# Technical Specifications & Standard Details


*Town of Fort Myers Beach*
*2523 Estero Boulevard*
*Fort Myers Beach, Florida*
*(239) 765-0202*

*www.fortmyersbeachfl.gov*

*July 2014*

# Technical Specifications

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# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.00
## FMB DETAIL INDEX

### SHEET INDEX



DATE: 08/06/14

NOT TO SCALE

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description of Work

B. Constraints

C. Work by Others

D. Contractor's Use of Site

E. Work Sequence

F. Owner Occupancy

| NOTE: Fill in the blanks and add additional work items under B as required. |
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1.2 DESCRIPTION OF WORK

A. General: The Work to be done under this Contract and consists of the construction of _____ a facility as shown and specified in Contract Documents entitled _____.

B. The Work includes:

1. Furnishing of all labor, material, superintendence, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, services and other means of construction necessary or proper for performing and completing the Work.

2. Sole responsibility for adequacy of plant and equipment.

3. Maintaining the Work area and site in a clean and acceptable manner.

4. Maintaining existing facilities in service at all times except where specifically provided for otherwise herein.

5. Protection of finished and unfinished Work.

6. Repair and restoration of Work damaged during construction.

7. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.

8. Furnishing, installing, and protecting all necessary guides, track rails, bearing plates, anchor and attachment bolts, and all other appurtenances needed for the installation of the devices included in the equipment specified. Make anchor bolts of appropriate size, strength and material for the purpose intended. Furnish substantial templates and shop drawings for installation.

C. Implied and Normally Required Work: It is the intent of these Specifications to provide the Town of Fort Myers Beach with complete operable systems, subsystems and other items of Work. Any part or item of Work which is reasonably implied or normally required to make each installation satisfactorily and completely operable is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.

D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these specifications will be made upon this basis.

| NOTE: Use 1.3 if applicable. |
|---|

1.3 CONSTRAINTS

A. The Contract Documents are intended to allow the Contractor flexibility in construction of the Work, however, the following constraints apply:

_____
_____
_____
_____
_____
_____
_____
_____

| NOTE: Complete or delete as required. |
|---|

1.4 WORK BY OTHERS

A. Work on the Project, which may take place concurrently with this Contract and which is excluded from this Contract, is as follows:

1.
2.
3.
4.

1.5 CONTRACTOR'S USE OF SITE

A. In addition to the requirements of the General Conditions, limit use of site and premises for work and storage to allow for the following:

1. Coordination of the Work under this Contract with the work of the other contractors where Work under this Contract encroaches on the Work of other contractors.

2. Town of Fort Myers Beach occupancy and access to operate existing facilities.

3. Coordination of site use with Engineer.

4. Responsibility for protection and safekeeping of products under this Contract.

5. Providing additional off-site storage at no additional cost to Town of Fort Myers Beach as needed.

1.6 WORK SEQUENCE

A. Construct Work in stages to accommodate Town of Fort Myers Beach's use of premises during construction period and in accordance with the limitations on the sequence of construction specified. Coordinate construction schedules and operations with Engineer.

B. Coordinate Work of all subcontractors.

| NOTE: Modify as necessary |
|---|

1.7 TOWN OF FORT MYERS BEACH OCCUPANCY

A. Town of Fort Myers Beach will occupy premises during entire period of construction in order to maintain normal operations. Cooperate with Town of Fort Myers Beach's representative in all construction operations to minimize conflict, and to facilitate Town of Fort Myers Beach usage.

B. Conduct operations so as to inconvenience the general public in the least.

PART 2 PRODUCTS

Not Used

PART 2 EXECUTION

A. Starting Work: Start Work within 10 days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion.

END OF SECTION

SECTION 01025

PAYMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values

B. Application for Payment

1.2 SCHEDULE OF VALUES

A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the General Conditions. Submit preliminary schedule of values within 10 calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the General Conditions.

B. Format: Utilize a format similar to the Table of Contents of the Project Specifications. Identify each line item with number and title of the major specification section. Identify site mobilization, bonds and insurance. Include within each line item, a direct proportional amount of Contractor's overhead and profit.

C. Revisions: With each Application for Payment revise schedule to list approved Change Orders.

1.3 APPLICATION FOR PAYMENT

A. Required Copies: Submit three copies of each application on EJCDC Form No. 1910-8-E (1990) or approved equal. Present required information in typewritten form or on electronic media printout.

B. Execute certification by signature of authorized officer.

C. Use data from approved Schedule of Values.

| NOTE: Include provisions for payment for stored materials in Supplementary Conditions. |
|---|

D. Stored Materials: When payment for materials stored is permitted, submit a separate schedule for Materials Stored showing line item, description, previous value received, value incorporated into the Work and present value.

E. Change Orders: List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of work.

F. Final Payment: Prepare Application for Final Payment as required in the General Conditions.

G. Submit an updated construction schedule with each Application for Payment.

H. Submit application for payment to Engineer on, or before, the _____ of each _____.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01026

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Explanation and Definitions

B. Measurement

C. Payment

D. Schedule of Values

E. Application for Payment

1.2 EXPLANATION AND DEFINITIONS

A. The following explanation of the Measurement and Payment for the bid form items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the bid form or relieve the Contractor of the necessity of furnishing such as a part of the Contract.

1.3 MEASUREMENT

A. The quantities set forth in the bid form are approximate and are given to establish a uniform basis for the comparison of bids. The Town of Fort Myers Beach reserves the right to increase or decrease the quantity of any class or portion of the work during the progress of construction in accord with the terms of the Contract.

B. All measurements for payment shall be measured/verified by an authorized Town of Fort Myers Beach representative.

1.4 PAYMENT

A. Payment shall be made for the items listed on the Bid Form on the basis of the work actually performed and completed, such work including but not limited to, the furnishing and mobilization of all necessary labor, materials, equipment, transportation, clean up, restoration of disturbed areas, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.

B. Payment shall fully reimburse the Contractor for cooperating with and meeting all the requirements of the State of Florida Trench Safety Act (90-96).

C. Unit prices are used as a means of computing the final figures for bid and Contract purposes, for periodic payments for work performed, for determining value of additions or deletions and wherever else reasonable.

## 1.5 SCHEDULE OF VALUES

A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the General Conditions. Submit preliminary schedule of values within 10 calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the General Conditions.

B. Refer to Article 14 of the General Conditions (Part G) and Supplementary General Conditions (Part H) of these Contract Documents for additional requirements.

## 1.6 APPLICATION FOR PAYMENT

A. Required Copies: Submit three (3) copies of each application on the “Estimate and Requisition for Payment” form CMO:013. Present required information in typewritten form or on electronic media printout.

B. Prepare the Application for Payment in accordance with Article 14 of the General Conditions (Part G) and Supplementary Conditions (Part H) of these Contract Documents. Execute certification by signature of authorized officer, with original signature on each copy of application for payment.

C. Use data from approved Schedule of Values.

D. Stored Materials: When payment for materials stored is permitted, submit a separate Schedule for Materials Stored showing line item, description, previous value received, value incorporated into the Work and present value.

E. Change Orders: List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of work.

F. Final Payment: Prepare Application for Final Payment as required in the General Conditions (Part G) of these Contract Documents.

G. Submit an updated construction schedule for each Application for Payment.

## PART 2 EXECUTION

### 2.1 MEASUREMENT AND PAYMENT

A. Payment shall be made on the basis of work actually performed completing each item in the Bid, such work including, but not limited to:

1. the furnishing and mobilization of all necessary labor, materials, equipment, and transportation
2. test pits or other methods required to locate existing underground utilities and/or structures
3. Maintenance of Traffic
4. erosion and sedimentation control
5. excavation, backfilling, and compaction
6. sheeting, shoring and bracing
7. protection of existing structures, utilities, and customer service lines
8. de-watering
9. installation and removal of plugs and bulkheads
10. pressure testing and leakage testing
11. bacteriological sampling and clearing
12. reconstruction and regrading of pavement areas, road shoulders, and ditches or swales disturbed by construction activity
13. finish grading and disposal of surplus material, unsuitable material and all debris
14. cleanup and restorations
15. all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications.

B. Retainage will be withheld from the final payment until written acceptance by the Owners Representative for all final clean up, restoration and Record Drawings / As-Builts.

C. PAYMENT ITEMS:

1. Mobilization: Payment for mobilization will be made at the Contract lump sum price. This item shall include full compensation for mobilization, de-mobilization, maintenance of traffic, bonds & insurance, disposal of materials, clean up, restorations, erosion and sedimentation control and other miscellaneous items for a complete installation.

2. Performance and Payment Bond Premiums and Insurance:

3. Furnish and Install Utility Pipelines: Payment for furnishing and installing utility pipelines (various sizes and types) will be made at the Contract unit price per lineal foot for the pipe in place. This item includes all necessary labor, equipment and materials for the furnishing and laying of the pipe, signs, maintenance of traffic, dewatering, compaction, pipe bedding, backfilling, sheeting, restrained joint piping, mylar detectable tape, polyethylene sleeve, clamps, harnessing, plugs and caps, adapters, excavation of all material encountered including rock, backfill, replacement of grass, sod, clearing and grubbing, pavement, driveways, sidewalks, mailboxes, culverts, storm sewers, and other surface materials not specifically designated in the Bid, clean-up, sterilization, and tests. Measurement of the pipe shall be to the nearest foot along the centerline including the lengths of manholes, valves and fittings. Lineal footage measurement shall be horizontal. Cuts shall be measured from existing grade to the invert elevation of the sewer.

4. Furnish and Install Standard Precast Concrete Sanitary Sewer Manholes: Payment for furnishing and installing standard precast concrete sanitary manholes will be made at the unit price per manhole acceptably installed. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, manhole frames and covers, coatings and linings, manhole joints, bottom channels and sanitary sewer connections. All manholes shall conform to the Standard Sanitary Sewer Precast Manhole detail shown on the Plans. This item does not include outside drop manholes or standard precast shallow manholes. Cuts shall be measured from existing grade to the invert elevation of the exiting sewer.

5. Furnish and Install Outside Drop Manholes: Payment for furnishing and installing outside drop manholes will be made at the unit price per drop manhole acceptably installed. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting. shoring, dewatering, concrete work and reinforcing, drop pipes and pipe connections, plugs for future connections, protection of adjacent facilities, manhole frames and covers, coatings and linings, manhole joints, bottom channels and sanitary sewer connections. All outside drop manholes shall conform to the Drop Manhole detail shown on the Plans. Cuts shall be measured from existing grade to the invert elevation of the exiting sewer.

6. Furnish and Install Valves and Boxes: Payment for furnishing and installing valves will be made at the appropriate Contract unit price per valve acceptably installed. This item includes the valve, box and all necessary labor, materials and equipment for installation, including valve stem and valve box extensions. This item also includes the installation of base material below the valve in accordance with the detail shown in the Plans.

7. Furnish and Install Fire Hydrant Assemblies: Payment for the furnishing and installing of fire hydrant assemblies will be made at the Contract unit price for each fire hydrant assembly acceptably installed. This item includes the tee installed on the utility main, all necessary fittings, valve, joint restraint from the valve to the tee and necessary piping from the tee to the hydrant location with the installation of barrel section to meet finished grade. All piping shall be six-inch (6") ductile iron pipe from the tee to hydrant. The Contractor shall be responsible to set the hydrant to grade in accordance with the detail shown on the Plans.

8. Furnish and Install Permanent Blow-offs: Payment for furnishing and installing permanent blow-offs will be made at the appropriate Contract unit price per blow-off acceptably installed. This item includes the reinforced concrete thrust collar, piping, making pipe connections, valves, meter box, tie rods and all other work for a complete installation. All permanent blow-offs shall conform to the detail shown on the Plans.

9. Furnish and Install Tapping Sleeve and Valve: Payment for furnishing and installing tapping sleeves and valves will be made at the appropriate Contract unit price per tapping sleeve and valve acceptably installed. This item includes all piping, making pipe connections, tapping sleeve, valve and valve box, restrained joints, protection of existing utilities, excavation, bedding, de-watering, compaction & backfilling, restoration, clean up, testing and all other work for a complete installation.

10. Furnish and Install Pump Station: Payment for the furnishing and installing the pump station will be made for at the Contract lump sum price for the pump station acceptably installed. This item includes pumps, wet well structure, valve vault structure, fence, stainless steel hardware, aluminum wet well cover, aluminum valve vault cover, coatings, valves, pipe, fittings, water service, panel, electrical hardware, electrical connection, driveway, culvert, and all necessary materials and labor to complete the pump station in accordance with the project plans. Also included is the cost to connect electrical power to the pump station. The Contractor shall schedule with Florida Power and Light to place the pump station into service.

11. Furnish and Install 6-Inch Diameter Sanitary Sewer Services: Payment for furnishing and installing 6-inch diameter sanitary sewer services will be made at the appropriate Contract unit price per linear foot for P.V.C. and ductile iron pipe sewer service acceptably installed. This item includes all labor, equipment and materials for furnishing and installing all necessary pipe, fittings, connections, solids sleeves and adapters, protection of existing utilities and facilities, excavation, pipe bedding, sheeting, shoring, dewatering, compaction, cleanouts, service markers, plugs, detectable tape, removal and replacement of grass, sod, shrubs, pavement, driveways, culverts and storm sewers, mailboxes, sidewalks and other surface materials not specifically designated in the Bid, cleanup, testing, and all other work for a complete installation.

12. Furnish and Install 2-Inch or Less Water Services: Payment for furnishing and installing 2-inch or less diameter water services will be made at the appropriate Contract unit price for each Polyethylene tubing short side and long side service acceptably installed. This item includes all labor, equipment and materials for furnishing and installing all necessary pipe, fittings, connections, casing pipes, meter stops, meter box, tapping sleeves, saddles, protection of existing utilities and facilities, excavation, pipe bedding, dewatering, compaction, disconnecting existing water service line, assistance notifying customers of temporary shutdown, removal and replacement of grass, sod, shrubs, pavement, driveways, culverts and storm sewers, mailboxes, sidewalks and other surface materials not specifically designated in the Bid, cleanup, sterilization, testing and all other work for a complete installation. Short side services may be up to 25 LF in length. Long side services may be up to 40 LF in length and shall include 4" diameter schedule 40 PVC (minimum)casing under roadway crossings. Casing shall extend 4 LF beyond edge of pavement.

13. Remove and Replace Driveway: Payment for removing and replacing driveway will be made at the appropriate Contract Unit price per lineal foot of concrete or asphalt driveway shown on the Plans to be removed and replaced for water main construction. Driveways shall be replaced to match existing elevations and materials of construction. Surface restoration required for driveway removal and replacement shall be included in this item.

14. Remove and Replace Street Pavement Surface and Base: Payment for removing and replacing street pavement surface and base will be made at the appropriate Contract unit price per square yard for pavement surface and base installed in the work. All pavement surface and base shall be replaced in accordance with the detail shown on the Plans.

15. Furnish and Install Force Main Interconnection: Payment for furnishing and installing the force main interconnection will be made at the Contract lump sum price for the interconnection acceptably installed. This item includes all labor, equipment and materials to install all necessary pipe, fittings, connections, tapping sleeve and valve with valve box, field measurements, protection of existing facilities, excavation, pipe bedding, dewatering, compaction, surface restoration, testing, cleanup and all other work for a complete installation.

16. Furnish and Install Unreinforced Concrete: Payment for furnishing and installing unreinforced concrete will be made at the Contract unit price per cubic yard for all unreinforced concrete installed as ordered in writing by the Engineer. All unreinforced concrete shall conform to the technical specifications. All unreinforced concrete installed in the work not shown on the Plans and not ordered by the Engineer in writing will not be measured for payment.

17. Furnish and Install Fittings: Payment for furnishing and installing fittings will be made at the Contract unit price per ton for fittings installed in the work and as ordered in writing by the Engineer. All fittings installed in the work not shown on the

plans and not ordered or approved by the Engineer in writing will not be measured for payment.

18. Special Pipe Bedding: Payment for special pipe bedding will be made at the Contract unit price per cubic yard of washed shell, gravel, or other acceptable material used in trench bottoms for pipe bedding where ordered in writing by the Engineer. If earth or sand is used for stabilizing the subgrade, no payment will be made under this item. Payment for earth or sand materials used in stabilizing the subgrade shall be included in the price for installing pipe.

19. Jack and Bore Crossing: Payment for furnishing and installing jack and bore in crossing will be made at the Contract unit price per lineal foot of casing installed. This item includes all necessary labor, equipment and materials for furnishing and installing the casing pipe, carrier pipe, casing spacers, casing end seals, maintenance of traffic, excavation pits, sheeting, de-watering, compaction, Jacking and Boring, necessary fittings and pipe restraints, Excavation of all material encountered including rock, back filling, restoration and any other items not specifically mentioned but are required for a complete installation. Measurement shall be to the nearest lineal foot of casing installed, as measured along the centerline.

20. Maintenance of Traffic: Payment for maintenance of traffic will be made for at the Contract lump sum price.

21. Tie-Ins to existing water mains: Payment for furnishing and connecting to existing water mains (excludes connections made via tapping sleeve & valve) by cutting in to the existing main will be made at the contract unit price per point of connection acceptably installed. This item includes all necessary labor, equipment and materials for installing the connection, piping, fittings, joint restraints, adaptor sleeves, plugs, caps, disconnecting existing watermain, excavations, de-watering, compaction and backfilling, restoration, assistance notifying customers of temporary shutdown, sterilization, testing, clean up and all other work necessary for a complete installation.

22. Grout filling existing pipe: Payment for furnishing and installing concrete grout will be made at the contract unit price per lineal foot of pipe grout-filled. All concrete grout shall conform to the technical specifications and be approved by the Engineer. This item includes all necessary labor, equipment and materials to perform the grouting, grout-fill access points, plugs, caps, blow offs and all other items necessary for a complete installation.

END OF SECTION

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SECTION 01030

LEAD ABATEMENT

## PART 1 GENERAL

### 1.1 SUMMARY

A. This specification details the requirements for worker protection, containment, environmental protection, and waste disposal for the removal of lead paint when required by the Contract Documents before repainting or recoating. The Contractor shall implement programs and procedures which comply with the requirements of the specification and all applicable Federal, State and Local OSHA and EPA Standards and regulations. The Contractor shall perform the work with a minimal impact on the environment and protect all workers, Town of Fort Myers Beach and Engineer from lead and other safety and health hazards.

B. The Contractor shall obtain the services of a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene in comprehensive practice. The Certified Industrial Hygienist shall:

1. Certify training.
2. Review and approve lead-containing paint removal plan for conformance to the applicable referenced standards
3. Inspect lead-containing paint removal work for conformance with the approved plan
4. Direct monitoring
5. Ensure work is performed in strict accordance with specifications and applicable codes and regulations at all times.
6. Ensure hazardous exposure to personnel and to the environment are adequately controlled at all times.

### 1.2 REFERENCES

A. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ANSI Z88.2 1980 Respiratory Protection

B. CODE OF FEDERAL REGULATIONS

| | | |
|---|---|---|
| 1. | 29CFR 1910.134 | Respiratory Protection |
| 2. | 29CFR 1910.1025 | Lead |
| 3. | 29CFR 1910.1200 | Hazard Communication |
| 4. | 29CFR 1926.55 | Gases, Vapors, Fumes, Ducts, and Mists |
| 5. | 29CFR 1926.62 | Lead Construction Industry Standard |
| 6. | 40CFR 260 | Hazardous Waste Management Systems: General |
| 7. | 40CFR 261 | Identification and Listing of Hazardous Waste |

| | | |
|---|---|---|
| 8. | 40CFR 262 | Regulations for Hazardous Waste Generators |
| 9. | 40CFR 263 | Regulations for Hazardous Waste Transporters |
| 10. | 40CFR 264 | Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities |
| 11. | 40CFR 265 | Interim Status Standards for Owner's and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities |
| 12. | 40CFR 266 | Standards for the Management of Specific Hazardous Waste and Specific types of Hazardous Waste Management Facilities |

C. RESOURCE AND RECOVERY ACT (RCRA)

1. Hazardous Waste Characterization
2. Toxic Characteristic Leaching Procedure (TCLP)

D. NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY & HEALTH (NIOSH):

1. NIOSH Method 7082
2. NIOSH 81-123, Occupational Health Guidelines for Chemical Hazards

E. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA):

1. OSHA CPL 2-2.20A, Chapter VIII: Sampling for Surface Contamination
2. OSHA Pub 3126 Working with Lead in the Construction Industry

F. STEEL STRUCTURES PAINTING COUNCIL (SSPC)

1. Guide 5 Guide to Maintenance Painting Programs
2. Guide 61 (CON) Guide for containing Debris Generated During Paint Removal Operation
3. Guide 71 (DIS) Guide for the Disposal of Lead Containment Surface Preparation Debris.

1.3 SUBMITTALS

A. PRE-JOB SUBMITTALS: These submittals shall be made at least two (2) weeks before the start of any field work. Approval of the plan must be obtained prior to the start of any paint removal work.

B. LEAD CONTAINING PAINT REMOVAL PLAN: Submit a detailed job-specific plan of the work procedures to be used in the removal of lead-containing paint. Obtain approval of the plan prior to the start of paint removal work. Prior to beginning work, the Contractor and CIH shall meet with the Town of Fort Myers Beach's representative to discuss in detail the lead containing paint removal plan, including work procedures and precautions. The plan shall include:

1. location, size, and details of lead control area.
2. location and details of decontamination rooms, change rooms, shower facilities and mechanical ventilation system.
3. eating, drinking, smoking and restroom procedures, interface of trades.
4. sequencing of lead related work,
5. collected wastewater and paint debris disposal plan
6. air sampling plan
7. respirators, protective equipment
8. a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area.
9. air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan.

C. Contractor'S TEST LABORATORY: Submit name, address and telephone number of the Contractor's testing laboratory selected to analyze the representative samples of wash water and debris by TCLP as required. This submittal must be approved by the Engineer prior to the start of lead removal work.

D. HAZARDOUS WASTE MANAGEMENT PLAN: Submit a Hazardous Waste Management Plan for Town of Fort Myers Beach's approval. The Hazardous Waste Management Plan shall comply with applicable requirements of federal, state, and local hazardous waste regulations and address:

1. Identification of hazardous wastes associated with the work.
2. Estimated quantities of wastes to be generated and disposed of.
3. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA, state hazardous waste permits and EPA Identification numbers.
4. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
5. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
6. Spill prevention, containment, and cleanup contingency measures to be implemented.
7. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.
8. Cost for hazardous waste disposal according to this plan.

E. MEDICAL EXAMINATION: Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1910.1025 and 29 CFR 1910.1200. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1910.1025 within the last year. Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

F. STATEMENTS:

1. Qualifications of CIH
2. Lead containing paint removal plan
3. Hazardous waste management plan

G. POST JOB SUBMITTALS:

1. Completion Date and Certificate of Completion.
2. Hazardous waste manifests (within 20 days of shipment offsite).
3. Employee Listings: An alphabetical listing of each employee used on this project and the dates that each employee worked on this project.
4. Employee Air Monitoring Results: A notarized copy of employee air monitoring results relative to OSHA respiratory level compliance.
5. Daily Sign In/Out Logs: Copies of logs showing each person who entered the work area. These logs shall contain the date, name, social security number, company represented, and reason for entry into the work area.

H. SOIL TESTING

1. Soil samples shall be taken at the site before any work is started. Four (4) samples shall be given to the Town of Fort Myers Beach, and four (4) to the Contractor for lead analysis. Following the abrasive blast cleaning and painting operations, four (4) additional soil samples shall be taken and analyzed for lead content. The Engineer shall determine the location of the soil samples. Soil samples shall be analyzed for lead content by a laboratory approved by the State of Florida and the Engineer. The cost of testing and analysis shall be borne by the Contractor including sampling and transporting.
2. Sampling and analysis shall be performed in accordance with a Florida Department of Environmental Protection approved comprehensive quality assurance plan.

I. DEFINITIONS

1. OSHA Occupational Safety and Health Administration.
2. NIOSH National Institute of Occupational Safety and Health.
3. CIH Certified Industrial Hygienist.
4. EPA United States Environmental Protection Agency
5. NESHAPS National Emissions Standard for Hazardous Air Pollutants.
6. TCLP Toxic Characteristic Leaching Procedure.
7. PEL Permissible Exposure Limit
8. *Abate or Abatement*: The elimination of exposure to lead-based substances that may result in lead toxicity or poisoning, by the removal of or encapsulation of lead-containing substances, by thorough cleanup procedures, and by post-cleanup treatment of surfaces.
9. *Area Monitoring*: The sampling of airborne lead concentrations within the lead control area and outside the exclusion boundary which may reach the breathing zone of Contractor employees or other personnel.

10. *Contractor*: Any business entity, public unit, or person performing the actual abatement for a lead abatement project.
11. *Containment System*: A containment system includes the tarps, screens, supports, shrouds and scaffold utilized to enclose a paint removal tool or enclose the entire worksite. Ground covers are also utilized as part of a containment system. When an existing floor, concrete slab, or the ground serves as the base of the containment, it shall be completely covered with impervious material such as solid panels of plywood or flexible materials such as tarpaulins. The materials shall be maintained throughout the project to avoid loosing debris through rips, tears, or breaks in the coverings. When the structure being prepared serves as the floor (e.g. bottom interior of tank), it shall remain uncovered to provide access for surface preparation and painting. The purpose is to minimize or prevent abrasive blast debris from entering into the environment and contain the blast debris within for collection and proper disposal.
12. *Decontamination Unit*: A series of connected rooms, with curtained doorways between any two adjacent rooms, for the decontamination of workers or of materials and equipment. For the purposes of this project, a decontamination unit shall consist of a free-standing enclosed room with hot and cold or warm running water suitably arranged for complete showering during decontamination which is in close proximity to the work area(s).
13. *Equipment Decontamination Enclosure System*: A decontamination enclosure system for materials and equipment, typically consisting of a washroom, an airlock, and a holding area.
14. *Enclosure*: Procedures necessary to completely enclose material containing lead-based paint behind airtight, impermeable, permanent barriers.
15. *Equipment Decontamination Enclosure System*: A decontamination enclosure system for materials and equipment, typically consisting of a washroom, an airlock, and a holding area.
16. *Equipment Room*: A contaminated area or room which is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment.
17. *HEPA filter*:A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97 percent of non-dispersed particles greater than 0.3 microns in diameter.
18. *HEP Vacuum Equipment*: Vacuuming equipment equipped with a HEPA-filtration system.
19. *Lead Abatement Project*: Any work performed in order to abate the presence of a lead-containing substance.
20. *Lead-Containing Substance*: Any paint, or other surface coating material containing more than 0.06 percent lead by weight calculated as lead metal in the dried solid.
21. *Lead Control Area*: An area where lead paint removal operations are performed which is isolated by physical boundaries to prevent unauthorized entry of personnel thereby preventing the exposure to, or spread of lead. Physical boundaries shall be established and located such that the level of airborne lead shall not exceed 30 micrograms per cubic meter of air outside of the established boundary at any time.

22. *Lead Permissible Exposure Limit*: The exposure limit as required by 29 CFR 1910.1026 or 29 CFR 1926.55, as applicable.
23. *Removal*: The act of removing lead containing or contaminated materials from the structure under properly controlled conditions to a suitable disposal site.

## PART 2 PRODUCTS

NOT USED

## PART 3 EXECUTION

### 3.1 CONTRACTOR OPERATIONS

A. The Contractor will carry out the lead paint removal operations in strict accordance with the approved lead removal plan and the requirements of this contract.

### 3.2 TRAINING

A. Contractor and Contractor employees will be trained by the Certified Industrial Hygienist in the proper handling of lead; health hazardous and risks involved, including the illness possible from exposure to lead; use and limits of the respiratory equipment to be used; and the importance of engineering and other hazard control techniques and procedures used during lead removal. Personnel who will perform Contractor's personnel air monitoring required by this Contract shall be trained and qualified by the CIH to perform such monitoring.

B. Only properly trained personnel shall be permitted to enter the containment area.

### 3.3 WARNING AND CAUTION SIGNS

A. The Contractor shall provide signs posted at approaches to lead control areas. These signs shall be posted at such a distance that they may be read and necessary precautions taken prior to entering the control areas. Caution labels shall also be posted on lead waste disposal containers.

B. Warning signs shall comply to 29CFR 1910.145 paragraph (d) (4) and shall display the following legend:

WARNING
LEAD WORK AREA
POISON
NO SMOKING, EATING OR DRINKING

3.4 DISPOSAL OF USED ABRASIVE:

A. Test used abrasive in accordance with 40 CFR 261 to determine if it is a hazardous waste. Handle and dispose of hazardous waste in accordance with local State rules and regulations for Hazardous Waste Generation, Transportation, Treatment, Storage and Disposal, 40 CFR 260, 261, 262, 263, 264, 265, and 266.

3.5 DISPOSAL OF WASH WATER

A. Residual water from pressure washing operations shall be collected and filtered with a two stage filter. The first filter stage being a 100 micron unit and the second, a 1 micron unit. The filtered water shall be tested and disposed of properly according to the test results. The filtered out paint chips and debris shall be tested and disposed of as specified in section 3.4.

END OF SECTION

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SECTION 01035

CHANGE ORDER AND FIELD DIRECTIVE CHANGE PROCEDURES

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Definitions

B. Change Orders

C. Field Directive Change

### 1.2 DEFINITIONS

A. Change Order: Refer to the Change Order definition in Article 2 of the General Conditions.

B. Field Directive Change: Field Directive Change is a written directive to the Contractor issued on or after the effective date of the agreement; signed by the Town of Fort Myers Beach, recommended by the Engineer ordering an addition, deletion, or revision in the Work. A Field Directive Change will subsequently be followed by the issuance of a Change Order.

C. Overhead: Overhead is defined as the cost of administration, field office and home office costs, general superintendence, office engineering and estimating costs, other required insurance, materials used in temporary structures (not including form work), additional premiums on the performance bond of the Contractor, the use of small tools, scheduling costs, and all other costs incidental to the performance of the change or the cost of doing business.

### 1.3 CHANGE ORDERS

A. Initiation of Proposals:

1. From time to time, the Town of Fort Myers Beach or the Engineer may issue a Request for a Change Order Proposal. The Request will contain a description of the intended change with supplementary or revised Drawings and Specifications as applicable, and the projected time for accomplishing the change.

2. The Contractor may propose a change in the Work by submittal of a Change Order Request to the Engineer describing the proposed change with a statement of the reason for the change and the effect on the Contract time and price, along with supporting documentation.

B. Execution of Change Order Proposal:

1. When a Proposal is requested for changed work, submit proposal within 15 days following receipt of the Request from Town of Fort Myers Beach or Engineer. State the increase or decrease, if any, in Contract Completion time and Contract Price.

2. Explain proposal in sufficient detail to permit review by Town of Fort Myers Beach.

3. For Omitted Work the decrease in the Contract Price will be determined by the Engineer and will include appropriate amounts for profit and overhead.

4. The Town of Fort Myers Beach and Engineer will review the Proposal and may request additional information and documentation. Provide these items upon request.

5. If the Town of Fort Myers Beach decides to proceed with the change, the Town of Fort Myers Beach will issue a Change Order for signature first by the Contractor and then by the Town of Fort Myers Beach.

6. The Contractor will promptly complete the approved change in the Work on receipt of the executed Change Order.

   a. Failure to sign the Change Order does not relieve the Contractor from performing the Work if the Change Order is signed by the Town of Fort Myers Beach.

C. Compute the cost of both additive and deductive changes in the Work in accordance with Article 11 of the General Conditions and as follows:

1. Include, the costs of labor, crew foreman and general foreman performing or directly supervising the changed Work on the site. Include travel and subsistence, but only to the extent incurred.

2. To the labor cost add all net premium for Workman's Compensation, taxes pursuant to the Federal Social Security Act, and payments required under State and Federal unemployment laws.

3. Add necessary extra materials, delivered at the site.

4. Include rent for plant and equipment at unit rental costs for similar rentals from an independent firm (i.e. a firm which is not owned in whole or in part by the Contractor). If equipment is owned by Contractor or rented from a firm in which the Contractor has an interest, calculate the rent in accordance with the

applicable provisions and terms of the current "Cost Reference Guide for Construction Equipment" published by Dataquest.

| NOTE: In Items 5 and 6 confirm percentages and edit as required. |
|---|

5. Include Subcontractor's costs, determined by items 1 through 4 in the preceding subparagraphs, including a maximum of 10 percent overhead and 10 percent profit for the first $20,000; 7-1/2 percent overhead and 7-1/2 percent profit on the next $30,000; and 5 percent overhead and 5 percent profit on balance over $50,000.

6. For all subcontract work add 5 percent overhead and 5 percent profit to the subcontractor's costs as determined in paragraph 5. For work performed by the Contractor's own forces add a maximum of 10 percent overhead and 10 percent profit for the first $20,000; 7-1/2 percent overhead and 7-1/2 percent profit on the next $30,000; and 5 percent overhead and 5 percent profit on balance over $50,000.

1.4 FIELD DIRECTIVE CHANGE

A. Initiation by Town of Fort Myers Beach: Town of Fort Myers Beach may issue a Field Directive Change with a Notice to Proceed without a prior Request for a Change Order Proposal or the Contractor's signature.

B. Payment Determination: The Town of Fort Myers Beach will designate the method of determining the amount of compensation or credit, if any, based on one of the methods contained in Article 11 of the General Conditions.

C. Timing: Proceed with the change in the Work immediately upon receipt of the Field Directive Change.

D. Addition to Contract: The Field Directive Change will be incorporated into the Contract Documents via a Change Order at a later date.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01040

PROJECT MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination

B. Preconstruction Conference

C. Progress Meetings

1.2 COORDINATION

A. General: Coordinate scheduling, submittals, and Contract work to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Accessory Placement: Place conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors and other like work in floors, roofs or walls of buildings and structures in conformity with the construction program.

1.3 PRECONSTRUCTION CONFERENCE

A. General: Prior to commencement of the Work, in accordance with the General Conditions, the Town of Fort Myers Beach will conduct a preconstruction conference to be held at a predetermined time and place.

B. Delineation of Responsibilities: The purpose of the conference is to designate responsible personnel, to establish a working relationship among the parties and to identify the responsibilities of the Town of Fort Myers Beach, plant personnel and the Contractor/Vendor. Matters requiring coordination will be discussed and procedures for handling such matters, established. The agenda will include:

1. Submittal procedures
2. Partial Payment procedures
3. Maintenance of Records
4. Schedules, sequences and maintenance of facility operations
5. Safety and First Aid responsibilities
6. Change Orders and Field Directive Changes
7. Use of site
8. Housekeeping
9. Equipment delivery

C. Attendees: The preconstruction conference is to be attended by the representatives of the Contractor/Vendor, the Town of Fort Myers Beach and plant personnel that will be

associated with the project. Representatives of regulatory agencies, subcontractors, and principal suppliers may also attend when appropriate.

D. Chair and Minutes: The preconstruction conference will be chaired by the Owner who will also arrange for the keeping and distribution of minutes to all attendees.

1.4 PROGRESS MEETINGS

| NOTE: Weekly progress meetings are the norm. Specify other frequency if appropriate to the project. |
|---|

A. Meeting Frequency and Format: Schedule progress meetings on at least a basis or more frequently as warranted by the complexity of the Project, to review the Work, discuss changes in schedules, maintain coordination and resolve potential problems. Invite Town of Fort Myers Beach, Engineer and all Subcontractor/Vendors. Suppliers may be invited as appropriate. Minutes of the meeting will be maintained by Contractor/Vendor and reviewed by Engineer prior to distribution by the Contractor/Vendor. Distribute reviewed minutes to attendees within ___ calendar days after each meeting.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Work Progress

B. Private Land

C. Work Locations

D. Open Excavations

E. Test Pits

F. Maintenance of Traffic

G. Maintenance of Flow

1.2 WORK PROGRESS

A. Furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will allow the completion of the work within the time stipulated in the Bid of these Specifications. If at any time such personnel appears to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress.

1.3 PRIVATE LAND

A. Do not enter or occupy private land outside of easements, except by permission of Town of Fort Myers Beach. Construction operations shall be conducted in accordance with Section 01500.

1.4 WORK LOCATIONS

A. Structures and pipelines shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference noted on the Drawings, such notation is for the

Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.5 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by the public and workmen.

1.6 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The costs for such test pits shall be borne by the Contractor.

1.7 MAINTENANCE OF TRAFFIC

A. Maintenance of traffic shall be in accordance with Sections 01570 and 02230.

B. All projects and work on highways, roads, and streets, shall have a traffic control plan, (TCP), as required by Florida Statute and Federal regulations. All work shall be executed under the established plan and Department approved procedures. The TCP is the result of considerations and investigations made in the development of a comprehensive plan for accommodating vehicular and pedestrian traffic through the construction zone.

C. The complexity of the TCP varies with the complexity of the traffic problems associated with a project. Many situations can be covered adequately with reference to specific sections from the Manual on Uniform Traffic Control Devices (MUTCD), the Traffic Control Devices Handbook (TCDH), or Roadway and Traffic Design Standard Series 600.

1.8 MAINTENANCE OF FLOW

A. Provide for the flow of sewers, drains, courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.

## PART 2 PRODUCTS

### 2.1 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from damage in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the Contractor at his own expense.

B. All structures shall be protected in a manner approved by the Engineer. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense and to the satisfaction of the Engineer. Special attention is directed to substructure bracing requirements, described in Section 02151. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. The Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the contract.

C. Take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Town of Fort Myers Beach.

## PART 3 EXECUTION

### 3.1 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. Sequence and schedule work in a manner to preclude delays and conflicts between the work of various trades and contractors. Each trade shall keep informed as to the work of other trades on the project and shall execute their work in a manner that will not interfere with the work of other trades.

### 3.2 DIAGRAMMATIC NATURE OF DRAWINGS

A. Where layout is diagrammatic, such as pipelines, conduits, ductwork, etc., it shall be followed as closely as other work will permit. Changes from diagrams shall be made as required to conform to the construction requirements.

B. Before running lines, carefully verify locations, depths and sizes and confirm that lines can be run as contemplated without interfering with other construction. Any deviation shall be referred to the Engineer for approval before lines are run. Minor changes in location of the equipment, fixtures, piping, etc., from those shown on the Drawings, shall be made without extra charge if so directed by the Engineer before installation.

C. Determine the locations and sizes of equipment, fixtures, conduit, ducts, openings, etc., in order that there will be no interference in the installation of the work or delay in the progress of other work. In the event that interferences develop, the Engineer's decision regarding relocation of work will be final.

D. Any changes made necessary through failure to make proper arrangements to avoid interference shall not be considered as extras. Cooperate with those performing other work in preparation of interference drawings, to the extent that the location of piping, ductwork, etc., with respect to the installations of other trades shall be mutually agreed upon by those performing the work.

3.3 PROVISIONS FOR LATER INSTALLATION

A. Where any work cannot be installed as the construction is progressing, provide for boxes, sleeves, inserts, fixtures or devices as necessary to permit installation of the omitted work during later phases of construction. Arrange for chases, holes, and other openings in the masonry, concrete or other work and provide for subsequent closure after placing equipment. Arrangement for and closure of openings shall be subject to the approval of the Engineer and all costs therefor shall be included in the contract price for the work.

3.4 COORDINATION

A. The Contractor shall be fully responsible for the coordination of his work and the wok of his employees, subcontractors, and suppliers with the Town of Fort Myers Beach, and regulatory agencies, and assure compliance with schedules.

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Requirements

B. Scheduling of Shutdown

1.2 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Section 02575 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

A. Contractor shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:

1. Make its several parts fit together properly.
2. Uncover portions of the work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

B. Coordination: Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.

C. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.

D. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without the Engineer’s concurrence.

## 1.4 SUBMITTALS

A. Submit a written request to the Engineer well in advance of executing any cutting or alteration which affects:
   1. Work of the Town of Fort Myers Beach or any separate contractor.
   2. Structural value or integrity of any element of the project or work.
   3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
   4. Efficiency, operational life, maintenance or safety of operational elements.
   5. Visual qualities of sight-exposed elements.

B. Request shall include:
   1. Identification of the work.
   2. Description of affected work.
   3. The necessity for cutting, alteration or excavation.
   4. Effect on work of Town of Fort Myers Beach or any separate contract, or on structural or weatherproof integrity of work.
   5. Description of proposed work:
      a. Scope of cutting, patching, alteration, or excavation.
      b. Trades who will execute the work.
      c. Products proposed to be used.
      d. Extent of refinishing to be done.
   6. Alternatives to cutting and patching.
   7. Cost proposal, when applicable.
   8. Written permission of any separate contractor whose work will be affected.

C. SUBMIT WRITTEN NOTICE TO THE Engineer DESIGNATING THE DATE AND THE TIME THE WORK WILL BE UNCOVERED.

## 1.5 SCHEDULING OF SHUTDOWN

A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the Town of Fort Myers Beach's normal operation is minimal. Overtime, night and weekend work without additional compensation from the Town of Fort Myers Beach, may be required to make these connections, especially if the connections are made at times other than those specified.

B. Request for Shutdowns: Submit a written request for each shutdown to the Town of Fort Myers Beach and the Engineer sufficiently in advance of any required shutdown.

# PART 2 PRODUCTS

## 2.1 MATERIALS

A. Comply with specifications and standards for each specific product involved.

## PART 3 EXECUTION

### 3.1 INSPECTION

A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.

C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with work until the Engineer has provided further instructions.

### 3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity or affected portion of work.

B. Provide devices and methods to protect other portions of project from damage.

C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work, and maintain excavations free from water.

D. Material Removal: Cut and remove all materials to the extent shown or as required to complete the Work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials which are not salvageable from the site.

### 3.3 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

C. Employ original installer or fabricator to perform cutting and patching for:
   1. Weather-exposed or moisture-resistant elements.
   2. Sight-exposed finished surfaces.

D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

E. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.

F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
   1. For continuous surfaces, refinish to nearest intersection.
   2. For an assembly, refinish entire unit.

## 3.4 PAVEMENT RESTORATION

A. Restore all pavement or roadway surfaces in accordance with Section 02575 – Pavement Repair and Restoration.

B. The restoration of existing street paving, including underdrains, if any are encountered, where damaged, shall be restored by the Contractor and shall be replaced or rebuilt using the same type of construction as was in the original. The Contractor shall be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. The Contractor shall obtain and pay for at his own expense such local or other governmental permits as may be necessary for the opening of streets and shall satisfy himself as to any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.

C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.

D. In all cases, the Contractor will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.

E. The Contractor shall do all the final resurfacing or repaving of streets or roads, over the excavations that he has made and he shall be responsible for relaying paving surfaces of roads that have failed or been damaged, at any time before the termination of the maintenance period on account of work done by him and he shall resurface or repave over any tunnel jacking, or boring excavation that shall settle or break the surface, shall be repaved to the satisfaction of the Town of Fort Myers Beach and at the Contractor's sole expense. Backfilling of trenches and the preparation of subgrades shall conform to the requirements of excavation and backfilling of pipeline trenches.

F. Where pipeline construction crosses paved streets, the Contractor may elect, at no additional cost to the Town of Fort Myers Beach, to place the pipe by the jacking or boring or tunneling method in lieu of cutting and patching of the paved surfaces.

END OF SECTION

SECTION 01051

LINES AND GRADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General

B. Surveys

C. Datum Plane

D. Protection of Survey Data

1.2 GENERAL

A. Construct all work in accordance with the lines and grades shown on the Drawings. Assume full responsibility for keeping all alignment and grade.

1.3 SURVEYS

A. Reference Points: The Town of Fort Myers Beach will provide reference points for the work as described in the General Conditions. Base horizontal and vertical control points will be designated by the Engineer and used as datum for the Work. Perform all additional survey, layout, and measurement work.

