



# CITY OF TAMPA

Pam Iorio, Mayor

CONTRACT ADMINISTRATION DEPARTMENT

David L. Vaughn, AIA, Director

## ADDENDUM NO. 1

DATE: November 12, 2009

Project: Bruce B. Downs Relief Force Main, Bears Avenue to 37<sup>th</sup> Street

Project No. 10-C-00003

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: Add, on page 2 of the Table of Contents, after Section 69, the following:

Section 73 – Restraining Devices

Item 2: Replace Proposal page P-4 with the attached page P-4R.

Item 3: Replace Workmanship and Materials Section 13 with the attached Section 13.

Item 4: Replace Workmanship and Materials Section 24 with the attached Section 24.

Item 5: Insert the attached Workmanship and Materials Section 73 after Section 69.

Item 6: Replace Plan Sheet 11 with the attached Plan Sheet 11.

Item 7: Change, on page C-5, in Contract Item 8000, in the third line of the second paragraph and in the last line of the fifth paragraph, the words "square yards" to read "cubic yards".

This addendum shall be included in and attached to the inside cover of the Contract Documents by and upon which bids are submitted.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect.

Questions are to be e-mailed to [ContractAdministration@tampagov.net](mailto:ContractAdministration@tampagov.net).

  
for Jim Greiner, P.E., Contract Manager

306 E. Jackson Street, 4N • Tampa, Florida 33602 • (813) 274-8456 • FAX: (813) 274-8080

  
www.tampagov.net



## SECTION 13 – HDPE PIPE / DIRECTIONAL DRILLING

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring or guided horizontal boring utilizing high density polyethylene (HDPE) pipe. This work shall include all services, equipment, materials, and labor for the complete and proper installation testing, restoration of underground utilities and environmental protection and restoration.

#### 1.02 QUALITY ASSURANCE

##### A. Design Requirements

- 1. Horizontal alignment shall be as shown on the Drawings. The pipe shall have a minimum 36-inch cover. The maximum depth shall be determined based on 18-inch minimum clearance from the existing or proposed utilities to be crossed. Compound curvatures may be used, but shall not exceed the maximum deflections as set forth by the HDPE pipe manufacturer or AWWA Standards, whichever is stricter.
- 2. Entry angle shall be 12° - 14° ideal (not to exceed 15°). Exit angle shall be 6° - 12° to facilitate “pull-back.”

- B. Qualifications: Directional drilling contractor (or subcontractor) shall have a minimum of four years experience with similar construction including pipelines of the same or larger diameter and the same or greater lengths. The Contractor shall also have successfully completed a minimum of five (5) similar projects of the same or larger diameter and of equal or greater lengths. All pipe and appurtenances of similar type and material shall be furnished by a single manufacturer.

#### 1.03 SUBMITTALS

- A. Work Plan: Prior to beginning work, the Contractor must submit to the Engineer a work plan detailing the procedure and schedule to be used to execute the project. The work plan should include a description of all equipment to be used, down-hole tools, a list of personnel and their qualifications and experience, list of subcontractors, a schedule work activity, a safety plan, traffic control plan, an environmental protection plan and contingency plans for possible problems. Work plan should be comprehensive, realistic and based on actual working conditions for this particular project. Plan should document the thoughtful planning required to successfully complete the project.

- B. Equipment: Contractor will submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Equipment shall include but not be limited to: drilling rig, mud system, mud motors (if applicable), down-hole tools, guidance system, rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives that Contractor intends to use or might use will be submitted.
- C. Material: Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.

## PART 2 - EQUIPMENT AND PRODUCTS

### 2.01 GENERAL

- A. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pull-back the pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the crossing, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused, a magnetic guidance system to accurately guide boring operations and record data for as-built purposes, a vacuum truck of sufficient capacity to handle the drilling fluid volume, trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

### 2.02 DRILLING SYSTEM

- A. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drilling string and an audible alarm, which automatically sounds when an electrical current is detected.

### 2.03 PIPE

- A. Pipe shall be HDPE and have a ductile iron pipe outside diameter and be in accordance with AWWA C-906. The pipe shall contain a minimum of 2 impregnated, longitudinal green stripes. The dimension ratio shall be verified by the Contractor based on the pipe pull strength required for the directional drilling. The

minimum working pressure rating of the pipe supplied shall be 160 psi.

