No pipe installation will be accepted until or unless the leakage as determined by above test is less than the amount set forth below.

The allowable leakage (gallons per hour) shall not be greater than determined by the following formula:

$$L = \frac{ND P}{7400}$$

L = Gallons Per Hour

D = Nominal Pipe Diameter (in.)

N = Number of Joints

P = Test Pressure (PSI)

If individual sections show leakage greater than the limits specified above, the contractor shall, at his own expense locate and repair the defective joints until the leakage is within the specified allowance.

ACCEPTANCE

A PRE-FINAL walk thru will be conducted after paving and parkway grading have been completed. A punch list will be generated noting any deficiencies. A copy will be provided to the Developer/Contractor.

The Contractor shall remedy, at his own expense, any corrections noted on the punch list.

FINAL acceptance will be based on re-inspection of the sewer force main after the appropriate repairs and corrections are completed.

Flow of any kind into the existing sewerage system shall not be allowed until the sewer force main has been approved and accepted for use by Global Water.

Under no circumstances shall any portion of the sewer collection system be placed in operations unless the pipeline is able to discharge directly to the Utility's backbone system. Upstream collection, hauling or pumping of raw wastewater will not be allowed.

Appendix C**INSPECTION, TESTING, APPROVAL AND ACCEPTANCE OF
WATER MAINS**APPLICATION

This section applies to the inspection, testing, approval and acceptance of water mains, including appurtenances normally installed as part of the system. The work includes leakage testing and super-chlorination requirements.

WATER LINE CONSTRUCTION AND MATERIALS

All water lines shall be constructed per M.A.G. standard specifications 610.

Water employed in testing of water mains shall be 'potable' water only.

Equipment necessary for any of the tests shall be of the type, quality and capacity to perform the operations required and to execute the tests specified, and shall be furnished by the Contractor, including all labor, materials, chemicals and water.

INSPECTION

Global Water's Inspector or authorized representative shall inspect and approve all work accomplished per approved plans and specifications signed and sealed by a Registered (Civil) Engineer. Any substantial change to the scope of work shall require a re-approval of plans.

TESTING

Testing shall be conducted by the Contractor and at this own expense. Testing of water lines shall be per M.A.G standard specifications 610.15.

All testing shall be accomplished in the presence of the Global Inspector or his authorized representative.

Global Water shall be notified 48 hours in advance of the testing.

Testing shall not commence on any portion of the pipeline, until all field placed concrete in contact with the pipe, fittings or appurtenances is adequately cured.

Test results shall be approved by Global's inspector prior to start of paving operations.

STERILIZATION OF PIPE LINES

On completion of the leakage test and the pressure tests, all water mains are required to be super-chlorinated and tested prior to acceptance.

The contractor shall furnish all labor, equipment and material necessary for the chlorination of the new pipe lines which shall be sterilized before being placed in service. The lines shall be sterilized by the application of the chlorinating agent. The chlorinating agent must be NSF certified and can be a liquid chlorine, liquid chlorine gas-water mixture, or a calcium hypochlorite solution, which shall be fed into the lines through a suitable solution-feed device, or other methods approved by the engineer. The chlorinating agent shall be applied at or near the point from which the line is being filled, and through a corporation stop or other approved connection inserted in the horizontal axis of the newly laid pipe. The water being used to fill the line shall be controlled to flow into the section to be sterilized very slowly, and the rate of application of the

chlorinating agent shall be in such proportion of water entering the pipe that the chlorine dose applied to the water entering the line shall be a minimum of 50 parts per million (ppm) not to exceed 100 ppm. This shall be verified by a Global Water inspector by testing the concentration levels in the pipe with chlorine tests. The super-chlorinated water shall be retained in the section of pipe for a period of twenty-four (24) hours.

After the 24 hour period, the section of pipe shall be checked to assure a minimum concentration of 10 ppm chlorine residual is maintained throughout. This shall be verified by a Global Water inspector through the use of chlorine test strips at each sampling location. Upon verification the section of pipe held a 10 ppm chlorine residual throughout, the contractor shall flush to a chlorine residual of less than 1 ppm or what is representative in the distribution system., Upon completion of flushing, the section of pipe shall be sampled for bacteriologic growth by a Global Water sampling technician. The section of pipe shall be sampled in piece sections of no less than 100 ft. The chlorine residual shall measured for both Free and Total chlorine as well as the pH/Temp of the water. On receipt of acceptable bacteriological analysis, the line may be brought into service.

The sampling riser shall be located at a location farthest from the point of chlorination. The riser shall be above ground and equipped with a faucet for control of flow during sampling.

ACCEPTANCE

A PRE-FINAL walk thru will be conducted after paving and parkway grading have been completed. A punch list will be generated noting any deficiencies. A copy will be provided to the Developer/Contractor.

The Contractor shall remedy, at his own expense, any corrections noted on the punch list.

Provisional acceptance will be based on re-inspection of the water main after the appropriate repairs and corrections are completed.

Under no circumstances shall any portion of the sewer collection system be placed in operations unless the pipeline is able to discharge directly to the Utility's backbone system. Upstream collection, hauling or pumping of raw wastewater will not be allowed.

Appendix D**INSPECTION, TESTING, APPROVAL AND ACCEPTANCE OF
RECLAIMED WATER MAINS**APPLICATION

This section applies to the inspection, testing, approval and acceptance of reclaimed water mains, including appurtenances normally installed as part of the system. The work includes leakage testing and super-chlorination requirements.

WATER LINE CONSTRUCTION AND MATERIALS

All reclaimed water lines shall be constructed per M.A.G. standard specifications 616.

Water employed in testing of reclaimed water mains shall be 'reclaimed or raw' water only.

Equipment necessary for any of the tests shall be of the type, quality and capacity to perform the operations required and to execute the tests specified, and shall be furnished by the Contractor, including all labor, materials, chemicals and water.

INSPECTION

Global Water's Inspector or authorized representative shall inspect and approve all work accomplished per approved plans and specifications signed and sealed by a Registered (Civil) Engineer. Any substantial change to the scope of work shall require a re-approval of plans.

TESTING

Testing shall be conducted by the Contractor and at this own expense. Testing of reclaimed water lines shall be per M.A.G standard specifications 610.15.

All testing shall be accomplished in the presence of the Global Inspector or his authorized representative.

Global Water shall be notified 48 hours in advance of the testing.

Testing shall not commence on any portion of the pipeline, until all field placed concrete in contact with the pipe, fittings or appurtenances is adequately cured.

ACCEPTANCE

A PRE-FINAL walk thru will be conducted after paving and parkway grading have been completed. A punch list will be generated noting any deficiencies. A copy will be provided to the Developer/Contractor.

The Contractor shall remedy, at his own expense, any corrections noted on the punch list.

Provisional acceptance will be based on re-inspection of the reclaimed water main after the appropriate repairs and corrections are completed.