1. Keep Engineer informed, sufficiently in advance, of the times and places at which work is to be performed so that base horizontal and vertical control points may be established and any checking deemed necessary by Engineer may be done, with minimum inconvenience to the Engineer and at no delay to Contractor. It is the intention not to impede the Work for the establishment of control points and the checking of lines and grades set by the Contractor. However, when necessary, suspend working operations for such reasonable time as the Engineer may require for this purpose. Costs associated with such suspension are deemed to be included in the Contract Price, and no time extension or additional costs will be allowed.

2. Provide an experienced survey crew including an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the Contractor.

1.4 DATUM PLANE

A. All elevations indicated or specified refer to the Mean Sea Level Datum Plane, 1929 General Adjustment, of the United States Coast and Geodetic Survey and are expressed in feet and decimal parts thereof, or in feet and inches.

1.5 PROTECTION OF SURVEY DATA

A. General: Safeguard all points, stakes, grade marks, known property corners, monuments, and bench marks made or established for the Work. Reestablish them if disturbed, and bear the entire expense of checking reestablished marks and rectifying work improperly installed.

B. Records: Keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Furnish copies of such data to the Engineer for use in checking the Contractor's layout. Data considered of value to the Town of Fort Myers Beach will be transmitted to the Town of Fort Myers Beach by the Engineer with other records on completion of the Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Abbreviations and Symbols

B. Reference Standards

C. Definitions

1.2 RELATED SECTIONS

A. Information provided in this section is used where applicable in individual Specification Sections, Divisions 2 through 16.

1.3 REFERENCE ABBREVIATIONS

A. Reference to a technical society, trade association or standards setting organization, may be made in the Specifications by abbreviations in accordance with the following list:

| | |
|---|---|
| AABC | Associated Air Balance Council |
| AAMA | Architectural Aluminum Manufacturers Association |
| AASHTO | American Association of State Highway and Transportation Officials |
| AATCC | American Association of Textile Chemists and Colorists |
| ACI | American Concrete Institute |
| ADC | Air Diffusion Council |
| AFBMA | Anti-friction Bearing Manufacturers Association |
| AGA | American Gas Association |
| AGMA | American Gear Manufacturers Association |
| AHA | Association of Home Appliance Manufacturers |
| AISC | American Institute of Steel Construction |
| AISI | American Iron and Steel Institute |
| AMCA | Air Movement and Control Association, Inc. |
| ANSI | American National Standards Institute |
| APA | American Plywood Association |
| ARI | American Refrigeration Institute |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASSE | American Society of Sanitary Engineers |
| ASTM | American Society for Testing and Materials |
| AWI | Architectural Woodwork Institute |

| | |
|---|---|
| AWPA | American Wood Preservers Association |
| AWS | American Welding Society |
| AWWA | American Water Works Association |
| BHMA | Builders' Hardware Manufacturers Association |
| BIA | Brick Institute of American |
| CABO | Council of American Building Officials |
| CAGI | Compressed Air and Gas Institute |
| CISPI | Cast Iron Soil Pipe Institute |
| CMAA | Crane Manufacturers Association of America |
| CRD | U.S. Corps of Engineers Specifications |
| CRSI | Concrete Reinforcing Steel Institute |
| CTI | Cooling Tower Institute |
| DHI | Door and Hardware Institute |
| DOH | Department of Health |
| DOT | Department of Transportation |
| Fed. Spec. | Federal Specifications |
| FGMA | Flat Glass Marketing Association |
| FM | Factory Mutual |
| HMI | Hoist Manufacturing Institute |
| HPMA | See HPVA |
| HPVA | Hardwood Plywood Veneer Association |
| ICEA | Insulated Cable Engineers Association |
| IEEE | Institute of Electrical and Electronics Engineers |
| IFI | Industrial Fasteners Institute |
| MIL | Military Specifications |
| MSS | Manufacturer's Standardization Society |
| NAAMM | National Association of Architectural Metal Manufacturers |
| NACM | National Association of Chain Manufacturers |
| NBS | National Bureau of Standards, See NIST |
| NEBB | National Environmental Balancing Bureau |
| NEC | National Electrical Code |
| NEMA | National Electrical Manufacturers Association |
| NETA | National Electrical Testing Association |
| NFPA | National Fire Protection Association |
| NFPA | National Forest Products Association |
| NFPA | National Fluid Power Association |
| NIST | National Institute of Standards and Technology |
| NLMA | National Lumber Manufacturers Association |
| NSF | National Sanitation Foundation |
| OSHA | Occupational Safety and Health Act |
| PCI | Prestressed Concrete Institute |
| PDI | Plumbing and Drainage Institute |
| SAE | Society of Automotive Engineers |
| SCPRF | Structural Clay Products Research Foundation |
| SMACNA | Sheet Metal and Air Conditioning Contractors' National Association |
| SPI | Society of the Plastics Industry |

| | |
|---|---|
| SSPC | Steel Structures Painting Council |
| STI | Steel Tank Institute |
| TCA | Tile Council of American |
| TIMA | Thermal Insulation Manufacturers' Association |
| UL | Underwriters' Laboratories, Inc. |
| USBR | U. S. Bureau of Reclamation |
| USBS | U. S. Bureau of Standards, See NIST |

1.4 REFERENCE STANDARDS

A. Latest Edition: Construe references to furnishing materials or testing, which conform to the standards of a particular technical society, organization, or body, to mean the latest standard, code, or specification of that body, adopted and published as of the date of bidding this Contract. Standards referred to herein are made a part of these Specifications to the extent which is indicated or intended.

B. Precedence: The duties and responsibilities of the Town of Fort Myers Beach, Contractor or ENGINEER, or any of their consultants, agents or employees are set forth in the Contract Documents, and are not changed or altered by any provision of any referenced standard specifications, manuals or code, whether such standard manual or code is or is not specifically incorporated by reference in the Contract Documents. Any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority, to undertake responsibility contrary to the powers of the Engineer as set forth in the Contract Documents cannot be assigned to the Engineer or any of the Engineer's consultants, agents or employees.

1.5 DEFINITIONS

A. In these Contract Documents the words furnish, install and provide are defined as follows:

1. Furnish (Materials): to supply and deliver to the project ready for installation and in operable condition.

2. Install (services or labor): to place in final position, complete, anchored, connected in operable condition.

3. Provide: to furnish and install complete. Includes the supply of specified services. When neither furnish, install or provide is stated, provided is implied.

PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01092

ABBREVIATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Abbreviations

B. Standards for Abbreviations

1.2 RELATED SECTIONS

A. Abbreviations provided in this section are used where applicable in individual Specification Sections, Divisions 2 through 16.

1.3 ABBREVIATIONS

A. Abbreviations which may be used in Divisions 1 through 16 for units of measure are as follows:

alternating current ..... ac
American wire gauge ..... AWG
ampere(s) ..... amp
ampere-hour(s) ..... AH
annual ..... ann
Ampere Interrupting Capacity ..... AIC
atmosphere(s) ..... atm
average ..... avg

biochemical oxygen demand ..... BOD
Board Foot ..... FBM
brake horsepower ..... bhp
Brinell Hardness ..... BH
British thermal unit(s) ..... Btu

calorie (s) ..... cal
carbonaceous biochemical oxygen demand ..... CBOD
Celsius (centigrade) ..... C
Center to Center ..... C to C
centimeter(s) ..... cm
chemical oxygen demand ..... COD
coefficient, valve flow ..... $C_v$

cubic ..... cu
cubic centimeter(s) ..... cc
cubic feet per day ..... cfd
cubic feet per hour ..... cfh
cubic feet per minute ..... cfm
cubic feet per minute, standard conditions ..... scfm
cubic feet per second ..... cfs
cubic foot (feet) ..... cu ft
cubic inch(es) ..... cu in
cubic yard(s) ..... cu yd

decibels ..... dB
decibels (A scale) ..... dBa
degree(s) ..... deg
dewpoint temperature ..... dpt
diameter ..... dia
direct current ..... dc
dissolved oxygen ..... DO
dissolved solids ..... DS
dry-bulb temperature ..... dbt

efficiency ..... eff
elevation ..... el

entering water temperature ..... ewt
entering air temperature..... eat
equivalent direct radiation ..... edr

face area..... fa
face to face ..... f to f
Fahrenheit..... F
feet per day..... fpd
feet per hour ..... fph
feet per minute..... fpm
feet per second ..... fps
foot (feet) ..... ft
foot-candle ..... fc
foot-pound..... ft-lb
foot-pounds per minute ..... ft-lb/min
foot-pounds per second ..... ft-lb/sec
formazin turbidity unit(s)..... FTU
frequency ..... freq

gallon(s) ..... gal
gallons per day ..... gpd
gallons per day per
cubic foot ..... gpd/cu ft
gallons per day per
square foot..... gpd/sq ft
gallons per hour ..... gph
gallons per minute..... gpm
gallons per second..... gps
gas chromatography and
mass spectrometry..... GC-MS
gauge..... ga
grain(s)..... gr
gram(s) ..... g
grams per cubic centimeter..... gm/cc

Heat Transfer Coefficient..... U
height..... hgt
Hertz ..... Hz
horsepower ..... hp
horsepower-hour..... hp-hr
hour(s) ..... hr
humidity, relative ..... rh
hydrogen ion concentration..... pH

inch(es) ..... in
inches per second..... ips

inside diameter ..... ID

Jackson turbidity unit(s) ..... JTU

kelvin..... K
kiloamperes ..... kA
kilogram(s) ..... kg
kilometer(s) ..... km
kilovar (kilovolt-amperes
reactive) ..... kvar
kilovolt(s)..... kV
kilovolt-ampere(s) ..... kVA
kilowatt(s)..... kW
kilowatt-hour(s) ..... kWh

linear foot (feet)..... lin ft
liter(s)..... L

megavolt-ampere(s)..... MVA
meter(s) ..... m
micrograms per liter ..... ug/L
miles per hour ..... mph
milliampere(s) ..... mA
milligram(s) ..... mg
milligrams per liter..... mg/L
milliliter(s)..... mL
millimeter(s) ..... mm
million gallons ..... MG
million gallons per day ..... mgd
millisecond(s)..... ms
millivolt(s)..... mV
minute(s)..... min

mixed liquor suspended
solids..... MLSS

nephelometric turbidity
unit..... NTU
net positive suction head ..... NPSH
noise criteria ..... nc
noise reduction coefficient ..... NRC
number..... no

ounce(s)..... oz
outside air ..... oa
outside diameter ..... OD

parts per billion ..... ppb
parts per million..... ppm
percent..... pct
phase (electrical)..... . . ph
pound(s)..... lb
pounds per cubic foot..... pcf
pounds per cubic foot per hour ..... pcf/hr
pounds per day .....lbs/day
pounds per day per cubic foot .....lbs/day/cu ft
pounds per day per square foot.....lbs/day/sq ft
pounds per square foot..... psf
pounds per square foot per hour .....psf/hr
pounds per square inch ..... psi
pounds per square inch absolute ..... psia
pounds per square inch gauge..... psig
power factor ..... PF
pressure drop or difference.....dp
pressure, dynamic (velocity) .....vp
pressure, vapor.....vap pr

quart(s) .....qt

Rankine..... R
relative humidity.....rh
resistance ..... res
return air .....ra
revolution(s)..... rev
revolutions per minute .....rpm
revolutions per second..... rps
root mean squared..... rms

safety factor ..... sf
second(s)..... sec
shading coefficient ..... SC
sludge density index ..... SDI
Sound Transmission Coefficient..... STC
specific gravity ..... sp gr
specific volume ..... Sp Vol
sp ht at constant pressure..... Cp
square..... sq
square centimeter(s).....sq cm
square foot (feet).....sq ft
square inch (es).....sq in
square meter(s)..... sq m
square yard(s)..... sq yd
standard..... std
static pressure .....st pr
supply air ..... . . sa
suspended solids ..... SS

temperature ..... temp
temperature difference..... TD
temperature entering..... TE
temperature leaving ..... TL
thousand Btu per hour ..... Mbh
thousand circular mils ..... kcmil
thousand cubic feet..... Mcf
threshold limit value ..... TLV
tons of refrigeration.....tons
torque..... TRQ
total dissolved solids..... TDS
total dynamic head..... TDH
total kjeldahl nitrogen..... TKN
total oxygen demand..... TOD
total pressure ..... TP
total solids..... TS
total suspended solids ..... TSS
total volatile solids..... TVS

vacuum ..... vac
viscosity ..... visc
volatile organic chemical..... VOC
volatile solids .....VS
volatile suspended solids..... VSS
volt(s)..... V
volts-ampere(s)..... VA
volume ..... vol

watt(s)..... W
watthour(s)..... Wh

watt-hour demand ..... WHD
watt-hour demand meter ..... WHDM
week(s) ..... wk
weight ..... wt
wet-bulb ..... WB
wet bulb temperature ..... WBT
yard(s) ..... yd
year(s) ..... yr

1.4 STANDARD FOR ABBREVIATIONS

A. Use ASME Y1.1-1989, "Abbreviations for use on Drawings and in Text" for abbreviations for units of measure not included in Paragraph 1.3.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description of Requirements

B. Submittal Procedures

C. Specific Submittal Requirements

D. Action on Submittals

E. Repetitive Review

1.2 DESCRIPTION OF REQUIREMENTS

A. This section specifies procedural requirements for Shop Drawings, product data, samples, and other miscellaneous Work-related submittals.

B. Procedures concerning items such as listing of manufacturers, suppliers, subcontractors, construction progress schedule, schedule of Shop Drawing submissions, bonds, payment applications, insurance certificates, and schedule of values are specified elsewhere.

C. Work-Related Submittals:

1. Substitution or "Or Equal" Items:

a. Includes material or equipment Contractor requests Engineer to accept, after Bids are received, as substitute for items specified or described in Specifications by using name of a proprietary item or name of particular supplier.

2. Shop Drawings:

a. Includes technical data and drawings specially prepared for this Project, including fabrication and installation drawings, diagrams, actual performance curves, data sheets, schedules, templates, patterns, reports, instructions, design mix formulas, measurements, and similar information not in standard printed form.

b. Standard information prepared without specific reference to the Project is not considered a Shop Drawing.

3. Product Data:

   a. Includes standard printed information on manufactured products, and systems that has not been specially prepared for this Project, including manufacturer's product specifications and installation instructions, catalog cuts, standard wiring diagrams, printed performance curves, mill reports, and standard color charts.

4. Samples:

   a. Includes both fabricated and manufactured physical examples of materials, products, and units of work, partial cuts of manufactured or fabricated work, swatches showing color, texture, and pattern, and units of work to be used for independent inspection and testing.

   b. Mock-ups are special forms of samples which are too large or otherwise inconvenient for handling in manner specified for transmittal of sample submittals.

5. Working Drawings:

   a. When used in the Contract Documents, the term “working drawings” shall be considered to mean the Contractor’S plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities control systems, forming and falsework for underpinning; temporary by-pass pumping and for such other work as may be required for construction but does not become an integral part of the project.

   b. Copies of working drawings shall be submitted to the Engineer at least fourteen (14) calendar days (unless otherwise specified by the ENGINEER) in advance of the required work.

   c. Working drawings shall be signed by a registered Professional Engineer currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use.

6. Miscellaneous Submittals:

   a. Work-related submittals that do not fit in the previous categories, such as guarantees, warranties, certifications, experience records, maintenance agreements, Operating and Maintenance Manuals, workmanship bonds, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field

measurement data, and similar information, devices, and materials applicable to the Work.

1.3 SUBMITTAL PROCEDURES

A. Scheduling:

1. Submit for approval, a preliminary schedule of shop drawings and samples submittals, in duplicate, and in accordance with the General Conditions.

2. Prepare and transmit each submittal to Engineer sufficiently in advance of scheduled performance of related work and other applicable activities.

B. Coordination:

1. Coordinate preparation and processing of submittals with performance of work. Coordinate each submittal with other submittals and related activities such as substitution requests, testing, purchasing, fabrication, delivery, and similar activities that require sequential activity.

2. Coordinate submission of different units of interrelated work so that one submittal will not be delayed by Engineer's need to review a related submittal. Engineer may withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

C. Submittal Preparation:

1. Stamp and sign each submittal certifying to review of submittal, verification of products, field measurement, field construction criteria, coordination of information within submittal with requirements of the Work and the Contract Documents, coordination with all trades, and verification that product will fit in space provided.

2. Transmittal Form: In the transmittal form forwarding each specific submittal to the Engineer, include the following information as a minimum:

a. Date of submittal and dates of previous submittals containing the same material.

b. Project title and number.

c. Submittal and transmittal number.

d. Contract identification.

e. Names of:

(1) Contractor
(2) Supplier
(3) Manufacturer

f. Identification of equipment and material with equipment identification numbers, model numbers, and Specification section number.

g. Variations from Contract Documents and any limitations which may impact the Work.

h. Drawing sheet and detail number as appropriate.

D. Resubmittal Preparation:

1. Comply with the requirements described in Submittal Preparation. In addition:

a. Identify on transmittal form that submittal is a resubmission.

b. Make any corrections or changes in submittals required by Engineer's notations on returned submittal.

c. Respond to Engineer's notations:

(1) On the transmittal or on a separate page attached to Contractor's resubmission transmittal, answer or acknowledge in writing all notations or questions indicated by Engineer on Engineer's transmittal form returning review submission to Contractor.

(2) Identify each response by question or notation number established by Engineer.

(3) If Contractor does not respond to each notation or question, resubmission will be returned without action by Engineer until Contractor provides a written response to all Engineer's notations or questions.

d. Contractor initiated revisions or variations:

(1) On transmittal form identify variations or revisions from previously reviewed submittal, other than those called for by Engineer.

(2) Engineer's responsibility for variations or revisions is established in the General Conditions.

## 1.4 SPECIFIC SUBMITTAL REQUIREMENTS

A. Specific submittals required for individual elements of work are specified in the individual Specification sections. Except as otherwise indicated in Specification sections, comply with requirements specified herein for each indicated type of submittal.

B. Requests for Substitution or "Or Equal"

1. Collect data for items to be submitted for review as substitution into one submittal for each item of material or equipment in accordance with the General Conditions.

2. Submit with other scheduled submittals for the material or equipment allowing time for Engineer to evaluate the additional information required to be submitted.

3. If Contractor requests to substitute for material or equipment specified but not identified in Specifications as requiring submittals, schedule substitution submittal request in Submittal schedule and submit as scheduled.

C. Shop Drawings:

1. Check all drawings, data and samples before submitting to the Engineer for review. Each and every copy of the drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. All shop drawings shall be submitted through the Contractor, including those from any subcontractors.

2. Submit newly prepared information, with graphic information at accurate scale. Indicate name of manufacturer or supplier (firm name). Show dimensions and clearly note which are based on field measurement; identify materials and products which are included in the Work; identify revisions. Indicate compliance with standards and notation of coordination requirements with other work. Highlight, encircle or otherwise indicate variations from Contract Documents or previous submittals.

3. Include on each drawing or page:

a. Submittal date and revision dates.

b. Project name, division number and descriptions.

c. Detailed specifications section number and page number.

d. Identification of equipment, product or material.

e. Name of Contractor and Subcontractor.

f. Name of Supplier and Manufacturer.

g. Relation to adjacent structure or material.

h. Field dimensions, clearly identified.

i. Standards or Industry Specification references.

j. Identification of deviations from the Contract Documents.

k. Contractor's stamp, initialed or signed, dated and certifying to review of submittal, certification of field measurements and compliance with Contract.

l. Physical location and location relative to other connected or attached material at which the equipment or materials are to be installed.

4. Provide 8-inch by 3-inch blank space for Contractor and Engineer stamps.

5. Submittals:

a. Submit 3 blue line or black line prints, or 2 reverse sepia reproducible and 1 blue or black line print. One reproducible or one print will be returned.

6. Distribution:

a. Do not proceed with installation of materials, products or systems until copy of applicable product data showing only approved information is in possession of installer.

b. Maintain one set of product data (for each submittal) at Project site.

c. Mark 5 additional copies with the date of approval and forward to the Engineer for use in field and for Town of Fort Myers Beach's records.

D. Product Data:

1. Preparation:

a. Collect required data into single submittal for each element of work or system. Where product data has been printed to include information on several similar products, some of which are not required for use on Project or are not included in submittal, mark copies to clearly show such information is not applicable.

b. Where product data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, submit data as a Shop Drawing and not as product data.

2. Submittals:

a. Submittal is for information and record, and to determine that products, materials, and systems comply with Contract Documents. Submittal is final when returned by Engineer marked "Approved" or "Approved as Noted".

b. Submit 3 copies.

3. Distribution:

a. Do not proceed with installation of materials, products or systems until copy of applicable product data showing only approval information is in possession of installer.

b. Maintain one set of product data (for each submittal) at Project site, available for reference by Engineer and others.

c. Mark 5 additional copies with the date of approval and forward to the Engineer for use in field and for Town of Fort Myers Beach records.

E. Samples:

1. Preparation:

a. Where possible, provide samples that are physically identical with proposed materials or products to be incorporated into the Work. Where variations in color, pattern or texture are inherent in material or product represented by sample, submit multiple units (not less than 3 units) showing approximate limits of variations.

b. Provide full set of optional samples where Engineer’s selection required. Prepare samples to match Engineer’s selection where so indicated.

c. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards.

d. Submit samples for Engineer’s visual review of general generic kind, color, pattern, texture, and for final check of coordination of these characteristics with other related elements of work.

2. Submittals:

   a. At Contractor's option, and depending upon nature of anticipated response from ENGINEER, initial submittal of samples may be either preliminary or final submittal.

   b. A preliminary submittal, consisting of a single set of samples, is required where specifications indicate Engineer’s selection of color, pattern, texture or similar characteristics from manufacturer's range of standard choices is necessary. Preliminary submittals will be reviewed and returned with Engineer’s "Action" marking.

   c. Final Submittals: Submit 3 sets of samples in final submittal, 1 set will be returned.

3. Distribution:

   a. Maintain returned final set of samples at Project site, in suitable condition and available for quality control comparisons throughout course of performing work.

   b. Returned samples intended or permitted to be incorporated in the Work are indicated in Specification sections, and shall be in undamaged condition at time of use.

F. Mock-Ups:

1. Mock-ups and similar samples specified in Specification sections are recognized as special type of samples. Comply with samples submittal requirements to greatest extent possible. Process transmittal forms to provide record of activity.

G. Miscellaneous Submittals:

1. Inspection and Test Reports:

   a. Classify each inspection and test report as being either "Shop Drawings" or "product data", depending on whether report is specially prepared for Project or standard publication of workmanship control testing at point of production. Process inspection and test reports accordingly.

2. Guarantees, Warranties, Maintenance Agreements, and Workmanship Bonds:

   a. Refer to Specification sections for specific requirements. Submittal is final when returned by Engineer marked "Approved" or "Approved as Noted".

b. In addition to copies desired for Contractor's use, furnish 2 executed copies. Provide 2 additional copies where required for maintenance data.

3. Survey Data:

a. Refer to Specification sections for specific requirements on property surveys, building or structure condition surveys, field measurements, quantitative records of actual Work, damage surveys, photographs, and similar data required by Specification sections. Copies will not be returned.

(1) Survey Copies: Furnish 2 copies. Provide 10 copies of final property survey (if any).

(2) Condition Surveys: Furnish 2 copies.

4. Certifications:

a. Refer to Specification sections for specific requirement on submittal of certifications. Submit 7 copies. Certifications are submitted for review of conformance with specified requirements and information. Submittal is final when returned by Engineer marked "Approved".

5. Closeout Submittals:

a. Refer to Specification Section 01720 for specific requirements on submittal of closeout information, materials, tools, and similar items.

(1) Record Documents: Section 01720.

(2) Materials and Tools: Spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

(3) Operating and maintenance data.

H. Operation and Maintenance Manuals:

1. Submit Operation and Maintenance Manuals in accordance with Section 01730.

I. General Distribution:

1. Unless required elsewhere, provide distribution of submittals to subcontractors, suppliers, governing authorities, and others as necessary for proper performance of work.

1.5 ACTION ON SUBMITTALS

A. Engineer's Action:

1. General:

a. Except for submittals for record and similar purposes, where action and return on submittals are required or requested, Engineer will review each submittal, mark with appropriate action, and return. Where submittal must be held for coordination, Engineer will also advise Contractor without delay.

b. ENGINEER will stamp each submittal with uniform, self-explanatory action stamp, appropriately marked with submittal action.

B. Action Stamp:

1. Approved:

a. Final Unrestricted Release: Where submittals are marked "Approved", Work covered by submittal may proceed PROVIDED IT COMPLIES WITH Contract DOCUMENTS. Acceptance of Work will depend upon that compliance.

2. Approved As Noted:

a. When submittals are marked "Approved as Noted", Work covered by submittal may proceed PROVIDED IT COMPLIES WITH BOTH ENGINEER'S NOTATIONS OR CORRECTIONS ON SUBMITTAL AND WITH Contract Documents. Acceptance of Work will depend on that compliance. Re-submittal is not required.

3. Comments Attached - Confirm or Resubmit:

a. When submittals are marked "Examined and Returned for Correction", do not proceed with Work covered by submittal. Do not permit Work covered by submittal to be used at Project site or elsewhere where Work is in progress.

b. Revise submittal or prepare new submittal in accordance with Engineer's notations in accordance with Paragraph 1.3D of this section. Resubmit submittal without delay. Repeat if necessary to obtain different action marking.

1.6 RE-SUBMITTAL REVIEW

A. Cost of Subsequent Reviews: Shop Drawings and Operation and Maintenance Manuals submitted for each item will be reviewed no more than twice at the Town of Fort Myers Beach's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense based on the Engineer's then prevailing rates including all direct and indirect costs and fees. Reimburse the Town of Fort Myers Beach for all such fees invoiced to the Town of Fort Myers Beach by the Engineer.

B. Time Extension: Any need for more than one resubmission, or any other delay in Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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NOTE: Review this section carefully. If Project Scope is relatively simple and straightforward this Specification is to be used. If Project is complex use Section 01311.

# SECTION 01310

# PROGRESS SCHEDULE

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Form of Schedules

B. Content of Schedules: Submit for approval, a preliminary progress schedule in accordance with the General Conditions.

C. Schedule Revisions

D. Submittal Requirements

### 1.2 FORM OF SCHEDULES

A. Prepare schedules in form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade or operation.

2. Utilize a horizontal time scale and identify first work day of each week.

3. Utilize scale and spacings to allow space for notations and future revisions.

B. Utilize a listing format which chronologically indicates the order of start of each item of work.

C. Identify each listing by major specification section numbers.

### 1.3 CONTENT OF SCHEDULES

A. Completion Dates: Show the beginning and ending contract dates stated in documents. Schedules showing completion prior to the contract completion date will be accepted but in no event will they be considered basis for a claim for delay against the Town of Fort Myers Beach by the Contractor for the period between the early completion date and the completion date provided in the Contract Documents.

B. Show complete sequence of construction by activity.

C. Show dates for beginning and completion of each major element of construction and installation dates for major items of equipment. Elements shall include, but not be limited to, the following:

1. Shop drawing receipt from supplier/manufacturer submitted to ENGINEER, review and return to supplier/manufacturer

2. Material and equipment order, manufacturer, delivery, installation, and checkouts

3. Performance tests and supervisory services activity

4. Construction of various facilities

5. Demolition

6. Excavation, sheeting, shoring, dewatering

7. Concrete placement sequence

8. Structural steel erection

9. Wall and roof construction

10. Piping and equipment installation

11. Electrical work activity

12. Heating, ventilating, and air conditioning work activity

13. Plumbing work activity

14. Sewer installation

15. Connection to existing sewers

16. Water main installation

17. Miscellaneous concrete placement

18. Subcontractor's items of work

19. Backfilling, grading, seeding, sodding, landscaping, fence construction, and paving

20. Final cleanup

21. Allowance for inclement weather

22. Coordination with concurrent Work on site

D. Show projected percentage of completion for each item as of first day of each month.

1.4 SCHEDULE REVISIONS

A. As a minimum, revise construction schedule every 30 calendar days to reflect changes in progress of Work for duration of Contract.

B. Indicate progress of each activity at date of submittal.

C. Show changes occurring since previous submittal of schedule.

1. Major change in scope
2. Activities modified since previous submittal
3. Revised projections of progress and completion
4. Other identifiable changes

D. Provide a written report as needed to define:

1. Problem areas, anticipated delays, and impact on schedule
2. Corrective action recommended and its effect
3. Effect of changes on schedules of other Contractors

1.5 SUBMITTAL REQUIREMENTS

A. Schedule: Submit final progress schedule in accordance with the General Conditions.

B. For preliminary and final submittal of construction progress schedule and subsequent revisions thereof furnish three copies to Engineer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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NOTE: Review this section carefully. If Project Scope is complex this Specification is to be used. If project is relatively simple and straightforward use Section 01310.

SECTION 01311

PROGRESS SCHEDULE

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Scheduling Responsibilities

B. Submittals

C. Network Requirement

D. Cost Loading

E. Progress of the Work

F. Schedule Updates

### 1.2 SCHEDULING RESPONSIBILITIES

A. Format: Use the Critical Path Method to schedule and monitor job progress. Provide all information concerning sequencing logic and duration of all activities as well as the initial CPM logic network diagram and tabulated report data.

B. Initial Submittal: Within 30 days after the Notice to Proceed, submit the initial logic network diagram to the Engineer for review. Within 60 days submit final network diagram.

C. Updates: On a monthly basis, furnish to the Engineer updated information on logic, percent complete, actual start and finish date and direction changes. Distribute copies at Progress Meetings.

D. Adherence: Schedule and direct forces in a manner that will allow for completion of the Work within the Contract time specified.

E. Accuracy: Provide initial schedule and subsequent update information to reflect the best efforts of the Contractor and all subcontractors as to how they envision the Work to be accomplished. Similarly, all progress information must be an accurate representation of the Contractor's and subcontractor's actual performance. Complete Work under this Contract in accordance with the established CPM schedule.

F. Cost of Revisions: At no additional cost to the Town of Fort Myers Beach, revise schedule when in the judgement of the ENGINEER, it does not accurately reflect the actual prosecution of the Work.

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1 and the General Conditions.

B. CPM Schedule:

1. Within 30 days after the date stated in the Notice to Proceed, submit to the Engineer prints of a proposed CPM network diagram and tabular reports for the first 90 days of the Work. Draw initial logic diagram as described herein and submit on sheets 24 inches by 36 inches. Include both procurement and construction activities. Schedule a review meeting with the Engineer and the Town of Fort Myers Beach (or Town of Fort Myers Beach's Consultants) within 2 weeks of its submission. Revise and resubmit the 90 day schedule until it is acceptable to the Engineer.

2. Within 60 Days after the Notice to Proceed, submit to the Engineer 3 sets of the proposed CPM logic diagram and tabular reports for the entire Contract duration. Include both procurement and construction activities. Sort these tabular reports by total float and activity number. Provide a predecessor/successor report, resource loading report, and project calendar. Draw logic diagram as described.

3. Schedule review meeting with the Engineer and the Town of Fort Myers Beach within 2 weeks of its submission. If a review of the submitted CPM Schedule indicates a work plan which will not complete the Work within the time requirements stated in the Contract, reallocate resources, revise the CPM Schedule and resubmit it until it is acceptable. Failure by the Contractor to submit an acceptable schedule may, at the Town of Fort Myers Beach's sole discretion, be cause for the withholding of any partial payment otherwise due under the Contract.

4. Review of the Schedule by the Engineer will not constitute Engineer’s representation that the Work can be completed as shown on the Schedule.

C. Submittals Schedule: In addition to the above scheduling requirements, submit a complete and detailed listing of anticipated submittals during the course of the Contract. Coordinate these submittals with those of subcontractors and suppliers. Identify each submittal by Contract drawing number and Specification section number. Show the anticipated submission due date for each submittal along with the date on which its return is required. For planning purposes, <u>average</u> turn-around time for shop drawings will be 14 Calendar Days after receipt. Longer durations for review may be required and will not be considered a basis for a claim for additional time or

compensation. For submittals on the critical path, at the time of submission mark transmittal in red with the words "Critical Path".

1. Submit Submittal schedule within 10 Days from the Notice to Proceed. Revise as required and incorporate the dates and review durations into the CPM Schedule.

1.4 NETWORK REQUIREMENTS

A. Diagram: Show in the network diagram the order and interdependence of activities and the sequence in which the Work is to be accomplished. The purpose of the network analysis diagram is to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of succeeding activities. Follow a time scaled precedence format. Time scale the detailed network diagram showing a continuous flow from left to right.

B. Develop the schedule activities into two major groups; procurement activities; and construction activities:

1. Include the following procurement activities as a minimum:

a. Permits
b. Easements
c. Submittal items
d. Approval of submittal items
e. Fabrication and delivery of submittal items.

Tie each of the above procurement items logically to the correct construction activity in the overall CPM construction schedule.

2. Under construction activities section utilize physical work activities to describe how the job will be constructed.

C. Activity Durations: Break the work into activities with durations of 1 to 20 Days each, except for nonconstruction activities, such as procurement of materials and delivery of equipment, and other activities which may require longer durations. To the extent feasible, group activities related to a specific physical area of the project on the network for ease of understanding and simplification. The Engineer and Town of Fort Myers Beach will review the selection and number of activities.

1. For each activity on the network indicate the following:

a. A single duration, no longer than 20 Days (i.e., the single best estimate of the expected elapsed time considering the scope of work involved in the activity) expressed in Days. Include normal holidays and weather delay. Show critical path for the schedule.

b. Assign an activity I.D. number to each activity. The I.D. number will be numeric with a maximum of 5 digits.

c. Include a brief description of the activity. If this description is not definitive, a separate listing of each activity and a descriptive narrative may be required.

d. Cost load each activity, except for procurement activities, to indicate the total estimated costs of the activity. No activity shall exceed $60,000 except for equipment items. Assign material costs to delivery activities.

e. Load each activity with the estimated work hours to be expended on each activity.

D. Incomplete Schedule: Failure to include on the network any element of work required for the performance of this Contract does not excuse the Contractor from completing all Work required within the applicable completion time, notwithstanding the network review by the Engineer or the Town of Fort Myers Beach and Town of Fort Myers Beach's Authorized Representative.

1.5 COST LOADING

A. Schedule of Values: Allocate a dollar value to each activity on the construction schedule as specified. Include in dollar value the cost of labor, equipment, and material, and a pro rata contribution to overhead and profit. The sum of the activities cost shall be equal to the total contract price. In submitting cost data the Contractor certifies that it is not unbalanced and that the value assigned to each activity represents the Contractor's estimate of the actual costs of performing that activity.

B. Documentation: If, in the opinion of the ENGINEER, the cost data does not meet the requirements for a balanced Contract Price breakdown, present documentation to the Engineer substantiating any cost allocation. If an activity on the construction schedule has been assigned a disproportionate allocation of direct costs, overhead and profit the cost allocations will be considered unbalanced.

1.6 PROGRESS OF THE WORK

A. Delays to Critical Path: Whenever it becomes apparent from the current monthly CPM Schedule update that delays to the critical path have resulted and these delays are through no fault of the Town of Fort Myers Beach, and hence, that the Contract completion date will not be met, or when so directed by the Town of Fort Myers Beach, take one or more of the following actions to improve the Completion Date at no additional cost to the Town of Fort Myers Beach.

1. Increase construction labor in such quantities and crafts as will substantially eliminate the backlog of Work.

2. Increase the number of working hours per shift, shifts per day, or days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities, and comply with the revised schedule.

4. Submit to the ENGINEER, the Town of Fort Myers Beach or Town of Fort Myers Beach's Authorized Representatives for review, a written statement of the steps proposed to be taken to remove or arrest the delay to the schedule. Failure to submit a written statement of the steps to be taken or failure to take such steps as required by the Contract, may result in the Town of Fort Myers Beach directing the level of effort in labor (trades), equipment, and work schedule (overtime, weekend and holiday work, etc.) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the accepted schedule. Promptly provide such level of effort at no additional cost to the Town of Fort Myers Beach. In addition, should schedule delays persist, the Contractor's surety will be asked to attend meetings at which schedule is updated.

5. If the requirements of this provision are not complied with, the Town of Fort Myers Beach at the Town of Fort Myers Beach's sole discretion, will withhold, partially or in total, payments otherwise due for work performed under this Contract. Any withholding of monies is not a penalty for noncompliance, but is an assurance to the Town of Fort Myers Beach that funds will be available to implement these requirements should the Contractor fail to do so.

1.7 SCHEDULE UPDATES

A. Monthly Meetings: If determined by the Town of Fort Myers Beach, a monthly Schedule Update Meeting will be held 1 week prior to the progress meeting at the construction site to review and update the CPM Schedule. The Schedule Update Meeting will be chaired by the Engineer and attended by the Town of Fort Myers Beach and the Contractor. Actual progress of the previous month will be recorded and future activities will be reviewed. The duration of activities and their logical connections may be revised as needed. Decisions made at these meetings and agreed to by all parties are binding with the exception that no contract completion dates will be modified without formal written requests and acceptance as specified herein. In the event a monthly Schedule Update Meeting is not required by the ENGINEER, the Contractor shall submit the update information to the Town of Fort Myers Beach and the update worksheets provided with each previous update. In either case the Contractor must provide the following information for each update at a minimum:

1. Actual start and finished dates for all completed activities.

2. Actual start dates for all started but uncompleted activities including remaining durations.

B. Withholding of Payments: Failure to provide specified updated information or failure to attend progress meetings may result in the withholding of progress payments.

C. Time Extensions: If in accordance with the provisions of Article 12 of the General Conditions, the Town of Fort Myers Beach or Engineer finds that the Contractor is entitled to any extension of the Contract completion date under the provisions of the Contract, the Town of Fort Myers Beach's determination as to the total number of Days extension will be based upon the current accepted and updated CPM Schedule and on all data relevant to the extension. Such data shall be included in the next monthly updating of the schedule. Actual delays in activities which, according to the CPM Schedule, do not affect any contract completion date shown by the critical path in the network, do not have any effect on the Contract completion date or dates and therefore, will not be the basis for a change in Contract completion time.

D. Schedule Adjustments: From time to time it may be necessary for the Contract schedule and completion time to be adjusted by the Town of Fort Myers Beach to reflect the effects of job conditions, acts or omissions of other contractors not directly associated with this Contract, weather, technical difficulties, strikes, unavoidable delays on the part of the Town of Fort Myers Beach or Town of Fort Myers Beach's representatives, and other unforeseeable conditions. Under such conditions, the Town of Fort Myers Beach will direct the Contractor to reschedule the Work to reflect the changed conditions and will grant, in writing, schedule extensions affecting the Contract completion time. No additional compensation will be made to the Contractor for such schedule adjustments.

E. Acceleration Costs: Additional compensation will be made to the Contractor in the event the Town of Fort Myers Beach requires the project completion prior to the completion date shown on the Contractor's accepted schedule. The Town of Fort Myers Beach, therefore, has the right to accelerate the schedule and the Contractor will be compensated for such acceleration as long as such acceleration is not required through fault of the Contractor. Available total float in the CPM Schedule may be used by the Town of Fort Myers Beach and Town of Fort Myers Beach's representatives as well as by the Contractor.

F. Float: Without obligation to extend the overall completion date or any intermediate completion dates set out in the CPM network, the Town of Fort Myers Beach may initiate changes to the Contract Work that absorb float time only. Town of Fort Myers Beach-initiated changes that affect the critical path on the CPM network shall be the sole grounds for extending (or shortening) said completion dates. Contractor initiated changes that encroach on the float time identified in the CPM network may be accomplished with the Town of Fort Myers Beach's concurrence. Such changes, however, shall give way to Town of Fort Myers Beach-initiated changes competing for the same float time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittals

B. Inspection Services

C. Inspection of Materials

D. Quality Control

E. Costs of Inspection

F. Acceptance Tests

G. Failure to Comply with Contract

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Specific Submittal Requirements

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Certificate Submittals: Furnish the Engineer authoritative evidence in the form of Certificates of Manufacture that the materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents. Include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

1.4 INSPECTION SERVICES

A. Town of Fort Myers Beach's Access: At all times during the progress of the Work and until the date of final completion, afford the Town of Fort Myers Beach and Engineer every reasonable, safe, and proper facility for inspecting the Work at the site. The observation and inspection of any work will not relieve the Contractor of any obligations to perform proper and satisfactory work as specified. Replace work rejected due to faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, with satisfactory work at no additional cost to the Town of Fort

Myers Beach. Replace as directed, finished or unfinished work found not to be in strict accordance with the Contract, even though such work may have been previously approved and payment made therefor.

B. Rejection: The Town of Fort Myers Beach and the Town of Fort Myers Beach's Authorized Representatives have the right to reject materials and workmanship which are defective or require correction. Promptly remove rejected work and materials from the site.

C. Inferior Work Discoveries: Failure or neglect on the part of the Town of Fort Myers Beach or the Town of Fort Myers Beach's Authorized Representatives to condemn or reject bad or inferior work or materials does not imply an acceptance of such work or materials. Neither is it to be construed as barring the Town of Fort Myers Beach or the Town of Fort Myers Beach's Authorized Representatives at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior work or improper materials were used.

D. Removal for Examination: Should it be considered necessary or advisable by the Town of Fort Myers Beach or the Town of Fort Myers Beach's Authorized Representatives, at any time before final acceptance of the Work, to make examinations of portions of the Work already completed, by removing or tearing out such portions, promptly furnish all necessary facilities, labor, and material, to make such an examination. If such Work is found to be defective in any respect, defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work will be considered a change in the Work to be paid for in accordance with applicable provisions of the Contract.

E. Operation Responsibility: Assume full responsibility for the proper operation of equipment during tests and instruction periods. Make no claim for damage which may occur to equipment prior to the time when the Town of Fort Myers Beach accepts the Work.

F. Rejection Prior to Warranty Expiration: If at anytime prior to the expiration of any applicable warranties or guarantees, equipment is rejected by the Town of Fort Myers Beach, repay to the Town of Fort Myers Beach all sums of money received for the rejected equipment on progress certificates or otherwise on account of the Contract lump sum prices, and upon the receipt of the sum of money, Town of Fort Myers Beach will execute and deliver a bill of sale of all its rights, title, and interest in and to the rejected equipment. Do not remove the equipment from the premises of the Town of Fort Myers Beach until the Town of Fort Myers Beach obtains from other sources, equipment to take the place of that rejected. The Town of Fort Myers Beach hereby agrees to obtain other equipment within a reasonable time and the Contractor agrees that the Town of Fort Myers Beach may use the equipment furnished by the Contractor without rental or other charge until the other new equipment is obtained.

## 1.5 INSPECTION OF MATERIALS

A. Premanufacture Notification: Give notice in writing to the Engineer sufficiently in advance of the commencement of manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. When required, notice to include a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, Engineer will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or will notify Contractor that the inspection will be made at a point other than the point of manufacture or testing, or that the inspection will be waived. Comply with these provisions before shipping any materials. Such inspection will not constitute a release from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

B. Testing Standards: Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized, applicable test codes except as may otherwise be stated herein.

## 1.6 QUALITY CONTROL

A. Testing

1. Field and Laboratory

a. Provide personnel to assist the Engineer in performing the following periodic observation and associated services.

(1) Soils: Observe and test excavations, placement and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.

(2) Concrete: Observe forms and reinforcement; observe concrete placement; witness air entrainment tests, facilitate concrete cylinder preparation and assist with other tests performed by Engineer.

(3) Masonry: Sample and test mortar, bricks, blocks and grout; inspect brick and block samples and sample panels; inspect placement of reinforcement and grouting.

b. When specified in Divisions 2 through 16 of the Contract Documents, provide an independent laboratory testing facility to perform required testing. Qualify the laboratory as having performed previous satisfactory work. Prior to use, submit to the Engineer for approval.

c. Cooperate with the Engineer and laboratory testing representatives. Provide at least 24 hours notice prior to when specified testing is required.