- B. HDPE resin shall be PE3408 resin characterized by ASTM D3350.
- C. HDPE pipe shall have a minimum SDR rating of 11. HDPE pipe shall be in nominal lengths of not less than 20 feet.
- D. Fittings shall be HDPE with ductile iron outside diameter meeting ANSI/AWWA C906, latest revision, with a minimum working pressure rating of 160 psi. Ductile iron fittings may be used only where specified on the plans and provided HDPE MJ adapters are used to transition from the pipe to the fitting. HDPE transition fittings, adapters, and service fittings shall be electrofusion-type.
- E. Pipes shall be marked in accordance with AWWA requirements.

#### 2.04 DRILLING FLUIDS

- A. Drilling fluids shall consist of a mixture of potable water and gel-forming colloidal material such as bentonite, or a polymersurfactant mixture producing a slurry of custard-like consistency.

### PART 3 - EXECUTION

#### 3.01 PERSONNEL REQUIREMENTS

- A. Responsible representatives of the Contractor and Subcontractor(s) shall be present at all times during the actual crossing operations. A responsible representative as specified herein is defined as a person experienced in the type of work being performed and who has the authority to represent the Contractor in a routine decision making capacity concerning the manner and method of carrying out the work specified herein.
- B. The Contractor and Subcontractor(s) shall have sufficient number of competent workers on the project at all times to ensure the utility placement is made in a timely, satisfactory manner. Adequate personnel for carrying out all phases of the actual crossing operation (where applicable: tunneling system operators, operator for removing spoil material, and laborers as necessary for various related tasks) must be on the job site at the beginning of work. A competent and experienced supervisor representing the Contractor or Subcontractor that is thoroughly familiar with the equipment and type of work to be performed, must be in direct charge and control of the operation at all times. In all cases, the supervisor must be continually present at the project site during the actual crossing operation.

#### 3.02 COORDINATION OF THE WORK

- A. The Contractor shall notify the Engineer at least 24 hours in advance of starting work. In addition, the actual crossing operation shall not begin until the Engineer or his representative is present at the project site and agrees that proper preparations for the crossing have been made. The Engineer's approval for beginning the crossing shall in no way relieve the Contractor from the ultimate responsibility for the satisfactory completion of the work.
- B. The Contractor and the Engineer shall select a mutually convenient time for crossing operation to begin in order to avoid schedule conflicts.

### 3.03 MAINTENANCE OF TRAFFIC

- A. Erection or installation of appropriate safety and warning devices in accordance with the Florida Department of Transportation (FDOT) Manual on Traffic Control and Safe Practices shall be completed prior to beginning work.

### 3.04 JOINING AND CUTTING

- A. **Joining and Connections:** Before joining, and before any special surface preparation, surfaces must be clean and dry. General dust and light soil may be removed by wiping the surfaces with clean, dry, lint-free cloths. Heavier soil may be washed or scrubbed off with soap and water solutions, followed by thorough rinsing with clean water, and drying with dry, clean, lint-free cloths.
- B. **Cutting Pipe:** Joining methods for plain end pipe require square-cut ends. Pipe cutting is accomplished with guillotine shears, run around cutters, and saws.
- C. **Cutting Branch Outlet Holes:** Except for self-tapping saddle tees, hole cutting is required for field installed side outlet fittings. Polyethylene pipe hole saws shall be used.
- D. **Conventional heat fusion joining** is the process where mating surfaces are prepared for joining, heated until molten, joined together, and cooled under pressure. All fusion procedures require appropriate surface preparation tools, alignment tools, and temperature controlled heating irons with properly shaped, non-stick heater faces. An open flame cannot be used for heating because it oxidizes the surface and prevents bonding. During joining, all heat fusion procedures require the mating components to be moved several inches apart to accommodate surface preparation and surface heating tools. All fusions shall be constructed in strict accordance with pipe and fitting manufacturers' recommendations. The following methods of conventional heat fusion with restrictions may be used:
  - 1. Socket fusion shall be used with ½ inch through 4-inch pipe and fittings.
  - 2. Saddle fusion outlets may be used on 8 inch and smaller outlets applied to 12 inch and smaller mains. Larger outlets and pipe sizes shall be factory fabricated.

3. Butt fusion joints shall be field constructed between pipe and fittings. Fusion may occur in the trench.
- E. Electrofusion is an acceptable heat fusion process where a socket or saddle fitting contains an integral heating source. After surface preparation, the fitting is installed on the pipe, and the heating source is energized. During heating, the fitting and pipe materials melt, expand, and fuse together. Heating and cooling cycles are automatically controlled.
- F. All heat fusion techniques and methods shall be in STRICT ACCORDANCE with the manufacturer's recommendations.

### 3.05 INSTALLATION

- A. Erosion and sedimentation control measures and on-site containers shall be installed to prevent drilling mud from spilling out of entry and/or exit pits. Drilling mud will be disposed of off-site in accordance with local, state and federal requirements and/or permit conditions.
  1. No other chemicals or polymer surfactant shall be used in the drilling fluid without written consent of the Engineer, and after a determination is made that the chemicals to be added are not harmful or corrosive to the facility and are environmentally safe.
- B. Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 2 percent of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than 2 percent of depth in 100 feet, Contractor will notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before the deviation.
- C. Reaming: Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25 percent greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle. The Contractor shall take all precautions required to avoid inadvertent mud returns (frac outs).
- D. Pull-Back: After successfully reaming bore hole to the required diameter, Contractor will put the pipe through the bore hole. In front of the pipe will be a swivel and barrel reamer to compact bore hole walls. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations, Contractor will not apply more than the maximum safe pipe pull pressure at any time. Contractor shall protect the pipe from damage or gouging at all times and at no time overstress the pipe during pull back or any other operation. Above ground rollers shall be used to prevent gouging or damage during fusing and pullback operations.
- E. The system must be remotely steerable and permit electronic monitoring of tunnel depth and locations. The system must be able to control the depth and direction of the pipe and must be accurate to a window of  $\pm 2''$ .

- F. Equipment shall be fitted with a permanent alarm system capable of detecting an electrical current. The system shall have an audible alarm to warn the operator if the drill head contacts electrified cables.
- G. Two strands of #8 gauge insulated copper or #10 gauge insulated copper clad steel tracing wire shall be attached to the pipe in a manner that assures the wires will be affixed near the top of the pipe. No payment will be made for pipe that does not pass a continuity test through the wires after installation.
- H. The Contractor shall field locate all utilities and plan his work to avoid conflict with all sewer laterals and all other utilities. SP-31 details the Contractor's responsibilities for locating utilities.
- I. Depth and horizontal location of the pipe shall be shown on the As-built Drawings at intervals of 10 feet. Horizontal location shall be referenced to edge of pavement or as directed by the Engineer. All valves, fittings, points of connection, depth and horizontal changes from the plans shall be shown on the As-built Drawings at all locations.
- J. The pipe entry area shall be graded to provide support for the pipe to allow free movement into the bore hole. The pipe shall be guided in the bore hole to avoid deformation of, or damage to, the pipe.
- K. If unexpected subsurface conditions are encountered during the bore, the procedure shall be stopped. The installation shall not continue until the Engineer has been consulted.
- L. The pipe shall be pulled back through the bore hole using the wet insertion construction technique. The pipe may be installed full of water.
- M. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, movement or distortion of surface features.
- N. Prior to construction, the Contractor shall submit for approval by the Engineer, a plan that establishes a means to determine if other utilities have been damaged by directional drilling operations. For gravity sewers, sewer laterals, storm sewer and other non-pressure conduits this may involve checking manholes, inlets or other structures for evidence of drilling fluids or drilled soil materials.

### 3.06 FIELD TESTING

- A. Perform hydrostatic testing for leakage prior to installation and following installation in accordance with Section 18.

\* \* \*

## SECTION 24 - PVC PIPE - FORCE MAIN

### W-24.01 General

All pipe and fittings, 4"-48" nominal diameter, shall be solid wall polyvinyl chloride (PVC) pipe manufactured to standards as outlined in the following sections.