Provide labor and materials, and necessary facilities at the site as required by the Engineer and the testing laboratory.

d. Provide an independent testing agency, a member of the National Electrical Testing Association, to perform inspections and tests specified in Division 16 of these Specifications.

2. Equipment: Coordinate and demonstrate test procedures as specified in the Contract Documents or as otherwise required during the formal tests.

3. Pipeline and Other Testing: Conform to test procedures and requirements specified in the appropriate Specification Section.

B. Reports

1. Certified Test Reports: Where transcripts or certified test reports are required by the Contract Documents, meet the following requirements:

a. Before delivery of materials or equipment submit and obtain approval of the Engineer for all required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract Documents. Perform all testing in an approved independent laboratory or the manufacturer's laboratory. Submit for approval reports of shop equipment tests within thirty days of testing. Transcripts or test reports are to be accompanied by a notarized certificate in the form of a letter from the manufacturer or supplier certifying that tested material or equipment meets the specified requirements and the same type, quality, manufacture and make as specified. The certificate shall be signed by an officer of the manufacturer or the manufacturer's plant manager.

2. Certificate of Compliance: At the option of the ENGINEER, or where not otherwise specified, submit for approval a notarized Certificate of Compliance. The Certificates may be in the form of a letter stating the following:

a. Manufacturer has performed all required tests

b. Materials to be supplied meet all test requirements

c. Tests were performed not more than one year prior to submittal of the certificate

d. Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified

e. Identification of the materials

## 1.7 COSTS OF INSPECTION

A. Town of Fort Myers Beach's Obligation: Initial inspection and testing of materials furnished under this Contract will be performed by the Town of Fort Myers Beach or his authorized Representatives or inspection bureaus without cost to the Contractor, unless otherwise expressly specified. If subsequent testing is necessary due to failure of the initial tests or because of rejection for noncompliance, reimburse the Town of Fort Myers Beach for expenditures incurred in making such tests.

B. Contractor's Obligation: Include in the Contract Price, the cost of all shop and field tests of equipment and other tests specifically called for in the Contract Documents.

C. Reimbursements to Town of Fort Myers Beach:

1. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Town of Fort Myers Beach for compliance. Reimburse the Town of Fort Myers Beach for expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.

2. Reimburse Town of Fort Myers Beach for the costs of any jobsite inspection between the hours of 7:00 p.m. and 6:00 a.m.

3. Reimburse Town of Fort Myers Beach for all costs associated with Witness Tests which exceed 5 Calendar Days per kind of equipment.

## 1.8 ACCEPTANCE TESTS

A. Preliminary Field Tests: As soon as conditions permit, furnish all labor and materials and services to perform preliminary field tests of all equipment provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this Contract does not meet the requirements of the Contract Documents, make all changes, adjustments and replacements required prior to the acceptance tests.

B. Final Field Tests: Upon completion of the Work and prior to final payment, subject all equipment, piping and appliances installed under this Contract to specified acceptance tests to demonstrate compliance with the Contract Documents.

1. Furnish all labor, fuel, energy, water and other materials, equipment, instruments and services necessary for all acceptance tests.

2. Conduct field tests in the presence of the Engineer. Perform the field tests to demonstrate that under all conditions of operation each equipment item:

a. Has not been damaged by transportation or installation
b. Has been properly installed

c. Has been properly lubricated
d. Has no electrical or mechanical defects
e. Is in proper alignment
f. Has been properly connected
g. Is free of overheating of any parts
h. Is free of all objectionable vibration
i. Is free of overloading of any parts
j. Operates as intended

3. Operate work or portions of work for a minimum of 100 hours or 14 days continuous service, whichever comes first. For those items of equipment which would normally operate on wastewater or sludge, plant effluent may be used if available when authorized by Engineer. If water cannot properly exercise equipment, conduct 100-hour test after plant startup. Conduct test on those systems which require load produced by weather (heating or cooling) exercise only when weather will produce proper load.

C. Failure of Tests: If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, then promptly correct such deficiencies. Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the Town of Fort Myers Beach, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the Contractor to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.9 FAILURE TO COMPLY WITH CONTRACT

A. Unacceptable Materials: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, do not deliver said material or equipment, or if delivered remove it promptly from the site or from the Work and replace it with acceptable material without additional cost to the Town of Fort Myers Beach. Fulfill all obligations under the terms and conditions of the Contract even though the Town of Fort Myers Beach or the Town of Fort Myers Beach's Authorized Representatives fail to ascertain noncompliance or notify the Contractor of noncompliance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. General Requirements

B. Temporary Utilities

C. Temporary Construction

D. Barricades and Enclosures

E. Fences

F. Security

G. Temporary Controls

H. Traffic Regulation

I. Field Offices and Sheds

### 1.2 GENERAL REQUIREMENTS

A. Plant and Facilities: Furnish, install, maintain and remove all false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the Work and which are not herein described or specified in detail. The Contractor shall accept responsibility for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.

B. First Aid: Maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.

C. Safety Responsibility: Accept sole responsibility for safety and security at the site. Indemnify and hold harmless the Town of Fort Myers Beach and the Town of Fort Myers Beach's Authorized Representatives, including the ENGINEER, for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents, deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by Contractor's forces while performing any part of the Work.

D. Hazard Communication: Furnish two copies of the Contractor's Hazard Communication Program required under OSHA regulations before beginning on site activities. Furnish two copies of amendments to Hazard Communications Program as they are prepared.

## 1.3 TEMPORARY UTILITIES

A. Water: Provide all necessary and required water without additional cost, unless otherwise specified. If necessary, provide and lay water lines to the place of use; secure all necessary permits; pay for all taps to water mains and hydrants and for all water used at the established rates.

B. Light and Power: Provide without additional cost to the Town of Fort Myers Beach temporary lighting and power facilities required for the proper construction and inspection of the Work. If, in the Engineer's opinion, these facilities are inadequate, do NOT proceed with any portion of the Work affected thereby. Maintain temporary lighting and power until the Work is accepted.

C. Heat: Provide temporary heat, whenever required, for work being performed during cold weather to prevent freezing of concrete, water pipes, and other damage to the Work or existing facilities.

D. Sanitary Facilities: Provide sufficient sanitary facilities for construction personnel. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.

E. Connections to Existing Utilities:

1. Unless otherwise specified or indicated, make all necessary connections to existing facilities including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electricity. In each case, obtain permission from the Town of Fort Myers Beach or the owning utility prior to undertaking connections. Protect facilities against deleterious substances and damage.

2. Thoroughly plan in advance all connections to existing facilities. Have on hand at the time of undertaking the connections, all material, labor and required equipment. Proceed continuously to complete connections in minimum time. Arrange for the operation of valves or other appurtenances on existing utilities, under the direct supervision of the owning utility.

## 1.4 TEMPORARY CONSTRUCTION

A. Bridges: Design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic. Assume responsibility for the sufficiency and safety of all such temporary work or bridges and for any damage which may result from their failure or their improper construction, maintenance, or

operation. Indemnify and save harmless the Town of Fort Myers Beach and the Town of Fort Myers Beach's representatives from all claims, suits or actions, and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.5 BARRICADES AND ENCLOSURES

A. Protection of Workmen and Public: Effect and maintain at all times during the prosecution of the Work, barriers and lights necessary for the protection of Workmen and the Public. Provide suitable barricades, lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the Work causes obstructions to normal traffic, excavation sites, or constitutes in any way a hazard to the public.

B. Barricades and Lights:

1. Protect all streets, roads, highways, excavations and other public thoroughfares which are closed to traffic; use effective barricades which display acceptable warning signs. Locate barricades at the nearest public highway or street on each side of the blocked section.

2. Statutory Requirements: Install and maintain all barricades, signs, lights, and other protective devices within highway rights-of-way in strict conformity with applicable statutory requirements by the authority having jurisdiction.

1.6 FENCES

A. Existing Fences: Obtain written permission from the Town of Fort Myers Beach prior to relocating or dismantling fences which interfere with construction operations. Reach agreements with the fence owner as to the period the fence may be left relocated or dismantled. Install adequate gates where fencing must be maintained. Keep gates closed and locked at all times when not in use.

B. Restoration: Restore all fences to their original or better condition and to their original location on completion of the Work.

1.7 SECURITY

A. Preservation of Property:

1. Preserve from damage, all property along the line of the Work, in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. Preserve from damage, public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. Note: Normal wear and tear of streets resulting from legitimate use by the Contractor are not considered as damage. Whenever damages occur to such property, immediately restore to its original condition. Costs for such repairs are incidental to the Contract.

2. In case of failure on the part of the Contractor to restore property or make good on damage or injury, the Town of Fort Myers Beach may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the Contractor under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the Town of Fort Myers Beach and not contemplated by the Contract Documents, the Contractor will be compensated, in accordance with the General Conditions, provided that such property has not been damaged through fault of the Contractor or the Contractor's employees.

B. Public Utility Installations and Structures:

1. Public utility installations and structures include all poles, tracks, pipes, wires, conduits, vaults, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property which may be affected by the Work are deemed included hereunder.

2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or found by, the Engineer in preparing the Drawings. These data are not guaranteed for completeness or accuracy, and the Contractor is responsible for making necessary investigations to become fully informed as to the character, condition, and extent of all public utility installations and structures that may be encountered and that may affect the construction operations.

3. Contact utility locating service sufficiently in advance of the start of construction to avoid damage to the utilities and delays to the completion date.

4. Remove, replace, relocate, repair, rebuild, and secure any public utility installations and structures damaged as a direct or indirect result of the Work under this Contract. Costs for such work are incidental to the Contract. Be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. Assume and accept responsibility for any injury, damage, or loss which may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service.

5. Repair or replace any water, electric, sewer, gas, or other service connection damaged during the Work with no addition to the Contract price.

6. At all times in performance of the Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures. Avoid unnecessary interference with, or interruption of, public utility services. Cooperate fully with the owners thereof to that end.

7. Give written notice to the owners of all public utility installations and structures affected by proposed construction operations, sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disrupting the lines and to allow them to take measures necessary to protect their interests. Advise the Chiefs of Police, Fire and Rescue Services of any excavation in public streets or the temporary shut-off of any water main. Provide at least 24 hours notice to all affected property owners whenever service connections are taken out of service.

NOTE: When easements are required to accomplish the work, and such easements have been acquired by the Town of Fort Myers Beach, insert the easement provisions applicable to the Contractor's work in this section. Edit text as appropriate. Delete if there is no work on private property.

C. Work on Private Property: Work on this project will require operations on private property, rights of way or easements. The Town of Fort Myers Beach has secured the appropriate easements or rights of entry from the affected property owners. Comply with all easement or rights of entry provisions including the following:

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Conduct operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. Upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by the construction as nearly as possible to the preconstruction conditions. Do not remove any material from private property without the consent of the property owner or responsible party in charge of such property. Save the Town of Fort Myers Beach harmless from any claim or damage

arising out of or in connection with the performance of work across and through private property.

D. Miscellaneous Structures: Assume and accept responsibility for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work. Assume and accept liability for damages to public or private property resulting therefrom. Adequately protect against freezing all pipes carrying liquid.

E. Protection of Trees and Lawn Areas:

1. Protect with boxes, trees and shrubs, except those ordered to be removed. Do not place excavated material so as to cause injury to such trees or shrubs. Replace trees or shrubs destroyed by accident or negligence of the Contractor or Contractor's employees with new stock of similar size and age, at the proper season, at no additional cost to the Town of Fort Myers Beach.

2. Leave lawn areas in as good condition as before the start of the Work. Restore areas where sod has been removed by seeding or sodding.

1.8 TEMPORARY CONTROLS

A. During Construction:

1. Keep the site of the Work and adjacent premises free from construction materials, debris, and rubbish. Remove this material from any portion of the site if such material, debris, or rubbish constitutes a nuisance or is objectionable.

2. Remove from the site all surplus materials and temporary structures when they are no longer needed.

3. Neatly stack construction materials such as concrete forms and scaffolding when not in use. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

4. Properly store volatile wastes in covered metal containers and remove from the site daily.

5. Do not bury or burn on the site or dispose of into storm drains, sanitary sewers, streams, or waterways, any waste material. Remove all wastes from the site and dispose of in a manner complying with applicable ordinances and laws.

B. Smoke Prevention:

1. Strictly observe all air pollution control regulations.

2. Open fires will be allowed only if permitted under current ordinances.

C. Noises:

1. Maintain acceptable noise levels in the vicinity of the Work. Limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods.

2. Supply written notification to the Town of Fort Myers Beach sufficiently in advance of the start of any work which violates this provision. Proceed only when all applicable authorizations and variances have been obtained in writing.

D. Hours of Operation:

1. Operation of construction equipment between the hours of 7:00 p.m. and 6:00 a.m. the following day is prohibited. For operation of this equipment during this period obtain written consent from the Town of Fort Myers Beach.

2. Do not carry out nonemergency work, including equipment moves, on Sundays without prior written authorization by the Town of Fort Myers Beach.

E. Dust Control:

1. Take measures to prevent unnecessary dust. Keep earth surfaces exposed to dusting moist with water or a chemical dust suppressant. Cover materials in piles or while in transit to prevent blowing or spreading dust.

2. Adequately protect buildings or operating facilities which may be affected adversely by dust. Protect machinery, motors, instrument panels, or similar equipment by suitable dust screens. Include proper ventilation with dust screens.

F. Temporary Drainage Provisions:

1. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the Work. Provide adequate drainage facilities to prevent damage to the Work, the site, and adjacent property.

2. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect the Town of Fort Myers Beach's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.

3. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

G. Pollution: Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewers. Do not permit sediment, debris, or other substances to enter sanitary sewers. Take reasonable measures to prevent such materials from entering any drain or watercourse.

1.9 TRAFFIC REGULATION

A. Parking: Provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities.

B. Access: Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when the Contractor has obtained permission from the owner or tenant of private property, or from the authority having jurisdiction over the public property involved, to obstruct traffic at the designated point.

1.10 FIELD OFFICES AND SHEDS

A. Contractor's Office: Erect, furnish, and maintain a field office with a telephone. Have an authorized agent present at this office at all times while the Work is in progress. Keep readily accessible copies of the Contract Documents, required record documents, and the latest approved shop drawings at this field office.

B. Material Sheds and Temporary Structures: Provide material sheds and other temporary structures of sturdy construction and neat appearance.

C. Location: Coordinate location of field offices, material sheds and temporary structures with Engineer and Town of Fort Myers Beach.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General Requirements

B. Traffic Control

1.2 RELATED SECTIONS

A. Section 01041 – Project Coordination

B. Section 02230 – Roadway Crossings by Open Cut

1.3 GENERAL REQUIREMENTS

A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.

B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

C. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Sections 01041 and 02230.

1.4 TRAFFIC CONTROL

A. The necessary precautions shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, marking, barricades, channelization, and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and requirements for the duration of the Construction period.

B. The Contractor shall provide at least 72 hours notification to the State or County Department of Transportation of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closings can be obtained at least 48 hours in advanced. At no time will more than one (1) lane of roadway be closed to vehicles and pedestrians. With any such closings adequate provision shall be made for the safe expeditious movement of each.

C. The Contractor shall also be responsible for notifying Police, Fire, and other Emergency Departments whenever construction is within roadways and of the alternate routes. Monthly status reports shall be provided to these Departments, as a minimum.

D. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area which exists as port of the normal pre-construction traffic control scheme. Any such actions shall be performed by the Contractor under the supervision, and in accordance with the Specifications, of the Owner, unless otherwise specified.

E. The Contractor shall immediately notify the Owner of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the project.

F. The Contractor shall be responsible for notifying all residents of any road construction and limited access at least 72 hours in advance.

## PART 2 PRODUCTS

NOT USED.

## PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description

B. Substitutions

C. Manufacturer's Written Instructions

NOTE: Include "Town of Fort Myers Beach PROCURED EQUIPMENT" if Town of Fort Myers Beach procures equipment for installation by Contractor.

D. Transportation and Handling

E. Storage, Protection and Maintenance

F. Manufacturer's Field Quality Control Services

G. Post Startup Services

H. Special Tools and Lubricating Equipment

I. Lubrication

1.2 DESCRIPTION

A. Proposed Manufacturers List: Within 15 calendar days of the date of the Notice to Proceed, submit to the Engineer a list of the names of proposed manufacturers, material providers, suppliers and subcontractors, obtain approval of this list by Town of Fort Myers Beach prior to submission of any working drawings. Upon request submit evidence to Engineer that each proposed manufacturer has manufactured a similar product to the one specified and that it has previously been used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

B. Furnish and install Material and Equipment which meets the following:

1. Conforms to applicable specifications and standards.

2. Complies with size, make, type, and quality specified or as specifically approved, in writing, by Engineer.

3. Will fit into the space provided with sufficient room for operation and maintenance access and for properly connecting piping, ducts and services, as applicable. Make the clear spaces that will be available for operation and maintenance access and connections equal to or greater than those shown and meeting all the manufacturers' requirements. Make all provisions for installing equipment furnished at no increase in Contract Price.

4. Manufactured and fabricated in accordance with the following:

   a. Design, fabricate, and assemble in accordance with best engineering and shop practices.

   b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.

   c. Provide two or more items of same kind identical, by same manufacturer.

   d. Provide materials and equipment suitable for service conditions.

   e. Adhere to equipment capabilities, sizes, and dimensions shown or specified unless variations are specifically approved, in writing, in accordance with the Contract Documents.

   f. Adapt equipment to best economy in power consumption and maintenance. Proportion parts and components for stresses that may occur during continuous or intermittent operation, and for any additional stresses that may occur during fabrication or installation.

   g. Working parts are readily accessible for inspection and repair, easily duplicated and replaced.

5. Use material or equipment only for the purpose for which it is designed or specified.

## 1.3 SUBSTITUTIONS

A. Substitutions:

1. Contractor's requests for changes in equipment and materials from those required by the Contract Documents are considered requests for substitutions and are subject to Contractor's representations and review provisions of the Contract Documents when one of following conditions are satisfied:

   a. Where request is directly related to an "or equal" clause or other language of same effect in Specifications.

b. Where required equipment or material cannot be provided within Contract Time, but not as result of Contractor's failure to pursue Work promptly or to coordinate various activities properly.

c. Where required equipment or material cannot be provided in manner compatible with other materials of Work, or cannot be properly coordinated therewith.

2. Contractor's Options:

a. Where more than one choice is available as options for Contractor's selection of equipment or material, select option compatible with other equipment and materials already selected (which may have been from among options for other equipment and materials).

b. Where compliance with specified standard, code or regulation is required, select from among products which comply with requirements of those standards, codes, and regulations.

c. "Or Equal": For equipment or materials specified by naming one or more equipment manufacturer and "or equal", submit request for substitution for any equipment or manufacturer not specifically named.

B. Conditions Which are Not Substitution:

1. Requirements for substitutions do not apply to Contractor options on materials and equipment provided for in the Specifications.

2. Revisions to Contract Documents, where requested by Town of Fort Myers Beach or Engineer, are "changes" not "substitutions".

3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions and do not constitute basis for a Change Order, except as provided for in Contract Documents.

1.4 MANUFACTURER'S WRITTEN INSTRUCTIONS

A. Instruction Distribution: When the Contract Documents require that installation, storage, maintenance and handling of equipment and materials comply with manufacturer's written instructions, obtain and distribute printed copies of such instructions to parties involved in installation, including six copies to Engineer.

1. Maintain one set of complete instructions at jobsite during storage and installation, and until completion of work.

B. Manufacturer's Requirements: Store, maintain, handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's written instructions and in conformity with Specifications.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult Engineer for further instructions.

2. Do not proceed with work without written instructions.

C. Performance Procedures: Perform work in accordance with manufacturer's written instructions. Do not omit preparatory steps or installation procedures, unless specifically modified or exempted by Contract Documents.

NOTE: Add subsection on "Town of Fort Myers Beach PROCURED EQUIPMENT" specifying installation requirements if Town of Fort Myers Beach procures equipment for installation by Contractor.

1.5 TRANSPORTATION AND HANDLING

A. Coordination with Schedule: Arrange deliveries of materials and equipment in accordance with Construction Progress Schedules. Coordinate to avoid conflict with work and conditions at site.

1. Deliver materials and equipment in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Protect bright machined surfaces, such as shafts and valve faces, with a heavy coat of grease prior to shipment.

3. Immediately upon delivery, inspect shipments to determine compliance with requirements of Contract Documents and approved submittals and that material and equipment are protected and undamaged.

B. Handling: Provide equipment and personnel to handle material and equipment by methods recommended by manufacturer to prevent soiling or damage to materials and equipment or packaging.

1.6 STORAGE, PROTECTION, AND MAINTENANCE

A. On-site storage areas and buildings:

1. Conform storage buildings to requirements of Section 01500.

2. Coordinate location of storage areas with Engineer and Town of Fort Myers Beach.

3. Arrange on site storage areas for proper protection and segregation of stored materials and equipment with proper drainage. Provide for safe travel around storage areas and safe access to stored materials and equipment.

4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

5. Store materials such as pipe, reinforcing and structural steel, and equipment on pallets, blocks or racks, off ground.

6. PVC Pipe may be damaged by prolonged exposure to direct sunlight and the Contractor shall take necessary precautions during storage and installation to avoid this damage. Pipe shall be stored under cover, and installed with sufficient backfill to shield it from the sun.

7. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

B. Interior Storage:

1. Store materials and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible.

2. Store materials and equipment, subject to damage by elements, in weathertight enclosures.

3. Maintain temperature and humidity within ranges required by manufacturer's instructions.

C. Accessible Storage: Arrange storage in a manner to provide easy access for inspection and inventory. Make periodic inspections of stored materials or equipment to assure that materials or equipment are maintained under specified conditions and free from damage or deterioration.

1. Perform maintenance on stored materials of equipment in accordance with manufacturer's instructions, in presence of Town of Fort Myers Beach or Engineer.

2. Submit a report of completed maintenance to Engineer with each Application for Payment.

3. Failure to perform maintenance, to notify Engineer of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.

D. Town of Fort Myers Beach's Responsibility: Town of Fort Myers Beach assumes no responsibility for materials or equipment stored in buildings or on-site. Contractor assumes full responsibility for damage due to storage of materials or equipment.

E. Contractor's Responsibility: Contractor assumes full responsibility for protection of completed construction. Repair and restore damage to completed Work equal to its original condition.

F. Special Equipment: Use only rubber tired wheelbarrows, buggies, trucks, or dollies to wheel loads over finished floors, regardless if the floor has been protected or not. This applies to finished floors and to exposed concrete floors as well as those covered with composition tile or other applied surfacing.

G. Surface Damage: Where structural concrete is also the finished surface, take care to avoid marking or damaging surface.

1.7 MANUFACTURER'S FIELD QUALITY CONTROL SERVICES

A. General:

1. Provide manufacturer's field services in accordance with this subsection for those tasks specified in other sections.

2. Provide training as specified in Section 01670.

3. Include and pay all costs for suppliers' and manufacturers' services, including, but not limited to, those specified.

B. Installation Instruction: Provide instruction by competent and experienced technical representatives of equipment manufacturers or system suppliers as necessary to resolve assembly or installation procedures which are attributable to, or associated with, the equipment furnished.

C. Installation Inspection, Adjustments and Startup Participation:

1. Provide competent and experienced technical representatives of equipment manufacturers or system suppliers to inspect the completed installation as follows.

a. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.

b. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

c. Verify that wiring and support components for equipment are complete.

d. Verify that equipment or system is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.

e. Verify that nothing in the installation voids any warranty.

2. Provide manufacturer's representatives to perform initial equipment and system adjustment and calibration conforming to the manufacturer's recommendations and instructions, approved shop drawings and the Contract Documents.

3. Obtain Engineer’s approval before start-up of equipment. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

4. Furnish Engineer with three copies of the following. When training is specified, furnish the copies at least 24 hours prior to training.

   a. "Certificate of Installation, Inspection and Start-up Services" by manufacturers' representatives for each piece of equipment and each system specified, certifying:

      (1) That equipment is installed in accordance with the manufacturers' recommendation, approved shop drawings and the Contract Documents.

      (2) That nothing in the installation voids any warranty.

      (3) That equipment has been operated in the presence of the manufacturer's representative.

      (4) That equipment, as installed, is ready to be operated by others.

   b. Detailed report by manufacturers' representatives, for review by Engineer of the installation, inspection and start-up services performed, including:

      (1) Description of calibration and adjustments if made; if not in Operation and Maintenance Manuals, attach copy.

      (2) Description of any parts replaced and why replaced.

      (3) Type, brand name, and quantity of lubrication used, if any.

      (4) General condition of equipment.

      (5) Description of problems encountered, and corrective action taken.

(6) Any special instructions left with Contractor or Engineer.

D. Field Test Participation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to participate in field testing of the equipment specified in Section 01400.

E. Trouble-Free Operation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to place the equipment in trouble-free operation after completion of start-up and field tests.

1.8 POST START-UP SERVICES

A. General: Provide Post Start-up Services in accordance with this subsection for equipment specified in other sections.

B. Site Visit: Provide the services of an authorized service representative for each equipment manufacturer or system supplier to make a final site visit after the equipment or system has been in operation for at least 6 months, but no longer than 11 months. Furnish assistance to Town of Fort Myers Beach's operating personnel in making adjustments and calibrations required to determine that the equipment and system is operating in conformance with design, manufacturer's, and specification requirements. Instruct the personnel in a review of proper operation and maintenance procedures.

C. Certificate: Furnish "Certificate of Post Start-up Services" cosigned by Engineer and the manufacturer's representative, certifying that this service has been performed. Use form provided in this section, and furnish the Town of Fort Myers Beach with three copies.

1.9 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

A. General: Furnish, per manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.)

B. Time of Delivery: Deliver special tools and lubricating equipment to Town of Fort Myers Beach when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.

C. Quality: Provide tools and lubricating equipment of a quality meeting equipment manufacturer's requirements.

1.10 LUBRICATION

A. General: Where lubrication is required for proper operation of equipment, incorporate in the equipment the necessary and proper provisions in accordance with manufacturer's requirements. Where possible, make lubrication automated and positive.

B. Oil Reservoirs: Where oil is used, supply reservoir of sufficient capacity to lubricate unit for a 24-hour period.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

**CERTIFICATE OF INSTALLATION, INSPECTION AND START-UP SERVICES**

Project _____

Equipment _____

Specification.Section _____

Contract _____

I hereby certify that the named equipment has been inspected, adjusted and operated by the Manufacturers' Representative and further certify:

1. That the equipment is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.

2. That nothing in the installation voids any warranty.

3. That equipment has been operated in the presence of the manufacturer's representative.

4. That equipment, as installed, is ready to be operated by others.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

Attach the detailed report called for by Specification Section 01600.

Complete and submit three copies of this form with the detailed report to Engineer as specified.

## CERTIFICATE OF POST START-UP SERVICES

Project _____

Equipment _____

Specification Section _____

Contract _____

I hereby certify the Manufacturers' Representative has inspected this equipment, made adjustments and calibrations, and that it is operating in conformance with the design, specifications, and manufacturer's requirements. Detailed notation of improper operation with corresponding recommendations, if any, are made and attached to this form.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

ENGINEER

Signature _____ Date _____

Name (print) _____

Title _____

Complete and submit three copies of this form to Town of Fort Myers Beach upon completion of 6 to 11 months re-inspection as required by Specification Section 01600.

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SECTION 01670

TRAINING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Training

1.2 TRAINING

| NOTE: Include training requirement in specification section for equipment and systems listed. |
|---|

A. Training: Provide the services of knowledgeable, technically competent, factory trained specialists to instruct (Plant) (Pump Station) personnel in the operation and maintenance of the equipment and system components listed in Paragraph B. The Town of Fort Myers Beach will furnish training classroom space.

1. Coordinate services with the Town of Fort Myers Beach, with a minimum of 30 days prior notice.

2. Provide a combination of classroom and "hands-on" instruction designed to completely familiarize operating and maintenance personnel with the systems theory, standard operating procedures, safety features and emergency procedures, and general maintenance of all components.

3. Conduct all training at the (Plant) (Pump Station) during regular hours on weekdays.

B. Provide training for the following:

| NOTE: List each item of equipment for which training is required. |
|---|

| Specification | Equipment Name | Minimum Hours |
|---|---|---|

C. Length of Training: The minimum lengths of training sessions are listed in Paragraph B. above.

D. Credentials: Submit for approval, credentials of equipment manufacturer representatives who are to be course instructors at least 14 days prior to a proposed training session.

E. Scheduling: Submit training outline and other information described in paragraphs G through K for approval at least 14 days prior to the proposed date for the training sessions. Verify scheduling with the Town of Fort Myers Beach at least 14 days prior to the training sessions.

F. Number of Copies: For each training class, provide instructional material for at least ten attendees plus five extra copies, plus duplicate copies of all audio-visual aids utilized during each training course.

G. Training Outline Submission: Provide a proposed training outline including the topics presented in Paragraph K. Identify specific components and procedures in the proposed training outline.

H. Training Topic Detail: Detail specific training topics. Describe "hands-on" demonstrations planned for the training. Reference training aids to be utilized in the training (i.e. video tapes, slides, transparencies) and attach where applicable.

I. Training Handouts: Attach training handouts to the proposed training outline.

J. Training Segment Duration: Indicate the duration of each training segment.

K. Training Outline:

1. Equipment Operation

    a. Describe equipment's operating (process) function.

    b. Describe equipment's fundamental operating principles and dynamics.

    c. Identify equipment's mechanical, electrical and electronic components and features.

    d. Identify all support equipment associated with the operation of the subject equipment.

2. Detailed Component Description

    a. Identify and describe in detail each component's function.

    b. Where applicable, group related components into subsystems.

c. Identify, and describe in detail, equipment safety features and control interlocks.

3. Equipment Preventive Maintenance

a. Describe preventive maintenance inspection procedures required to perform and inspect the equipment in operation, and spot potential trouble symptoms (anticipate breakdowns).

b. Outline recommended routine lubrication and adjustments (preventive maintenance).

4. Equipment Troubleshooting

a. Define recommended systematic troubleshooting procedures.

b. Provide component specific troubleshooting checklists.

c. Describe applicable equipment testing and diagnostic procedures to facilitate troubleshooting.

5. Equipment Corrective Maintenance

a. Describe recommended equipment preparation requirements.

b. Identify and describe the use of special tools required for maintenance of the equipment.

c. Describe component removal/installation and disassembly/ assembly procedures.

d. Perform at least two "hands-on" demonstrations of common corrective maintenance repairs.

e. Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate.

f. Define recommended torquing, mounting, calibration, and alignment procedures and settings, as appropriate.

g. Describe recommended procedures to check/test equipment following corrective repair.

L. Certificate: Provide "Certificate of Instructional Services" signed by Engineer and equipment representative, verifying that training has been accomplished to

satisfaction of all parties. Use form provided in this section, and furnish Engineer with three copies.

M. Substantial Completion: Training provided by manufacturers' representative, Engineer and Town of Fort Myers Beach does not constitute substantial completion.

N. Equipment Use: Use of equipment for training will not void manufacturers' or contract warranties.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

Not Used

END OF SECTION

## CERTIFICATE OF INSTRUCTIONAL SERVICES

Project _____

Equipment _____

Specification.Section _____

Contract _____

I hereby certify the equipment Manufacturers' Representative has instructed Town of Fort Myers Beach's personnel in startup operation and maintenance of this equipment as required in the Contract Documents.

MANUFACTURER'S REPRESENTATIVE

Signature _____

Name: (print) _____

Title: _____

Representing _____

Contractor

Signature _____ Date _____

Name (print) _____

Title _____

ENGINEER

Signature _____ Date _____

Name (print) _____

Title _____

COMMENTS:

Complete and submit three copies of this form to Engineer upon completion of training as required by Specification Section 01670.

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SECTION 01710

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. General Requirements

B. Disposal Requirements

1.2 GENERAL REQUIREMENTS

A. Execute cleaning during progress of the work and at completion of the work.

1.3 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

A. Execute daily cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.

B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

## 3.2 FINAL CLEANING

A. Requirements: At the completion of work and immediately prior to final inspection, clean the entire project as follows:

1. Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the Engineer.

2. Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts.

3. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.

4. Should the Contractor not remove rubbish or debris or not clean the buildings and site as specified above, the Town of Fort Myers Beach reserves the right to have the cleaning done at the expense of the Contractor.

B. Employ experienced workers, or professional cleaners, for final cleaning.

C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.

F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.

G. Replace air-handling filters if units were operated during construction.

H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.

I. Vacuum clean all interior spaces, including inside cabinets.

J. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.

L. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.

M. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment which may have become soiled during installation.

N. Perform touch-up painting.

O. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

P. Remove erection plant, tools, temporary structures and other materials.

Q. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

## 3.3 FINAL INSPECTION

A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the Town of Fort Myers Beach and Engineer.

END OF SECTION

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SECTION 01720

CONTRACT CLOSE OUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Warranties and Bonds

B. Record Drawings

C. Special Tools

1.2 WARRANTIES AND BONDS

Prior to final payment deliver to the Town of Fort Myers Beach the original and one copy of all bonds, warranties, guarantees and similar documents, including those customarily provided by manufacturers and suppliers which cover a period greater than the one year correction period. Show Town of Fort Myers Beach as beneficiary of these documents.

1.3 RECORD DRAWINGS

At the site keep and maintain one record copy of all Contract Documents, reference documents and all technical documents submitted in good order. As the work progresses the Engineer or his designated representative shall record on one set of reproducible drawings all changes and deviations from the original Plans. He shall record the exact location of all changes in vertical and horizontal alignment by offsets and ties at each; sewer, water, electric, gas, communication and other services by off-set distance to permanent improvements such as building and curbs.

Prior to acceptance of the project and before final payment is made, the Engineer shall submit one (1) set of reproducible drawings, two (2) sets of blue-line or black-line prints, all marked "Drawings of Record". These Record Drawings must be certified by the Florida Registered Professional Engineer, who prepared the plans and signs and seals these plans, and submits AutoCAD compatible diskette copy of the drawings, and other applicable related records to the Town of Fort Myers Beach.

These Record Drawings must be certified by the Florida Registered Professional Engineer, who prepared the plans and signs and seals these plans. The Record Drawings shall include vertical and horizontal alignment of all water, sewer, and effluent reuse lines, valves, tees, bends, reducers, hydrants, pump stations, service connections, meter boxes and/or pads, and other pertinent structures. Pipeline runs in excess of 152.4m, (500'), without fittings shall include vertical alignment information at 152.4m, (500') intervals. Said alignment shall be tied to permanent improvements, such as roadway and/or railroad centerlines and rights-

of-way, building and property corners, and shall be certified by a Professional Land Surveyor, licensed in the State of Florida. The Professional Land Surveyor can coordinate with the Contractor to install the necessary appurtenances on buried utilities to facilitate the survey after construction is completed. In addition, property strap numbers and street names shall be shown on the plan.

On a case by case basis, the Town of Fort Myers Beach may waive the requirement for certification by a Professional Land Surveyor, licensed in the State of Florida. However, prior consent must first be obtained from the Town of Fort Myers Beach. The Town of Fort Myers Beach shall withhold final acceptance of the project until the requirement for record drawings and related records has been met. Record Drawings without detailed field verified horizontal and vertical locations of all facilities shown will be rejected.

1.4 SPECIAL TOOLS

Special tools are considered to be those tools which, because of their limited use, are not normally available but which are necessary for maintenance of particular equipment.

For each type of equipment provided under this Contract, furnish a complete set of all special tools including grease guns and other lubricating devices, which may be needed for the adjustment, operation, maintenance, and disassembly of such equipment. Furnish only tools of high grade, smooth forged alloy tool steel. Manufacture grease guns of the lever type.

Furnish and erect one or more neat and substantial steel wall cases or cabinets with flat key locks and clips or hooks to hold each special tool in a convenient arrangement.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description

B. Quality Assurance

C. Submittals

D. Format and Contents

1.2 DESCRIPTION

A. Scope: Furnish to the Engineer 10 copies of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed.

1.3 QUALITY ASSURANCE

A. Reference Codes and Specifications: No current government or commercial specifications or documents apply.

1.4 SUBMITTALS

A. Prior to the Work Reaching 50 Percent Completion, submit to the Engineer for approval two copies of the manual with all specified material. Submit the approval copies with the partial payment request for the specified completion. Within 30 days after the Engineer's approval of the two-copy submittal, furnish to the Engineer the remaining 8 copies of the manual. Provide space in the manual for additional material. Submit any missing material for the manual prior to requesting certification of substantial completion.

1.5 FORMAT AND CONTENTS

A. Prepare and arrange each copy of the manual as follows:

1. One copy of an equipment data summary (see sample form) for each item of equipment.

2. One copy of an equipment preventive maintenance data summary (see sample form) for each item of equipment.

3. One copy of the manufacturer's operating and maintenance instructions. Operating instructions include equipment start-up, normal operation, shutdown, emergency operation and troubleshooting. Maintenance instructions include equipment installation, calibration and adjustment, preventive and repair maintenance, lubrication, troubleshooting, parts list and recommended spare parts.

4. List of electrical relay settings and control and alarm contact settings.

5. Electrical interconnection wiring diagram for equipment furnished including all control and lighting systems.

NOTE: Edit if valves are not to be numbered.

6. One valve schedule giving valve number, location, fluid, and fluid destination for each valve installed. Group all valves in same piping systems together in the schedule. Obtain a sample of the valve numbering system from the Engineer.

7. Furnish all O&M Manual material on 8-1/2 by 11 commercially printed or typed forms or an acceptable alternative format.

B. Organize each manual into sections paralleling the equipment specifications. Identify each section using heavy section dividers with reinforced holes and numbered plastic index tabs. Use 3-ring, hard-back binders Type No. VS11 as manufactured by K&M Company, Torrence, CA, or equal. Punch all loose data for binding. Arrange composition and printing so that punching does not obliterate any data. Print on the cover and binding edge of each manual the project title, and manual title, as furnished and approved by the Engineer.

C. Leave all operating and maintenance material that comes bound by the equipment manufacturer in its original bound state. Cross-reference the appropriate sections of the Contractor's O&M manual to the manufacturers' bound manuals.

D. Label binders Volume 1, 2, and so on, where more than one binder is required. Include the table of contents for the entire set, identified by volume number, in each binder.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

NOTE: Fill in name of Project.

TOWN OF FORT MYERS BEACH

_____

Equipment Data Summary

Equipment Name: Specification Reference:

Manufacturer:

Name:

Address:

Telephone:

Number Supplied: Location/Service:

Model No: Serial No:

Type:

Size/Speed/Capacity/Range (as applicable):

Power Requirement (Phase/Volts/Hertz):

Local Representative:

Name:

Address:

Telephone:

NOTES:

NOTE: Fill in name of Project.

TOWN OF FORT MYERS BEACH

_____

Preventive Maintenance Summary

Equipment Name: Location:

Manufacturer:

Name:

Address:

Telephone:

Model No: Serial No:

| Maintenance Task | Lubricant/Part | D | W | M | Q | SA | A | O&M Manual Reference |
|---|---|---|---|---|---|---|---|---|

NOTES:

*D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual

SECTION 01740

WARRANTIES AND BONDS

## PART 1 GENERAL

### 1.1 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds, as in Articles 6 and 13 of the General Conditions.

B. Co-executed submittals when so specified.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the Engineer for review and transmittal to Town of Fort Myers Beach.

### 1.2 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Two original signed copies are required.

C. Table of Contents. Neatly typed in orderly sequence. Provide complete information for each items.

1. Product or work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance contract.
6. Provide information for Town of Fort Myers Beach's personnel:
    a. Proper procedure in case of failure.
    b. Instances which might affect the validity of warranty or bond.
7. Contractor, name of responsible principal, address and telephone number.

### 1.3 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2" x 11", punch sheets for standard 3-post binder.
    a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title “WARRANTIES AND BONDS” list:

   a. Title of Project
   b. Name of Contractor

C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of 2 inches.

1.4 WARRANTY SUBMITTAL REQUIREMENTS

A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer’s warranty period shall be concurrent with the Contractor’s for one (1) year, unless otherwise specified, commencing at the time of substantial completion.

B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Division 11, 13, 14, 15, and 16 and which has a 1 HP motor or which lists for more than $1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be “major” in the Contractor’s one-year warranty period even though certificates of warranty may not be required.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 02050

DEMOLITION

## PART 1 GENERAL

### 1.1 SUMMARY

A. Section Includes: All work necessary for the removal and disposal of buildings, structures, foundations, piping, equipment and roadways, or any part thereof including masonry, steel, reinforced concrete, plain concrete, electrical facilities, and any other material or equipment shown or specified to be removed.

B. Basic Procedures and Schedule: Carry out demolition so that adjacent structures, which are to remain, are not endangered. Schedule the work so as not to interfere with the day to day operation of the existing facilities. Do not block doorways or passageways in existing facilities.

C. Additional Requirements: Provide dust control and make provisions for safety.

### 1.2 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

B. Site Inspection: Visit the site and inspect all existing structures. Observe and record any defects which may exist in buildings or structures adjacent to but not directly affected by the demolition work. Provide the Town of Fort Myers Beach with a copy of this inspection record and obtain the approval of the Project Manager/Engineer and/or Town of Fort Myers Beach prior to commencing the demolition.

### 1.3 QUALITY ASSURANCE

A. Limits: Exercise care to break concrete well for removal in reasonably small masses. Where only parts of a structure are to be removed, cut the concrete along limiting lines with a suitable saw so that damage to the remaining structure is held to a minimum.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.1 EXAMINATION OF EXISTING DRAWINGS

A. Drawings of existing structures and equipment will be available for inspection at the office of the Town of Fort Myers Beach.

### 3.2 PROTECTION

A. General Safety: Provide warning signs, protective barriers, and warning lights as necessary adjacent to the work as approved or required. Maintain these items during the demolition period.

B. Existing Services: Undertake no demolition work until all mechanical and electrical services affected by the work have been properly disconnected. Cap, reroute or reconnect interconnecting piping or electrical services that are to remain in service either permanently or temporarily in a manner that will not interfere with the operation of the remaining facilities.

C. Hazards: Perform testing and air purging where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, and eliminate the hazard before demolition is started.

### 3.3 DEMOLITION REQUIREMENTS

A. Explosives: The use of explosives will not be permitted.

B. Protection: Carefully protect all mechanical and electrical equipment against dust and debris.

C. Removal: Remove all debris from the structures during demolition and do not allow debris to accumulate in piles.

D. Access: Provide safe access to and egress from all working areas at all times with adequate protection from falling material.

E. Protection: Provide adequate scaffolding, shoring, bracing railings, toe boards and protective covering during demolition to protect personnel and equipment against injury or damage. Cover floor openings not used for material drops with material substantial enough to support any loads placed on it. Properly secure the covers to prevent accidental movement.

F. Lighting: Provide adequate lighting at all times during demolition.

G. Closed Areas: Close areas below demolition work to anyone while removal is in progress.

H. Material Drops: Do not drop any material to any point lying outside the exterior walls of the structure unless the area is effectively protected.

3.4 DISPOSAL OF MATERIALS

A. Final Removal: Remove all debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition unless otherwise indicated. Take title to all demolished materials and remove such items from the site.

B. The Town of Fort Myers Beach's Property: In addition to any items which may be shown, the following items remain the property of the Town of Fort Myers Beach. Remove carefully, without damage, all items listed or shown, and stockpile as directed.

END OF SECTION

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SECTION 2105

INCLUSION OF FDOT SPECIFICATIONS

PART 1. GENERAL

1.1. All design standards, specifications and details of the latest edition of the Florida Department of Transportation ("FDOT") Standard Specifications for Road and Bridge Construction, as amended, shall apply to and form a part of this Contract as if fully written herein. Where a FDOT Section is cited that contains references to other sections, they shall also be included as though written herein.

A. Revisions, deletions, and/or additions to the FDOT Standard Specifications are contained in the technical specifications included in this project manual.

B. Where a reference is made to "department" or "department's representative" in the FDOT Standard Specifications and Technical Specifications, it shall mean "Owner' or "Contractor", as applicable.

C. Where FDOT Standard Specifications refer to the "Engineer', "Engineer of Tests", or "Division of Tests", it shall be understood to mean the Engineer or the Owner as stated in the Contract Documents.

D. The latest FDOT Specification Manual and Supplements can be viewed and downloaded from the following website:

http://WWW.DOT.STATE.FL.US/Specificationsoffice/Implemented/Specbooks/Default.Shtm

E. Method of Measurement and Basis of Payment for Material and work performed In conformance with the FDOT Standard Specifications and Technical Specifications shall be as indicated in Section 01026 – Measurement & Payment. The lump sum and/or unit cost bid shall be full compensation for labor, equipment, materials, and incidentals necessary to complete the work in conformance with the Contract Documents.

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SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for clearing of all areas within the Contract limits and other areas shown, including work designated in permits and other agreements, in accordance with the requirements of Division 1.

B. Related Work Specified in Other Sections Includes:

1. Section 02050 – Demolition

2. Section 02222 - Excavation - Earth and Rock

3. Section 02223 – Backfilling

4. Section 02400 – Lawn Restoration

1.2 DEFINITIONS

A. Clearing: Clearing is the removal from the ground surface and disposal, within the designated areas, of trees, brush, shrubs, down timber, decayed wood, other vegetation, rubbish and debris as well as the removal of fences.

B. Grubbing: Grubbing is the removal and disposal of all stumps, buried logs, roots larger than 1-1/2 inches, matted roots and organic materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TREE REMOVAL

A. Remove trees and shrubs within the (limits of the right-of-way) unless otherwise indicated.

1. Remove trees and shrubs within the right-of-way as needed to install facilities. Trees and shrubs will not be re-installed within the right-of-way.

B. Tree Removal Outside Property Limits: Do not cut or damage trees outside the (right-of-way) (property limits) unless shown to be removed or unless written permission has been obtained from the property The Town of Fort Myers Beach. Furnish three copies of the written permission before removal operations commence.

3.2 TREES AND SHRUBS TO BE SAVED

If trees and shrubs are to be saved within the right-of-way, the property owner will be responsible for the removal and relocation at their own expense.

3.3 CLEARING AND GRUBBING

A. Clearing: Clear all items specified to the limits shown and remove cleared and grubbed materials from the site.

1. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrent with excavation.

2. Comply with erosion, sediment control and storm management measures as specified in Division 1.

B. Grubbing: Clear and grub areas to be excavated, areas receiving less than 3 feet of fill and areas upon which structures are to be constructed.

1. Remove stumps and root mats in these areas to a depth of not less than 18 inches below the subgrade of sloped surfaces.

2. Fill all depressions made by the removal of stumps or roots with material suitable for backfill as specified in Section 02223.

C. Limited Clearing: Clear areas receiving more than 3 feet of fill by cutting trees and shrubs as close as practical to the existing ground. Grubbing will not be required.

D. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the various classes of work.

3.4 TOPSOIL

A. Stripping: Strip existing topsoil from areas that will be excavated or graded prior to commencement of excavating or grading and place in well-drained stockpiles in approved locations.

## 3.5 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property along the route of the construction. Trees, shrubbery, gardens, lawns, and other landscaping, which in the opinion of the Contractor must be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.

B. All soil preservation procedures and replanting operations shall be under the supervision of a nursery representative experienced in such operations.

C. Improvements to the land such as fences, walls, outbuildings, and other structures which of necessity must be removed, shall be replaced with equal quality materials and workmanship.

D. Clean up the construction site across developed private property directly after construction is completed upon approval of the Town of Fort Myers Beach.

E. Any commercial signs, disturbed or removed, shall be restored to their original condition within 24 hours.

END OF SECTION

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SECTION 02222

EXCAVATION - EARTH AND ROCK

## PART 1 GENERAL

### 1.1 SUMMARY

A. Section Includes: Requirements for performing open-cut excavations to the widths and depths necessary for constructing structures, pipelines and conduits including excavation of any material necessary for any purpose pertinent to the construction of the Work.

B. Related Work Specified In Other Sections Includes:

1. Section 02110 - Site Clearing
2. Section 02151 - Shoring, Sheeting and Bracing
3. Section 02223 - Backfilling
4. Section 03311 – Concrete for Non-Plant Work

### 1.2 DEFINITIONS

A. Earth: "Earth" includes all materials which, in the opinion of the Town of Fort Myers Beach, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledges and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.

B. Rock: "Rock" includes all materials which, in the opinion of the Town of Fort Myers Beach, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

NOTE: Add Geotechnical Firm in 1.4 (A)

### 1.3 SITE CONDITIONS

A. A geotechnical investigation report is not part of the Contract Documents.

B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.

C. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.

D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS: NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Clearing: Clear open-cut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 02110, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.

B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 02151.

C. Safety: Whenever an excavation site or trench is left unattended by the Contractor or when an area is not within 100 feet of observation by the Contractor, the excavation site or trench shall be filled and/or, at the Town of Fort Myers Beach's discretion, protected by other means to prevent accidental or unauthorized entry. Such protection shall include barricades and other protection devices requested by the Town of Fort Myers Beach, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the Contractor of any site safety requirements or a liability established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.

D. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 01500.

E. During excavation and any site work, storm water pollution prevention measures shall be taken to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 TRENCH EXCAVATION

A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all

trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.

B. Adequate Space: Keep the width of trenches to a minimum; however provide adequate space for workers to place, joint and backfill the pipe properly.

C. Depth:

1. Excavate trenches to a minimum depth of 8 inches below the bottom of the pipe or the bottom of encasement for electrical ducts, unless otherwise shown, specified or directed, so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for duct encasement, pipe barrels and bells.

2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with #57 stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Excavation below trench grade that is not ordered in writing by the Town of Fort Myers Beach shall be backfilled to trench grade and compacted.

D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".

1. Material shall be removed for the full width of the trench and to the depth required to reach suitable foundation material.

2. When in the judgment of the Town of Fort Myers Beach the unstable or unsuitable material extends to an excessive depth, the Town of Fort Myers Beach may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.

3. Crushed stone, washed shell and gravel shall be as specified in Section 02223.

4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.

E. Length of Excavation: Keep the open excavated trench preceding the pipe or electrical duct laying operation and the unfilled trench, with pipe or duct in place, to a minimum length which causes the least disturbance. Provide ladders for a

means of exit from the trench as required by applicable safety and health regulations.

F. Excavated Material: Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used and shall maintain his operations to provide for natural drainage and not present an unsightly appearance.

G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe or duct flotation.

## 3.3 SHORT TUNNEL EXCAVATION

A. Short Tunnel Requirements: In some instances, trees, shrubs, utilities, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open-cut trench excavation. In such cases, excavate by means of short tunnels in order to protect such obstructions against damage.

1. Construct the short tunnel by hand, auger or other approved method approximately 6 inches larger than the diameter of pipe bells or outer electrical duct encasement.

2. Consider such short tunnel work incidental to the construction of pipelines or conduits and all appurtenances. The need for short tunnels will not be grounds for additional payment.

## 3.4 EXCAVATION FOR JACKING AND AUGERING

A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.

## 3.5 ROCK EXCAVATION

A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required.

1. Rock removed from the excavation becomes the property of the Contractor. Transport and dispose of excavated rock at an offsite disposal location. Obtain the offsite disposal location.

2. Remove all shattered rock and loose pieces.

B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.

C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 4 feet, unless otherwise approved.

D. Trench Depth: For trench excavation in which pipelines or electrical ducts are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.

E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.

F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.

G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".

H. Payment: Rock excavation, including placing, compacting and shaping of the select fill material, will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

I. Blasting: Perform authorized blasting by authorized and qualified workers as approved as to the number, length, placing and direction, and loading of holes. Do not use charges which will make the excavation unduly large or irregular, nor shatter the rock upon or against which masonry is to be built, nor injure masonry or existing structures at the site or in the vicinity.

    1. Cover each blast with a woven wire cable mat weighted with heavy timbers. Blasting will not be permitted within 25 feet of existing or of the completed pipeline or structure. Control blasts in tunnels so that the material surrounding the tunnel base proper is not loosened or displaced.

2. Discontinue blasting whenever it is determined that further blasting may injure or damage adjacent rock, masonry, utility lines, or other structures. In such cases, excavate the remaining rock by barring, wedging, or other approved methods.

3. Where sewers, gas, water, steam, or other utility ducts or lines, catch basin connections, or other structures have been exposed during excavation, adequately protect such structures from damage before proceeding with the blasting. Promptly repair any structure damaged by blasting at no addition to the Contract Price.

4. Take due precautions to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent power lines, dust storms or other sources of extraneous electricity.

5. Keep a sufficient quantity of explosives on hand to avoid delay to the Work on the site when rock excavation is in progress. At no time keep a quantity in excess of that which will be required for use within the following 12 hours.

6. Store, handle and use such explosives in conformity with all laws, ordinances, and regulations of the county or governing body governing the storage and use of explosives at the construction site.

7. Provide a magazine keeper to keep accurate daily records and account for each piece of explosive, detonator and equipment from time of delivery at the magazine until used or removed from the site. Abandon no explosives or blasting agents.

8. Take sole responsibility for the methods of handling, use, and storage of explosives and any damage to persons or property resulting there from. Approval of these methods or failure to order that blasting be discontinued does not relieve the Contractor of any of this responsibility.

## 3.6 FINISHED EXCAVATION

A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.

B. Finish Methods: Provide a degree of finish which is ordinarily obtainable from blade-grade operations, except as otherwise specified in Section 02223.

## 3.7 PROTECTION

A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.

B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.

C. It shall be the Contractor's responsibility to acquaint themselves with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, work shall be coordinated with the facility owner and performed so as to cause as little interference as possible with the service rendered by the facility disturbed. Facilities or structures damaged in the prosecution of the work shall be repaired and/or replaced immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the Contractor's expense.

D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

## 3.8 AUTHORIZED ADDITIONAL EXCAVATION

A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:

1. In case the materials encountered at the elevations shown are not suitable.
2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.

B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 02223.

C. Compaction: Where necessary, compact fill materials to avoid future settlement. As a minimum, unless otherwise specified or directed, backfill layers shall not exceed 12-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 200 feet apart if under roadway and 400 feet outside of roadways and on each 12-inch compacted layer.

D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

## 3.9 UNAUTHORIZED EXCAVATION

A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional

Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.

B. Refill Materials: Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.

C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefore.

3.10 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.

B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.

C. Excess Materials: Contractor shall be responsible to transport and dispose of surplus excavated material and excavated material unsuitable for backfilling or embankments at an offsite disposal location secured by the Contractor.

3.11 REMOVAL OF WATER

A. Dry Excavations: Keep the excavation dry.

B. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.

C. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.

D. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.

E. Sanitary Sewers: Discharge no water into sanitary sewers.

F. Storm Sewers: Discharge no water containing settleable solids into storm sewers.

G. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

SECTION 02223

BACKFILLING

## PART 1 GENERAL

### 1.1 SUMMARY

A. General Requirements: Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade or as shown. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible, or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.

B. Equipment Limitations: Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

C. Related Work Specified In Other Sections Includes:

1. Section 02110 - Site Clearing

2. Section 02222 – Excavation – Earth and Rock

### 1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 1557 - Standard Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using 10 lb Rammer and 18 in Drop

## PART 2 PRODUCTS

### 2.1 BACKFILL MATERIAL - GENERAL

A. General: Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials.

B. General Materials Requirements: Conform materials used for backfilling to the requirements specified. Follow common fill requirements whenever drainage or select fill is not specified. Determine and obtain the approval of the appropriate test method where more than one compaction test method is specified.

## 2.2 DRAINAGE FILL

A. Materials for Drainage Fill: Use clean gravel, crushed stone, or other suitable material conforming to the gradation specified for drainage fill. Clay and fine particles are unacceptable in drainage fill. Provide drainage fill of a grade between the following limits:

| U.S. Standard Sieve | Percent Passing By Weight |
|---|---|
| 1-1/2 inch | 100 |
| 1 inch | 95-100 |
| 1/2 inch | 45-65 |
| #4 | 5-15 |
| #16 | 0-4 |

## 2.3 SELECT FILL

A. Materials for Select Fill: Use clean gravel, crushed stone, washed shell, or other granular or similar material as approved which can be readily and thoroughly compacted to 95 percent of the maximum dry density obtainable by ASTM D 1557.

1. Allowed Materials: Grade select fill between the following limits:

| U.S. Standard Sieve | Percent Passing By Weight |
|---|---|
| 2 inch | 100 |
| 1-1/2 inch | 90-100 |
| 1 inch | 75-95 |
| 1/2 inch | 45-70 |
| #4 | 25-50 |
| #10 | 15-40 |
| #200 | 5-15 |

2. Unallowed Materials: Very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet are unacceptable as select fill.

2.4 COMMON FILL

A. Materials for Common Fill: Material from on-site excavation may be used as common fill provided that it can be readily compacted to 90 percent of the maximum dry density obtainable by ASTM D 1557, and does not contain unsuitable material. Select fill may be used as common fill at no change in the Contract Price.

B. Granular Materials On-Site: Granular on-site material, which is fairly well graded between the following limits may be used as granular common fill:

| U.S. Standard Sieve | Percent Passing by Weight |
|---|---|
| 3 inch | 100 |
| #10 | 50-100 |
| #60 | 20-90 |
| #200 | 0-20 |

C. Cohesive Materials On-Site: Cohesive site material may be used as common fill.

1. The gradation requirements do not apply to cohesive common fill.

2. Use material having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.

D. Material Approval: All material used as common fill is subject to approval. If there is insufficient on-site material, import whatever additional off-site material is required which conforms to the specifications and at no additional cost.

PART 3 EXECUTION

3.1 ELECTRICAL DUCT AND PRECAST MANHOLE BEDDING

A. Bedding Compaction: Bed all electrical ducts and precast manholes in well graded, compacted, select fill conforming to the requirements except as otherwise shown, specified, or required. Extend electrical duct bedding a minimum of 6 inches below the bottom of the duct encasement for the full trench width. Compact bedding thickness no less than 6 inches for precast concrete manhole bases.

B. Concrete Work Mats: Cast cast-in-place manhole bases and other foundations for structures against a 2500 psi concrete work mat in clean and dry excavations, unless otherwise shown, specified or required.

C. Bedding Placement: Place select fill used for bedding beneath electrical ducts and precast manhole bases, in uniform layers not greater than 9 inches in loose thickness. Thoroughly compact in place with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.

D. Use of Select Fill: Bed existing underground structures, tunnels, conduits and pipes crossing the excavation with compacted select fill material. Place bedding material under and around each existing underground structure, tunnel, conduit or pipe and extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

3.2 PIPE BEDDING AND INITIAL BACKFILL

A. Stone Placement: Do not place large stone fragments in the pipe bedding or backfill to 1 foot over the top of pipes, nor nearer than 2 feet at any point from any pipe, conduit or concrete wall.

B. Unallowed Materials: Pipe bedding containing very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet is unacceptable.

3.3 BEDDING PLACEMENT AND BACKFILL FOR PIPE IN SHORT TUNNEL

A. Bed pipelines or electrical ducts placed in short tunnels in select fill or 2500 psi concrete. Completely fill the remainder of the annular space between the outside of the pipe wall and the tunnel wall with select fill, suitable job-excavated material, or 2500 psi concrete, as approved. Suitably support pipelines or ducts in short tunnels to permit placing of backfill suitably tamped in place.

3.4 TRENCH BACKFILL

A. General: Backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stone, or an approved combination thereof. Backfilling shall be accomplished under two specified requirements: First Lift, from trench grade to a point 12 inches above the top of the utility, and, Second Lift, from the top of the First Lift to the ground surface. Where thrust blocks, encasements, or other below-grade concrete work have been installed, backfilling shall not proceed until the concrete has obtained sufficient strength to support the backfill load.

B. First Lift: Fine material shall be carefully placed and tamped around the lower half of the utility. Backfilling shall be carefully continued in compacted layers not exceeding 12 inches in thickness for the full trench width, until the fill is 12 inches above the top of the utility, using the best available material from the excavation, if approved. If proper compaction cannot be obtained in 12-inch lifts, then the lifts shall be reduced accordingly until proper compaction is achieved. The material for these first layers of backfill shall be lowered to within 2 feet above the top of pipes before it is allowed to fall, unless the material is placed with approved devices that protect the pipes from impact. The "First Lift" shall be compacted before the "Second Lift" is placed. The "First Lift" backfill shall exclude stones, or rock fragments larger than the following:

(Greatest Dimension-Inches)

| Pipe Type | Fragment Size (Inches) |
|---|---|
| Steel | 2 |
| Concrete | 2 |
| Ductile Iron | 2 |
| Plastic | 1 |
| Fiberglass | 1 |

C. Second Lift: The remainder of the trench shall be backfilled and tested in layers not exceeding 12 inches. The maximum dimension of a stone, rock, or pavement fragment shall be 6 inches. If proper compaction cannot be obtained in 12-inch lifts, then the lifts shall be reduced accordingly until proper compaction is achieved. When trenches are cut in pavements or areas to be paved, compaction, as determined by ASTM D 1557, shall be equal to 98% of maximum density, with compaction in other areas not less than 95% of maximum density in unpaved portions of the Rights-of-Way or 90% of maximum density in other areas.

D. Compaction Methods: The above specified compaction shall be accomplished using accepted standard methods (powered tampers, vibrators, etc.), with exception that the first two feet of backfilling over the pipe shall be compacted by hand-operated tamping devices. Flooding or puddling with water to consolidate backfill is acceptable.

E. Density Tests: Density tests for determination of the above specified compaction shall be made by an independent testing laboratory and certified by a Florida Registered, Professional Engineer at the expense of the Developer or Contractor. Test locations may be determined by the Town of Fort Myers Beach, but in any case, shall be spaced not more than 200 feet apart under roadways or 400 feet outside of roadways where the trench cut is continuous. The first lift of testing starts at 1'-2' above the top of the pipe. If any test results are unsatisfactory, the Contractor shall re-excavate and re-compact the backfill at his expense until the desired compaction is obtained. Additional compaction tests shall be made to

each site of an unsatisfactory test, as directed, to determine the extent of re-excavation and re-compaction if necessary.

Copies of all density test results shall be furnished on a regular basis by the Contractor, to the Town of Fort Myers Beach. Failure to furnish these results will result in the project not being recommended for acceptance by the Town of Fort Myers Beach.

F. Dropping of Material on Work: Do trench backfilling work in such a way as to prevent dropping material directly on top of any conduit or pipe through any great vertical distance. Do not allow backfilling material from a bucket to fall directly on a structure or pipe and, in all cases, lower the bucket so that the shock of falling earth will not cause damage.

G. Distribution of Large Materials: Break lumps up and distribute any stones, pieces of crushed rock or lumps which cannot be readily broken up, throughout the mass so that all interstices are solidly filled with fine material.

3.5 STRUCTURE BACKFILL

A. Use of Select Fill: Use select fill underneath all structures, and adjacent to structures where pipes, connections, electrical ducts and structural foundations are to be located within this fill.

1. Place backfill in uniform layers not greater than 12 inches in loose thickness and thoroughly compact in place with suitable approved mechanical or pneumatic equipment.

2. Compact backfill to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.

B. Use of Common Fill: Use common granular fill adjacent to structures in all areas not specified above, unless otherwise shown or specified. Select fill may be used in place of common granular fill at no additional cost.

1. Extend such backfill from the bottom of the excavation or top of bedding to the bottom of subgrade for lawns or lawn replacement, the top of previously existing ground surface or to such other grades as may be shown or required.

2. Place backfill in uniform layers not greater than 12 inches in loose thickness and thoroughly compact in place with suitable equipment, as specified above.

3. Compact backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.

## 3.6 EARTH EMBANKMENTS

A. Use of Cohesive Materials: Make all earth embankments of approved cohesive common fill material.

1. Place fill in uniform layers not greater than 10 inches in loose thickness. Compact in place with suitable approved mechanical equipment.

2. Compact earth embankments to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.

3. Do not use cohesionless, granular material as earth embankment backfill, unless otherwise shown or required.

## 3.7 COMPACTION EQUIPMENT

A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.

1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use hand held pneumatic tampers elsewhere for compaction of cohesive fill material.

2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.

3. Do not use heavy compaction equipment over pipelines or other structures, unless the depth of fill is sufficient to adequately distribute the load.

## 3.8 BORROW

A. Should there be insufficient material from the excavations to meet the requirements for fill material, borrow shall be obtained from pits secured and tested by the Contractor and approved by the Town of Fort Myers Beach. Copies of all test results shall be submitted to Town of Fort Myers Beach.

## 3.9 FINISH GRADING

A. Final Contours: Perform finish grading in accordance with the completed contour elevations and grades shown and blend into conformation with remaining natural ground surfaces.

1. Leave all finished grading surfaces smooth and firm to drain.

2. Bring finish grades to elevations within plus or minus 0.10 foot of elevations or contours shown.

B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water.

## 3.10 RESPONSIBILITY FOR AFTERSETTLEMENT

A. Aftersettlement Responsibility: Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

## 3.11 INSPECTION AND TESTING OF BACKFILLING

A. Sampling and Testing: Provide sampling, testing, and laboratory methods in accordance with the appropriate ASTM Standard Specification. Subject all backfill to these tests.

B. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 200 feet apart under roadway and 400 feet apart outside of road and on each 12-inch compacted layer.

C. Correction of Work: Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating or sprinkling as needed and recompaction in place prior to placement of a new lift.

END OF SECTION

SECTION 02226

JACKING, AUGERING AND MINING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Pipeline installation in casing pipe beneath highways, railroads and other structures may be installed by jacking and augering or by jacking and mining.

B. Related Work Specified in Other Sections Includes:

1. Section 02151 – Shoring, Sheeting and Bracing
2. Section 02222 - Excavation - Earth and Rock
3. Section 03311 – Concrete for Non-Plant Work

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

2. ASTM A 139 - Specification for Electric-Fusion (Arc) -Welded Steel Pipe (NPS in 4 in. and Over)

3. OSHA PL-91-596- Occupational Safety Health Act of 1970 Public Law 91-596

1.3 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

1. Working drawings of the jacking pipe, jacking frame, jacking head, reaction blocks, sheeting, including design calculations and the complete jacking installation.

2. It shall be the responsibility of the Contractor to submit the necessary permit documents and data to the appropriate authority and receive approval thereof.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Division 1 and as follows:

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Use one of the following for casing piping.

1. New prime steel pipe, meeting the requirements of ASTM A 139, Grade B. The minimum casing pipe size and wall thickness shall be as shown in the following table, for the carrier pipe size indicated. For sizes not included therein, or for special design considerations, approval shall be obtained from the Town of Fort Myers Beach.

**For PVC or DIP Pressure Carrier Pipes**

| Carrier Pipe Nominal Size Inches | Casing Pipe Nominal Diameter Inches | Casing Pipe Wall Thickness Inches |
|---|---|---|
| 4 | 12 | 0.250 |
| 6 | 16 | 0.250 |
| 8 | 18 | 0.250 |
| 10 | 20 | 0.250 |
| 12 | 24 | 0.312 |
| 14 | 28 | 0.312 |
| 16 | 30 | 0.312 |
| 18 | 30 | 0.312 |
| 20 | 36 | 0.375 |
| 24 | 42 | 0.500 |

**For Gravity Sewer Carrier Pipes**

| Carrier Pipe Nominal Size Inches | Casing Pipe Nominal Diameter Inches | Casing Pipe Wall Thickness Inches |
|---|---|---|
| 8 | 14 | 0.250 |
| 10 | 16 | 0.250 |
| 12 | 20 | 0.250 |
| 15 | 24 | 0.312 |
| 18 | 26 | 0.312 |
| 21 | 30 | 0.312 |
| 24 | 32 | 0.375 |
| 27 | 36 | 0.375 |

2. HDPE may be used as the carrier pipe and casing pipe with approval from The Town of Fort Myers Beach. The HDPE casing shall be SDR 11 and there shall be a minimum of 4 inches clearance between the interior of the casing pipe and the outside of the carrier pipe, unless otherwise approved by the Town of Fort Myers Beach.

B. Fill Material: Use fill material consisting of 1-1/4 pounds of Bentonite per gallon of water during jacking to fill any voids between pipe and the earth.

## PART 3 EXECUTION

### 3.1 INSTALLATION

A. Casing Pipe:

1. Install all casing pipe in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

2. The provisions of this section shall represent the minimum standards for the installation of casing pipe for sewer force main or water main pipeline.

3. Sewer force mains and water mains to be placed under all Lee County Department of Transportation & Engineering roadways shall be installed in a casing. The steel casing procedures shall conform to the requirements of Lee County DOT as outlined in “Administrative Code AC-11-12” and any supplements thereto. All work and materials shall be subject to inspection by DOT. The Department’s property and surface conditions shall be restored to the original condition in keeping with the Department’s specifications and standards.

4. In general, all underground sewer force mains and water mains crossing all existing Lee County roadways, Florida State Highways and railroads shall be installed under these traffic ways within steel casing pipe. Specific crossing requirements shall be obtained in advance from the authority having jurisdiction.

5. It shall be the sole responsibility of the Contractor to submit the necessary permit documents and data to the appropriate authority and receive approval thereof. The Contractor shall maintain traffic on the roadway and shall keep all workmen and equipment clear of the travel way during the work. All safety regulations of the Department and any permit(s) shall be complied with.

6. Casing pipes crossing under County roadways shall be located at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures with minimum 36 inches depth of cover between the top of the casing pipe and the surface of the roadway.

7. For casing pipe crossing under roadways, railroads, or other installations not within the jurisdiction of Lee County, the Contractor shall comply with the regulations of said authority in regard to design, specifications and construction. State Highway casing installations shall be as specified in the FDOT, "Utility Accommodation Guide", and for railroads, the American Railway Engineering Association, Part 5, Section 5.2, "Specifications for Pipelines Conveying Nonflammable Substances", shall be applicable. However, in no case shall the minimum casing pipe diameter and wall thickness, for a specific carrier pipe size, be less than that specified above.

8. Any boring and jacking operations shall be done simultaneously, with continuous installation until the casing pipe is in final position. Correct line and grade shall be carefully maintained. Add-on sections of casing pipe shall be full-ring welded to the preceding length, developing water-tight total pipe strength joints. The casing installation shall produce no upheaval, settlement, cracking, movement or distortion of the existing roadbed or other facilities. Following placement of the carrier pipe within the steel casing, masonry plugs are to be installed at each open end. Said plugs shall be suitable for restraining the external earth load, while allowing internal drainage.

9. Casing pipe holes shall be mechanically bored through the soil by a cutting head on a continuous auger mounted inside the pipe. The auger shall extend a minimum distance beyond the end of the casing pipe to preclude formation of voids outside the pipe shell.

10. The casing pipe shall be adequately protected to prevent crushing or other damage under jacking pressures. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage. Should the casing pipe be damaged, such damaged portion, if not in the hole, shall be replaced; however, if inserted, the encasement pipe shall be abandoned in place, suitably plugged, and an alternate installation made, as directed by the Town of Fort Myers Beach.

11. Required boring or jacking pits or shafts shall be excavated and maintained to the minimum dimension. Said excavation shall be adequately barricaded, sheeted, braced and dewatered as required.

12. Directional boring may be used for the installation of HDPE pipe.

B. Casing Spacers:

1. Stainless steel carriers with Teflon skids, or The Booster Casing Spacers, being on center and restrained shall be the preferred method for installing the carrier pipe. Skids shall be installed 7 feet or less, on center. After the carrier pipe has been tested for leakage, the casing shall have the ends blocked with either an 8" wall of brick masonry with a weep hole installed near the bottom of each wall or Cascade Model CCES End Seals with stainless steel bands.

2. High density polyethylene Raci casing spacers or approved equal can be used for all size PVC pipes and on DIP pipe with diameters 12 inches or less. The spacers shall be of a projection type with a minimum number of projections around the circumference totaling the number of carrier pipe diameter inches. Casing spacers shall be spaced per manufacturer's recommendation with double spacers on each end of the casing. The casing spacers shall provide a minimum safety factor of 2 to 1 to support the service load.

C. Augering: Conduct augering with the proper equipment and procedure such that the carrier pipe and the casing pipe can be installed to the grades specified without disturbing the adjacent earth. Submit all equipment and procedures for prior approval.

D. Hand Mining: Conduct hand mining only in casings that are sufficiently large enough to permit such operation. Provide adequate fresh air supply within the casing pipe and conduct all operations in accordance with the requirements of the U.S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act 7 1970 (PL-91-596).

E. Jacking Pit: Make the jacking pit of adequate length to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Make the pit sufficiently wide to allow ample working space on each side of the jacking frame. Make the depth of the pit such that the invert of the pipe, when placed on the guide frame, is at the elevation desired for the completed line. Provide excavation in conformance with Section 02222.

F. Sheeting: Sheet the jacking pit tightly and keep it dry at all times. Conform sheeting to Section 02151. Have complete design calculation for sheeting the jacking pit sealed and submitted by a Professional Engineer registered in the State of Florida.

G. Jacking Frame: Use a jacking frame that applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.

H. Reaction Blocks: Use reaction blocks designed to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.

I. Operation: Use hydraulic jacks in the jacking operation. Use extreme care to hold the pipe to exact line and grade. Advance the excavation at the heading manually or with an auger. Do not allow the advance to exceed one foot ahead of the casing pipe. Make every effort to avoid loss of earth outside the casing.

J. Safety Railing: Provide a safety railing all around the top of the pit at all times.

K. Property and surface conditions shall be restored to the original condition in accordance with Lee County DOT specifications and standards.

L. Carrier Pipe:

1. Water Mains or Sewer Force Mains installed within casing pipes shall utilize joint restraining for the entire pipe length inside the casing.

END OF SECTION

SECTION 02276

TEMPORARY EROSION AND SEDIMENTATION CONTROL

## PART 1 GENERAL

### 1.1 DESCRIPTION

A. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary.

B. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering, and reseeding onsite surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Town of Fort Myers Beach.

C. Temporary sedimentation controls include, but are not limited to silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Town of Fort Myers Beach.

D. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

### 1.2 REFERENCE DOCUMENTS

A. South Florida Building Code and Standard Building Code.

## PART 2 PRODUCTS

### 2.1 EROSION CONTROL

A. Seeding and Sodding is specified in Section 02400.

B. Netting - fabricated of material acceptable to the Town of Fort Myers Beach.

### 2.2 SEDIMENTATION CONTROL

A. Bales - clean, seed free cereal hay type.

B. Netting - fabricated of material acceptable to the Town of Fort Myers Beach.

C. Filter Stone - crushed stone conforming to Florida Department of Transportation specifications.

D. Concrete Block - hollow, non load-bearing type.

E. Concrete - exterior grade not less than one inch thick.

## PART 3 EXECUTION

### 3.1 EROSION CONTROL

A. Minimum procedures for grassing are:

1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.

2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.

3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.

4. Apply netting over mulched areas on sloped surfaces.

5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

### 3.2 SEDIMENTATION CONTROL

A. Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings, hay bales which deteriorate and filter stone which are dislodged shall be replaced.

### 3.3 PERFORMANCE

A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida, Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION

SECTION 02400

LAWN RESTORATION

## PART 1 GENERAL

### 1.1 DESCRIPTION OF REQUIREMENTS

A. The work in this section consists of furnishing all labor, material and equipment to replace and maintain all areas disturbed during construction by establishing a stand of grass, within the areas called for by the furnishing and placing grass sod, or seeding, or seeding and mulching.

### 1.2 REFERENCE DOCUMENTS

A. The materials used in this work shall conform to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction as follows:

1. Sod - Section 981-2

2. Fertilizer - Section 982

3. Water - Section 983

### 1.3 SUBMITTALS

A. Submit certifications and identification labels for all sodding supplied as specified in Section 01300.

## PART 2 PRODUCTS

### 2.1 SODDING

A. Types: Sod may be of either St. Augustine or Argentine Bahia grass or as that disturbed, as established prior to construction. It shall be well matted with roots. When replacing sod in areas that are already sodded, the sod shall be the same type as the existing sod.

B. Sod shall be provided as required in accordance with Florida Department of Transportation Specifications 575 and 981. The Contractor shall furnish sod equal to and similar in type as that disturbed. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575.

C. The sod shall be taken up in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.

D. The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted.

E. Sod should be handled in a manner to prevent breaking or other damage. Sod shall not be handled by pitch forks or by dumping from trucks or other vehicles. Care shall be taken at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling during delivery, storage or installation will be rejected.

2.2 FERTILIZER (if needed)

A. Chemical fertilizer shall be supplied in suitable bags with the net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.

B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.

C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a non water-soluble organic source. The nitrogen source may be an unreaformaldehyde source provided it is not derived from a waste product of the plastic industry.

2.3 EQUIPMENT

A. The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.

2.4 NETTING

A. Netting is fabricated of material similar to Geoscope Landscape Fabric or approved equal.

2.5 GRASSING

A. The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT

Specifications Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications.

B. Grass seed shall be Argentine Bahia, 60 #/acre March 1 to November 1, 50 #/acre with 20 #/acre of rye grass seed November 1 to March 1. Argentine Bahia seed shall be a scarified seed having a minimum active germination of 40% and total of 85%.

C. Mulch material shall be free of weeds and shall be oat straw or rye, Pangola, peanut, Coastal Bermuda, or Bahia grass hay.

2.6 TOPSOIL

A. Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the Town of Fort Myers Beach. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

2.7 MULCH

A. Mulch shall be fresh cypress mulch. Rate of application specified herein shall correspond to depth not less than 1-inch or more than 3-inches according to texture and moisture content of mulch material.

2.8 WATER

A. It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 EXECUTION

3.1 SOD BED PREPARATION

A. Areas to be sodded and/or seeded shall be cleared no all rough grass, weeds, and debris, and brought to an even grade.

B. The soil shall then be thoroughly tilled to a minimum 8-inch depth.

C. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to

finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

## 3.2 INSPECTION

A. Verify that soil preparation and related preceding work has been completed.

B. Do not begin work until conditions are satisfactory.

## 3.3 SOD HANDLING AND INSTALLATION

A. During delivery, prior to planting, and during the planting of sod areas, the sod panels shall at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.

B. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.

C. Sod shall be placed at all areas where sod existed prior to construction, on slopes of 3 horizontal on 1 vertical (3:1) or greater, in areas where erosion of soils will occur, and as directed by the Town of Fort Myers Beach. On areas where the sod may slide, due to height and slope, the Town of Fort Myers Beach may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.

## 3.4 SOD MAINTENANCE

A. The sod shall produce a dense, well established growth. The Contractor shall be responsible for the repair and re-sodding of all eroded or bare spots until project acceptance. Repair to sodding shall be accomplished as in the original work.

B. Sufficient watering shall be done by the Contractor to maintain adequate moisture for optimum development of the seeded and sodded areas.

## 3.5 CLEANING

A. Remove debris and excess materials from the project site.

END OF SECTION

SECTION 02523

SIDEWALKS, DRIVEWAYS AND CURBS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Sidewalks, sidewalk ramps, driveways, curbs and drive approaches complete with concrete materials, concrete curing compounds, joint materials, field quality control and appurtenances.

1.2 REFERENCES

A. Reference Standards: Conform the work for this Section to the applicable portions of the following standard Specifications.

1. ASTM - American Society of Testing and Materials
2. AASHTO - American Association of State Highway and Transportation Officials
3. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge Construction.
4. FAC - Florida Accessibility Code.
5. ADAAG - American with Disabilities Act Accessibility Guidelines
6. UFAS - Uniform Federal Accessibility Standards

1.3 SUBMITTALS

A. Reports: Written permission for the use of all local disposal sites Furnish copies to the Town of Fort Myers Beach.

B. Test Reports:

1. Thickness and Compressive Strength: Provide the Town of Fort Myers Beach with two (2) certified copies of the test results. Perform the tests by a laboratory approved by the Town of Fort Myers Beach.

1.4 JOB CONDITIONS

A. Environmental Requirements:

1. Temperature: Comply with the requirements for concrete installation due to outside ambient air temperatures as specified under Article 3.3.I of this Section.

B. Protection:

1. Protection Against Rain: Comply with the requirements for protecting new work against damage from Rain, as specified under Article 3.3.I of this Section.

2. Protection Against Cold Weather: Comply with the requirements for protecting new work against damage from cold weather, as specified under Article 3.3.I of this Section.

## PART 2 PRODUCTS

### 2.1 MATERIALS

A. Concrete: Use 2,500 psi concrete except as modified herein.

B. Ready-Mixed Concrete: Use ready-mixed concrete which conforms to ASTM C94, Alternate 2.

C. Water: Use water for mixing and curing concrete reasonably clean and free from oil, salt, acid, alkali, chlorides, sugar, vegetable, or other substances injurious to the finished product. Waters from sources approved by the local Health Department as potable may be used without test. Test water requiring testing in accordance with the current Method of Test for Quality of Water to be Used in Concrete, AASHTO T-26.

D. Concrete Curing Compounds: Use white membrane curing compound for curing concrete which conforms to AASHTO M148, Type 1 clear, or Type 2 while per FDOT Section 925.

E. Pre-molded Joint Filler: Use fiber joint filler which conforms to ASTM D1751. Use filler of the thickness, as specified herein, or as directed by the Town of Fort Myers Beach.

F. Steel Hook Bolts: Use hook bolts which conform to ASTM A706, or for Grade 60 of ASTM A615, A616, or A617. Use 5/8-inch diameter hook bolts self tapping.

G. Joint Sealant: Use hot-poured type joint sealant which conforms to ASTM D1190.

## PART 3 EXECUTION

### 3.1 CONTRACTOR'S VERIFICATION

A. Excavation and Forming: Prior to the installation of any concrete, examine the excavation and forms for the proper grades, lines, and levels required to receive

the new work. Ascertain that all excavation and compacted sub-grades are adequate to receive the concrete to be installed.

1. Correct all defects and deficiencies before proceeding with the work.

B. Existing Improvements: Investigate and verify location of existing improvements to which the new work is to be connected.

1. Making necessary adjustment in line and grade to align the new work with the existing improvements must be approved by the Town of Fort Myers Beach prior to any change.

3.2 PREPARATION

A. Forms: Use wood or metal forms, straight and free from warp, clean, and sufficient strength to resist springing during the process of depositing concrete against them.

1. Use full depth of the concrete forms.

3.3 INSTALLATION

A. Sidewalks, Sidewalk Ramps, Driveways and Driveway Approaches: Construct all sidewalks and sidewalk ramps four (4) inches thick except at driveways and alleys. Construct thickness of the sidewalks six (6) inches at driveways and alleys. Construct sidewalks five (5) feet wide unless otherwise noted on the Plans and slope 1/4-inch per foot towards the center of the road. Normally, sidewalks will be located within the right-of-way, parallel the property lines, at a distance of 1-foot from the property line.

1. Construct alleys, driveways and approaches six (6) inches thick. Construct the width of the driveways and driveway approaches as shown on the Plans.

B. Removal of Existing Curb for Sidewalk Ramps and Driveway Approaches: Conform construction of sidewalk ramps within street intersections where curbed pavement existing to the current FDOT Roadway and Traffic Design Standards.

1. Saw cut, to full depth of pavement, and remove a minimum of an 18-inch wide curb and gutter section where there is no proper curb drop for the sidewalk ramp or driveway approach. When mountable curbs are present, remove a 24-inch wide curb and gutter section for the construction of sidewalk ramps, as specified above.

2. Replace the removed curb and gutter section with materials, equal to what was removed and seal joint with hot poured rubber asphalt.

C. Install 5/8 inch diameter self tapping hook bolts, in the existing concrete pavement as indicated on the Plans prior to placing concrete for the removed curb and gutter section.

D. Placement of Forms: Use wood forms, straight and free from warp, of nominal depth for sidewalk sections less than 25 feet in length.

1. Stake forms to line and grade in a manner that will prevent deflection and settlement.

2. When unit slab areas are to be poured, place slab division forms such that the slab division joints will be straight and continuous.

3. Set forms for sidewalk ramps to provide a grade toward the centerline of the right-of-way in accordance with current standards. Use a uniform grade, except as may be necessary to eliminate short grade changes.

4. Oil forms before placing concrete. Leave forms in place at least 12 hours after the concrete is placed. Place forms ahead of the pouring operations to maintain uninterrupted placement of concrete.

5. The use of slip form pavers can be allowed when approved by the Town of Fort Myers Beach in lieu of the construction system described above.

E. Joints: Construct transverse and longitudinal expansion and plane-of-weakness joints at the locations specified herein, or as indicated on the Plans.

1. Place the transverse expansion joints for the full width and depth of the new work. Use transverse expansion joints placed against an existing pavement a minimum of six (6) inches deep but no less than the thickness of the concrete being placed.

2. Conform longitudinal expansion joints to the requirements as transverse expansion joints.

3. Construct joints true to line with their faces perpendicular to the surface of the sidewalk. Install the top slightly below the finished surface of the sidewalk. Construct transverse joints at right angles to the centerline of the sidewalk and construct longitudinal joints parallel to the centerline.

4. Place transverse expansion joints, 1/2-inch thick, through the sidewalk at uniform intervals of not more than 50 feet and elsewhere as shown on the Plans.

5. Place expansion joints, 1/2-inch thick, between the sidewalk and back of abutting parallel curb, buildings or other rigid structures, concrete driveways

and driveway approaches. When directed by the Town of Fort Myers Beach, place the expansion joint between sidewalks and buildings 1-foot from the property line and parallel to it.

6. Form plane-of-weakness joints every five (5) feet. Form joints by use of slab division forms extending to the full depth of the concrete or by cutting joints in the concrete, after floating, to a depth equal to 1/4 the thickness on the sidewalk. Construct cut joints not less than 1/8-inch or more than 1/4-inch in width and finish smooth and at right angles to the centerline on the sidewalk.

F. Placing and Finishing Concrete: Place all concrete on a prepared unfrozen, smooth, leveled, rolled and properly compacted base. Place concrete on a moist surface with no visible water present.

1. Deposit the concrete, in a single layer to the depth specified. Spade or vibrate and compact the concrete to fill in all voids along the forms and joints. Strike off the concrete with a strike board until all voids are removed and the surface has the required grade and cross section as indicated on the Plans.

2. Float the surface of the concrete just enough to produce a smooth surface free from irregularities. Round all edges and joints with an edger having a 1/4-inch radius.

3. Broom the surface of sidewalks, driveways and approaches to slightly roughen the surface.

4. Texture the surface of the sidewalk ramps with a coarse broom transversely to the ramp slope, and coarser roughen than the remainder of the sidewalk. Contract the ramp slope in color (using a brick-red dye or approved equal) from the remainder of the sidewalk. Comply with minimum color contract and slope requirements from FAC, UFAS, ADAAG, Local Government Standards.

G. Curing: After finishing operations have been completed and immediately after the free water has left the surface, completely coat and seal the surface of the concrete (and sides if slip-forming is used) with a uniform layer of white membrane curing compound. Do not thin the curing compound. Apply the curing compound at the rate of one gallon per 200 square feet of surface.

H. Barricades: Place suitable barricades and lights around all newly poured sidewalks, sidewalk ramps, driveways, driveway approaches and curb and gutter sections in order to protect the new work from damage from pedestrians, vehicles and others until the concrete has hardened.