### W-24.02 Pipe standards

For PVC force mains, 4" through 12", the pipe shall be AWWA C900, DR-18 (class 150). For PVC force mains 14" through 48", the pipe shall conform to AWWA C905, DR-25. The outside diameter dimensions shall be identical to ductile iron pipe dimensions. The pipe shall have integral bell push on type joints conforming to ASTM D3139. Bell ends shall be equipped with elastomeric gaskets meeting the requirements of ASTM F477. The color shall be green and the nominal laying length per pipe section shall be 20 ft.

### W-24.03 Pre-Installation Tests, Reports, Markings and Submittals

All pipe and fittings shall be marked per Section 2.6 "Marking Requirements" of AWWA C900.

**PRIOR TO SHIPMENT** of the pipe and fittings to the project site, the Contractor shall submit to the Engineer test reports and certifications as described below, duly certified by the manufacturer's testing facility or an independent certified testing laboratory demonstrating full compliance with AWWA C900 or C905. Certification from the supplier is not acceptable.

An original, plus four (4) copies of the following, shall be submitted to the Engineer.

1. The name, address, and phone number of the pipe and fittings manufacturer and the location of the plant at which they will be manufactured.
2. **CERTIFICATION AND CERTIFIED TEST REPORTS** that each **LOT** of pipe and fittings has been manufactured, sampled, and tested per AWWA C900 or C-905. The City shall be provided in writing with the means to cross-reference the markings with the certification and test reports (i.e. date of manufacturer, lot number and shift number etc.). If this information is marked on the pipe in a code, the markings shall be decoded in writing.

### W-24.04 Bedding Requirements

Unless otherwise indicated on the Plans, the PVCP force main shall be installed with Class "C" bedding as shown on the plans. If suitable fill material is not excavated at the project site, it shall be imported. Compaction requirements are described in subsection W-24.12 "Bedding Placement for Pipelines". In no cases shall a concrete cradle be used. In the event the Contractor opts to install crushed stone, it shall be **NO GREATER THAN A #57 STONE**.

## W-24.05 Fittings

Both PVC and ductile iron fittings are acceptable unless the plans specifically call for PVC fittings. For standard angles, in sizes 4" through 8", fittings shall be injection molded in accordance with AWWA C907 and CSA B137.2.. For larger sizes (10" and greater) and for non-standard angles, fittings shall conform to the requirements of CSA B137.3 and shall be fabricated in a factory from AWWA C900/905 pipe.

Injection molded fittings shall have a dimensional ratio of 18 (DR18) and fabricated fittings shall have a dimensional ratio equal to that of the pipe they are being installed on.

All PVC fittings shall incorporate integral elastomeric gasket bell joints.

Materials used in the manufacture of PVC fittings shall equal or exceed cell class 12454 (ASTM 1784) with a hydrostatic design basis of 27.58 Mpa at 23°C as outlined in AWWA C900 and C905, and CSA B137.3.

Fabricated fittings shall be manufactured from segments of PVC pipe to the requirements of AWWA C900 and C905, and CSA B137.3. Segments shall be bonded together and over wrapped with fiberglass-reinforced polyester. All bends, up to and including 45°, shall be constructed from a single section of PVC pipe, without joints, bonding or fiberglass-reinforced polyester wrapping.

The pressure rating of the fittings shall be equal to the pressure rating of the pipe they are being installed on.

The manufacturer shall meet all the qualification test requirements as outlined in CSA B137.3

All injection molded fittings shall conform to CSA B137.2 and fabricated fittings shall conform to CSA B137.3

All fittings shall be marked with the following identifications:

- Nominal size, CIOD
- Manufacturers name or trademark
- AWWA pressure rating/pressure class and standard number to which the fitting is made
- CSA Standard number
- Proper handling label

## W-24.06 Harnessing

Joint restraint devices for all pipes and fittings shall meet requirements as specified under the "RESTRAINING DEVICES" specification. Thrust blocks shall not be allowed.

All wedge devices assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid Xylan fluoropolymer coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before

drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be Mega-Bond as manufactured by EBAA Iron, Inc., Eastland, Texas, or approved equal.

#### W-24.07 Marking and Locating

The PVC force main shall have an insulated metallic locating wire (14 gauge copper) buried a maximum of 1" above the centerline of the pipe capable of detection by a cable locator. The wire shall be looped around each bell. Use duct tape if necessary to hold the wire directly on the top of the pipe. The locating wire shall terminate at the top of each valve box and air release valve and be capable of extending 12" above the top of the box in such a manner so as not to interfere with the valve operation.

#### W-24.08 Installation

Installation of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground Installation Of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings For Water".

Pipe bending shall not be allowed.

Joint deflections up to a maximum of 1 degree will be permitted at integral bell and spigot joints. Joint deflections up to a maximum of 3 degrees will be permitted by utilizing twin-gasketed couplings instead of integral bell and spigot joints. Deflections larger than 3 degrees may be accomplished with factory molded or fabricated standard angle fittings; or, a standard deflection shall be accomplished with a factory fabricated fitting of the proper angle. Refer to Section W-24.05.

Air release valves shall use service saddles to attach the corporation stop connection to the PVC pipe. The service saddle body shall be sized exactly to the outside diameter of the pipe, with double straps anchored with a minimum of a four bolt pattern. The service saddle body shall be ductile iron, the sealing gasket shall be BUNA-N rubber and the straps shall be corrosion resistant alloy steel.

#### W-24.09 Testing

Testing of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground Installation Of Polyvinyl Chloride (PVC) Pressure Pipe And Fittings For Water" Section 7 (less references to disinfecting). The hydrostatic and leakage testing may be performed simultaneously. The average hydrostatic test pressure shall be 100 psi.

Air pressure testing of installed pressure pipe is expressly prohibited due to the catastrophic nature of failure should failure occur.

#### W-24.10 Storage of PVC Pipe

Pipe shall be stored at the job site in unit packages provided by the manufacturer. Caution

shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe. When unit packages of PVC pipe are stacked, the Contractor ensure that the weight of upper units does not cause deformation to pipe in lower units.

PVC pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

PVC pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam line, engine exhaust, etc.

When unit packages of PVC pipe are stacked, ensure that the height of the stack does not result in instability which could cause stack collapse, pipe damage, bodily injury, and property damage.

The interior as well as all sealing surfaces of pipe, fittings, and other accessories shall be kept free from dirt and foreign matter.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease.

#### W-24.11 Handling of PVC Pipe - Standard Procedures

When using fork lifts or other handling equipment, prevent damage to PVC pipe.

When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends.

Pipe shall be lowered, not dropped, from trucks and into trenches.

In preparation for pipe installation, placement (stringing) of pipe shall be as close to the trench as practical and on the opposite side from excavated earth. Bell ends shall point in the direction of work progress.

The Engineer may reject any pipe that shows visible signs of damage resulting from poor storage and handling practices.

#### W-24.12 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180. No stone larger than 4 inches in diameter shall be placed closer than two feet to any point on any pipe.

#### W-24.13 Trench Backfill

Trench backfilling work shall be done in a manner to prevent dropping of material directly on top of any conduit or pipe from a vertical distance greater than 5 feet. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material.

#### W-24.14 Backfill for Short Tunnel

Where pipelines are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable excavated material. Pipelines in short tunnels shall be suitably supported, to permit placing backfill which shall be suitably tamped in place.

#### W-24.15 Inspection and Testing of Backfilling

All backfill shall be subject to test by the Engineer.

\* \* \*

## SECTION 73–RESTRAINING DEVICES

### W-73.01 General

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating equal to that of the pipe on which it is used but a minimum 100 psi. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

### W-73.02 Material

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

### W-73.03 Gaskets

Mechanical joint gasket shall be of a design that causes the gasket to deflect approximately 30% during assembly of the mechanical joint. The gasket material shall conform to the requirements of ANSI/AWWA C111/A21.11, section 11-6.4, of the latest revision.

### W-73.04 Traceability

An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.

#### W-73.05 Installation

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

#### W-73.06 Approvals

Mechanical Joint Restraints shall be listed by Underwriters Laboratories in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints shall be Factory Mutual Approved in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints, 4 inch through 24 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.

Mechanical joint restraint shall be Series 2000PV for PVC pipe and Series 1000 for DIP pipe produced by EBAA Iron Inc. or approved equal.

#### W-73.07 Coating System

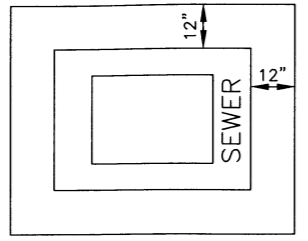
Coating for restraint devices shall consist of the following:

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid Xylan® fluoropolymer coating with heat cure to follow each coat.