1. Leave barricades in place for a minimum of two (2) days, except for driveway approaches and curb and gutter sections. Leave barricades in place for a minimum of three (3) days.

2. Remove and replace any concrete that suffers surface or structural damage at no additional cost.

I. Protection:

1. Against Rain: Protect new concrete from the effects of rain before the concrete has sufficiently hardened. Have available on the job site at all times enough burlap or 6-mil thick polyurethane film to cover and protect one day's work. Stop work and cover completed work when rain appears eminent. As soon as the rain ceases, uncover the concrete and burlap drag the surface where necessary. Apply curing compound to any areas where the compound has been disturbed or washed away.

2. Against Cold Weather: If concrete is placed between December 15 and February 15, have available on the site sufficient amount of clean, dry straw or hay to cover one (1) day's production. If the temperature reaches 40 degrees F and is falling, place the hay or straw 12 inches thick, immediately after the curing compound is applied.

3. Concrete Temperature Limitations: Do not place concrete when the temperature of the concrete at the point of placement is above 90 degrees F.

J. Cleanup: After the concrete has gained sufficient strength, but no sooner than within 12 hours, remove the fixed forms and backfill the spaces on both sides with sound earth of topsoil quality. Compact, level and leave backfill in a neat condition.

K. Gutters and Curbs: Construct gutters and curbs in accordance with Section 520 FDOT Standard Specifications for Road and Bridge Construction, latest edition, including supplements.

3.4 FIELD QUALITY CONTROL

A. Concrete Delivery Ticket: Use a ticket system for recording the transportation of concrete from the batching plant to point of delivery. Issue this ticket to the truck operator at the point of loading.

B. Concrete Delivery Rejection: Remove concrete not permitted for inclusion in the work by the Town of Fort Myers Beach from the site. Rejection of concrete will be determined through Field Quality Control and elapsed time from mixer charging to delivery.

C. Concrete Testing at Placement: Perform tests of each batch of concrete delivered, each 50 cubic yards, or whenever consistency appears to vary. The sampling and testing of slump, air content and strength will be performed at no cost to the Town of Fort Myers Beach.

1. Sampling: Secure composite samples in accordance with the Method of Sampling Fresh Concrete, ASTM C172.

2. Slump Test: Test in accordance with ASTM C143. Use the least slump possible consistent with workability for proper placing of the various classifications of concrete.

   a. Place structural concrete for walls and slabs, by means of vibratory equipment, with a slump of four (4) inches.

   b. A tolerance of up to 1-inch above the indicated maximum will be allowed for individual batches provided the average for all batches or the most recent ten (10) batches tested, whichever is fewer, does not exceed the maximum limit.

3. Air Content: Determine air content of normal weight concrete in accordance with Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C23 1, or by the volumetric method, ASTM C 173, for each strength test.

4. Compressive Strength: Make two (2) strength tests of three (3) samples each for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one (1) day.

   a. Handling Samples: Mold and cure three (3) specimens from each sample in accordance with Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31. Record any deviations from the requirements of this Standard in the test report.

   b. Testing: Test specimens in accordance with Method of Test for Compressive Strength of Cylindrical Concrete Specimens, ASTM C39. Test one (1) specimen at seven (7) days for information and test two (2) at 28 days for acceptance. Use the average of the strengths of the two (2) specimens tested at 28 days. Discard results if one (1) specimen in a test manifests evidence of improper sampling, molding or testing, and use the strength of the remaining cylinder. Should both specimens in test shown any of the above defects, discard the entire test.

   c. Acceptance of Concrete: The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three

consecutive strength test results equal or exceed the specified 28-day strength and no individual strength test results falls below the specified 28-day strength by more than 500 psi. If the strength test is not acceptable, perform further testing to qualify the concrete.

d. Concrete Temperature: Determine the temperature of concrete sample for each strength test.

D. Reductions due to deficiencies in thickness or compressive strength are additive that is, if an area is deficient by 3/8 inch and under strength by 200 psi, the total reduction is 20% plus 02% or 40% reduction.

END OF SECTION

SECTION 02530

GROUNDWATER CONTROL FOR OPEN CUT EXCAVATION

## PART 1 GENERAL

### 1.1 DESCRIPTION OF REQUIREMENTS

A. This section provides for furnishing all labor, materials, equipment, power and incidentals for performing all operations necessary to dewater, depressurize, drain and maintain excavations as described herein and as necessary for installation of pipeline and appurtenances. Included are installing, maintaining, operating and removing dewatering systems and other approved devices for the control of surface and groundwater during the construction of open cut excavations, directional drilling, pipelines and appurtenances, and protecting work against rising waters and repair of any resulting damage.

### 1.2 CONTRACTOR'S RESPONSIBILITY

A. It is the sole responsibility of the Contractor to identify groundwater conditions and to provide any and all labor, material, equipment, techniques and methods to lower, control and handle the groundwater as necessary for his construction methods and to monitor the effectiveness of this installed system and its effect on adjacent facilities.

B. Operate, maintain and modify the system(s) as required to conform to these Specifications. Upon completion of the Construction, Contractor shall remove the system(s). The development, drilling and abandonment of all wells used in the dewatering system shall comply with regulations of the Florida Department of Environmental Protection and the governing Water Management District.

C. Assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the dewatering operation.

END OF SECTION

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SECTION 02575

PAVEMENT REPAIR AND RESTORATION

## PART 1 GENERAL

### 1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and remove and replace pavements over trenches excavated for installation of pipelines as shown on the drawings and/or specified herein.

### 1.2 GENERAL

A. All damage, as a result of work under this project, done to existing pavement, driveways, paved areas, curbs and gutters, sidewalks, grass, utility poles, utility pipe lines, conduits, drains, catch basins, or stabilized areas or driveways shall be repaired in a manner satisfactory to the Town of Fort Myers Beach. Bid prices shall include the furnishing of all labor, materials, equipment, and incidentals necessary for the cutting, repair, and restoration of the damaged areas unless pay items for specific types of repair are included in the Bid Form.

B. Keep the surface of the backfilled area of excavation in a safe condition and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repair shall conform to applicable Town of Fort Myers Beach or State requirements for pavement repair and as described herein.

C. All materials and workmanship shall be first class and nothing herein shall be construed as to relieve the Contractor from this responsibility. The Town of Fort Myers Beach reserves the right to require soil bearing or loading tests or materials tests, should the adequacy of the foundation or the quality of materials used be questionable. Costs of these tests shall be borne by the Town of Fort Myers Beach, if found acceptable; the costs of all failed tests shall be borne by the Contractor.

D. All street and road repair shall be made in accordance with the details indicated on the drawings and in accordance with the applicable requirements of these Specifications and meeting the permit requirements and approval of the governing Department of Transportation agencies.

E. Pavement or roadway surfaces cut or damaged shall be replaced by the Contractor in equal or better condition than the original, including stabilization, base course, surface course, curb and gutter or other appurtenances. The Contractor shall obtain the necessary permits prior to any roadway work.

1.3 QUALITY ASSURANCE

A. Applicable provisions of the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", and Supplemental Specifications hereunder govern the work under this Section. The Florida Department of Transportation will hereafter be referred to as FDOT.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials utilized in flexible base pavement and base course shall be as specified in the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

PART 3 EXECUTION

3.1 CUTTING PAVEMENT

A. Cut and remove pavement as necessary for installing the new pipelines and appurtenances and for making connections to existing pipelines.

B. Before removing pavement, the pavement shall be marked for cuts nearly paralleling pipelines and existing street lines. Asphalt pavement shall be cut along the markings with a jackhammer, rotary saw, or other suitable tool, leaving a uniform and straight edge with minimum disturbance to the remaining adjacent surface.

C. No pavement shall be machine pulled until completely broken and separated along the marked cuts.

D. The pavement adjacent to pipeline trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, remove the damaged pavement and replace it at Contractor’s own expense.

3.2 GENERAL RESTORATION

The restoration of existing street paving, driveways, etc., shall be restored, replaced or rebuilt using the same type of construction as was in the original. Be responsible for restoring all such work, including sub-grade and base courses where present. Obtain and pay for such local or other governmental permits as may be necessary for the opening of streets. Meet any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.

## 3.3 PRIME AND TACK COATS

A. The work shall consist of the application of bituminous prime and tack coats on the previously prepared base course in accordance with Section 300 of the FDOT Specifications.

## 3.4 WEARING COURSE

A. The work shall consist of the construction of plant-mixed hot bituminous pavement to the thickness indicated in the drawings conforming to Type III asphaltic concrete in accordance with Section 333 of the FDOT Specifications. The requirements for plant and equipment are specified in Section 320 and the general construction requirements for asphaltic concrete pavement are contained in Section 330 of the FDOT specifications.

## 3.5 TESTING

A. All field testing shall be performed by an independent laboratory employed by the Contractor. All materials shall be tested and certified by the producer. Tests repeated because sub-grade or base does not meet specified compaction shall be at the Contractor's expense.

## 3.6 MISCELLANEOUS RESTORATION

A. Sidewalks cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb gutter shall be restored to the existing height and cross section in full sections or lengths between joints. Concrete shall be as specified on the drawings. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass seed or sod of a type matching the existing grass.

## 3.7 CLEANUP

A. After all repair and restoration or paving has been completed, all excess asphalt, dirt, and other debris shall be removed from the roadways. All existing storm sewers and inlets shall be checked and cleaned of any construction debris.

END OF SECTION

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SECTION 02623

POLYVINYL CHLORIDE (PVC) WATER MAIN PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required, and install polyvinyl chloride (PVC) waterline, fittings, service connections and appurtenances as shown on the Drawings and as specified herein.

B. All water mains less than or equal to 12 inches in diameter shall be constructed of PVC, unless otherwise approved by The Town of Fort Myers Beach.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. This standard references the documents listed below. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.

1. ASTM D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.

2. ASTM D1599 - Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.

3. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

4. ASTM D2122 - Standard Method of Determining dimensions of Thermoplastic Pipe and Fittings.

5. ASTM D2152 - Standard Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.

6. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series).

7. ASTM D2412 - Standard Test Method for Determination of External Loading characteristics of Plastic Pipe by Parallel-Plate Loading.

8. ASTM D2774 - Recommended Practice for underground Installation of Thermoplastic Pressure Piping.

9. ASTM D2837 – Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials

10. ASTM D3139 – Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

11. ASTM F477 – Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

12. AWWA M23 – PVC Pipe - Design and Installation.

13. NSF 14 – Plastics Piping System Components and Related Materials.

14. PPI TR3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

## 1.3 SUBMITTAL

A. Submit to the Engineer within fourteen days after receipt of Notice-to-Proceed a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Submit for approval, as provided in the Supplement to the General Conditions, complete, detailed shop drawings of all PVC pipe and fittings.

C. Submit and shall comply with pipe manufacturer's recommendations for handling, storing, and installing pipe and fittings.

# PART 2 PRODUCTS

## 2.1 WATER MAIN

A. Polyvinyl Chloride (PVC) Pipe

1. All 4-inch through 12-inch diameter PVC pipe shall be rated per AWWA, C900, DR18, Class 150. Water mains larger than 12 inches shall be constructed of Ductile Iron Pipe.

2. PVC pipe less than 4-inches in diameter shall be Schedule 80 with a pressure rating of 200 psi solvent welded, including blow-off assemblies. PVC pipe will be acceptable for pipe diameters of 12 inches or less.

3. The potable water mains shall be blue in color.

4. All pipes shall be manufactured in the United States.

B. Steel Encasement Pipe: Conform to ASTM Designation A252, Grade 2. Joints shall be welded completely around the pipe by a certified welder. Pipe shall meet all AASHTO standards and Florida DOT requirements.

C. Fittings:

1. PVC Pipe: Fittings shall be ductile iron mechanical joint, with a working pressure of 250 psi and conforming to AWWA Specifications C110 or C153. For pipe 8 inches and smaller, fittings shall be C900 PVC rated fittings.

2. PVC fittings for 2-inch and smaller diameter pipe shall be threaded or glued and shall be Schedule 80 and conform to the requirements of ASTM D-2464.

Threaded joints shall be used only with Schedule 80 pipe or stronger. At threaded joints between PVC and metal pipes, the metal shall contain a threaded socket and the PVC threaded spigot end. A metal spigot shall not, under any circumstances be screwed into a PVC socket. PVC fittings 4 inches and larger in diameter shall meet the requirements of applicable AWWA C900 and C905 specifications. Fittings shall be manufactured entirely of PVC meeting ASTM D1784, shall be formed by a thermal-form process and be of one-piece construction, able to withstand 755 psi quick burst pressure-tested in accordance with ASTM D1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D1598. Bells shall be gasketed push on type conforming to ASTM D3139 with gaskets conforming to ASTM F477. Fittings shall be as manufactured by the Harrington Corporation, or approved equal. Cement lined ductile iron fittings with mechanical or push on joints conforming to AWWA C153 or C110 may be approved as alternative when PVC pressure fittings of the required sizes are not available.

Tapping Sleeves: Sleeve shall be stainless steel, mechanical joint type, with working pressure rating of 250 PSI, and conform to AWWA Standard C110.

3. All fittings shall be manufactured in the United States.

D. Joint Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall

conform to the details shown on the drawings. Concrete thrust blocks may be utilized as additional restraint if approved by The Town of Fort Myers Beach.

1. Joint restraint devices for C-900, C905 PVC pipe used with ductile iron mechanical joint fittings shall be EBAA Iron Sales, Inc., Series 2000 PV, UniFlange 1300, Star Pipe Product, L.P., or approved equal.
2. Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Inc., Series 1600 for C-900 PVC pipe, Series 2800 for bell restraint on C-905 PVC pipe or Uni-Flange Series 1300, 1360 or 1390 or ROMAC Series 600, Star Pipe Products L.P., or approved equal.

3. C-900 or C-905 PVC fittings shall be restrained with EBAA Iron Inc., Series 2500 bell restraint for PVC fittings, Star Pipe Products, L.P., or an approved equal.

4. Bolts and nuts shall be Ductile Iron, T-Head type with hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface.

E. Joint Design: PVC pipe 4 inches in diameter or larger shall have provisions for expansion and contraction provided in the joints. All joints shall be designed for push-on make-up connections. Push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section, similar and equal to John's Mannville ring-type and Ethyl Bell Ring or may be made with a separate twin gasketed coupling similar and equal to CertainTeed Fluid-Type.

## 2.2 IDENTIFICATION

A. Pipe shall bear identification markings that will remain legible after normal handling, storage, and installation. Markings shall be applied in a manner that will not weaken or damage the pipe. Marking shall be applied at intervals of not more than 5 feet on the pipe. Marking on the pipe shall include the following:

1. Nominal size and OD base.

2. PVC

3. Dimension ration

4. AWWA pressure rating.

5. AWWA designation.

6. Manufacturer’s name and trademark.

7. Manufacturer’s production code, including day, month, year, shift, plant, and extruder of manufacturer.

8. All PVC water pipe shall be color-coded blue.

## PART 3 EXECUTION

### 3.1 WATER MAIN INSTALLATION

A. Polyvinyl Chloride (PVC) water pipe shall be installed in accordance with the manufacturer’s recommendation, as shown on the drawings, and as specified herein.

B. The Contractor shall use care in handling, storage, and installation of pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer’s recommendation. Under no circumstances shall pipe or fittings be dropped into the trench.

C. Pipe shall be laid to lines and grade shown on the drawings with bedding and backfill as shown on the drawings. Blocking under the pipe will not be permitted.

D. When laying is not in progress, or the potential exists for dirt or debris to enter the pipe, the open ends of the pipe shall be closed with plug or by other approved means.

### 3.2 SERVICE CONNECTIONS

A. All potable service taps shall be located in open/green areas unless specifically approved by The Town of Fort Myer Beach. Any service taps that are approved within a paved area, a 2-inch cast iron body gate valve shall be used in lieu of a corporation stop.

B. Service connections shall be installed at the locations and in the manner shown on the Drawings.

C. Meters shall be placed or relocated within the right-of-way.

D. Service clamps for PVC mains shall be full-circle bearing types as shown on the Town of Fort Myers Beach Details.

E. Corporation stops and curb stops shall be fitted with a compression connection outlet with split-lock devices for polyethylene or copper pipe.

F. On curbed streets the exact location for each installed service shall be marked by etching or cutting a “W” in the concrete curb; where no curb exists or is planned, locations shall be adequately marked by a method approved by The Town of Fort Myers Beach.

G. Service connection shall not be installed on pipelines 16 inches and larger unless extenuating conditions exist and said connection is approved by the Town of Fort Myers Beach.

H. When practical, in new residential, commercial, or/and industrial subdivisions, the corporation stop shall be located at the intersecting property line or in the center of the lot.

1. Polytubing Polyethylene Tubing will be acceptable in sizes from 1-1/2 inches to 2 inches in diameter. Tubing for service lines shall be of a type approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23ºC, and shall be manufactured in accordance with the requirements of ASTM D2737 and shall be blue in color.

## 3.3 CLEANING

A. At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipe lines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed at the Contractor’s expense.

## 3.4 TESTING AND DISINFECTION

A. Test completed water pipeline in accordance The Town of Fort Myers Beach operations manual. Disinfect completed water pipeline in accordance The Town of Fort Myers Beach operations manual.

END OF SECTION

SECTION 02630

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required, and install ductile iron pipe, fittings and appurtenances as shown on the Drawings and as specified herein.

B. NOTE: No buried ductile iron pipe shall be acceptable for sanitary force main construction. All water mains larger than 12 inches shall be constructed of Ductile Iron Pipe and shall be used for all vertical deflections ditch crossings, subaqueous crossings, and all paved surfaces unless otherwise approved by The Town of Fort Myers Beach.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02650 - Laying and Jointing Buried Pipe

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards: (Latest Revision)

1. ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.

3. ANSI/AWWA C110/A21.10 Ductile-Iron Fittings, 3 in. Through 48 Inches, for Water and Other Liquids. (C110 2-48 inches).

4. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Threaded Flanges.

6. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.

7. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.

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| 8. | ANSI/AWWA C153/A21.53 | Ductile-Iron Compact Fittings, 3 inches through 16 inches, for Water and Other Liquids. |
| 9. | AWWA C600 | Installation of Ductile Iron Water Mains and Their Appurtenances. |
| 10. | AWWA F477 | Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Material |

1.4 CONTRACTOR SUBMITTALS

A. Shop Drawings: Submit shop drawings of pipe and fittings in accordance with the requirements in the General Conditions, the requirements of the referenced standards and the following supplemental requirements as applicable:

1. Certified dimensional drawings of all valves, fittings, and appurtenances.
2. For pipe 48 inches in diameter and larger, a line layout and marking diagram shall indicate the specific number and location (station) of each fitting.
3. In all cases, a line layout to indicate the limits of each reach of restrained joints, or of concrete encasement shall be supplied.

B. Certifications: Furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, which indicates that all tests have been made and that all results comply with the requirements of AWWA C151, including but not necessarily limited to the following:

1. Acceptance Tests.
2. Hydrostatic Tests.
3. Low Temperature Impact Tests.

C. Additional Documentation: Foundry records shall be furnished in the form of written transcripts upon request.

D. All expenses incurred for certification, testing, and data submittal shall be borne by the Contractor or the Supplier.

1.5 QUALITY ASSURANCE

A. Inspection: All pipe shall be available for inspection at the place of manufacture prior to shipping in accordance with the provisions of the referenced standards. Notify the Town of Fort Myers Beach in writing not less than 10 calendar days prior to the shipping of the pipe.

B. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.

C. Provide data on material tests at no additional cost to the Town of Fort Myers Beach.

1.6 CORROSION PROTECTION

A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of the Town of Fort Myers Beach. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by the Town of Fort Myers Beach. The DIP pipe will be required to have a Polybond Plus lining or approved equal. The Polybond Plus lining consist of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000 volt charge.

B. If specifically approved by the Town of Fort Myers Beach for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

PART 2 PRODUCTS

2.1 GENERAL

A. Cement mortar lined ductile iron pipe shall conform to ANSI/AWWA C151 and C104, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.

B. Markings: Legibly mark specials 48 inches in diameter and larger in accordance with the laying schedule and marking diagram. All fittings shall be marked at each end with top field centerline.

C. Handling and Storage: The pipe shall be handled by wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe and its lining. The use of equipment or handling, which might injure the pipe and its lining, will not be permitted. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling. All other pipe handling equipment and methods shall be acceptable to the Town of Fort Myers Beach.

D. Laying lengths: Maximum pipe laying lengths shall be 20 feet.

E. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness, in accordance with ANSI/AWWA C104.

F. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing shown on the Drawings or line layouts where applicable.

2.2 PIPE DESIGN CRITERIA

A. General: Ductile Iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150 as applicable and as modified in this Section.

B. Pipe Wall Thickness for Internal Pressure: The pipe shall be designed with a net thickness to withstand the design internal pressure in accordance with the hoop stress formula. In addition to the requirements of the Section, the minimum wall thickness shall be in accordance with the minimum thickness wall depicted in table 50.5 of ANSI/AWWA C150.

C. Ductile Iron Pipe shall be a minimum of Class 50 or pressure Class 250 and will be accepted in any diameter for use within the water distribution system.

D. All aboveground water main pipes shall be painted blue. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 “B” with 5-foot cover in conformance with ANSI Standard A21.50.

2.3 MATERIALS

A. Ductile Iron Pipe: Pipe materials shall conform to the requirements of ANSI/AWWA C151.

B. Cement: Cement for mortar lining shall conform to the requirements of ANSI/AWWA C104; provided that cement for mortar lining shall by Type II or V. A fly ash or pozzolan shall not be used.

C. Adapters to connect ductile iron pipe or fittings to pipe or fittings of dissimilar materials shall be supplied by the Contractor in accordance with the pipe manufacturer recommendations, and as approved by the Town of Fort Myers Beach.

## 2.4 SPECIALS AND FITTINGS

A. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3 inches through 48 inches and shall have a minimum pressure rating of 250 psi. Ductile iron fittings shall be cement lined, seal coated and outside coated as specified. Ductile Iron fittings larger than 48 inches shall conform to the above referenced standard with the necessary modifications for the larger size manufacturer's standard.

B. All above-ground fittings in direct contact with wastewater shall be HDPE or ductile iron flanged joints with a minimum pressure rating of 250 psi conforming to ANSI A21.10. If above-ground ductile iron fitting is used, the fitting shall be lined with Protecto 401 applied in strict accordance with the manufacturers' specifications to a dry film thickness of 40 mils. All above-ground fittings shall have a factory applied exterior epoxy coating in accordance with AWWA C550.

## 2.5 DESIGN OF PIPE

A. General: The pipe furnished shall be ductile iron pipe, mortar-lined, with rubber gasketed joints.

B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C151.

C. Pipe Dimensions: The pipe shall be of the diameter and class shown. The minimum wall thickness for each pipe size shall be as specified herein or shown on the Drawings.

D. Fitting Dimensions: The fittings shall be of the diameter shown and class specified.

E. Joint Design: Ductile Iron pipe and fittings shall be furnished with mechanical joints, push-on joints and flanged joints as follows:

1. For buried pipe applications, unless otherwise indicated, mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11, with the minimum pressure rating of 250 psi.

2. For above-ground or buried vault applications, unless otherwise indicated, flanged joints shall conform to ANSI/AWWA C115/A21.15, with the minimum pressure rating of 250 psi. All above-ground fittings shall be painted blue.

F. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the details shown on the drawings.

1. Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Inc., Series 1100 Megalug (R), Star Pipe Products, L.P., or approved equal.
2. Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint, Star Pipe Products L.P., or approved equal.

G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket, itself, will provide watertight joints under all operating conditions when properly installed. Require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

H. Gaskets shall be a Buna N, Neoprene, or a Nitryl-based rubber product approved by the County. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.

I. Shop-applied interior linings and exterior coatings shall be applied evenly to the nominal thickness specified. Holiday free cement is not possible to manufacture. Exterior coatings: asphalt coating for buried pipe or primed pipe cannot be furnished holiday free.

2.6 CEMENT-MORTAR LINING

A. Cement-Mortar Lining For Shop Application: Except as otherwise provided herein, interior surfaces of all ductile iron pipe shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. Ductile-Iron pipe fittings need not have the cement-mortar lining applied centrifugally. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired in the field in accordance with ANSI/AWWA C104.

B. The nominal wet lining thickness shall be as follows:

| Nominal Factory Nominal Replacement | | |
|---|---|---|
| Nominal Pipe Diameter (in.) | Applied Lining Thickness (in.) | Lining Thickness (in.) |
| 3-12 | 1/8 | 1/8 |
| 14-24 | 3/16 | 3/16 |
| 30-64 | 1/4 | 1/4 |

C. Protection of Pipe Lining/Interior: All shop applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with ANSI/AWWA C104.

2.7 EXTERIOR COATING OF PIPE

A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of rust-inhibitive primer conforming to the requirements of Section 09900, “Painting and Coating”. All above-ground pipes shall be painted blue.

B. Exterior Coating of Buried Piping: The exterior coating shall be an asphaltic coating approximately 1 mil thick, conforming to ANSI/AWWA C151.

2.8 CORROSION PROTECTION

A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of The Town of Fort Myers Beach. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by The Town of Fort Myers Beach. The DIP pipe will be required to have a Polybond Plus lining or approved equal. The Polybond Plus lining consist of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000 volt charge.

B. If specifically approved by The Town of Fort Myers Beach for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then

protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF PIPE

A. Handling and Storage: All pipe, fittings, etc., shall be carefully handled and protected against damage, impact shocks, and free fall and in accordance with ANSI/AWWA C600. Pipe shall not be placed directly on rough rocky ground but in such instances shall be supported in a manner which will protect the pipe against injury whenever stored at such trench site or elsewhere. No pipe shall be installed where the lining or coating show defects that may be harmful as determined by the Town of Fort Myers Beach. Such damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

B. All pipe damaged prior to Substantial Completion or during warrantee period shall be repaired or replaced by the Contractor.

C. Inspect each pipe and fitting prior to installation to insure that no damaged portions of the pipe gets installed.

D. Before placement of pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance, which may have collected therein and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the work.

E. Pipe Laying: The pipe shall be installed in accordance with ANSI/AWWA C600.

F. Pipe shall be laid directly on the bedding material. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the Town of Fort Myers Beach may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 70 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint.

H. Pipe and Specials Protection: The openings of all pipe and specials shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water, or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.

I. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs per ANSI/AWWA C600 and C602 prior to testing and disinfecting the completed pipeline. Pipe larger than 12" diameter will utilize a polyurethane foam plug "Poly Pig" to remove all debris from main.

## 3.2 RUBBER GASKETED JOINTS

A. Rubber Gasketed Joints: Immediately before jointing pipe, the bell end of the pipe shall be thoroughly cleaned, and a clean rubber gasket shall be placed in the bell groove. The bell and spigot end of push-on joint pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant or per manufacturer's recommendation. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

## 3.3 INSTALLATION OF PIPE APPURTENANCES

A. Installation of Valves: All valves shall be handled in a manner to prevent any injury or damage to any part of the valve. All joints shall be thoroughly cleaned and prepared prior to installation. Adjust all stem packing and operate each valve prior to installation to insure proper operation.

B. All valves shall be installed so that the valve stems are plumb and in the location shown on the Drawings.

C. Mechanical joints consisting of bell, socket, gland, gasket, bolts, and nuts shall conform to ANSI Standard A21.11. Bolts and nuts shall be high strength, low alloy, Cor-Ten, T-Head Type having hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface. Single sealed gasket push-on type joints shall conform to the requirements of ANSI A21.11 and shall be Tyton, Fastite, Superbelltite, Alltite, or approved equal.

D. Mechanical joint retainer glands may be used to restrain mechanical joint pipe and fittings to the plain end of ductile iron pipe and fittings when used in conjunction with thrust blocks of reduced size.

## 3.4 TESTING AND DISINFECTION

A. Test completed water pipeline in accordance with Section 02676. Disinfect completed water pipeline in accordance with Section 02675.

END OF SECTION

SECTION 02645

HYDRANTS

## PART 1 GENERAL

### 1.1 DESCRIPTION OF REQUIREMENTS

A. Furnish and install fire hydrants where shown on the Drawings or directed by the Town of Fort Myers Beach.

### 1.2 QUALITY ASSURANCE

A. Install hydrants to meet current requirements of The Town of Fort Myers Beach.

B. Provide manufacturer's certificate those products meet or exceed minimum requirements as specified.

### 1.3 SUBMITTALS

A. Submit manufacturer's certificates on conformance.

B. Shop Drawings: Submit manufacturer's drawings and data sheets for material to be supplied under this Section. Indicate sizes and types to be installed.

### 1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During loading, transportation and unloading, exercise care to prevent damage to materials.

B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.

C. Storage: Should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanism. In outside storage, parts and flanges should be protected from the weather and foreign materials.

## PART 2 PRODUCTS

### 2.1 FIRE HYDRANTS

A. Fire hydrants shall be of the compression type with breakaway upper sections capable of ready replacement without loss in the event of traffic damage. Each hydrant shall have a 6" bottom inlet connection and valve opening at least 5-1/4 inches in diameter. Hydrants shall turn to the left (counter clockwise) to open. Each hydrant shall be fitted with one 4-1/2-inch pumper connection and two 2-1/2 inch hose connections, both having threads that conform to the Fire Division Standard for the area. Hose caps shall be chained to the hydrant barrel and fitted with nuts similar to the hydrant operating nuts. Each hydrant shall have a barrel of sufficient length to bring the bottom of the 6" pipe connection 3 feet below the surface of the finished ground. Each hydrant shall be made in at least two sections bolted together. All interior working parts of the hydrant shall be removable from the top of the hydrant to allow repairs without removing the hydrant barrel after it has been installed. Hydrants shall have renewable O-ring stem seals. Hydrant barrels shall be painted AWWA Safety Yellow. They shall be designed for a working pressure of 150 psi and will conform to AWWA Standard C502, "Fire Hydrants for Ordinary Water Works Service".

B. Hydrant shall have no drain parts. If parts exist, they shall be plugged with a threaded plug.

C. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.

D. Hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.

E. Hydrant guard posts (bollards) shall be 6-inch diameter Class 50 ductile iron pipe.

F. Acceptable models include:

1. Mueller Centurion A-423

2. Kennedy K-81A

3. American Darling LCU B84B

4. Clow Medallion

5. U. S. Pipe Metropolitan 250 Model 94

## PART 3 EXECUTION

### 3.1 INSTALLATION

A. Hydrants shall be set plumb and in true alignment with mains. They shall utilize concrete thrust blocks or restrained joints and Grade-Lok adapters. Backfilling around hydrants shall be carefully done so as not to disturb the hydrant and shall be thoroughly compacted so as to support the hydrant securely. The hydrants shall have between 18" and 24" clearance measured from finish grade to the center of pumper connection.

B. Hydrant guard posts (bollards) shall be 6 feet long, buried 3 feet below finished grade, filled with 2500 psi concrete and painted AWWA safety yellow as shown on the Town of Fort Myers Beach Details.

END OF SECTION

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SECTION 02650

LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified.

1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings.

2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.

3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.

4. Close off all lines with bulkheads when pipe laying is not in progress.

B. Related Work Specified in Other Sections Includes:

1. Section 02222 – Excavation - Earth and Rock

2. Section 02223 – Backfilling

3. Section 02610 – Polyvinyl Chloride (PVC) Gravity Sewer Pipe

4. Section 02611 – Buried Fiberglass Reinforced Plastic (FRP) Gravity Sewer Pipe

5. Section 02620 – High Density Polyethylene (HDPE) Pipe and Fittings

6. Section 02622 – Polyvinyl Chloride (PVC) Force Main Pipe

7. Section 02623 – Polyvinyl Chloride (PVC) Water Main Pipe

8. Section 02630 – Ductile Iron Pipe and Fittings

9. Section 02676 – Leakage Tests

10. Section 02675 – Disinfection

## 1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping

2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

3. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile

4. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800

5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges

6. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

7. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe With Threaded Flanges

8. ASTM E 165 - Practice for Liquid Penetrant Examination

9. ASTM E 709 - Practice for Magnetic Particle Examination

## 1.3 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:

B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.

C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.

1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.

2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating.

D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.

1. Under no condition pass the sling through the pipe.

2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.

3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.

E. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes.

F. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.

1. Obtain approval for the type of blocking and stakes, and the method of installation.

G. Storage for Gaskets: Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, or grease until installed.

1. Do not use any gaskets showing signs of checking, weathering or other deterioration.

2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

A. Repair of Sanitary Sewers and Services: Re-bed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.

1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.

2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.

3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

## PART 2 PRODUCTS

A. The materials allowed for buried sewer pipes are PVC, HDPE or fiberglass. Use of ductile iron pipe is not allowed for sewer construction without specific approval of The Town of Fort Myers Beach.

## PART 3 EXECUTION

### 3.1 PREPARATION

A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.

1. Where groundwater is encountered, make every effort to obtain a dry trench bottom.
2. If a dry trench bottom has not been obtained due to improper or insufficient use of all known methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or 2500 psi concrete over the trench bottom may be given.

3. If all efforts fail to obtain a stable dry trench bottom and it is determined that the trench bottom is unsuitable for pipe foundation, obtain an order, in writing, for the kind of stabilization to be constructed.

4. Perform trench excavation and backfill in accordance with Sections 02222 and 02223.

### 3.2 INSTALLATION

A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Where pipe deflections are used, do not exceed 80 percent of the maximum deflection limits shown in AWWA C600.

1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.

B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, ASTM D 2774 for thermoplastic pressure piping, and as modified or supplemented by the Specifications.

C. Pipe Laying - General:

1. For pipelines intended for gravity flow, begin pipeline laying at the low end of a run and proceed upgrade.

2. Carefully place each pipe and check for alignment and grade.

3. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.

4. Wedging or blocking up the pipe barrel is not permitted.

5. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.

6. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description.

7. Keep all lines absolutely clean during construction.

8. Lay pipelines accurately to line and grade.

9. During suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other material from entering the pipe.

D. Pipe Laying - Trenches:

1. Lay all pipelines in trench excavations as specified in Section 02223, concrete cradle or other foundations as shown, specified or ordered in writing.

2. Properly secure the pipe against movement and make the pipe joints in the excavation as required.

3. Carefully grade and compact pipe bedding.

4. Bell Holes:

a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

b. Thoroughly tamp bell holes full of select fill material following the making of each joint.

E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.

F. Ductile Iron Pipe Mechanical Joints:

1. Assembly: In making up mechanical joints, center the spigot in the bell.

   a. Thoroughly brush the surfaces with which the rubber gasket comes in contact with a wire brush just prior to assembly of the joint.

   b. Brush lubricant over the gasket just prior to installation.

   c. Place the gasket and gland in position, bolts inserted, and the nuts tightened finger-tight.

   d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly. Torque wrenches shall be set as specified in AWWA C111. Spanner type wrenches not loner than specified in AWWA C111 may be used with the permission of The Town of Fort Myers Beach.

   e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.

2. Torques: Apply the following range of bolt torques:

| Size Inches | Range of Torque - ft. lbs |
|---|---|
| 5/8 | 45 - 60 |
| 3/4 | 75 - 90 |
| 1 | 85 - 100 |
| 1-1/4 | 105 - 120 |

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

G. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.

   a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.

   b. Apply a thin film of lubricant to the inside surface of the gasket that will come in contact with the entering pipe.

c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.

d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.

2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.

a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.

b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.

3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 02630 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.

H. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.

1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.

I. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.

1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.

J. Concrete Encasement: Concrete encasement shall be constructed when:

1. A waterline crosses at a depth which provides less than 12 inches clear distance from sewer lines. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Encase the sewer main unless specifically approved by the Town of Fort Myers Beach.

2. A waterline running parallel to a sewer line shall be per the latest FDEP separation rules.

3. The Engineer has ordered the line encased.

4. The points of beginning and ending of pipe encasement shall be not more than 6 inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

K. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.

1. Satisfactorily reset any valve box which is moved from its original position, preventing the operation of the extension valve stem.

2. Replace any extension valve stem which has been damaged so that it can be operated.

L. Jacking:

1. General: Perform jacking as shown. After jacking is completed, seal the ends of the casing pipe with brick masonry.

a. Jacking Pit: Provide jacking pit of adequate length to provide room for the jacking frame, the jacking head, reaction block, the jacks, rig, and jacking pipe.

b. Construct the pit to be sufficiently wide to allow ample working space on each side of the jacking frame and sufficiently deep so that the invert of the pipe will be at the elevation desired for the completed line when placed on the guide frame.

c. Tightly sheet the pit and keep it dry at all times.

d. Provide adequate protective railings at the top of the pit at all times.

2. Jacking Frame: Design the jacking frame so that it applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.

3. Reaction Blocks: Adequately design the reaction blocks to carry the thrust of the jacks to the soil without excessive soil deflection in a manner which avoids any disturbance of adjacent structures or utilities.

4. Hydraulic Jacks: Use hydraulic jacks in the jacking operation, and take extreme care to hold the casing pipe to exact line and grade.

5. Advance Excavation: Advance excavation by augering.

6. Casing Pipe: Furnish steel casing pipe, unless otherwise specified, conforming to ASTM A 139 with wall thicknesses and pipe diameters shown on the Plans. Provide full penetration butt welded pipe joints.

7. Fill Material: Use fill material, consisting of 1-1/4 pounds of Bentonite per gallon of water, during jacking to fill any voids between the casing pipe and the earth.

M. Identification:

1. Identification Tape: For all types of pipe to be installed, 3-inch detectable marking tape, of appropriate color, shall be placed along the entire pipe length. In all cases, marking tape shall be installed 12 inches to 18 inches below the finished grade during backfill operations. All PVC pipe, PVC fittings, and identification tape shall be color-coded per standards outlined in the Utility Location and Coordinating Council's Uniform Color Code.

2. Locating Wire: A locating tracing wire shall also be installed with PVC, HDPE and fiberglass pipes and shall be a continuous No. 12 insulated copper tracing wire laid in the trench on top of the utility pipe and attached to the pipe at ten (10) foot intervals. This continuous tracing wire shall run along the entire pipe and be stubbed out at valves, pressure clean-outs and air release valves.

## 3.3 FIELD QUALITY CONTROL

A. Testing: Test pipelines in accordance with Section 02676.

1. Test valves in place, as far as practicable, and correct any defects in valves or connections.

B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.

1. Cut away any lumps or projections on the face of the spigot end or the shoulder.

2. Do not use any cracked, broken, or defective pieces in the work.

3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

## 3.4 CLEANING

A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.

B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

## 3.5 DISINFECTION

A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 02675.

END OF SECTION

SECTION 02675

DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Disinfection of all pipelines, tanks, structures, conduits and equipment which are to store, handle or carry potable water. Furnish all labor, water, chemicals and equipment, including taps, corporation stops, temporary pumps and other items necessary to perform the Work, except as otherwise specified.

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. AWWA C651 - Disinfecting Water Mains

2. AWWA C652 - Disinfection of Water-Storage Facilities

1.3 QUALITY ASSURANCE

A. Disinfection Standards: Disinfect in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment.

B. Chlorinated Water Disposal: Dispose of old highly chlorinated water in accordance with applicable regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WATER MAIN DISINFECTION

A. Following acceptable pressure testing, disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Advance notice of 24-hours shall be provided to the Town of Fort Myers Beach before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C601, "Disinfecting Water Main" and all appropriate approval agencies.

B. The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 12 hours or more of not less than 50 parts per million. Chlorine may be derived from Chlorine gas, or 70% (high test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C601 as proposed by the Contractor and approved by the Town of Fort Myers Beach. Proposals as to method must be made prior to commencement of the disinfection process.

C. Following contact with chlorine solution, the system shall be thoroughly flushed out. Samples shall then be taken using sterile containers obtained from the County Health Department. Samples shall be taken by the Contractor and delivered by him to the County Health Department or approved laboratory for analysis.

D. If samples do not demonstrate satisfactory results, the disinfection procedure shall be repeated until two series of satisfactory samples are obtained, the period between such series of samples to be a minimum of 24 hours.

3.1 DISINFECTION PROCEDURES FOR TANKS

A. Disinfect potable water storage tanks and equipment in accordance with AWWA C652, Method 2 or 3, using sodium hypochlorite.

1. In Method 2, spray method, spray the entire interior surface of the tank with chlorinated water containing 200 mg/l of available chlorine. After spraying, allow the tank to stand at least two hours before filling with fresh water.

B. After disinfection, allow the tanks and equipment to overflow until the chlorine residual is approximately 2 mg/l.

END OF SECTION

SECTION 02676

LEAKAGE TESTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Testing for any signs of leakage in all pipelines and structures required to be watertight.

1. Test gravity sewers and drain lines by low pressure air testing.

2. Test all other pipelines with water under the specified pressures.

B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.

1.2 PERFORMANCE REQUIREMENTS

A. Written Notification of Testing: Provide written notice when the work is ready for testing, and make the tests as soon thereafter as possible.

1. Personnel for reading meters, gauges, or other measuring devices, will be furnished.

2. Furnish all other labor, equipment, air, water and materials, including meters, gauges, smoke producers, blower, pumps, compressors, fuel, water, bulkheads and accessory equipment.

1.3 REFERENCES

A. Codes and standards referred to in this Section are:

1. AWWA C 600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

1.4 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Testing Report: Prior to placing the sewer system in service submit for review and approval a detailed bound report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.

1. Reference Sewer Line Data

a. For Low Pressure Air Testing

(1) The length and diameter of the section of line tested (MH to MH) including any laterals.

(2) A complete description of test procedures and methods, including:

(a) Trench backfilling and sewer cleaning status

(b) Type of plugs used and where

(c) Depth of sewer, and ground water pressure over sewer pipe

(d) Stabilization time period and air pressure

(e) Actual air test pressures used if ground water is present

(f) The allowed time by specifications

(g) The actual test time

(h) The air pressure at beginning and end of test

(3) The name of the inspector/tester and the date(s) and time(s) of all testing, including any retesting.

(4) A description of any repairs made.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.1 LEAKAGE TESTING

A. All new sewer and water pipelines installed shall be tested for leakage. The test used will be Hydrostatic Testing for pressure lines and Low Pressure Air Testing for gravity lines. Tests to be performed will be indicated by the Town of Fort Myers Beach and witnessed by the Engineer and Town of Fort Myers Beach representatives.

1. Flushing

   a. All mains shall be flushed to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 4 fps. Flushing shall be terminated at the direction of the Town of Fort Myers Beach. Dispose of the flushing water without causing a nuisance or property damage.

   b. Temporary flush out connections shall be installed on all dead end water mains at the locations shown on the Drawings and in accordance with the detail.

2. Hydrostatic Testing

   Perform hydrostatic testing of the system as set forth in the following, and shall conduct said tests in the presence of representatives from the Town of Fort Myers Beach and other authorized agencies, with 48 hours advance notice provided.

   Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the Town of Fort Myers Beach. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

   Hydrostatic testing shall be performed with a sustained pressure for a minimum of two (2) hours at 150 psi pressure. Testing shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standard C600. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{133{,}200}$$

   Where,

   L = Allowable leakage in gallons per hour;

   S = Length of pipe tested in feet;

   D = Nominal diameter of the pipe in inches;

   P = Average test pressure maintained during the leakage test in pounds per square inch

$$\text{For 150 psi, } L = (9.195 \times 10^{-5})\,SD$$

The testing procedure shall include the continued application of the specified pressure to the test system, for the one hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

Should the test fail, necessary repairs shall be accomplished by the Contractor and the test repeated until results are within the established limits. The Contractor shall furnish the necessary labor, water, pumps, and gauges at specified location(s) and all other items required to conduct the required testing and perform necessary repairs.

General. All sanitary sewers and associated service lines shall be constructed watertight to prevent infiltration and/or exfiltration. All new sanitary sewer systems will be subject to low pressure air testing.