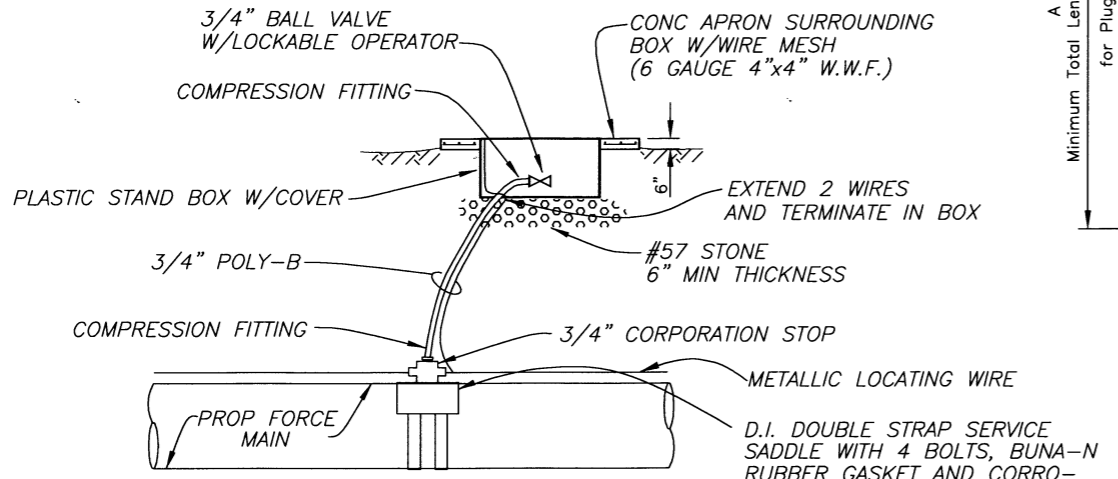
All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review.

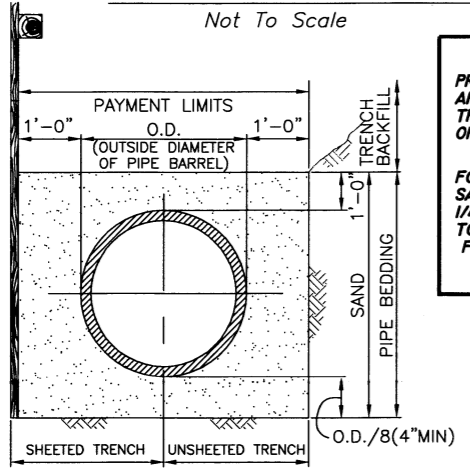
\*\*\*



PLAN VIEW



AIR RELEASE VALVE DETAIL

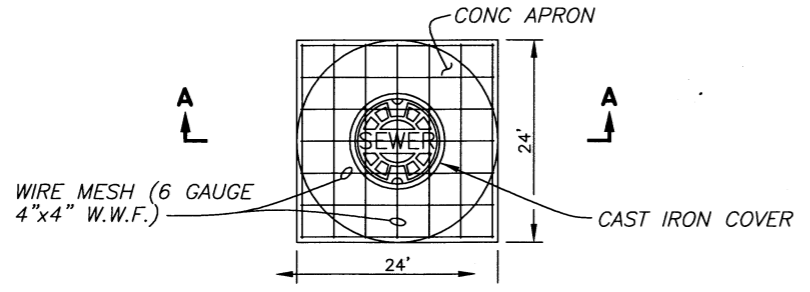


CLASS C BEDDING

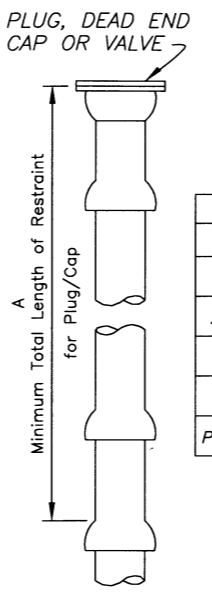
**IMPORTANT - FOR EACH OPERABLE VALVE:**  
 PROVIDE A BRASS IDENTIFICATION TAG EPOXIED TO THE CONCRETE APRON THAT IS A MINIMUM 2" IN DIAMETER AND 1/8-INCH THICK. THE TAG SHALL BE ENGRAVED WITH "SEWER", SIZE OF VALVE, TYPE OF VALVE, AND DIRECTION AND NUMBER OF TURNS TO OPEN.