3. Low Pressure Air Test

After completing backfill of a section of gravity sewer line, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the below stated equipment, according to state procedures and under the supervision of the Town of Fort Myers Beach and in the presence of a Town of Fort Myers Beach representative, with 48-hours advanced notice provided.

a. Equipment:

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

2. Pneumatic plugs shall resist internal bracing or blocking.

3. All air used shall pass through a single control panel.

4. Three individual hoses shall be used for the following connections:

a. From control panel to pneumatic plugs for inflation.

b. From control panel to sealed line for introducing the low pressure air.

c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

b. Procedures:

All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole to manhole reach of pipe has been backfilled and cleaned and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psi. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psi greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable", if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) is greater than the time shown for the given diameters in the following table:

| Pipe Diameter In Inches | Minutes |
|---|---|
| 8 | 4.0 |
| 10 | 5.0 |
| 12 | 5.5 |
| 16 | 7.5 |
| 18 | 8.5 |
| 24 | 11.5 |

Time in minutes = 0.472 D
D = Diameter of pipe in inches.

In areas where ground water is known to exist, the Contractor shall install capped pipe adjacent to the top of one of the sewer lines. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, and a measurement of the height in feet of water over the invert of the pipe shall be taken. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psi. This

increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same).

If the installation fails to meet this requirement, the Contractor shall, at his own expense, determine the source of leakage. He shall then repair or replace all defective materials and/or workmanship.

## 3.2 LEAKAGE TESTS FOR STRUCTURES

A. Structure Leakage Testing: Perform leakage tests of wet wells, tanks, vaults and similar purpose structures before backfilling, by filling the structure with water to the overflow water level and observing the water surface level for the following 24 hours.

1. Make an inspection for leakage of the exterior surface of the structure, especially in areas around construction joints.

2. Leakage will be accepted as within the allowable limits for structures from which there are no visible leaks.

3. If visible leaks appear, repair the structure by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other methods approved.

4. Water for testing will be provided by the Town of Fort Myers Beach at the Contractor’s expense.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Provide concrete formwork for architectural concrete and structural concrete as specified to form concrete to profiles shown.

1. Architectural concrete is defined as concrete for the following exposed reinforced concrete surfaces:

a. Interior walls

b. Exterior walls to 6 inches below finish grade

c. Interior tank walls to 6 inches below normal operating water level

d. Beams

e. Columns

f. Undersides of floor slabs, roof slabs and stairs

2. Provide concrete with smooth rubbed finish.

3. Structural concrete is defined as all concrete that is not architectural concrete.

B. Related Work Specified in Other Sections Includes:

1. Section 03200 - Concrete Reinforcement

2. Section 03250 - Concrete Accessories

3. Section 03310 - Cast-In-Place Concrete

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ACI 318 - Building Code Requirements for Reinforced Concrete

2. ACI SP-4 - Formwork for Concrete

3. ACI 303R - Guide to Cast-in-Place Architectural Concrete

## 1.3 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

1. Contractor's Shop Drawings: Proposed form layout drawings and tie pattern layout drawings for Concrete. Review of these drawings does not relieve the Contractor of responsibility for adequately designing and constructing forms.

2. Samples: Pieces of each type of sheeting, chamfer strips, form ties, form liners and rustication strips

## 1.4 QUALITY ASSURANCE

A. Formwork Compliance: Use formwork complying with ACI SP-4, ACI 347 and ACI 303R.

B. Mock-Up Erection: Erect, on the site where directed, a full size mock-up of a cast-in-place wall or panel a minimum of 10 feet by 10 feet by 12 inches thick as shown. Conform mock-up to requirements of ACI 303R.

1. Reinforce the panel as shown. Use form ties the same as those approved and with the form tie pattern similar to that approved. Use one face of the panel for smooth architectural concrete including "reveal" rustication with form joints, and the opposite face for form liner concrete.

2. Plug the tie holes as specified to determine the correct mortar mixture to match the panel color. If required, remove and replace tie hole plugging mortar until an acceptable color match is obtained. After the sample panels have been approved, intentionally damage and patch portions of the finish surface of the panels for the purpose of determining the correct mixture for patching mortar and patching technique to match the original panel color and surface.

3. Leave the approved mock-up on the job during construction as the standard of workmanship for the project. Remove mock-up from the premises after completion of the work.

# PART 2 PRODUCTS

## 2.1 MANUFACTURER

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Release Agent - Magic Kote VOC by Symons Corporation

2. Form coating - A.C. Horn Corporation, Brooklyn, NY

3. Form liners - Dura-Tex by Symons Corporation, Des Plaines, IL

4. Rustications - Symons Corporation, Des Plaines, IL

2.2 MATERIALS

A. Structural Concrete: Provide structural concrete form materials as follows:

1. Obtain approval for form material before construction of the forms.

2. Use a barrier type form release agent.

3. Use form ties, hangers, and clamps of such type that, after removal of the forms, no metal will be closer than one inch from concrete surface. Wire ties will not be permitted.

4. Provide ties with swaged washers or other suitable devices to prevent seepage of moisture along the ties. Leave the ties in place.

5. Use lugs, cones, washers, or other devices which do not leave holes or depressions greater than 7/8-inch in diameter.

B. Architectural Concrete: Provide architectural concrete form materials as follows:

1. Construct forms using 3/4-inch thick, High Density Overlay (HDO) Plyform, Class 1 or 2, meeting the requirements of the American Plywood Association. Use surfacing materials having a minimum weight of 60-60.

2. Use form coating, and use thinner as recommended by manufacturer of the form coating, to coat cut or raw edges.

3. Use she-bolts with water seals for form ties.

4. Use form liners having one inch deep relief, elastomeric Dura-Tex in a fractured rib pattern to match existing. Furnish form liners in full height lengths with no horizontal joints, except where shown. Use wood for forms to be used with form liners.

5. Use elastomeric vertical "V-groove" rustications in the concrete bands and the horizontal rustication joints shown in the form liner concrete of the profile shown.

6. Use a barrier type VOC compliant form release agent.

## PART 3 EXECUTION

### 3.1 DESIGN

A. Design Responsibility: Be responsible for the design, engineering and construction of the architectural concrete formwork and the structural concrete formwork. Conform the work to the recommendations of ACI SP-4 and ACI 303R.

B. Setting Time and Slag Use: The presence of fly ash or ground granulated blast furnace slag in the concrete mix for architectural concrete and structural concrete will delay the setting time. Take this into consideration in the design and removal of the forms.

C. Responsibility During Placement: Assume and take sole responsibility for adequate design of all form elements for support of the wet concrete mixtures specified and delivered.

D. Consistency: Design forms to produce concrete members identical in shape, lines and dimensions to members shown.

### 3.2 CONSTRUCTION DETAILS FOR FORMWORK

A. Structural Concrete Details: Follow the following details for all structural concrete:

1. Provide forms which are substantial, properly braced, and tied together to maintain position and shape and to resist all pressures to which they may be subjected. Make forms sufficiently tight to prevent leakage of concrete.

2. Determine the size and spacing of studs and wales by the nature of the work and the height to which concrete is placed. Make forms adequate to produce true, smooth surfaces with not more than 1/8-inch variation in either direction from a geometrical plane. Provide horizontal joints which are level, and vertical joints which are plumb.

3. Supply forms for repeated use in sufficient number to ensure the required rate of progress.

4. Thoroughly clean all forms before reuse and inspect forms immediately before concrete is placed. Remove deformed, broken, or defective forms from the work.

5. Provide temporary openings in forms at convenient locations to facilitate cleaning and inspection.

6. Coat the entire inside surfaces of forms with a suitable form release agent just prior to placing concrete. Form release agent is not permitted on the reinforcing steel.

7. Assume and take responsibility for the adequacy of all forms and remedying any defects resulting from their use.

B. Architectural Concrete Details: Follow the following details for all Architectural Concrete:

1. Conform all construction details for formwork to "Construction Details for Formwork," subsections A1, A2, A3, A4, A6 and A7 and the requirements of this section.

2. Thoroughly clean and lightly recoat HDO plywood panels before each additional use. Do not use forms more than three times.

3. Install form liners and rustication strips in strict accordance with the manufacturer's written instructions and recommendations. Clog the ends of the form liner pattern and tape all form joints and edges using 1/8-inch thick by 3/4-inch wide foam tape centered on the joints, then caulk in accordance with the manufacturer's recommendations each time forms are set. Have a representative of the manufacturer present at the site to supervise the installation of the form liner for the entire project.

4. Install forms for smooth concrete in such a manner that there will be no horizontal form joints, and align the forms so that vertical joints occur only at "V-Groove" rustications. Space form ties in a uniform pattern vertically and horizontally. Position form ties in smooth concrete bands and in panels between "reveal" rustications, if any.

5. Erect beam and girder soffits with a camber of 1/2-inch in 20 feet and sufficiently braced, shored, and wedged to prevent deflection. Clamp column sides in accordance with this specification with metal column clamps, spaced according to the manufacturer's directions.

6. Provide external angles of walls, beams, pilasters, columns, window openings and girders with 3/4-inch bevel strips.

7. Give surfaces of concrete panel forms one thinned coat of form film.

8. Apply the release agent in strict accordance with the manufacturer's instructions.

## 3.3 FORM REMOVAL

A. Structural Concrete Form Removal: Do not remove forms for structural concrete until the concrete has hardened sufficiently to support its own load safely, plus any superimposed load that might be placed thereon. Leave the forms in place for the minimum length of time indicated below or until the concrete has reached the minimum strength indicated as determined by testing, whichever time is reached first.

1. The times indicated represent cumulative days or hours, not necessarily consecutive, during which the air surrounding the concrete is above 50 degrees F. These times may be decreased if re-shores are installed.

| | | Minimum Time | Minimum Strength (psi) |
|---|---|---|---|
| a. | Columns | 12 hrs. | 1300 |
| b. | Columns | 12 hrs. | 1300 |
| c. | Side forms for girders and beams | 12 hrs. | 1300 |
| d. | Walls | 12 hrs. | 1300 |
| e. | Bottom forms of slabs | | |
| | Under 10 feet clear span | 4 days | 2300 |
| | 10 to 20 feet clear span | 7 days | 2700 |
| | Over 20 feet clear span | 10 days | 2900 |
| f. | Bottom forms of beams and girders | | |
| | Under 10 feet clear span | 7 days | 2700 |
| | 10 to 20 feet clear span | 14 days | 3000 |
| | Over 20 feet clear span | 21 days | 3500 |

2. Increase form removal times as required if concrete temperature following placement is permitted to drop below 50 degrees F or if fly ash or ground granulated blast furnace slag is used in the concrete mix.

3. Withdraw the removable portion of form ties from the concrete immediately after the forms are removed. Clean and fill holes left by such ties with grout as specified in Cast-In-Place Concrete, Subsection Structural Concrete Surfaces.

4. Plug-tie holes flush with the surface using Portland cement mortar. Prewet-tie holes with clean water and apply a neat cement slurry bond coat. Densely tamp mortar of a dry-tamp consistency into the tie holes exercising care so as not to smear mortar onto the finished concrete surface. Include

sufficient white cement in the mortar mix to cause the plugged holes to blend in with the adjacent surfaces. Make sample patches with different mixes to assure that this requirement is met.

B. Architectural Concrete Form Removal: Remove forms for architectural concrete in accordance with the above subsection 3.3 A, except that do not remove forms for vertical surfaces sooner than 12 hours nor longer than 36 hours after placement of concrete.

3.4 RESHORING

A. Re-shoring Method: Develop a system for re-shoring and early removal of forms, in the event early stripping of forms becomes necessary. Include details and schedules in this system for each element which is to be re-shored.

B. Construction Load Support: Do not support construction loads upon any un-shored portion of the structure exceeding the structural design loads.

3.5 TOLERANCES

A. Tolerance Limits: Design, construct and maintain concrete form and place the concrete to provide completed concrete work within the tolerance limits set forth in ACI SP-4.

3.6 SURVEY OF FORMWORK

A. Field Survey: Employ an Engineer or surveyor to check by instrument survey the lines and levels of the completed formwork before concrete is placed and make whatever corrections or adjustment to the formwork are necessary to correct deviations from the specified tolerances.

B. Placement Surveying Requirements: Check formwork during the placement of the concrete to verify that the forms, braces, tie rods, clamps anchor bolts, conduits, piping, and the like, have not been knocked out of the established line, level or cross section by concrete placement or equipment.

END OF SECTION

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SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for providing concrete reinforcement as shown and specified herein. Reinforcement includes all steel bars, wire and welded wire fabric as shown and specified.

B. Related Work Specified in Other Sections Includes:

1. Section 03100 - Concrete Formwork
2. Section 03310 - Cast-In-Place Concrete
3. Section 03410 - Precast Concrete Structures

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

| | | | |
|---|---|---|---|
| 1. | ACI SP66 | - | ACI Detailing Manual |
| 2. | ACI 318 | - | Latest edition "Building Code Requirements for Reinforced Concrete" |
| 3. | ASTM A 185 | - | Steel Welded Wire Fabric, Plain, for Concrete Reinforcement |
| 4. | ASTM A 615/A615M | - | Deformed and Plains Billet-Steel Bars for Concrete |
| 5. | ASTM A 706/A706M | - | Low Alloy Steel Deformed Bars for Concrete Reinforcement |
| 6. | ASTM A 775/A775M | - | Epoxy Coated Reinforcing Steel Bars |
| 7. | AWS D1.4 | - | Structural Welding Code - Reinforcing Steel |

1.3 SUBMITTALS

A. Provide all submittals, including the following, as specified in Division 1.

1. Product Data and Information: Submit manufacturers literature with product data, and material description of fusion bonded epoxy coating for reinforcement and reinforcement accessories, including manufacturer's

recommendations for field touch-up of mars and cut ends when epoxy coated reinforcement is specified to be used.

2. Contractor's Shop Drawings: Submit checked Working Drawings, including bar lists, schedules, bending details, placing details and placing plans and elevations for fabrication and placing reinforcing steel conforming to "ACI Detailing Manual - 88".

    a. Do not bill wall and slab reinforcing in sections. Show complete elevations of all walls and complete plans of all slabs, except that, when more than one wall or slab are identical, only one such elevation or plan is required. These plans and elevations need not be true views of the walls or slabs shown. Bill every reinforcing bar in a slab on a plan. Bill every reinforcing bar in a wall on an elevation. Take sections to clarify the arrangement of the steel reinforcement. Identify all bars, but do not bill on such sections.

    b. For all reinforcing bars, unless the location of a bar is clear, give the location of such bar or bars by a dimension to some structural feature which will be readily distinguishable at the time bars are placed.

    c. Make the reinforcing steel placing drawings complete for placing reinforcement including the location of support bars and chairs, without reference to the design drawings.

    d. Submit Detailer certification that every reinforcing steel placing drawing and bar list is completely checked and corrected before submittal for approval.

    e. If, after reinforcing steel placing drawings and bar lists have been submitted for approval, a review reveals that the drawings and lists obviously have not been checked and corrected they will be returned for checking and correcting by the Detailer.

3. Samples: Submit the following samples when epoxy coated reinforcement is specified to be used.

    a. 12-inch long epoxy-coated steel reinforcing bar, of any size typical to this Project

    b. One of each type of epoxy-coated reinforcement accessory used on this Project

    c. 12-inch long, nylon coated tie wire

4. Certificates: Test certificates of the chemical and physical properties covering each shipment of reinforcing steel bars.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)

1. Delivery Requirements: Have reinforcing steel delivered to the work in strongly tied bundles. Identify each group of both bent and straight bars with a metal tag giving the identifying number corresponding to the reinforcing steel placing drawings and bar lists.

2. Storage: Properly store all bars in an orderly manner, with all bars completely off the ground. Keep bars clean after delivery to the site of the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Mechanical connections

a. Dowel Bar Splicer/Dowel-In System and Coupler Splice System of the Richmond Screw Anchor System

b. Cadweld Rebar Splice by Erico Products Inc.

c. Bar Grip Splice by Barsplice Products Inc.

2.2 MATERIALS

A. Steel Bars: Use new billet steel bars, deformed bars, meeting the requirements of ASTM A 615/A625M Grade 60 for reinforcing steel bars.

1. Roll all reinforcing steel bars with special deformations or identifying marks indicating the ASTM Specification and Grade.

2. Use bars free from defects, kinks and from bends that cannot be readily and fully straightened in the field.

3. Supply reinforcing bars in lengths which will allow convenient placement in the work and provide the required lap of joints as shown. Provide dowels of

proper length, size and shape for tying walls, beams, floors, and the like together.

B. Epoxy Coating: Conform fusion bonded epoxy coated reinforcing steel bars to ASTM A 775/A775M when used. Leave portions of the reinforcing steel bars uncoated where mechanical connections are shown.

C. Welded Wire Fabric: Use welded wire fabric of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and meeting the requirements of ASTM A 185.

D. Supports and Accessories: Provide bar supports and other accessories and, if necessary, additional supports to hold bars in proper position while concrete is being placed.

1. Use side form spacers against vertical or sloping forms to maintain prescribed side cover and cross position of bars.

2. Use individual hi-chairs with welded cross ties or circular hoops to support top bars in slabs thicker than 8 inches.

3. Bolsters, chairs and other accessories:

a. Use hot-dipped galvanized or provide plastic coated legs when in contact with forms for surfaces of concrete other than architectural surfaces.

b. Use stainless steel when in contact with forms for architecturally exposed surfaces.

c. Use epoxy coated bolsters, chairs and accessories including wire ties for epoxy coated reinforcing bars.

d. Use chairs of an approved type and space them properly to support and hold reinforcing bars in position in all beams and slabs including slabs placed directly on the subgrade or work mat. Do not use continuous hi-chairs for supporting of top bars in slabs over 8 inches in thickness.

E. Mechanical Connections: Provide mechanical connections that develop at least 125 percent of the specified yield strength of the bar in tension.

F. Stirrups and Ties: Provide stirrups and ties as shown and specified and meeting the requirements of ASTM A 185.

## 2.3 FABRICATION

A. Drawing Review Prior to Fabrication: Do not fabricate any material before final review and approval of shop drawings.

B. Bending and Cutting: Cut bars to required length and bend accurately before placing. Bend bars in the shop unless written approval for field bending is obtained. If field bending is permitted, do it only when the air temperature, where the bending operation is performed, is above 30 degrees F. Do not field bend bars which have been partially embedded in concrete.

C. Splices: Use lapped splices for tension and compression splices unless otherwise noted.

D. Cleaning: Clean and bend reinforcement in accordance with ACI 315 and ACI 318.

# PART 3 EXECUTION

## 3.1 INSTALLATION

A. Placement: Place all bars in accordance with CRSI "Recommended Practice for Placing Reinforcing Bars".

B. Tolerances: Place bars used for top reinforcement in slabs to a vertical tolerance of plus or minus 1/4-inch. Place all other reinforcement to the tolerances given to ACI 318.

C. Cleaning: Have reinforcing steel delivered without rust other than that accumulated during transportation to the work. At all times, fully protect reinforcing steel from moisture, grease, dirt, mortar and concrete. Before being placed in position, thoroughly clean reinforcing steel of all loose mill scale and rust and of any dirt, oil, grease coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, inspect and satisfactorily clean the steel immediately before the concrete is placed.

D. Bar Positioning: Place bars in the exact positions shown with the required spacing and cross wire bars securely in position at intersections to prevent displacement during the placing of the concrete. Fasten the bars with annealed wire of not less than 17 gauge or other approved devices.

E. Bar Extension Beyond Formwork: On any section of the work where horizontal bars extend beyond the length of the forms, perforate the form or head against which the work ends or at the proper places to allow the bars to project through a distance at least equal to the lap specified.

F. Unacceptable Materials: Do not place reinforcing steel with damaged, unsuitably bonded epoxy-coating or rusting. If approved, mars, exposed threads of mechanical connections and cut ends may be field coated with approved epoxy coating material.

G. Review of Placement: Have reinforcing placement reviewed by the Town of Fort Myers Beach before concrete is placed.

H. Welding - Not Approved: Do not use reinforcing bar assemblies made by welding of any kind, or accessories of any kind which require field welding to reinforcing bars.

I. Welding - Approved: Where welding of reinforcing steel is shown, AWS D1.4 "Structural Welding Code - Reinforcing Steel" applies.

J. Tension and Compression Lap Splices: Conform tension and compression lap splices to ACI 318 with all supplements. Avoid splices at points of maximum tensile stress wherever possible. Provide temperature bars with the clear spacing shown. Stagger all bar splices in hoop tension bars in circular tanks with not more than 50 percent of the bars spliced in any one direction. Have welded splices made by certified welders in accordance with AWS D1.4.

K. Welded Wire Fabric: Place welded wire fabric in the positions shown, specified or required to fit the work. Furnish and place suitable spacing chairs or supports, as specified for bars, to maintain the fabric in the correct location. Where a flat surface of fabric is required, provide flat sheets, when available. Otherwise reverse roll the fabric or otherwise straighten to make a perfectly flat surface before placing. Obtain approval for the length of laps not indicated.

L. Concrete Cover: Place reinforcing steel and welded wire fabric and hold in position so that the concrete cover, as measured from the surface of the bar or wire to the surface of the concrete, is as shown or specified.

END OF SECTION

SECTION 03250

CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for providing concrete accessories shown and specified herein such as waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.

B. Products Installed: Waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.

C. Related Work Specified in Other Sections Includes:

1. Section 03100 - Concrete Formwork

2. Section 03200 - Concrete Reinforcement

3. Section 03310 - Cast-in-Place Concrete

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. AASHTO - Standard Specifications for Highway Bridges

2. ASTM A 240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels

3. ASTM A 536 - Standard Specifications for Ductile-Iron Castings

4. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension

5. ASTM D 3545 - Test Methods for Alcohol Content and Purity of Acetate esters by Gas Chromatography

6. ASTM D 3575 - Test Methods for Flexible Cellular Materials Made From Olefin Polymers

7. CRD-C513 - Specifications for Rubber Waterstops

8. CRD-C572 - Specifications for Polyvinyl Chloride Waterstop

9. Fed. Spec.
TT-S-00227 - Sealing Compound, Elastomeric Type, Multicomponent (for Calking, Sealing, and Glazing in Buildings and Other Structures)

10. Fed. Spec.
TT-S-00230 - Sealing Compound, Elastomeric Type, Single Component (for Calking, Sealing, and Glazing in Buildings and Other Structures)

1.3 SUBMITTALS

A. General: Provide all Work related submittals, including the following, as specified in Division 1.

B. Product Data and Information:

1. Manufacturer's Data and Specifications: Submit printed manufacturer's data and specifications for each item used on this project.

2. Samples: Provide one sample of each item used.

3. Joint Sealant and Preformed Joint Seal: Indicate special procedures, surface preparation and perimeter conditions requiring special attention. All products in contact with potable water, shall be "NSF Standard 61" certified. Submit certified material records indicating approval for use with potable water.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

1. Joint Filler
   a. Sonoflex F Foam by Sonneborn Building Products
   b. PVC Joint Filler No. 327 by A.C. Horn

2. Sealant Backup Material
   a. Sealtight Backer Rod
   b. Sonofoam Backer Rod

3. Preformed Joint Seal
   a. Evazote 380, ESF by Epoxy Industries

4. Wedge Inserts
   a. Type F-7 by Dayton Superior, Miamisburg, OH

5. Dovetail Anchor
   a. A.A. Wire Products Co.
   b. Dur-O-Wal Inc.

6. Flashing Reglets
   a. Standard reglets by Beehive Anchoring System

2.2 MATERIALS

A. Extruded Waterstops: Provide waterstops made of extruded polyvinyl chloride unless otherwise shown or specified.

1. Do not use any reclaimed plastic material in their manufacture.

2. Provide plastic waterstops meeting the requirements of CRD-C572, except as modified herein. Provide a Shore A/10 durometer hardness between 73 and 79, the tensile strength not less than 1850 psi, and specific gravity not more than 1.38.

3. Unless otherwise shown, use waterstops for construction joints which are flat, at least 6 inches wide, and not less than 3/8-inch thick at the thinnest section. Provide these waterstops with ribbed longitudinal strips.

4. Unless otherwise shown, provide waterstops for expansion joints at least 9 inches wide and not less than 1/4-inch thick at the narrowest point and not less than 3/8-inch thick immediately adjacent to the center of the waterstop. Provide the waterstop with ribbed longitudinal strips with a 3/4-inch inside diameter hollow bulb center. Limit joint movement to 1/4-inch under a tensile force of not more than 500 pounds per lineal inch.

B. Stainless Steel Waterstops: Provide stainless steel waterstops where shown or specified.

1. Fabricate stainless steel waterstops from ASTM A 240 Type 316, 20 gauge stainless steel, conforming to the dimensions and profiles shown.

2. Prefabricate and miter corners and intersections for all stainless steel waterstops. Make only butt joints in the field.

C. Rubber Waterstops: Provide rubber water stops where shown or specified.

1. Provide rubber water stops of either the molded or extruded type, fabricated from a high grade tread type compound, either SBR or natural rubber, conforming to CRD-C513.

2. Provide water stops for construction joints at least 6 inches wide and 3/8-inch thick and with solid end bulbs 3/4-inch in diameter.

3. Provide water stops for expansion joints 9 inches wide and 3/8-inch thick and with solid end bulbs 1-inch in diameter and a hollow center bulb 1-1/2 inches in diameter with a 3/4-inch diameter center cavity.

D. Expansion Joint Filler: Use joint filler for all expansion joints.

1. Provide a closed cell polyethylene or PVC joint filler of the thickness shown.

E. Joint Sealant Requirements: Finish expansion joints with a joint sealant where shown or specified.

1. Joint sealant materials may be either a single component urethane compound meeting the requirements of Fed. Spec. TT-S-00230C, or a 2-component urethane compound meeting the requirements of Fed. Spec. TT-S-00227E, except as modified in this specification.

2. Provide the urethane sealant of 100 percent polymer, non-extended, containing no solvent, lime, or coal tar. Color as selected by the Town of Fort Myers Beach, but not black. Conform sealant properties to the following:

| | Property | Value | Test Method |
|---|---|---|---|
| a. | Maximum final cure | 3 days | -- |
| b. | Minimum tensile strength | 140 to 200 psi | ASTM D 412 |
| c. | Minimum elongation | 400% | ASTM D 412 |
| d. | Modulus at 100% elongation | 40-60 psi | ASTM D 412 |
| e. | Shore A hardness | 25-40 | ASTM D 2240 |

| | Property | Value | Test Method |
|---|---|---|---|
| f. | Solid content | 98-100% | -- |
| g. | Peel strength | 20-40 lb/in. | Fed. Spec. TT-S-00230C<br>Fed. Spec. TT-S-00227E |
| h. | Minimum recovery | 80-90% | Fed. Spec. TT-S-00230C<br>Fed. Spec. TT-S-00227E |
| i. | Initial tack-free cure | 24-48 hrs. | Fed. Spec. TT-S-00230C<br>Fed. Spec. TT-S-00227E |

3. Provide primer as recommended by the manufacturer of the sealant, subject to approval.

4. Provide fillers and backup materials in contact with sealant which are nonimpregnated and free from asphalt, creosote, oil or extractable plasticizers. Use a backup material of a closed cell polyethylene foam rod with a diameter 1/4-inch larger than the joint width.

F. Preformed Joint Seal: Provide a preformed joint seal where shown or specified.

1. Provide joint material which is resilient, non-extrudable, impermeable, closed-cell, cross-linked, ethylene vinyl acetate, low density, polyethylene copolymer, nitrogen blown material which is ultraviolet light, weather and wear resistant, and which is concrete beige in color.

2. Conform material properties with the following:

| | Property | Value | Test Method |
|---|---|---|---|
| a. | Density, pcf | 2.8 to 3.4 | ASTM D 3575 Suffix: W, Method A |
| b. | Water Absorption total immersion 3 months | 0.02% by volume | ASTM D 3575 Suffix: L |
| c. | Tensile Strength | 125 psi | ASTM D 3575 Suffix: T |
| d. | Elongation before breaking | 255% | ASTM D 3575 Suffix: T |
| e. | Working Temperature | -94 to 160 F | -- |

G. Neoprene Pads: Use neoprene pads as shown or required where slabs or beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.

1. Use neoprene pads of a structural grade meeting the requirements of Section 25, Division 2 of the AASHTO Standard Specifications for Highway Bridges.

2. Do not use neoprene pads thinner than 1/4-inch.

H. Wedge Inserts: Make wedge inserts for 5/8-inch and 3/4-inch bolts of ductile iron conforming to ASTM A 536.

I. Dovetail Anchors: Provide dovetail anchors of one of the following types:

1. Dovetail anchors having a 3/16-inch by 1-inch by 1/2-inch stainless steel dovetail section with 3/16-inch diameter stainless steel wire.

2. Dovetail anchor slots of 24 gauge galvanized steel 1-inch by 1-inch by 5/8-inch throat. Fill anchor slots.

J. Flashing Reglets: Provide flashing reglets of 24 gauge galvanized steel foam filled reglets.

## PART 3 EXECUTION

### 3.1 INSTALLING OF WATERSTOPS

A. Assembly of Extruded Waterstops: Prefabricate corners and intersections for all waterstops. Make only butt joints in the field. Miter and assemble corners and intersections with approved equipment, as described for field joints.

1. Make field joints by cutting the ends of the sections to be spliced so they will form a smooth even butt joint. Heat the cut ends with the splicing tool until the plastic melts. Press the two ends together until the plastic cools. Do splicing in a way that limits damage to the continuity of the ribbed strips.

2. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

B. Prefabricated Stainless Steel Waterstops: Prefabricate corners and intersections for all stainless steel waterstops. Make only butt joints in the field. Miter and weld corners and intersections.

1. Provide field joints having a nominal 1-inch lap joint, with the exposed edge welded or brazed on each side.

2. Make field joints with PVC waterstops as shown.

3. At expansion joints, seal the base of the expansion section of the waterstop with at least one layer of 2-inch wide duct tape.

4. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

C. Splices: Use splices made in the manufacturer's plant where possible for rubber waterstops.

1. Use a preformed rubber union or fitting and splicing cement as recommended by the manufacturer when splices are made.

2. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.

D. Joint Filler Placement: Place joint filler for expansion joints against the completed portion of the work before the concrete for the next section is placed.

1. Fasten the filler to the hardened concrete with a compatible adhesive in accordance with manufacturer's instructions. Extend the filler through the thickness of the wall or slab and make it flush with the finished surface, except where a preformed joint seal or joint sealant is shown.

2. In joints having a waterstop, fit the filler accurately on each side of the waterstop to prevent the intrusion of concrete.

E. Preparation of 2-Component Sealants: Mix 2-component joint sealant using a slotted paddle and slow speed mixer for 5 to 8 minutes, continually working paddle from top to bottom until the sealant color is uniform. Scrape down the side of the container and paddle blade several times during the mixing operation to ensure uniform mixing.

1. Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, waterproofing compounds or form release materials prior to the application of primer and sealant.

2. Prime all concrete joint surfaces and all surfaces exposed to water prior to sealing, with no exceptions. Prime all other surfaces as recommended by the manufacturer of the sealant. Provide the prime as recommended by the manufacturer of the sealant, subject to approval. Apply the primer by either brushing or spraying on the joint surfaces. Apply and install the sealant within 2 to 24 hours after the application of primer.

3. For horizontal joints, install the sealant by pouring directly from a suitable shaped can or by flowing from a bulk-loading gun.

4. Fill vertical joints from a gun, starting from the bottom, to avoid bridging and the formation of air voids.

5. Fill overhead joints from a gun, by laying a bead along each side of the joint and then filling the middle. Immediately after installation, tool in the sealant in order to establish firm contact with joint surfaces and to provide a smooth sealant surface. Tool in accordance with the manufacturer's instructions.

6. Control joint depth with the use of joint fillers and backup materials. Make joint widths and sealant depths as shown. Do not exceed 1/2-inch for sealant depth.

F. Preformed Joint Seal Surface Preparation: Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, water-proofing compounds or form release materials.

1. Blast clean or saw cut all existing concrete surfaces to expose a clean bare concrete surface. Allow new concrete to be well cured, and attain a minimum of 80 percent of the specified strength before installing sealant.

2. Apply bonding adhesive, as recommended by the manufacturer to the concrete surfaces in strict compliance with the manufacturer's recommendations. Install the joint material under a compression of 25 percent and in one continuous operation, in accordance with manufacturer's recommendations. Do all splices and directional changes using heat welding method as recommended by the manufacturer.

G. Unbonded Joints: Use unbonded horizontal joints as shown or required where slabs of beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.

1. Prevent bonding by use of structural grade neoprene pads placed over the bearing surface of the footing, wall or other supporting part of the structure so as to isolate it from the new concrete being placed.

H. Encasing Inserts: Encase wedge inserts, flashing reglets and dovetail anchor slots in the concrete as shown. Take special care to place and maintain them to the proper lines and grades and to compact concrete thoroughly around them to prevent the passage of water. Set these items before placing concrete and thoroughly brace them to prevent movement during the progress of the work. Provide dovetail anchor slots spaced not more than 16 inches apart for all concrete walls faced with masonry.

END OF SECTION

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SECTION 03410

PRECAST CONCRETE STRUCTURES

## PART 1 GENERAL

### 1.1 SCOPE OF WORK

A. Furnish all materials, labor, and equipment and construct manholes, wet wells, valve pits, meter pits, and accessory items, consisting of precast sections as shown on the Drawings and as specified herein.

B. The forms, dimensions, concrete, and construction methods shall be approved by the Town of Fort Myers Beach in advance of construction.

C. These specifications are intended to give a general description of what is required, but do not purport to cover all of the structural design details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, shop testing, delivery, and complete installation of all precast structures whether specifically mentioned in these specifications or not.

D. The supplier of the precast manholes, wet wells, valve pits, meter pits, and accessory items shall coordinate his work with that of the Contractor to the end that the unit will be delivered and installed in the excavation provided by the Contractor, in accordance with the Contractor's construction schedule.

E. Coordinate the precast structures fabrication with the equipment supplied to achieve the proper structural top slab openings, spacings, and related dimensions for the selected equipment frames and covers. The top slabs, frames, covers, and subsurface structures shall be capable of supporting a live load of 150 pounds per square foot.

### 1.2 SUBMITTALS

A. Submit to the Town of Fort Myers Beach, as provided in the General Conditions, shop drawings showing details of construction, reinforcing and joints.

B. Shop Drawings

1. Content

a. Dimensions and finishes
b. Estimated camber
c. Reinforcing and connection details
d. Anchors

e. Lifting and erection inserts
f. Other items cast into members

2. Show location of unit by same identification mark placed on member.

3. Include design calculations.

C. Manufacturer's Literature: Manufacturer's recommended installation instructions.

D. Manufacturer's certificates of material conformance with specifications.

E. Test Reports: Reports of tests on concrete.

F. Testing

1. Manholes and Valve Vaults: Four (4) concrete test cylinders shall be taken for every 50 cubic yards (cu. yds) for each type of precast structure.

2. Pump Stations: Four (4) concrete test cylinders shall be taken for each pump station wet well. Four (4) concrete test cylinders shall be taken for each pump station's top and bottom slabs.

3. Certification: The supplier shall provide the certified results of testing (7 day, 28 day) for the test cylinders stated herein. Random test cylinders may be taken at any time by the Town of Fort Myers Beach at the Town of Fort Myers Beach's expense.

## PART 2 PRODUCTS

### 2.1 PRECAST CONCRETE WET WELLS AND VALVE VAULTS

A. Precast submersible pump station wet wells shall consist of precast base, precast wet well sections, and top cover slab. Precast valve vaults shall consist of precast base, sidewalls and top slab. Concrete shall be air entrained at the time of delivery and shall have a minimum compressive strength of 4,000 psi at the end of 28 days.

B. Joints between precast concrete sections shall be set by plastic shims and fitted with non-metallic non-shrink grout as shown on the drawings.

C. The top slab sections shall be fitted with water tight hatches. The frames and covers will be sized for the openings shown on the drawings.

D. The various precast sections should have the inside dimensions and minimum thickness of concrete as indicated on the drawings. All precast and cast-in-place

concrete members shall conform to the Building Code Requirements for Reinforced Concrete ACI 318.

E. A vent pipe shall be furnished and installed as shown on the drawings.
F. Fillets shall be provided and installed in the wet wells as shown on the drawings.

G. Precast structures shall be constructed to the dimensions as shown on the drawings and as specified in these Specifications.

H. Type II cement shall be used except as otherwise approved.

I. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

J. Sections shall be cured by an approved method and shall not be shipped until the minimum 7-day compressive strength has been attained.

K. Each pre-cast section manufactured in accordance with the drawings shall be clearly marked to indicate the intended pump station installation location. The Contractor shall be responsible for the installation of the correct pre-cast sections in their designated pump station locations.

L. Paint all exterior surfaces with two coats of coal tar bitumastic, each coat to be 9 mils each. All interior surfaces of valve vaults shall be coated with two coats of coal tar epoxy (9 mils each).

## 2.2 PIPE CONNECTIONS AT STRUCTURES

A. Where pipes are to extend into or through structures from the exterior, flexible connections (mechanical or push-on type joints) shall be provided at the exterior wall face.

B. For pipes passing through structural walls, wall pipes with water stops shall be installed where the location is below the surface of the ground or at any point where fluid levels will exceed that elevation. Neoprene sleeves with watertight caulking and 316 Series SS stainless steel clamps will be suitable at other locations.

# PART 3 EXECUTION

## 3.1 INSTALLATION

A. The Contractor shall be responsible for control of ground water to provide firm, dry subgrade for the structure, shall prevent water rising on new poured in place

concrete or grouted joint sections within 24 hours after placing, and shall guard against flotation or other damage resulting from ground water or flooding.

B. A minimum of a 12 inch layer of crushed stone or shell as specified under Section 02223 shall be placed as a foundation for the wet well base slabs, valve pits, and meter pits.

C. Backfill material around the wet well and above the pipe bedding shall be selected material as specified in Section 02223.

D. Precast bases, conforming to all requirements of ASTM C478 and above listed requirements for precast sections, may be used. The base shall be set in place on a thoroughly compacted crushed stone sub-base and adjusted in grade for the correct structure elevation.

E. The base may be cast-in-place concrete as specified in Division 3, placed on a thoroughly compacted crushed stone sub-base. The tops of the cast-in-place bases shall be shaped to mate with the precast barrel section, and shall be adjusted in grade so that the top slab section is at the approximately correct elevation.

F. Precast concrete structure sections shall be set so as to be vertical and with sections in true alignment with a 3 inch maximum tolerance to be allowed. The outside and inside joint shall be filled with a non-shrink grout and finished flush with the adjoining surfaces. Allows joints to set for 24 hours before backfilling. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. If leaks appear in the structures, the inside joints shall be caulked with lead wool to the satisfaction of the Town of Fort Myers Beach. Install the precast sections in a manner that will result in a watertight joint.

G. Holes in the concrete sections required for handling or other purposes shall be plugged with a non-shrinking grout or by grout in combination with concrete plugs.

H. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done by core drilling prior to setting them in place to prevent any subsequent jarring which may loosen the mortar joints.

END OF SECTION

SECTION 15100

WATER VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

1.2 REFERENCES

A. Codes, specifications, and standards referred to by number or title form a part of this Section to the extent required by the references to codes, specifications, and standards. Latest revisions, as of the date of bid opening, apply, unless otherwise noted on the Drawings or specified in this Section.

B. Standards

| Designation | Title |
|---|---|
| ANSI/AWWA C111/A21.11 | Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings |
| ANSI/AWWA C500 | Gate Valves |
| ANSI/AWWA C509 | Resilient-Seated Gate Valves 3 through 12 NPS, for Water and Sewage Systems |
| ANSI/B16.1 | Cast Iron Pipe Flanges and Flanged Fittings, Class 125 |
| ANSI/B16.3 | Malleable Iron Threaded Fittings, Class 150 and 300 |
| ANSI/B16.5 | Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys |
| ASTM A276 | Specification for Stainless and Heat-Resisting Steel Bars and Shapes |
| ASTM A231 | Specification for Steel Casting, Austenitic, for High-Temperature Service |
| ASTM A743 | Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, and Nickel-Base Corrosion-Resistant for General Application |

MSS SP-60 Connecting Flange Joint Between Tapping Sleeves and Tapping Valves

1.3 DEFINITIONS

A. References to valve sizes on the Drawings and in the Specifications are intended to be nominal size, and shall be interpreted as nominal size.

1.4 SUBMITTALS

A. General: as specified in:

1. General Conditions;
2. Supplementary General Conditions;

1.5 QUALITY ASSURANCE

A. Testing: Test valves as specified in this Section.

PART 2 PRODUCTS

2.1 GENERAL:

A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.

B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

2.2 MANUFACTURERS

A. U.S. Pipe Metroseal 250, McWayne, American or equal by U.S. manufacturer.

2.3 DESIGN

A. Resilient, Wedge or Gate Valves and Boxes

1. Valves for pipe less than 2" in diameter shall conform to the requirements of AWWA C509 (latest revision) and shall be cast iron, single wedge, non-rising stem, screwed bonnet, 125 pounds S.P., 200 pounds W.O.G with stuffing box repackable under pressure and all parts renewable. Ends shall be as shown or indicated on the drawings.

2. Resilient, wedge or gate valves 2" in diameter and larger shall be cast or ductile iron body, non-rising stem, bronze mounted gate valves, mechanical

joint conforming to requirements of the AWWA Standard C509 and shall be provided with a 2" square operating nut. Valves shall be resilient, wedge, or gate type and shall turn to the left (counter clockwise) to open. The wedge or gate shall be cast iron or ductile iron per ASTM A536, minimum 65,000 psi strength and, completely encapsulated with urethane rubber, permanently bonded to the wedge or gate to meet ASTM test for rubber metal bond, ASTM D429. The valve stems for non-rising stem assemblies shall be cast bronze with integral collars in full compliance with AWWA. The NRS stem stuffing box shall be the O-ring seal type with two rings located above thrust collar; the two rings shall be replaceable with valve fully open and subjected to full rated working pressure.

3. There shall be two low torque thrust bearings located above and below the stem collar. The stem nut shall be independent of wedge and shall be made of solid bronze. There shall be a smooth unobstructed waterway free of all pockets, cavities and depressions in the seat area. The body and bonnet shall be coated with fusion bonded epoxy both interior and exterior. The valve shall be designed and tested to be opened and closed under a differential pressure of 150 psi or greater.

B. Valves for Buried Service

1. Valves for buried service shall meet all the requirements as specified herein for interior except that buried valves shall have mechanical joint ends.

2. All buried valves shall have cast-iron three piece valve boxes, valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface. The barrel shall be two-piece, screw type, having 53" shaft. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling, shall be designed so as to prevent the transmission of surface loads directly to the valve or piping, and shall be complete with cast iron covers. Covers shall have "WATER" cast into the top. The covers shall be so constructed as to prevent tipping or rattling. Valve boxes shall be manufactured by OPELIKA FOUNDRY COMPANY, Opelika, Alabama or TYLER PIPE DIVISION, Tyler, Texas or approved equal.

3. One tee-handled wrench of suitable length shall be furnished to operate each valve with a valve box.

4. Where valves are located out of pavement, the boxes shall be adjusted to finished grade and a concrete slab two feet square and six inches thick shall be poured around the box.

5. Valve boxes shall be of the heavy duty, traffic bearing cast iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a

bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, class 30 minimum and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 1/4" and the adjustable length shall be from 18" to 24". The wall thickness shall be 3/16" ± 1/16". The weight of the assembly shall be 61 pounds ± 2 pounds, with the cover weight being a minimum of 12 pounds.

6. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection, as per Federal Specification RR-F-621-C, latest revision. The valve box shall be cast, machined, assembled, and packaged within the United States and shall fully comply with the Buy American provisions of Public Law 102-240, enacted 12/18/91.