FOR EXAMPLE, A 4-INCH PLUG VALVE ON A SANITARY SEWER FORCE MAIN THAT REQUIRES 1/4 TURNS TO THE LEFT (COUNTERCLOCKWISE) TO BE FULLY OPEN WOULD REQUIRE THE FOLLOWING ON AN IDENTIFICATION TAG:

**SEWER**  
**4" P.V.**  
**1/4 T.O.L.**

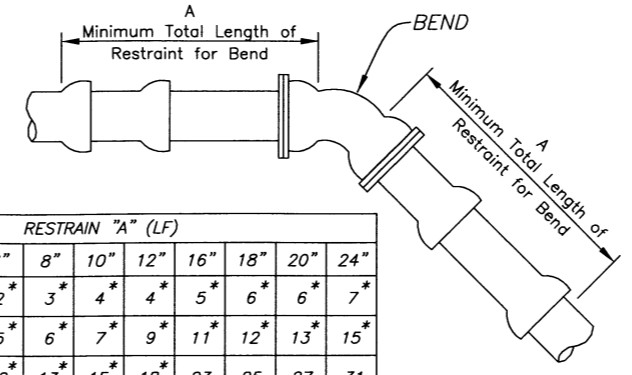


PLAN



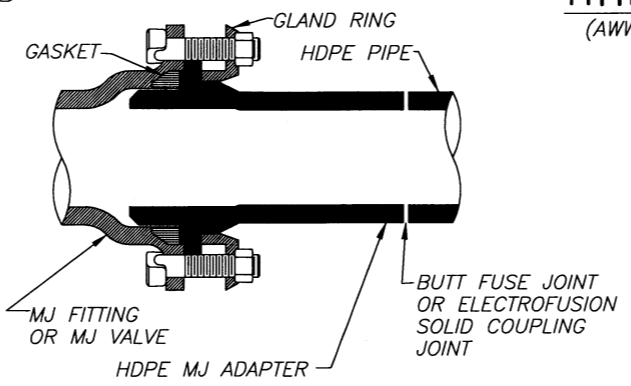
| RESTRAIN "A" (LF) |     |     |     |     |     |     |     |     |     |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| FITTING           | 4"  | 6"  | 8"  | 10" | 12" | 16" | 18" | 20" | 24" |
| 11-1/4'           | 2*  | 2*  | 3*  | 4*  | 4*  | 5*  | 6*  | 6*  | 7*  |
| 22-1/2'           | 3*  | 5*  | 6*  | 7*  | 9*  | 11* | 12* | 13* | 15* |
| 45°               | 7*  | 10* | 13* | 15* | 18* | 23  | 25  | 27  | 31  |
| 90°               | 17* | 24  | 31  | 37  | 43  | 55  | 60  | 65  | 75  |
| PLUG/CAP          | 38  | 53  | 69  | 83  | 96  | 126 | 139 | 153 | 178 |

A=MINIMUM FOOTAGE OF PIPE TO BE RESTRAINED  
 \* MINIMUM ONE PIPE JOINT UPSTREAM AND DOWNSTREAM OF EACH FITTING SHALL BE RESTRAINED



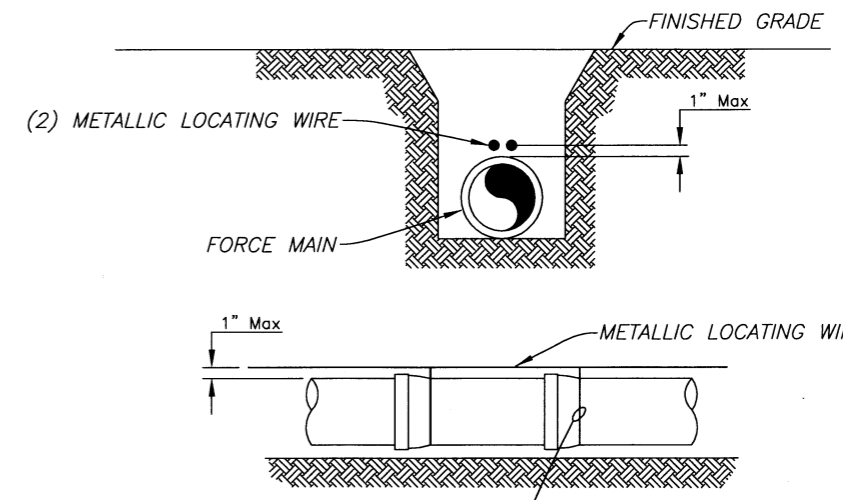
FITTING RESTRAINT DETAIL

(AWWA C900/C905 PVC PIPE)



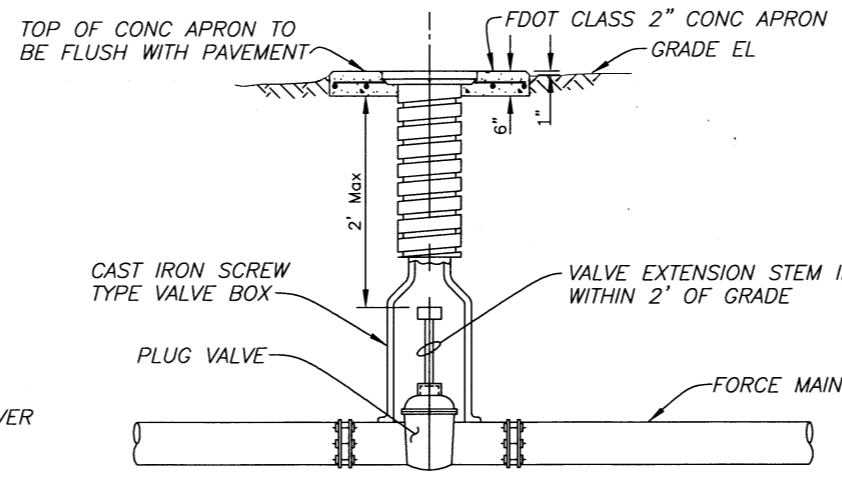
HDPE TRANSITION DETAIL

Not To Scale  
 NOTE: SCHEMATIC SHOWN FOR STANDARD MJ FITTING AND PLUG VALVES.



PIPE LOCATING WIRE DETAIL

- NOTES:
- Pipe shall require 2 insulated metallic locating wires capable of detection by a cable locator and shall be buried directly above the centerline of the pipe. Wire shall be 8 gauge copper wire or 10 gauge copper clad steel wire. Thicker wire is allowed.
  - Locating wire shall terminate at the top of each valve box and air release valve. Wire shall be capable of extending 24" above top of box in such a manner so as not to interfere with valve operation.
  - Use duct tape as necessary to hold wire directly on the top of the pipe.
  - For directional boring with HDPE a 1" conduit may be pulled back with the locating wire to ease installation and to prevent the wire from breaking.



SECTION A-A

VALVE BOX DETAIL

Not To Scale

PIPE LOCATING WIRE DETAIL

Not To Scale

User: SS15 Drawing Name: C:\CAD FILES\DWG\PIPE\2010-5474-BBDowns-Bearss-37th\Sheet Set\5474-SHEETS\5474-MODELS\5474\_100.dwg  
 Layout: SH-11-FM DETAIL; Last Saved: Oct 16, 2009 - 1:08pm

|   |     |      |           |                |   |   |           |
|---|-----|------|-----------|----------------|---|---|-----------|
| JACINTO CARLOS FERRAS, P.E. #49454<br>DESIGN DIVISION HEAD<br>WASTEWATER DEPARTMENT | No. | DATE | REVISIONS | DES: DR        | <b>CITY of TAMPA</b><br>WASTEWATER DEPARTMENT | <b>BRUCE B. DOWNS RELIEF FORCE MAIN</b><br>BEARSS AVENUE TO 37TH STREET<br>• FORCE MAIN STANDARD DETAIL • | W.O. 5474 |
|   | 3   |      |           | DRN: RS        |   |   | SHEET     |
|   | 2   |      |           | CKD: <i>CK</i> |   |   | 11        |
|   | 1   |      |           | DATE: 10/16/09 |   |   | OF 14     |