C. Gate Valves Greater Than 20 Inches

1. Valves larger than 20" in diameter and larger shall be approved by the County and shall be epoxy-coated, cast or ductile iron body mechanical joint type conforming to requirements of the AWWA Standards and shall be provided with a 2" square operating nut.

2. 20" or larger resilient gate valve must have a 4" bypass line and 4" gate valve. If a Metroseal 250 or approved equal resilient gate valve is used, the 4" bypass line and 4" gate valve is not required. Butterfly valves may be used for valves greater than 24" without the 4" bypass line and 4" gate valve.

D. Check Valves

1. Check valves smaller than 4" shall have a bronze body with a bronze disk. Check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the delivery pressure.

2. The valve must be full opening, tight seating and its seat right shall be renewable and must be securely held in place by a threaded joint; the valve disc shall be bronze and shall be suspended from a non-corrosive shaft which will pass through a stuffing box.

3. The check valve 4" and larger shall be a rubber flapper type swing check valve and the body and cover shall be cast iron construction meeting ASTM A126 Class B or Ductile Iron construction. The flapper shall be Buna-N having an “O” ring seating edge and be internally reinforced with steel.

4. Flapper to be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position during flow through

the valve. Flapper shall be easily removed without need to remove valve from line. Check Valves to have full pipe size flow area. Seating surface to be on a 45° angle requiring the flapper to travel only 35° from closed to full open position, for minimum head loss and non-slam closure.

5. Non-slam closing characteristic shall be provided through a short 35º disc stroke and a memory flex disc return action.

6. When essential to create backflow thru the check valve, i.e.; to prime or backflush a clogged pump, an external backflow device shall be included.

7. Valve exterior to be painted Phenolic Primer Red Oxide for high resistance to corrosion.

8. Materials of construction shall be certified in writing to conform to A.S.T.M. specified above.

9. Valve shall be APCO Series 100 Rubber Flapper Swing Check Valve, as manufactured by Valve & Primer Corporation, Schaumburg, Illinois, U.S.A or Series 500 swing flex valve as manufactured by Val-Matic Valve and Manufacturing Corporation or approved equal.

E. Backflow Prevention Devices

1. Backflow prevention devices for fire protection systems which do not utilize chemical additives or an auxiliary water supply shall be double detector check valve assemblies, shall be USC approved, painted red, and meet all requirements of ANSI/AWWA C510 For all other applications, backflow prevention devices shall be reduced pressure principle assemblies and shall be USC approved, and shall meet all requirements of ANSI/AWWA C511 and the Southern Standard Plumbing Code. Refer the Town of Fort Myers Beach Details and Section 17196.

F. Air Release Valves

1. Air release valves shall be of the short body, automatic type as shown on the Town of Fort Myers Beach Standard Detail. The valve body shall be cast iron construction, ASTM A126, Class B, and all internal working parts shall be 300 Series stainless steel, and BUNA-N orifice button. The inlet openings shall be 1" NPT screwed connection. The venting orifice shall be 3/16" in diameter and shall be installed to vent a minimum of 1 foot above the flood elevation. Air release valves shall be the 400 series SARV as manufactured by Valve and Primer Corporation, Schaumburg, Illinois, or approved equal.

G. Tapping Valves and Sleeves

1. Tapping valves shall be of non-rising stem type of O-Ring seals and conform to the applicable requirement as specified above for valves and shall have one flange joint end and mechanical joint end.

2. Valve end connecting to tapping sleeve shall have a flange for bolting to the sleeve. The flange shall have a tongue which fits a recess in sleeve. Tongues shall meet the requirements of MSS SP-60. Resilient-seated gate valves having a port diameter equal to or exceeding 1/4 inch over nominal diameter shall not require a tongue. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Mechanical joints shall meet the requirements of ANSI/AWWA C111/A21.11. A full nominal diameter cutter shall be used for tapping.

3. Tapping valves 16" and smaller, shall be installed vertically. Tapping valves larger than 16" shall be installed horizontally and shall have bypass valves. Tapping valves installed horizontally shall have rollers and tracks. Valves 16" and larger, shall have gear operators with enclosed gear cases suitable for buried service. Gear cases shall be extended type or totally enclosed type. Extended type gear cases shall have bolted side plates to cover stem and stuffing box.

H. Meter Boxes

1. Meters less than 1” shall be installed in a CDR WB00-1118-12 box with CDR WC00-1118-2C cover.
2. Meters 1” through 2” shall be installed in a CDR WB-1730-12 box with CDR WC00-1730-2C cover.
3. Meters larger than 2” shall be installed above ground and approved by The Town of Fort Myers Beach. Refer to Town of Fort Myers Beach Standard Details.

Meter boxes, which need to be replaced, shall be CDR R-1071-2C. Should just the cover need to be replaced it shall be CDR WC00-1730-2C

## PART 3 EXECUTION

### 3.1 INSTALLATION

A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Town of Fort Myers Beach before they are installed.

B. After installation, all valves and appurtenances shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired.

C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

D. Flanged joints shall be made with Series 300, stainless steel bolts. All exposed bolts shall be made with Series 300 stainless steel bolts.

E. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

F. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. After the bolts have been inserted and all nuts have been made up finger-tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

G. Valves shall be carefully inspected, opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Gate valves, unless shown otherwise, shall be set with their stems vertically above the center line of the pipe. Any valve that does not operate correctly shall be removed and replaced.

H. Valve boxes shall be carefully centered over the operating nuts of the valves so as to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange as shown on the details. The valve box shall not transmit surface loads to the pipe or valve. Care shall be taken to prevent earth and other material from entering the valve box.

Any valve box which is out of alignment or whose top does not conform to the finished ground surface shall be dug and reset. Before final acceptance of the work, all valve boxes shall be adjusted to finish grade. Valve operating risers shall be installed with any valves required to ensure that the operating nut is 30 inches or less from the ground surface.

## 3.2 SHOP PAINTING

A. Ferrous surfaces of valves and appurtenances shall receive a coating of epoxy in accordance with AWWA Standard C550 and meets or exceeds all test requirements including the Food and Drug Administration Document Title 21 of the Federal Regulations on Food Additives, Section 175.000 entitled "Resinous and Polymeric Coating"; Impact Test Requirement in accordance with the ASTM D2794.

END OF SECTION

## SECTION 125

## EXCAVATION FOR STRUCTURES AND PIPE

**125-1 Description.**

Excavate for bridge foundations, box culverts, pipe culverts, storm sewers and all other pipe lines, retaining walls, headwalls for pipe culverts and drains, catch basins, drop inlets, manholes, and similar structures. Construct and remove cofferdams, sheeting, bracing, etc.; pump or otherwise dewater foundations; remove and dispose of any existing structures or portions of structures not covered by other items in the Contract, including foundations, abutments, piers, wings, and all other materials, obstructions, etc., found necessary to clear the site for the proposed work; backfill, dispose of surplus material, and perform final cleaning, as may be necessary for the proper execution of the work. This Section does not include excavation for bases or pavements, curbs, curb and gutter, valley gutter, ditch pavement, or rubble gutter. Perform work in accordance with an approved Quality Control (QC) Plan meeting the requirements of 105-3.

**125-1.1 Trench Excavation Safety System and Shoring, Special (Trench Excavation):** When performing trench excavation in excess of 5 feet in depth, comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, and all subsequent revisions or updates adopted by the Department of Labor and Employment Security. Ensure that trench boxes are wide enough to accommodate compaction and density testing.

Submission of bid and subsequent execution of the Contract will serve as certification that all trench excavation in excess of 5 feet in depth will be in compliance with Section 553.62, Florida Statutes.

Consider all available geotechnical information available when designing the trench excavation safety system.

Consider these and any more stringent trench safety standards as minimum Contract requirements.

**125-2 Classification.**

Consider all materials excavated as unclassified and as excavation regardless of the material encountered.

**125-3 Cofferdams.**

**125-3.1 Construction:**

**125-3.1.1 Methods:** Construct all foundations by open excavation, and shore, brace, or protect the foundation openings with cofferdams. Provide cofferdams or cribs for foundation construction below the bottom of the footings. Provide sufficient clearance in the cofferdam interiors to permit construction of forms and inspection of their exteriors, and for pumping equipment.

**125-3.1.2 Protection of Concrete:** Construct cofferdams to protect green concrete against damage from a sudden rising of the water and to prevent damage by erosion. Do not leave timber or bracing in cofferdams or cribs that extend into the substructure masonry except where permitted in writing by the Engineer.

**125-3.1.3 Placing in the Dry:** For placing footings in the dry, the Engineer may require cofferdam sheeting to be driven to an elevation 6 feet below the elevation of the bottom of

the footings and require sufficient pumping equipment to dewater and maintain the cofferdam in a comparatively dry condition.

**125-3.1.4 Working Drawings:** For substructure work, submit drawings showing the proposed method of cofferdam construction and other details left to choice or not fully shown in the Plans. Obtain the Engineer's approval of the type and clearance of cofferdams, insofar as such details affect the character of the finished work. For other details of design that do not affect the character of the finished work, assume responsibility for the successful construction of the work. Retain a Professional Engineer, registered in the State of Florida, to prepare the above construction drawing, and keep a signed and sealed copy on hand at the site at all times. On completion of the work, furnish the Department with as-built drawings on permanent reproducible material as noted in 5-1.4.1.

**125-3.2 Removal:** Unless otherwise provided, remove cofferdams or cribs, with all sheeting and bracing, after completion of the substructure without disturbing or marring the finished masonry.

**125-4 Excavation.**

**125-4.1 Requirements for all Excavation:** Excavate foundation pits to permit the placing of the full widths and lengths of footings shown in the Plans, with full horizontal beds. Do not round or undercut corners or edges of footings. Perform all excavation to foundation materials, satisfactory to the Engineer, regardless of the elevation shown in the Plans. Perform all
excavation in stream beds to a depth at least 4 feet below the permanent bed of the stream, unless a firm footing can be established on solid rock before such depth is reached, and excavate to such additional depth as may be necessary to eliminate any danger of undermining. Wherever rock bottom is secured, excavate in such manner as to allow the solid rock to be exposed and prepared in horizontal beds for receiving the masonry. Remove all loose and disintegrated rock or thin strata. Have the Engineer inspect and approve all foundation excavations prior to placing masonry.

**125-4.2 Earth Excavation:**

**125-4.2.1 Foundation Material other than the Rock:** When masonry is to rest on an excavated surface other than rock, take special care to avoid disturbing the bottom of the excavation, and do not remove the final foundation material to grade until just before placing the masonry. In case the foundation material is soft or mucky, the Engineer may require excavation to a greater depth and to backfill to grade with approved material.

**125-4.2.2 Foundation Piles:** Where foundation piles are used, complete the excavation of each pit before driving the piles. After the driving is completed, remove all loose and displaced material, leaving a smooth, solid, and level bed to receive the masonry.

**125-4.2.3 Removal of Obstructions:** Remove boulders, logs, or any unforeseen obstacles encountered in excavating. Compensation will be in accordance with the requirements of 4-3.4.

**125-4.3 Rock Excavation:** Clean all rock and other hard foundation material, remove all loose material, and cut all rock to a firm surface. Either level, step vertically and horizontally, or serrate the rock, as may be directed by the Engineer. Clean out all seams, and fill them with concrete or mortar.

**125-4.4 Pipe Trench Excavation:** Excavate trenches for pipe culverts and storm sewers to the elevation of the bottom of the pipe and to a width sufficient to provide adequate working room. Remove soil not meeting the classification specified as suitable backfill material in 125-8.3.2.2, to a depth of 4 inches below the bottom of the pipe elevation. Remove rock, boulders or other hard

lumpy or unyielding material to a depth of 12 inches below the bottom of the pipe elevation. Remove muck or other soft material to a depth necessary to establish a firm foundation. Where the soils permit, ensure that the trench sides are vertical up to at least the midpoint of the pipe.

For pipelines placed above the natural ground line, place and compact the embankment, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to four pipe diameters, and then excavate the trench to the required grade.

For pipe trenches utilizing trench boxes, ensure that the trench box used is of sufficient width to permit thorough tamping of bedding material under and around the pipes as specified in 125-8.1.6.

Do not disturb the installed pipe and its embedment when moving trench boxes. Move the trench box carefully to avoid excavated wall displacement or damage. As the trench box is moved, fill any voids left by the trench box and continuously place and compact the backfill material adjacent to and all along the side of the trench box walls to fill any voids created by the trench box.

**125-5 Preservation of Channel.**

**125-5.1 General:** Unless shown in the Plans, do not excavate outside of caissons, cribs, cofferdams, or sheet piling, and do not disturb the natural stream bed adjacent to the structure. If excavating or dredging at the site of the structure before sinking caissons, cribs, or cofferdams, complete the foundation and backfill all such excavations to the original ground surface or other required elevation, with material satisfactory to the Engineer.

**125-5.2 Removal of Excavated Materials:** Do not allow materials that are deposited adjacent to the stream area to infiltrate the water areas. Leave the stream in its original condition.

**125-6 Disposal of Surplus.**

Use suitable excavated materials for backfilling over or around the structure. Dispose of unsuitable materials. Meet the disposal requirements pertaining to water pollution contained in Section 104 and in 7-1.1.

**125-7 Pumping.**

Pump from the interior of any foundation enclosure in such manner as to preclude the possibility of any portion of the concrete materials being carried away. Do not pump while placing concrete, or for a period of at least 24 hours thereafter, unless using a suitable pump separated from the concrete work by a watertight wall.

**125-8 Backfilling.**

**125-8.1 General Requirements for Structures and Pipe:** *See* SECTION 02223 – BACKFILLING located within these technical specifications.

**125-8.2 Additional Requirements for Structures Other than Pipe:**

**125-8.2.1 Density:** Where the backfill material is deposited in water, obtain a 12-inch layer of comparatively dry material, thoroughly compacted by tamping, before verifying the layer and density requirements. Meet the requirements of 125-9.2.

**125-8.2.2 Box Culverts:** For box culverts over which pavement is to be constructed, compact around the structure to an elevation not less than 12 inches above the top of the structure, using rapid-striking mechanical tampers.

**125-8.2.3 Other Limited Areas:** Compact in other limited areas using mechanical tampers or approved hand tampers, until the cover over the structure is at least 12 inches thick.

When hand tampers are used, deposit the materials in layers not more than 4 inches thick using hand tampers suitable for this purpose with a face area of not more than 100 square inches. Take special precautions to prevent any wedging action against the masonry, and step or terrace the slope bounding the excavation for abutments and wingwalls if required by the Engineer.

**125-8.2.4 Culverts and Piers:** Backfill around culverts and piers on both sides simultaneously to approximately the same elevation.

**125-8.2.5 Compaction Under Wet Conditions:** Where wet conditions do not permit the use of mechanical tampers, compact using hand tampers. Use only A-3 material for the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practical, perform mechanical tamping in such manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

**125-8.3 Additional Requirements for Pipe 15 Inches Inside Diameter or Greater:**

**125-8.3.1 General:** Trenches for pipe may have up to four zones that must be backfilled.

Lowest Zone: The lowest zone is backfilled for deep undercuts up to within 4 inches of the bottom of the pipe.

Bedding Zone: The zone above the lowest zone is the bedding zone. Usually it will be the backfill which is the 4 inches of soil below the bottom of the pipe. When rock or other hard material has been removed to place the pipe, the bedding zone will be the 12 inches of soil below the bottom of the pipe.

Cover Zone: The next zone is backfill that is placed after the pipe has been laid and will be called the cover zone. This zone extends to 12 inches above the top of the pipe. The cover zone and the bedding zone are considered the Soil Envelope for the pipe.

Top Zone: The top zone extends from 12 inches above the top of the pipe to the base or final grade.

**125-8.3.2 Material:**

**125-8.3.2.1 Lowest Zone:** Backfill areas undercut below the bedding zone of a pipe with coarse sand, or other suitable granular material, obtained from the grading operations on the project, or a commercial material if no suitable material is available.

**125-8.3.2.2 Soil Envelope:** In both the bedding zone and the cover zone of the pipe, backfill with materials classified as A-1, A-2, or A-3. Material classified as A-4 may be used if the pipe is concrete pipe.

**125-8.3.2.3 Top Zone:** Backfill the area of the trench above the soil envelope of the pipe with materials allowed on Design Standards, Index No. 505.

**125-8.3.3 Compaction:**

**125-8.3.3.1 Lowest Zone:** Compact the soil in the lowest zone to approximately match the density of the soil in which the trench was cut.

**125-8.3.3.2 Bedding Zone:** If the trench was not undercut below the bottom of the pipe, loosen the soil in the bottom of the trench immediately below the approximate middle third of the outside diameter of the pipe. If the trench was undercut, place the bedding material and leave it in a loose condition below the middle third of the outside diameter of the pipe. Compact the outer portions to meet the density requirements of the acceptance criteria. Place the material in lifts no greater than 6 inches (compacted thickness).

**125-8.3.3.3 Cover Zone:** Before placing the cover zone material, lay pipe according to Section 430. Excavate for pipe bells before laying pipe. Place the material in 12- inch layers (compacted thickness), evenly deposited on both sides of the pipe, and compact with mechanical tampers suitable for this purpose. Hand tamp material below the pipe haunch that cannot be reached by mechanical tampers. Meet the requirements of in 125-9.2.

**125-8.3.3.4 Top Zone:** Place the material in layers not to exceed 12 inches in compacted thickness. Meet the requirements of the density acceptance criteria.

**125-8.3.4 Backfill Under Wet Conditions:** Where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined below may be used when specifically authorized by the Engineer in writing. The Department will pay for any select material which is not available from the grading as Unforeseeable Work. The Department will not pay for select material that might be used by the Contractor for his own convenience instead of dewatering.

The Department will permit the use of granular material below the elevation at which mechanical tampers would be effective, but only material classified as A-3. Place and compact the material using timbers or hand tampers until the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers. When the backfill has reached such elevation, use normally acceptable backfill material. Compact the material using mechanical tampers in such manner and to such extent as to transfer the compacting force into the material previously tamped by hand.

The Department will permit the use of coarse aggregate below the elevation at which mechanical tampers would be effective. Use coarse aggregate as specified in Section 901 for Aggregate Size Number 89, 8, 78, 7, 68, 6, or 57. Place the coarse aggregate such that it will be stable and firm. Fully wrap the aggregate with a layer of Type D-4 filter fabric, as specified on Design Standards, Index No. 199. Do not place coarse aggregate within 4 feet of the ends of the trench or ditch. Use normally accepted backfill material at the ends.

**125-10.3 Soil Classification:** Meet the requirements of 120-10.4.3.

**125-11 Site Restoration.**

Wherever the existing site is disturbed solely for the purpose of constructing or removing box culverts, pipe culverts, storm sewers, inlets, manholes, etc., completely replace and restore the site to the Engineer’s satisfaction, without additional compensation.

**125-12 Cleaning Up.**

Upon completion of the work, leave the structure and all adjacent areas in a neat and presentable condition, clear up all temporary structures, rubbish and surplus materials and leave the space under the structure unobstructed and in such shape that drift will not collect nor scour or be induced. Pile all material from existing structures that have been removed neatly on the bank, unless otherwise directed by the Engineer. Pull false work piling unless the Engineer permits it to be cut or broken off in which case it will be cut or broken off at least 2 feet below the ground line or stream bed.

**125-13 Method of Measurement.**

When direct payment for excavation for structures is provided in the proposal, and such payment is on a unit basis, such excavation will be measured in its original position by the cross section method to determine the amount of material. The cubic yard volume of excavation used as a basis of

payment will then be that material actually removed below the original ground line or stream bed, but not including that shown in the Plans to be paid for either as regular excavation, subsoil excavation, lateral ditch excavation or channel excavation, or which is included in the item for grading, and except that no payment will be made for material removed in excavating for footings or foundations outside of an area which is bounded by vertical planes 12 inches outside of the limits of the footing and parallel thereto. For pipe trenches the width used to be in the calculation shall be the diameter of the pipe, plus 24 inches.

**125-14 Basis of Payment.**

**125-14.1 When No Direct Payment Provided:** When direct payment for excavation for structures is not provided for in the proposal, all work specified in this Section, other than as specified in 125-14.3 through 125-14.7, shall be included in the Contract price for the concrete or for other items covering the applicable structure.

**125-14.2 Direct Payment:** When direct payment for work under this Section is provided, the Contract price per cubic yard (measured as provided in 125-13), as shown in the proposal, shall be full compensation for all the work specified in this Section, except such work as is specifically stipulated to be paid for separately, in 125-14.3 through 125-14.7.

**125-14.3 Excavation Below Plan Grade:** When excavation of material below plan grade is called for in the Plans or authorized by the Engineer, and payment for Excavation for Structures is on a cubic yard basis, the material excavated below plan grade will be included in the measurement for this item. Payment for the material used for the backfill will be made as specified in 125-14.7.

**125-14.4 Strengthening Foundations:** The work of strengthening the foundations (as provided in 125-4.2) shall be paid for as provided in 4-4, unless such work is covered by a bid item.

**125-14.5 Backfilling for Additional Support:** The work of providing additional support by backfilling with sand or other satisfactory material, where called for by the Engineer (as specified in 125-8), shall be paid for as provided in 4-4.

**125-14.6 Removal and Replacement of Existing Pavement:** For pavement, curb, etc., which is removed only in order to construct pipe culverts or storm sewers, as specified in 125-11, all costs of such removal and replacement shall be included in the costs of the pipe or other structure for which it is removed, unless otherwise provided for in the contract.

**125-14.7 Removal and Replacement of Material Unsuitable for Backfill:** When it cannot reasonably be anticipated from information contained in the Plans, that material excavated for the structure will be unsuitable for use as backfill, and such material proves to be unsuitable for this use, the work of disposing of such material away from the site will be paid for as Unforeseeable Work, and the work of bringing in substitute material for the backfill will be paid for as specified for the particular case shown below:

(a) No additional payment will be made for backfill materials obtained from surplus material available from the normal excavation or grading operations.

(b) When the necessary material is not available from the normal excavation or grading operations, and the Contract includes an item for borrow excavation, backfill material authorized to be obtained from designated borrow areas will be included in the volume of borrow excavation to be paid for.

(c) When the necessary material is not available from the normal excavation or grading operations and no separate item for borrow excavation is included in the Contract, any backfill material obtained by increasing the volume of excavation within the roadway right of way will be measured and paid for as regular excavation subject to the provisions of 9-3.2.2.

(d) When authorization is given for obtaining the material from outside the right of way and from other than designated borrow areas, such excavation will be paid for as unforeseeable work.

(e) Where pipe bedding is provided, as specified in 125-8, by the use of select granular material, the quantity of such select material obtained either as commercial material or from material from the grading operations other than in the immediate vicinity of the pipe to be bedded, as authorized by the Engineer, will be paid for at the Contract price per cubic yard for select bedding material. No payment for this material will be made for material available from the excavation for the pipe culvert or from other material available from the grading operations at a location not sufficiently remote as to require loading on trucks.

**125-14.8 Pay Items:** Payment for the work under this Section, when provided for directly, shall be made under:

Item No. 125- 1- Excavation for Structures - per cubic yard.

Item No. 125- 3- Select Bedding Material - per cubic yard.

## SECTION 430

## PIPE CULVERTS

**430-1 Description.**

Furnish and install drainage pipe and end sections at the locations called for in the Plans. Furnish and construct joints and connections to existing pipes, catch basins, inlets, manholes, walls, etc., as may be required to complete the work.

Construct structural plate pipe culverts or underdrains in accordance with Sections 435 and 440.

Obtain pipe culverts from a Producer currently on the Department's list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3.

When the producer's Quality Control Program is suspended, accept responsibility of either obtaining drainage products from another producer with an accepted Quality Control program or await re-approval of the producer's Quality Control Program. The Engineer will not allow changes in Contract Time or completion dates as a result of the producer's Quality Control
Program suspension. Accept responsibility for all delay costs or other costs associated with the producer's Quality Control Program suspension.

**430-2 Materials.**

**430-2.1 Pipe:** Meet the following requirements:

Concrete Pipe .....Section 449
Round Rubber Gaskets .....Section 942
Corrugated Steel Pipe and Pipe Arch .....Section 943
Corrugated Aluminum Pipe and Pipe Arch .....Section 945
Corrugated Polyethylene Pipe .....Section 948
Polyvinyl Chloride (PVC) Pipe .....Section 948

**430-2.2 Joint Materials:** Use joint materials specified in 430-7 through 430-9 according to type of pipe and conditions of usage.

**430-2.3 Mortar:** Use mortar composed of one part Portland cement and two parts of clean, sharp sand, to which mixture the Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. Use mortar within 30 minutes after its preparation.

**430-3 Type of Pipe to Be Used.**

**430-3.1 General:** When the Plans designate a type (or types) of pipe, use only the type (or choose from the types) designated. As an exception, when the Plans designate reinforced concrete pipe as Class S, Class I, Class II, Class III and Class IV, the Contractor may use nonreinforced concrete pipe up to and including 36 inch in diameter.

**430-3.2 Side Drain:** If the Plans do not designate a type (or types) of pipe, the Contractor may use either a minimum Class I concrete pipe, corrugated steel pipe, corrugated aluminum pipe, corrugated polyethylene pipe or PVC pipe. If one of the metal types is chosen, use the minimum gage specified in Section 943 for steel pipe or Section 945 for aluminum pipe. Non-reinforced concrete pipe may also be substituted for concrete pipe in side drains, subject to the provisions of 430-3.1.

**430-4 Laying Pipe.**

**430-4.1 General:** Lay all pipe, true to the lines and grades given, with hubs upgrade and tongue end fully entered into the hub. When pipe with quadrant reinforcement or circular pipe with elliptical reinforcement is used, install the pipe in a position such that the manufacturer's marks designating "top" and "bottom" of the pipe are not more than five degrees from the vertical plane through the longitudinal axis of the pipe. Do not allow departure from and return to plan alignment and grade to exceed 1/16 inch per foot of nominal pipe length, with a total of not more than 1 inch departure from theoretical line and grade. Take up and relay any pipe that is
not in true alignment or which shows any settlement after laying at no additional expense to the Department.

Do not use concrete pipe with lift holes except round pipe which has a inside diameter in excess of 54 inches or any elliptical pipe.

Repair lift holes, if present, by use of a hand-placed, stiff, non-shrink, 1-to-1 mortar of cement and fine sand, after first washing out the hole with water. Completely fill the void created by the lift hole with mortar. Cover the repaired area with a 24 by 24 inches piece of filter fabric secured to the pipe. Use a Type D-3 filter fabric meeting the requirements shown on Design Standards, Index 199.

Secure the filter fabric to the pipe using a method that holds the fabric in place until the backfill is placed and compacted. Use a grout mixtures, mastics, or strapping devices to secure the fabric to the pipe.

When installing pipes in structures, construct inlet and outlet pipes of the same size and kind as the connecting pipe shown in the Plans. Extend the pipes through the walls for a distance beyond the outside surface sufficient for the intended connections, and construct the concrete around them neatly to prevent leakage along their outer surface as shown on the Design Standards, Index 201. Keep the inlet and outlet pipes flush with the inside of the wall. Resilient
connectors as specified in 942-3 may be used in lieu of a masonry seal.

Furnish and install a filter fabric jacket around all pipe joints and the joint between the pipe and the structure in accordance with Design Standards, Index Nos. 201 and 280. Use fabric meeting the physical requirements of Type D-3 specified in the Design Standards, Index 199. The fabric shall extend a minimum of 12 inches beyond each side of the joint or both edges of the coupling band, if a coupling band is used. The fabric shall have a minimum width of 24 inches, and a length sufficient to provide a minimum overlap of 24 inches.

Secure the filter fabric jacket against the outside of the pipe by metal or plastic strapping or by other methods approved by the Engineer.

Meet the following minimum joint standards:

| Pipe Application | Minimum Standard |
|---|---|
| Storm and Cross Drains | Water-tight |
| Gutter Drain | Water-tight |
| Side Drains | Soil-tight |

When rubber gaskets are to be installed in the pipe joint, the gasket shall be the sole element relied on to maintain a tight joint. Soil tight joints must be watertight to 2 psi.

Water-tight joints must be water-tight to 5 psi unless a higher pressure rating is required in the Plans.

**430-4.2 Trench Excavation:** *See* Utility Provider's specifications.

**430-4.3 Not used.**

**430-4.4 Not used.**

**430-4.5 Plugging Pipe:** When existing pipe culverts are to be permanently placed out of service, fill them with flowable fill that is non-excavatable, contains a minimum 350 lbs/cy of cementious material and meets the requirements of Section 121 and/or plug them with masonry plugs as shown in the Plans. Install masonry plugs that are a minimum of 8 inches in thickness, in accordance with Design Standards, Index 280.

When proposed or existing pipe culverts are to be temporarily placed out of service, plug them with prefabricated plugs as shown in the Plans. Install prefabricated plugs in accordance with the manufacturer's recommendations. Do not fill or construct masonry plugs in any pipe culvert intended for current or future service.

**430-4.6 End Treatment:** Place an end treatment at each storm and cross drain, and side drain as shown in the Plans. Refer to the Design Standards for types of end treatment details. As an exception to the above, when concrete mitered end sections are permitted, the Contractor may use reinforced concrete U-endwalls, if shop drawings are submitted to the Engineer for approval prior to use. Provide end treatments for corrugated polyethylene pipe and PVC pipe as specified in Section 948, or as detailed in the Plans.

**430-4.7 Metal Pipe Protection:** Apply a bituminous coating to the surface area of the pipe within and 12 inches beyond the concrete or mortar seal prior to sealing, to protect corrugated steel or aluminum pipe embedded in a concrete structure, such as an inlet, manhole, junction box, endwall, or concrete jacket.

Ensure that the surface preparation, application methods (dry film thickness and conditions during application), and equipment used are in accordance with the coating manufacturers' published specifications.

Obtain the Engineer's approval of the coating products used.

**430-5 Removing Existing Pipe.**

If the Plans indicate that existing pipe is to remain the property of the Department, collect and stack along the right-of-way all existing pipe or pipe arch so indicated in the Plans to be removed, or that does not conform to the lines and grades of the proposed work and that is not to be re-laid, as directed by the Engineer. Take care to prevent damage to salvageable pipe during removal and stacking operations.

**430-6 Placing Pipe Under Railroad.**

**430-6.1 General:** Construct pipe culverts under railroad tracks in accordance with the requirements of the railroad company. Perform all the shoring under the tracks, and sheeting and bracing of the trench, required by the railroad company or deemed necessary by the Engineer in order to ensure safe and uninterrupted movement of the railroad equipment, at no expense to the Department.

**430-6.2 Requirements of the Railroad Company:** Install pipe using methods required by the railroad company and shown in the Contract Documents. When the general method of installation required by the railroad company is indicated in the Plans, do not alter such method, or any other specific details of the installation which might be indicated in the Plans, without receiving approval or direction from the railroad, followed by written approval from the Engineer.

**430-6.3 Notification to Railroad Company:** Notify the railroad company and the Engineer at least ten days prior to the date on which pipe is to be placed under the railroad tracks.

**430-6.4 Placing Pipe by Jacking:** Obtain the Engineer's and the railroad company's approval of the details of the jacking method to be used, when placing pipe through the railroad embankment, before the work is started.

**430-6.5 Use of Tunnel Liner:** When the railroad company requires that a tunnel liner be used for placing the pipe in lieu of the jacking method, the Department will pay for the tunnel liner material separately in cases where the Contract Documents do not require the use of a tunnel liner. For these cases the Department will reimburse the Contractor for the actual cost of the liner, delivered at the site. The Department will base such cost on a liner having the minimum gage acceptable to the railroad.

**430-7 Specific Requirements for Concrete Pipe.**

**430-7.1 Sealing Joints:** Seal the pipe joints with round rubber or profile gaskets meeting the requirements of Section 449. Ensure that the gasket and the surface of the pipe joint, including the gasket recess, are clean and free from grit, dirt and other foreign matter, at the time the joints are made. In order to facilitate closure of the joint, application of a vegetable soap lubricant immediately before closing of the joint will be permitted. Prelubricated gaskets may be used in lieu of a vegetable soap lubricant when the lubricating material is certified to be inert with respect to the rubber material.

**430-7.2 Laying Requirements for Concrete Pipe with Rubber Gasket Joints:** Do not allow the gap between sections of pipe to exceed 5/8 inch for pipe diameters of 12 inches through 18 inches, 7/8 inch for pipe diameters of 24 through 66 inches, and 1 inch for pipe diameters 72 inches and larger. Where minor imperfections in the manufacture of the pipe create an apparent gap in excess of the tabulated gap, the Engineer will accept the joint provided that the imperfection does not exceed 1/3 the circumference of the pipe, and the rubber gasket is 1/4 inch or more past the pipe joint entrance taper. Where concrete pipes are outside of these tolerances, replace them at no expense to the Department. Do not apply mortar, joint compound, or other filler to the gap which would restrict the flexibility of the joint.

**430-7.3 Field Joints for Elliptical Concrete Pipe:** Use either a preformed plastic gasket material or an approved rubber gasket to make a field joint.

**430-7.3.1 Plastic Gasket:** Meet the following requirements when field joints are made from preformed plastic gasket material:

**430-7.3.1.1 General:** Install field joints in accordance with the manufacturer's instructions and the following:

**430-7.3.1.2 Material:** Meet the requirements of 942-2.

**430-7.3.1.3 Joint Design:** Ensure that the pipe manufacturer furnishes the Engineer with details regarding configuration of the joint and the amount of gasket material required to affect a satisfactory seal. Do not brush or wipe joint surfaces which are to be in contact with the gasket material with a cement slurry. Fill minor voids with cement slurry.

**430-7.3.1.4 Primer:** Apply a primer of the type recommended by the manufacturer of the gasket material to all joint surfaces which are to be in contact with the gasket material, prior to application of the gasket material. Thoroughly clean and dry the surface to be primed.

**430-7.3.1.5 Application of Gasket:** Apply gasket material to form a continuous gasket around the entire circumference of the leading edge of the tongue and the groove joint, in accordance with the detail shown on the Design Standards, Index No. 280. Do not remove the paper wrapper on the exterior surface of the gasket material until immediately prior to joining of

sections. Apply plastic gasket material only to surfaces which are dry. When the atmospheric temperature is below 60ºF, either store plastic joint seal gaskets in an area above 70ºF, or artificially warm the gaskets to 70ºF in a manner satisfactory to the Engineer.

**430-7.3.1.6 Installation of Pipe:** Remove and reposition or replace any displaced or contaminated gasket as directed by the Engineer. Install the pipe in a dry trench. Carefully shape the bottom of the trench to minimize the need for realignment of sections of pipe after they are placed in the trench. Hold to a minimum any realignment of a joint after the gaskets come into contact. Prior to joining the pipes, fill the entire joint with gasket material and ensure that when the pipes are joined there is evidence of squeeze-out of gasket material for the entire internal and external circumference of the joint. Trim excess material on the interior of the pipe to provide a smooth interior surface. If a joint is defective, remove the leading section of pipe and reseal the joint.

**430-7.3.2 Rubber Gasket:** Meet the following requirements when field joints are made with profile rubber gaskets:

**430-7.3.2.1 General:** Install field joints in accordance with the manufacturer's instructions and the following:

**430-7.3.2.2 Material:** Meet the requirements of 942-4.

**430-7.3.2.3 Joint Design:** Ensure that the pipe manufacturer furnishes the Engineer with details regarding configuration of the joint and gasket required to effect a satisfactory seal. Do not apply mortar, joint compound, or other filler which would restrict the flexibility of the gasket joint.

**430-7.4 Requirements for Concrete Radius Pipe:**

**430-7.4.1 Design:** Construct concrete radius pipe in segments not longer than 4 feet (along the pipe centerline), except where another length is called for in the Contract Documents. Join each segment using round rubber gaskets. Ensure that the pipe manufacturer submits details of the proposed joint, segment length and shape for approval by the Engineer, prior to manufacture.

**430-7.4.2 Pre-Assembly:** Ensure that the manufacturer pre-assembles the entire radius section in his yard, in the presence of the Engineer, to ensure a proper fit for all parts. At the option of the manufacturer, the Contractor may assemble the pipe without gaskets. Consecutively number the joints on both the interior and exterior surfaces of each joint, and make match marks showing proper position of joints. Install the pipe at the project site in the same order as pre-assembly.

**430-8 Specific Requirements for Corrugated Metal Pipe.**

**430-8.1 Field Joints:**

**430-8.1.1 General:** Make a field joint with locking bands, as specified in Article 9 of AASHTO M 36 and AASHTO M 196M for aluminum pipe. For aluminum pipe, fabricate bands from the same alloy as the culvert sheeting. When existing pipe to be extended is helically fabricated, make a field joint between the existing pipe and the new pipe using one of the following methods:

(1) Cut the new pipe to remove one of the re-rolled annular end sections required in Sections 943 or 945, or fabricate the pipe so that the re-rolled annular section is fabricated only on one end. Use either a spiral (helical) band with a gasket or a flat band with gaskets as required by 430-8.1.2 (2) to join the pipe sections.

(2) The Contractor may construct a concrete jacket as shown on the Design Standards, Index No. 280, provided that the minimum cover required by the Design Standards, Index No. 205 can be obtained.

**430-8.1.2 Side Drain, Storm and Cross Drain, and Gutter Drains:** Where corrugated metal pipe is used as side drain, storm and cross drain, or gutter drain, use a rubber or neoprene gasket of a design shown to provide a joint as specified in 430-4. Use a gasket of one of the following dimensions:

(1) For annular joints with 1/2 inch depth corrugation: either a single gasket a minimum of 7 inches by 3/8 inch or two gaskets a minimum of 3 1/2 inches by 3/8 inch; and for annular joints with 1 inch depth corrugations: either a single gasket a minimum of 7 inches by 7/8 inch or two gaskets a minimum of 3 1/2 inches by 7/8 inch.

(2) For helical joints with 1/2 inch depth corrugation: either a single gasket a minimum of 5 inches by 1 inch or two gaskets a minimum of 3 1/2 inches by 1 inch; and for helical joints with 1 inch depth corrugations: either a single gasket a minimum of 5 inches by 1 1/2 inches or two gaskets a minimum of 3 1/2 inches by 1 1/2 inches.

(3) Such other gasket designs as may be approved by the Engineer.

If, in lieu of a single gasket spanning the joint, two gaskets are used, place these individual gaskets approximately 2 inches from each pipe end at the joint. When two gaskets are used, seal the overlapping area on the coupling band between the gaskets consistent with the joint performance specified. The Contractor may tuck a strip of preformed gasket material over the bottom lip of the band for this purpose. Use coupling bands that provide a minimum circumferential overlap of 3 inches. As the end connections on the coupling band are tightened, ensure that there is no local bending of the band or the connection. Use precurved coupling bands on pipe diameters of 24 inches or less.

Use flat gaskets meeting the requirements of ASTM D-1056, designation 2C2 or 2B3. In placing flat gaskets on pipe prior to placing the coupling band, do not stretch the gasket more than 15% of its original circumference. Use circular gaskets meeting the requirements of ASTM C-361. Do not stretch the circular gasket more than 20% of its original circumference in placing the gasket on pipe. Use preformed plastic gasket material meeting the composition requirements of 942-2.2.

Apply an approved vegetable soap lubricant, as specified for concrete pipe in 430-7.1.1.

**430-8.1.3 Alternate Joint:** In lieu of the above-specified combination of locking bands and flat gaskets, the Contractor may make field joints for these pipe installations by the following combinations:

(a) Use the metal bands as specified in Article 9 of AASHTO M 36M that are at least 10 1/2 inches wide and consist of a flat central section with a corrugated section near each end, designed to match the annular corrugation in the pipe with which they are to be used. Connect the bands in a manner approved by the Engineer, with a suitable fastening device such as the use of two galvanized 1/2 inch diameter bolts through a galvanized bar and galvanized strap, suitably welded to the band. Use a strap that is the same gage as the band. Where helically corrugated pipe is to be jointed by this alternate combination, ensure that at least the last two corrugations of each pipe section are annular, and designed such that the band will engage each pipe end with the next-to-outside annular corrugation.

(b) For these bands, use a rubber gasket with a circular cross-section of the "O-ring" type conforming to ASTM C-361. Use gaskets having the following cross-sectional diameter for the given size of pipe:

| **Non-SI Units Pipe Size** | **Gasket Diameter** |
|---|---|
| 12 inches through 36 inches (with 1/2 inch depth corrugations) | 13/16 inch |
| 42 inches through 96 inches (with 1/2 inch depth corrugations) | 7/8 inch |

36 inches through 120 inches (with 1 inch depth corrugations) 1 3/8 inches

Use preformed gasket material to seal the overlapping area on the coupling band between gaskets.

(c) Use channel band couplers in helical pipe with ends which have been reformed and flanged specifically to receive these bands. Use channel band couplers that are of a two piece design, are fabricated from galvanized steel stock conforming to AASHTO M 36, have 2 by 2 by 3/16 inch angles fastened to the band ends to allow for proper tightening, and meet the following:

| **Non SI Units Band Thickness** | **Pipe Wall Thickness** |
|---|---|
| 0.079 inch 0.109 inch or lighter | 3/4 inch wide 0.109 inch or lighter |
| 0.109 inch 0.138 inch or heavier | 1 inch wide 0.138 inch or heavier |

Furnish two 1/2 inch diameter connection bolts with each band, that conform to ASTM A-307, Grade A and are electroplated in accordance with ASTM B-633.

Use a gasket with the joint that is a hydrocarbon blend of butyl rubber meeting the chemical composition and physical properties of 942-2.2. Use a 3/8 by 3/4 inch gasket for pipe fabricated from 0.109 inch or lighter material and a 3/8 by 1 inch gasket for pipe fabricated from 0.138 inch and heavier material.

The Contractor may use a flange band coupler without the gasket for all applications other than side drain, storm and cross drain, and gutter drain.

Do not use the flange band coupler to join dissimilar types of pipe.

The Contractor may join reformed flanged helical pipe to existing annular or reformed pipe having annular ends. On non-gasketed installations, use either an annular band or an alternate joint described in 430-8.1.3. On gasketed installations, use an annular band, minimum of five corrugations in width, in conjunction with two O-ring gaskets as specified in 430-8.1.3. Use mastic material to seal the area of band overlap. The minimum joint performance standards specified in 430-4.1 apply.

**430-8.2 Laying and Shape Requirements for Corrugated Metal Pipe:** Install pipe using either a trench or open ditch procedure.

Check pipe shape regularly during backfilling to verify acceptability of the construction method used. Pipe deflected 5% or more of the certified actual mean diameter of the pipe at final inspection shall be replaced at no cost to the Department. Deflection measurements are taken at the point of smallest diameter on the corrugations.

**430-9.Specific Requirements for Corrugated Polyethylene Pipe and Polyvinyl Chloride (PVC) Pipe.**

**430-9.1 Field Joints:** Use gasketed joints to seal side drain, and storm and cross drain. Use gaskets meeting the requirements of Section 449. Ensure that the pipe manufacturer provides a joint design approved by the Engineer before use.

**430-9.2 Installation Requirements Including Trenching, Foundation and Backfilling Operations:** Check structure shape regularly during backfilling to verify acceptability of the construction method used. Pipe deflected 5% or more of the certified actual mean diameter of the pipe at final inspection shall be replaced at no cost to the Department.

**430-10 Desilting Pipe or Concrete Box Culvert.**

Desilt pipe culvert and concrete box culvert as designated in the Plans.

**430-11 Method of Measurement.**

**430-11.1 New Pipe:** The quantities of storm and cross drain pipe, storm drain trench, side drain pipe and gutter drain pipe to be paid for will be plan quantity, in place and accepted. The plan quantity will be determined from the inside wall of the structure as shown on the Plans, along the centerline of the pipe.

**430-11.2 Mitered End Section:** The quantity to be paid for will be the number completed and accepted.

**430-12 Basis of Payment.**

**430-12.1 General:** Prices and payments will be full compensation for all work specified in this Section, including all excavation except the volume included in the items for the grading work on the project, and except for other items specified for separate payment in Section 125; all backfilling material and compaction; disposal of surplus material; and all clearing and grubbing outside of the required limits of clearing and grubbing as shown in the Plans.

**430-12.2 Removing Existing Pipe:** When existing pipe is removed and replaced with new pipe approximately at the same location, the cost of excavating and removing the old pipe and of its disposal will be included in the Contract unit price for clearing and grubbing.

**430-12.3 Site Restoration:** The cost of restoring the site, as specified in 125-11, that is disturbed, solely for the purpose of constructing pipe culvert, will be included in the Contract unit price for the pipe culvert, unless designated specifically to be paid for under other items.

**430-12.4 Plugging Pipes:** The cost of temporarily plugging a pipe culvert, either proposed or existing, will be incidental to the contract unit price for new pipe culvert. The cost of filling and/or plugging an existing pipe culvert that is to be permanently placed out of service will be paid for at the contract unit price for filling and plugging pipe, per cubic yard. Price and payment will be full compensation for flowable fill, masonry, concrete, mortar, and all labor and materials necessary to complete the work.

When the project includes no quantities for new pipe culverts, and temporary plugs are required for existing pipe culverts, the cost will be considered as extra work, in accordance with 4-3.5.

**430-12.5 Desilting Pipe:** Desilting Pipe will be paid for at the contract unit price per foot for each pipe desilted. Price and payment will be full compensation for furnishing all equipment, tools and labor, disposal of silt and debris, and all incidentals necessary for satisfactorily performing the work.

**430-12.6 Desilting Concrete Box Culverts:** Price and payment will be full compensation for all work required.

**430-12.7 Flared End Sections:** Price and payment will be full compensation for all work and materials required.

**430-12.8 Mitered End Sections:** Price and payment will be full compensation for all pipe, grates when required, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands, and all work required.

**430-12.9 Railroad Requirements:** Where pipe culvert is constructed under railroad tracks, the Contract unit price for the pipe culvert will include the costs of any jacking operations and the operation of placing the pipe by use of a tunnel liner, (except as specified for unanticipated tunnel liner, in 430-6.5, where reimbursement is to be made for such unanticipated liner), and all other work necessary to meet the requirements of the railroad company, excluding

the costs of watchman or flagman services provided by the railroad company, except as provided below.

The Department will reimburse the Contractor for the actual costs of any trestle bridge work which is performed by the railroad's forces, as billed to him by the railroad, less the value of any salvage materials derived there from, whether such salvage materials are retained by the railroad company or by the Contractor. When the work of shoring and bracing is to be performed by the railroad, such fact will be stipulated in the Contract Documents and the Contractor will be required to pay to the railroad the amount of such costs, which amount will be reimbursed to him by the Department. The Contract unit price for the pipe culvert shall include the costs of all other work of shoring and bracing.

**430-12.10 Payment Items:** Payment will be made under:

Item No. 430- 17- Pipe Culvert Optional Material - per foot.
Item No. 430- 94- Desilting Pipe – per foot.
Item No. 430- 96- Polyvinyl Chloride Pipe - per foot.
Item No. 430- 98- Mitered End Section - each.
Item No. 430-200- Flared End Sections - each.
Item No. 430-610- U-Endwall - each.
Item No. 430-830- Filling and Plugging Pipe – cubic yard.
Item No. 430-950- Desilting Concrete Box Culvert – per cubic yard.

## SECTION 443

## FRENCH DRAINS

**443-1 Description.**
Construct French Drains, utilizing one of the authorized types of pipe, with coarse aggregate, or ballast rock when specified, and filter fabric.

**443-2 Materials.**

**443-2.1** Pipe: Unless a particular type is specified in the Plans, pipe furnished may be any of the following types:

(1) Concrete Pipe (Bell & Spigot): Slotted or perforated concrete pipe may be used. Meet the requirements of Section 449 for concrete pipe. Use the class of pipe specified on the Design Standards, Index No. 205. Do not use gaskets. Fully insert the spigot in the bell, and bring home. Conform to Design Standards, Index No. 285 for slotted pipe. Use perforated pipe having perforations equally located 360 degrees around the pipe. Use pipe having not less than 30 round perforations, 3/8 inch each, per square foot of inside pipe surface. Extend perforations to within 6 inches of the bell or spigot area. The Engineer will permit other perforations not less than 5/16 inch nor more than 3/8 inch in the least dimension if they provide an opening area not less than 3.31 in2/ft2 of pipe surface.

(2) Corrugated Aluminum Alloy Culvert Perforated Pipe: Meet the requirements of Section 945. Use perforated pipe having perforations equally located 360 degrees around the pipe. Locate perforations either on the inside crests or on the neutral axis of all corrugations except that perforations are not required within 4 inches of each end of each length of pipe or in a corrugation where seams are located.

Provide pipe having not less than 30 round perforations, 3/8 inch each, per square foot of pipe surface. The Engineer will permit other perforations not less than 5/16 inch nor more than 3/8 inch in the least dimension if they provide an opening area not less than 3.31 *in2/ft2* of pipe surface.

(3) Corrugated Steel Perforated Pipe: Meet the requirements of Section 943. Space the perforations and meet the requirements as specified in (2) above.

(4) Bituminous Coated Corrugated Steel Perforated Pipe: Meet the requirements of Section 943. Space the perforations and meet the requirements as specified in (2) above. Place the perforations prior to the bituminous coating. The Engineer will accept the minimum opening of not less than 3.31 in2/ft2 of pipe if 50% of the opening area is maintained after coating.

(5) Corrugated Polyethylene Pipe: Meet the requirements of 948-2.3. Space the perforations and meet the requirements as specified in (2) above.

(6) Polyvinyl Chloride (PVC) Pipe: Meet the requirements of 948-1.7. Space the perforations and meet the requirements as specified in (2) above.

**443-2.2 Coarse Aggregate:** Meet the requirements of 90 1-1.4 for No.4 stone.

**443-2.3 Select Fill:** Use select fill meeting the requirements of either Section 911, 913, 913A or 915.

**443-3 Excavating Trench.**

Excavate the trench in accordance with Section 125 unless specific trench excavation procedures are described in the Plans.

Carefully excavate the trench to such depths as required to permit the filter fabric, coarse aggregate and the pipe to be placed in accordance with the details shown in the Plans.

**443-4 Laying Pipe.**

Lay all pipe conforming with the lines and grades specified in the Plans and in accordance with these Specifications. Unless otherwise specified in the Plans, set the pipe with a 36 inch minimum cover and a maximum cover of 66 inches.

**443-5 Placing Coarse Aggregate and Backfilling.**

After placing the pipe and without disturbing the pipe, carefully place the coarse aggregate around the pipe to a depth shown in the Plans. Fold the filter fabric over the coarse aggregate. Backfill and compact as described below.

**443-5.1 French Drains Under Pavement:** Fill the area above the coarse aggregate with select fill material meeting the requirements of this Section. Place and compact the select fill according to the requirements for pipe as specified in Section 125. The Department will allow use of additional coarse aggregate over the top of the pipe instead of select fill material. In this case, the filter fabric shall be extended to wrap the additional course aggregate. The top of the coarse aggregate shall not be higher than the bottom of the base, unless shown in the Plans. The Department will not pay additional costs associated with substituting coarse aggregate for select fill.

**443-5.2 French Drains not Under Pavement**: Fill and compact the area above the coarse aggregate according to the requirements for pipe in Section 125, unless specific procedures are described in the Plans as specified in Section 125.

**443-6 Method of Measurement.**

The quantity of french drains to be paid for under this Section will be the length in feet, measured in place, completed and accepted as specified on Design Standards, Index No. 285 for french drains.

**443-7 Basis of Payment.**

The quantities determined as provided above will be paid for at the Contract unit price per foot for french drains. Such prices and payments will be full compensation for all the work specified in this Section and will include all materials and all excavation, and will also include sheeting or shoring, if required, the disposal of surplus material, pavement restoration, backfilling and tamping, but will not include payment for items paid for elsewhere in the specifications.

Payment shall be made under:

Item No. 443- 70- French Drains - per foot.

## SECTION 530

## RIPRAP

**530-1 Description.**

Construct riprap composed of sand-cement or rubble (consisting of broken stone or broken concrete) as shown in the Design Standards and in the Plans. When specified in the Plans, place bedding stone under the rubble riprap. When specified in the Plans or Design Standards, place geotextile fabric under the riprap.

**530-2 Materials.**

**530-2.1 Sand-Cement:**

(1) Portland Cement: Provide cement from an approved source meeting the requirements of Section 921. Certify that cement meets the requirements of the Contract Documents.

(2) Fine Aggregate: Meet the requirements of902-3.3.

(3) Sacks: Provide sacks made of jute, cotton, or scrim reinforced paper capable of holding the sand-cement mixture without leakage. Ensure that sack material is permeable and absorptive enough to permit passage of water to provide for hydration of the cement. Ensure that paper used in sacks is non-asphalt laminated with a polyester fiber scrim reinforcement in a three-way directional pattern, has an embossed finish, and is perforated approximately *3/32* inch in approximate 1 inch centers. Extend perforations continuously through the entire wall.

Provide sacks of uniform size and dimensions, in order to provide uniformity of lines in the completed work. Use sacks that are free from holes and strong enough to withstand handling without ripping or splitting. Use only one type and size of sack at anyone structure.

(4) Grout: Provide sand from an approved source meeting the requirements of 902-3.3. Provide cement from an approved source meeting the requirements of Section 921 .

(5) Geotextile Fabric: Meet the requirements of Section 514 and Design Standards, Index 199.

**530-2.2 Rubble:**

530-2.2.1 Rubble (Bank and Shore Protection): Provide sound, hard, durable rubble, free of open or incipient cracks, soft seams, or other structural defects, consisting of broken stone with a bulk specific gravity of at least 2.30. Ensure that stones are rough and angular.

For this application, use broken stone meeting the following gradation and thickness requirements:

| Weight Maximum Pounds | Weight 50% Pounds | Weight Minimum Pounds | Minimum Blanket Thickness in Feet |
|---|---|---|---|
| 700 | 300 | 60 | 2.5 |
| [Ensure that at least 97% of the material by weight is smaller than Weight Maximum pounds].<br>[Ensure that at least 50% of the material by weight is greater than Weight 50% pounds].<br>[Ensure that at least 85% of the material by weight is greater than Weight Minimum Pounds]. | | | |

**530-2.2.2 Rubble (Ditch Lining):** Use sound, hard, durable rubble, free of open or incipient cracks, soft seams, or other structural defects, consisting of broken stone or broken concrete with a bulk specific gravity of at least 1.90. Ensure that stones or broken concrete are rough and angular.

Use broken stone or broken concrete meeting the following gradation and thickness requirements:

| Weight Maximum Pounds | Weight 50% Pounds | Weight Minimum Pounds | Minimum Blanket Thickness in Feet |
|---|---|---|---|
| 75 | 30 | 4 | 1.5 |
| [Ensure that at least 97% of the material by weight is smaller than Weight Maximum pounds].<br>[Ensure that at least 50% of the material by weight is greater than Weight 50% pounds].<br>[Ensure that at least 90% of the material by weight is greater than Weight Minimum Pounds]. | | | |

**530-2.2.3 Physical Requirements of Broken Stone and Broken Concrete:** Use broken stone and broken concrete meeting the following physical requirements:

| | |
|---|---|
| Absorption<br>(FM 1-T85) | Maximum 5% |
| Los Angeles Abrasion<br>(FM 1-T096) | Maximum loss 45% |
| Soundness (Sodium Sulphate)<br>(AASHTO T104) | Maximum loss 12%** (after five cycles) |
| Flat and elongated pieces | Materials with least dimension less than one third of greatest dimension not exceeding 10% by weight. |
| Dirt and Fines | Materials less than ½ in maximum dimension accumulated from interledge layers, blasting or handling operations not exceeding 5% by weight. |
| Drop Test***(EM1110-2-2302) | No new cracks developed, or no existing crack widened additional 0.1 inch, or final largest dimension greater than or equal to 90% original largest dimension of dropped piece. |
| * Ensure that granite does not have a loss greater than 55% and that broken concrete does not have a loss greater than 45%.<br><br>** The Engineer may accept rubble exceeding the soundness loss limitation if performance history shows that the material will be acceptable for the intended use. The Engineer will waive the soundness specification for rubble riprap (broken stone and broken concrete) when project documents indicate it will be placed in or adjacent to water or soil with a sulfate content less than 150 parts per million and a pH greater than 5.0.<br><br>*** The Engineer will waive the Drop Test unless required to ensure structural integrity. Provide all equipment, labor and testing at no expense to the Department. EM refers to the US Army Corps of Engineer's Specification Engineering Method. | |

**530-2.2.4 Source Approval and Project Control:** The Engineer will approve mineral aggregate sources in accordance with 6-2.3 as amended by the following:

(1) The Engineer may perform Independent Verification tests on all materials placed on the project.

(2) The Engineer will check the gradation of the riprap by visual inspection at the project site. Resolve any difference of opinion with the Engineer in accordance with the method

provided in FM 5-538. Provide all equipment, labor, and the sorting site at no expense to the Department.

(3) The Engineer may test components in a blend of rubble processed from different geologic formations, members, groups, units, layers or seams. The Engineer may select components based on like color, surface texture, porosity, or hardness. The Engineer will reject any blend if a component that makes up at least five percent by volume of the blend does not meet these specifications.

**530-2.3 Bedding Stone:** Use Bedding Stone of either a durable quality limestone or other quarry run stone, with a bulk specific gravity of not less than 1.90 and that is reasonably free from thin, flat and elongated pieces. Ensure that the bedding stone is also reasonably free from organic matter and soft, friable particles. Meet the following gradation limits:

| Standard Sieve Sizes<br>Inches | Individual Percentage by Weight Passing |
|---|---|
| 12 inches | 100 |
| 10 inches | 70 to 100 |
| 6 inches | 60 to 80 |
| 3 inches | 30 to 50 |
| 1 inch | 0 to 15 |

The Engineer will conduct source approval and project control of bedding stone as specified in 530-2.2.4. In lieu of limestone or other quarry run stone, the Contractor may substitute non-reinforced concrete from existing pavement that is to be removed and which meets the above requirements for commercial bedding stone.

**530-2.4 Geotextile Fabric:** Meet the requirements of Section 514 and Design Standards, Index 199.

**530-3 Construction Methods.**

**530-3.1 Sand-Cement:**

**530-3.1.1 Mixing Materials:** Proportion sand and cement in the ratio of 5 cubic feet of sand to 94 Ibs. (1 bag) of cement. If proportioning the materials by mass, use a density of 85 lbs\ft$^3$ (loose volume) for sand. The Contractor may batch sand at the moisture content occurring in the stockpile.

Mix the sand and cement until the mixture is of uniform color.

**530-3.1.2 Filling Sacks:** Accurately measure the mixed material into each sack, taking care to place the same amount of material in each sack; keep at least the top 6 inches of the sacks unfilled to allow for proper tying or folding and to ensure against breaking of the sack during placing.

**530-3.1.3 Placing:** Place the filled sacks with their tied or folded ends all in the same direction. Lay the sacks with broken joints, in a regular pattern. Ram or pack the sacks against each other so as to form a close and molded contact after the sand and cement mixture has set up. Remove and replace sacks ripped or torn in placing with sound, unbroken sacks. Then, thoroughly saturate all sacks with water.

**530-3.1.4 Grouting:** Immediately after watering, fill all openings between sacks with dry grout composed of one part Portland cement and five parts sand.

**530-3.1.5 Toe Walls:** The Contractor may construct toe walls of rip rap for fill slopes of poured in place concrete in lieu of sand cement in sacks. Meet the concrete requirements as specified in Section 347. If using sand cement in sacks for the toe walls, fill the entire trench excavated for the toe walls with sand cement in sacks.

**530-3.2 Rubble:** Dump rubble in place forming a compact layer conforming to the neat lines and thickness specified in the Plans. Ensure that rubble does not segregate so that smaller pieces evenly fill the voids between the larger pieces.

**530-3.3 Bedding Stone:** Place bedding stone without puncturing or tearing the geotextile fabric. Remove and replace geotextile fabric damaged as a result of operations at no expense to the Department.

The Engineer will allow an in place thickness tolerance of plus or minus 1 inch.

**530-4 Method of Measurement.**

**530-4.1 Sand-Cement:** The quantity to be paid for will be the volume, in cubic yards, of sand actually used in the sand cement mixture and grout, satisfactorily placed and accepted.

If sand cement is proportioned by volume, the sand will be measured loose in an approved measure prior to mixing with cement. If sand cement is proportioned by weight, approved scales will be used for this purpose and the volume will be calculated using a standard conversion factor for sand of 85 *Ibs/ft3.* No adjustment of batch weights to allow for varying moisture content of the sand will be made.

For toe walls, the quantity to be paid for will include only the volume of sand cement in sacks or concrete placed within the neat lines shown in the Plans for the toe walls.

**530-4.2 Rubble and Bedding Stone:** The quantities to be paid for will be the weight, in tons, in surface dry natural state, by railroad scales, truck scales, or barge displacement. The Contractor shall determine the weights as follows:

(1) Railroad Weights: The Contractor shall weigh railroad cars on railroad scales, before and after loading or before and after unloading. If weighed by other than the Engineer, a certified statement of weights will be required. Certificates of weight, furnished by the railroad company, will be acceptable without further certification.

(2) Truck Weights: The Contractor shall weigh trucks on certified scales, loaded and empty, as prescribed above for railroad weights. The Contractor shall weigh trucks in the presence of the Engineer, or furnish certificates of weights.

(3) Barge Displacement: The Engineer will measure each barge. The Contractor shall fit each barge with gauges graduated in tenths of a foot increments. The Contractor shall locate a gauge at each corner of the barge near the lower end of the rake. The Contractor shall furnish additional gauges amidships if the Engineer deems necessary. The Engineer will compute all weights.

**530-5 Basis of Payment.**

**530-5.1 Sand-Cement:** Price and payment will be full compensation for all work specified in this Section, including all materials, labor, hauling, excavation, and backfill.

Include the cost of dressing and shaping the existing fills (or subgrade) for placing riprap in the Contract unit price for riprap (sand-cement).

**530-5.2 Rubble:** Price and payment will be full compensation for all work specified in this Section, including all materials, hauling, excavation, and backfill.

Include the cost of dressing and shaping the existing fills (or subgrade) for placing riprap in the Contract unit price for riprap (rubble).

As an exception to the above, concrete that is shown to be removed from an existing structure and subsequently disposed of by being used in the embankment as riprap will not be paid for under this Section. Include the cost of such work under removal of existing structures.

**530-5.3 Bedding Stone:** Price and payment will be full compensation for all work specified in this Section, including all materials and hauling.

Include the cost of dressing and shaping the existing fills (or subgrade) for placing bedding stone in the Contract unit price for riprap (rubble).

**530-5.4 Geotextile Fabric:** Include the cost of materials and installation of the geotextile fabric in the contract unit price for riprap.

**530-5.5 Payment Items.** Payment will be made under:

Item No. 530- 1- Riprap (Sand-Cement) - per cubic yard.

Item No. 530- 3- Riprap (Rubble) - per ton.

Item No. 530- 74- Bedding Stone - per ton.

# DIVISION III MATERIALS
# AGGREGATES

## SECTION 901

## COARSE AGGREGATE

**901-1 General.**

**901-1.1 Composition:** Coarse aggregate shall consist of naturally occurring materials such as gravel, or resulting from the crushing of parent rock, to include natural rock, slags, expanded clays and shales (lightweight aggregates) and other approved inert materials with similar characteristics, having hard, strong, durable particles, conforming to the specific requirements of this Section.

Coarse aggregate for use in pipe backfill under wet conditions, underdrain aggregate, or concrete meeting the requirements of Section 347 may consist of reclaimed portland cement concrete meeting the requirements of901-5. Coarse aggregate for use in bituminous mixtures may consist of reclaimed portland cement concrete meeting the requirements of 901-5, except that the reclaimed concrete shall be from a concrete mix which was produced and placed in accordance with applicable Department Specifications.

Materials substantially retained on the No.4 sieve, shall be classified as coarse aggregate.

Approval of mineral aggregate sources shall be in accordance with 6-2.3.

**901-1.2 Deleterious Substances:** All coarse aggregates shaH be reasonably free of clay lumps, soft and friable particles, salt, alkali, organic matter, adherent coatings, and other substances not defined which may possess undesirable characteristics. The weight of deleterious substances shall not exceed the following percentages:

| | |
|---|---|
| Coal and lignite (AASHTO T 113) | 1.00 |
| Soft and friable particles (AASHTO T 112)* | 2.00 |
| Clay lumps (AASHTO T 112)* | 2.00 |
| Plant root matter (visual inspection in AASHTO T 27)**** | 0.005 |
| Wood and wood matter (visual inspection in AASHTO T 27)**** | 0.005 |
| Cinders and clinkers | 0.50 |
| Free shell** | 1.00 |
| Total Material passing the No. 200 sieve (FM 1-T011) | |
| At Source with Los Angeles Abrasion less than or equal to 30 | 2.50 |
| At Source with Los Angeles Abrasion greater than 30 | 1.75 |
| At Point of Use | 3.75 |
| Fine-Grained Organic Matter (AASHTO 194) | 0.03 |
| Chert (less than 2.40 specific gravity SSD) (AASHTO T-I 13)*** | 3.00 |

* The maximum percent by weight of soft and friable particles and clay lumps together shall not exceed 3.00.

** Aggregates to be used in asphalt concrete may contain up to 5% free shell. Free shell is defined as that portion of the coarse aggregate retained on the No.4 sieve consisting of loose,

whole, or broken shell, or the external skeletal remains of other marine life, having a ratio of the maximum length of the particle to the shell wall thickness exceeding five to one. Coral, molds, or casts of other shells, and crushed clam and oyster shell indigenous to the formation will not be considered as free shell.

*** This limitation applies only to coarse aggregates in which chert appears as an impurity. It is not applicable to aggregates which are predominantly chert.

**** Plant root matter, and wood and wood matter shall be considered deleterious when any piece exceeds two inches in length or *1/2* inch in width.

The weights of deleterious substances for reclaimed Portland cement concrete aggregate shall not exceed the following percentages:

Bituminous Concrete .....1.00
Bricks .....1.00
Wood and other organic substances (by weight)***** ..... 0.1
Reinforcing Steel and Welded Wire Fabric..... 0.1
Plaster and gypsum board ..... 0.1
Joint Fillers ..... 0.1

***** Supersedes requirement for other coarse aggregate

**901-1.3 Physical Properties:** Coarse aggregates shall meet the following physical property requirements, except as noted herein:

Los Angeles Abrasion (FM 1-T 096) ..... maximum loss 45%
Soundness (Sodium Sulfate) AASHTO TI04..... maximum loss 12%*
Flat or elongated pieces** ..... maximum 10%

* For source approval - aggregates exceeding soundness loss limitations will be rejected unless performance history shows that the material will not be detrimental for Portland cement concrete or other intended usages.

** A flat or elongated particle is defined as one having a ratio between the maximum and the minimum dimensions of a circumscribing prism exceeding five to one.

**901-1.4 Gradation:** Coarse aggregates shall conform to the gradation requirements of Table 1, when the stone size is specified. However, Table 1 is waived for those aggregates intended for usage in bituminous mixtures, provided the material is graded on sieves specified in production requirements contained in 6-2.3, and meets uniformity and bituminous design requirements.

**TABLE 1**
**Standard Sizes of Coarse Aggregate**

| **Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size No. | Nominal Size Square Openings | 4 inches | 3 ½ Inches | 3 inches | 2 ½ inches | 2 inches | 1 ½ inches | 1 inch |

TABLE 1
Standard Sizes of Coarse Aggregate

| Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size No. | Nominal Size Square Openings | 4 inches | 3 ½ Inches | 3 inches | 2 ½ inches | 2 inches | 1 ½ inches | 1 inch |
| 1 | 3 ½ to 1 ½ inches | 100 | 90 to 100 | - | 25 to 60 | - | 0 to 13 | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | 2 ½ inches to 1 ½ inches | - | - | 100 | 90 to 100 | 35 to 70 | 0 to 15 | - |
| 24 | 2 ½ inches to ¾ inch | - | - | 100 | 90 to 100 | - | 25 to 60 | - |
| 3 | 2 inches to 1 inch | - | - | - | 100 | 90 to 100 | 35 to 70 | 0 to 15 |
| 357 | 2 inches to No. 4 | - | - | - | 100 | 95 to 100 | - | 35 to 70 |
| 4 | 1 ½ inches to ¾ inch | - | - | - | - | - | 90 to 100 | 20 to 55 |
| 467 | 1 ½ inches to No. 4 | - | - | - | - | - | 95 to 100 | - |
| 5 | 1 inch to ½ inch | - | - | - | - | - | 100 | 90 to 100 |
| 56 | 1 inch to 3/8 inch | - | - | - | - | - | 100 | 90 to 100 |
| 57 | 1 inch to No. 4 | - | - | - | - | - | 100 | 95 to 100 |
| 6 | ¾ inch to 3/8 | - | - | - | - | - | - | 100 |
| 67 | ¾ inch to No. 4 | - | - | - | - | - | - | 100 |
| 68 | ¾ inch to No. 8 | - | - | - | - | - | - | - |
| 7 | ½ inch to No. 4 | - | - | - | - | - | - | - |
| 78 | ½ inch to No. 8 | - | - | - | - | - | - | - |
| 8 | 3/8 inch to No. 8 | - | - | - | - | - | - | - |
| 89 | 3/8 inch to No. 16 | - | - | - | - | - | - | - |
| 9 | No. 4 to No. 16 | - | - | - | - | - | - | - |
| 10 | No. 4 to 0 | - | - | - | - | - | - | - |

TABLE 1
Standard Sizes of Coarse Aggregate

| Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Size No. | Nominal Size Square Openings | ¾ inch | ½ inch | 3/8 inch | No. 4 | No. 8 | No. 16 | No. 50 |
| 1 | 3 ½ to 1 ½ inches | 0 to 5 | | | | | | |
| 2 | 2 ½ inches to 1 ½ inches | 0 to 5 | | | | | | |

| TABLE 1 (Continued)<br>Standard Sizes of Coarse Aggregate | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent | | | | | | | | |
| Size No. | Nominal Size Square Openings | ¾ inch | ½ inch | 3/8 inch | No. 4 | No. 8 | No. 16 | No. 50 |
| 24 | 2 ½ to ¾ inches | 0 to 10 | 0 to 5 | | | | | |
| 3 | 2 inches to 1 inch | - | 0 to 5 | | | | | |
| 357 | 2 inches to No. 4 | - | 10 to 30 | - | 0 to 5 | | | |
| 4 | 1 ½ inches to ¾ inch | 0 to 15 | - | 0 to 5 | | | | |
| 467 | 1 ½ inches to No. 4 | 35 to 70 | - | 10 to 30 | 0 to 5 | | | |
| 5 | 1 inch to 3/8 inch | 20 to 55 | 0 to 10 | 0 to 5 | | | | |
| 56 | 1 inch to 3/8 inch | 40 to 85 | 10 to 40 | 0 to 15 | 0 to 5 | | | |
| 57 | 1 inch to No. 4 | - | 25 to 60 | - | 0 to 10 | 0 to 5 | | |
| 6 | ¾ inch to 3/8 inch | 90 to 100 | 20 to 55 | 0 to 15 | 0 to 5 | | | |
| 67 | ¾ inch to No. 4 | 90 to 100 | - | 20 to 55 | 0 to 10 | 0 to 5 | | |
| 68 | ¾ inch to No. 8 | 90 to 100 | - | 30 to 65 | 5 to 25 | 0 to 10 | 0 to 5 | |
| 7 | ½ inch to No. 4 | 100 | 90 to 100 | 40 to 70 | 0 to 15 | 0 to 5 | | |
| 78 | ½ inch to No. 8 | 100 | 90 to 100 | 40 to 75 | 5 to 25 | 0 to 10 | 0 to 5 | |
| 8 | 3/8 inch to No. 8 | - | 100 | 85 to 100 | 10 to 30 | 0 to 10 | 0 to 5 | |
| 89 | 3/8 inch to No. 16 | - | 100 | 90 to 100 | 20 to 55 | 0 to 30 | 0 to 10 | 0 to 5 |
| 9 | No. 4 to No. 16 | - | - | 100 | 85 to 100 | 10 to 40 | 0 to 10 | 0 to 5 |
| 10 | No. 4 to 0 | - | - | 100 | 85 to 100 | - | - | - |

The gradations in Table 1 represent the extreme limits for the various sizes indicated which will be used in determining the suitability for use of coarse aggregate from all sources of supply. For any grade from anyone source, the gradation shall be held reasonably uniform and not subject to the extreme percentages of gradation specified above.

**901-2 Natural Stones.**

Course aggregate may be processed from gravels, granites, limestones, dolomite, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this Section.

**901-2.1 Gravels:** Gravel shall be composed of naturally occurring quartz, free from deleterious coatings of any kind. The minimum dry-rodded weight AASHTO T19 shall be *95 lb/ft*$^3$.

Crushed gravel shall consist of a minimum of 85%, by weight, of the material retained on the No.4 sieve, having at least three fractured faces.

**901-2.2 Granites:** Coarse aggregate produced from the crushing of granites shall be sound and durable. For granites to be used in bituminous mixtures and surface treatments, the Los Angeles Abrasion requirement of901-1.3 is modified to permit a maximum loss up to 50 (FM *I-T* 096). Maximum amount of mica schist permitted is 5% (FM 5-584).

**901-2.3 Limestones, Dolomite and Sandstone:** Coarse aggregates may be produced from limestone, dolomite, sandstones, and other naturally occurring hard, durable materials meeting the requirements of this Section.

Pre-Cenozoic limestones and dolomite shall not be used as crushed stone aggregates either coarse or fine for Asphalt Concrete Friction Courses, or any other asphalt concrete mixture or surface treatment serving as the final wearing course. This specifically includes materials from the Ketone Dolomite (Cambrian) Newala Limestone (Mississippian), and Northern Alabama and Georgia.

As an exception to the above up to 20% fine aggregate from these materials may be used in asphalt concrete mixtures other than Friction Courses which serve as the final wearing course.

**901-2.4 Cemented Coquina Rock:** For Cemented Coquina Rock to be used in bituminous mixtures, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096) provided that the amount of material finer than No. 200 generated during the Los Angeles Abrasion test is less than 18%.

**901-3 Manufactured Stones.**

**901-3.1 Slags:** Coarse aggregate may be produced from molten nonmetallic by-products consisting essentially of silicates and aluminosilicates of calcium and other bases, such as aircooled blast-furnace slag or phosphate slag, provided it is reasonably uniform in density and quality, and reasonably free from deleterious substances as specified in 901-1.2. In addition, it must meet the following specific requirements:

Sulphur content ..... not more than 1.5%
Dry rodded weight AASHTO T 19 ..... minimum 70 *lb/ft*$^3$
Glassy Particles ..... not more than 10%

Slag shall not be used as an aggregate for Portland cement concrete.

For Air-Cooled Blast Furnace Slag, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM *I-T* 096) provided that the amount of material finer than No. 200 sieve generated during the Los Angeles Abrasion test is less than 18%.

**901-4 Lightweight Aggregates.**

**901-4.1 Lightweight Coarse Aggregate for Bituminous Construction:** Lightweight coarse aggregate may be produced from naturally occurring materials such as pumice, scoria and tuff or

from expanded clay, shale or slate fired in a rotary kiln. It shall be reasonably uniform in quality and density, and free of deleterious substances as specified in 901-1.2, except that the term cinders and clinkers shall apply to those particles clearly foreign to the extended aggregate in question.

In addition, it must meet the following specific requirements:

Material passing the No. 200 Sieve.....maximum 3.00%, (FM I-T011)
Dry loose weight (AASHTO T 19)* .....33-55 lb/ft$^3$
Los Angeles Abrasion (FM I-T096) .....maximum 35%
Ferric Oxide (ASTM C 641) .....maximum 1.5 mg

* Source shall maintain dry-loose unit weight within plus or minus 6% of Quality Control average. Point of use dry-loose unit weight shall be within plus or minus 10% of Source Quality Control average.

**901-4.2 Lightweight Coarse Aggregate for Structural Concrete:** The requirements of 901-4.1 are modified as follows:

Aggregates shall not be produced from pumice and scoria.

Los Angeles Abrasion (FM I-T 096, Section 12) shall be *4S%*, maximum.

Gradation shall meet the requirements of AASHTO M 195 for 3/4 inch, 1/2 inch and 3/8 inch.

**901-5 Reclaimed Portland Cement Concrete.**

The reclaimed Portland cement concrete shall be crushed and processed to provide a clean, hard, durable aggregate having a uniform gradation free from adherent coatings.

The Contractor's (producer's) crushing operation shall produce an aggregate meeting the applicable gradation requirements. The physical property requirements of 90 1-1.3 for soundness shall not apply and the maximum loss as determined by the Los Angeles Abrasion (FM 1-T096) is changed to 50.

The sources of reclaimed Portland cement concrete will be treated as a mine and subject to the requirements of Section 6 and Section 105. These sources shall qualify as facilities generating clean debris, defined in Rule 62-701.200(15), Florida Administrative Code (FAC), as uncontaminated concrete exempt from solid waste regulation in accordance with Rule 62-70 1.220(2)(f), FAC.

If the Department determines that the concrete has been contaminated with petroleum products or lead-based paint, the concrete shall not be considered clean debris and the source shall be required to be permitted and to perform testing in accordance with Rule 62-701, FAC, subject to any ensuing enforcement action by the Florida Department of Environmental Protection.

Concrete shall be asbestos free.

Operators of demolition recycling facilities shall demonstrate that they are in compliance with 40 Code of Federal Regulations (CFR) 61.141 and 61.145. Notification requirements from each owner or operator of a demolition or renovation activity supplying reclaimed concrete shall be available at the recycling facility.

**901-6 Exceptions, Additions and Restrictions.**

Pertinent specification modifications, based on material usage, will be found in other Sections of the specifications.

SECTION 17196

BACKFLOW PREVENTERS

## PART 1 GENERAL

### 1.1 DESCRIPTION

A. Provide reduced pressure principle or double check valve assembly backflow preventers where indicated on the drawings. The type of backflow preventer required for a particular installation shall be as required and approved by the Town of Ft. Myers Beach.

B. Backflow prevention devices for fire protection systems which do not utilize chemical additives or an auxiliary water supply shall be double detector check valve assemblies, shall be USC approved, painted red, and meet all requirements of ANSI/AWWA C510. For all other applications, backflow prevention devices shall be reduced pressure principle assemblies and shall be USC approved, and shall meet all requirements of ANSI/AWWA C511 and the Southern Standard Plumbing Code. Refer to The Town of Fort Myers Beach Standard details.

### 1.2 SUBMITTALS

A. Submit manufacturer's catalog data, illustrations, principle dimensions, materials of construction, installation instructions and other pertinent data.

B. Submit certificates from manufacturer stating that products furnished comply with these specifications.

C. Operation and Maintenance Manuals: Submit six manuals for each different size, type or model of backflow preventer furnished. Manuals shall be bound sets of literature including the following and other pertinent information required.

1. Detailed assembly drawings, clear and concise instructions for operating, adjusting, overhauling, troubleshooting and other maintenance.

2. A complete lubrication schedule including lubricant types, grades and frequency of lubrication.

## 1.3 STANDARDS OF CONSTRUCTION

A. Backflow prevention devices shall be manufactured in accordance with AWWA C510 and AWWA C511, latest revision, American Society of Sanitary Engineering Standards, the University of Southern California Foundation for Cross Connection Control and Hydraulic Research Foundation "Manual of Cross Connection Control", latest edition and shall be approved by Underwriters Laboratories for fire system installations.

## 1.4 PRODUCT HANDLING

A. Exercise care in transporting and handling backflow preventers to avoid damage. Inside of backflow preventers shall be kept free of dirt and debris.

# PART 2 PRODUCTS

## 2.1 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS

A. Reduced pressure principle backflow preventers shall be in accordance with AWWA C511 and include an integral sensing system that will automatically open a relief valve whenever the differential pressure between the inlet supply and the reduced pressure zone drops to 2 psi. The relief valve shall remain open until a positive pressure differential of 2 psi is re-established. If pressure upstream of the first check valve drops to atmospheric or below, the relief valve shall remain fully open providing an internal air gap between the first check valve and the water level in the reduced pressure zone. The unit shall also be constructed such that any minor leakage of the second check valve will result in visible flow from the relief valve, even if the first check valve is totally disabled.

B. Reduced pressure principle backflow preventers shall have all bronze bodies for sizes 3 inches and smaller and cast iron bodies for sizes 4 inches and larger. Cast iron bodies shall be coated with a two-part thermosetting epoxy coating in accordance with AWWA C550. The reduced pressure backflow preventer shall consist of two independently operated, spring loaded, wye pattern, poppet type check valves designed for installation in a normal horizontal flow attitude. An independent spring loaded relief valve shall be located between the two check valves. Check valve and relief valve springs shall be stainless steel, and all other internal working parts shall be bronze and stainless steel. Check valve and relief valve seats shall be stainless steel or bronze and shall be field replaceable without removing the device from the service line. Backflow preventers shall be designed for a working pressure of 150 psi and a temperature range of 32°F to 140°F. The backflow preventer shall be manufactured as a complete unit including test cocks, and upstream and downstream isolation gate valves. The test cocks shall be arranged such that the unit can be tested

without removing the unit from the line. Isolation gate valves furnished for the unit shall be as specified below.

C. Reduced pressure principle backflow preventers shall be as listed on the Foundation's most current list.

2.2 DOUBLE CHECK VALVE ASSEMBLY BACKFLOW PREVENTERS

A. Double check valve assembly backflow preventers shall be designed to open under normal flow conditions at a pressure differential not less than 1 psi at each check valve. The check valves shall be designed to close when the downstream pressure is greater than the supply pressure.

B. Double check valve assembly backflow preventers shall have all bronze bodies for sizes 2 inches and smaller and cast iron bodies for sizes 2-1/2 inches and larger. Cast iron bodies shall be coated with a two-part thermosetting epoxy coating in accordance with AWWA C550. The double check valve assembly shall consist of two independently operated, spring loaded, wye pattern, poppet type check valves. The unit shall be designed for installation in a normal horizontal flow attitude. Check valve springs shall be stainless steel, and all other internal working parts shall be bronze and stainless steel. Check valve seats shall be stainless steel or bronze and shall be field replaceable without removing the device from the service line. Backflow preventers shall be designed for a working pressure of 150 psi and a temperature range of 32°F to 140°F. The backflow preventer shall be manufactured as a complete unit including test cocks, and upstream and downstream isolation gate valves. The test cocks shall be arranged such that the unit can be tested without removing the unit from the line. Isolation gate valves furnished for the unit shall be as specified below.

C. Double check valve assembly backflow preventers shall be as listed on the Foundation's most current list.

2.3 ISOLATION GATE VALVES

A. Backflow preventers shall be furnished complete with upstream and downstream isolation gate valves.

B. Isolation gate valves for potable water service:

1. Gate valves 2 inches in size and smaller shall be all bronze valves conforming to Fed. Spec. WW-V-54, Type I, Class A designed for a working pressure of 150 psi. Bronze for valve body and internals shall be in accordance with ASTM B61. Valves shall be furnished with screwed ends, handwheel operator, non-rising stem, one-piece solid wedge disc and union bonnet. Valves shall be as manufactured

by Crane, Powell or an approved equal. The minimum weight of valves shall be as follows:

| Valve Size (Inches) | Valve Weight (Pounds) |
|---|---|
| 3/4 | 1.4 |
| 1 | 2.4 |
| 1-1/4 | 3.6 |
| 1-1/2 | 5.0 |
| 2 | 8.0 |

2. Gate valves 3 to 12 inches in size shall be resilient seated gate valves in accordance with AWWA C509 with flanged ends, non-rising stem and a handwheel operator.

C. Isolation gate valves for fire protection service shall be resilient seated gate valves in accordance with AWWA C509 with flanged ends and a handwheel operator. The operator shall be of the open screw and yoke (OS & Y) type.

## PART 3 EXECUTION

### 3.1 GENERAL WARNING

A. Backflow prevention devices installed on closed systems may cause excessive pressure increases due to thermal water expansion and/or waterhammer downstream of the backflow preventer. Excessive pressure increases may cause damage or failure to water heaters and other plumbing fixtures which may be hazardous. The customer or plumbing contractor should install adequate pressure and thermal expansion devices to prevent possible excessive pressure increases within water heaters and other plumbing fixtures.

### 3.2 INSTALLATION

A. Backflow preventers shall be installed, where required by the Town of Fort Myers Beach at the locations shown on the Drawings. Backflow preventers shall be installed in accordance with the manufacturer's written installation instructions and as shown on the Town of Fort Myers Beach Standard Details.

B. Reduced pressure principle backflow preventers shall be installed horizontally with an 18-inch minimum clearance between the finished grade and the lowest point on the bottom of the unit. Reduced pressure backflow preventers shall be installed with provisions for a suitable drain arrangement to drain off discharges from the relief valve, so that discharges are not objectionable. Double check valve assembly backflow preventers shall be installed horizontally with a 12- inch minimum clearance between the finished grade

and the lowest point on the bottom of the unit. Backflow preventers shall be installed such that they are easily accessible for testing, maintenance and repair.

C. Piping and fittings for units 3-inches and larger in size shall have flanged joints. Piping, fittings and valves for units 3-inches and larger in size shall be properly supported with concrete foundations and adjustable pipe support stands as shown on the Standard Details.

D. Following installation the device shall be tested by a certified backflow prevention device tester. If the test fails the device shall be repaired by a certified backflow prevention device technician and retested by a certified tester. Copies of all tests shall be furnished to the Town of Fort Myers Beach.

## 3.3 COATING

A. Following installation of the backflow preventer, piping, fittings and valves, the entire aboveground assembly shall be primed and coated. Prior to applying primer and finish coatings all surfaces shall be clean, dry and free of rust, oil and grease.

B. Prior to applying primer and finish coatings, all piping, fittings and valves with asphaltic coatings shall be either commercial sandblasted to remove all asphaltic coatings or coated with two coats, 1.2 mils DFT each coat, of a sealer consisting of synthetic alcohol-soluble resin and titanium dioxide pigment. The sealer shall be KopCoat Inertol Tar Stop or an equal approved by the Town of Fort Myers Beach.

C. The aboveground installation shall be primed with one coat, 1.5 mils DFT per coat, of a rust inhibitive synthetic resin primer. The primer shall be Kop-Coat Pug Primer, Kopcoat 622 Rust Penetrating Primer or an equal approved by the Town of Fort Myers Beach.

D. The installation shall be finish coated with two coats, 1.4 mils DFT each coat, of a straight long oil alkyd resin enamel. The color of the finish coats shall be OSHA yellow. The finish coating shall be Kop-Coat Rustarmor 500 or an equal approved by the Town of Fort Myers Beach.

END OF SECTION

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SECTION 5.0

WATER SYSTEMS

## 5.1 GENERAL

This section sets forth the general requirements for design, installation and testing of water distribution systems for potable service.

## 5.2 SYSTEM DESIGN

The Engineer shall comply with the design and installation requirements as specified by The Town of Fort Myers Beach, the Florida Department of Environmental Protection, the Florida Department of Health, Lee County Department of Transportation, Florida Department of Transportation and any other relevant state and local regulatory agencies.

A. Flow Demands - Flow demands for design shall be calculated on the basis of full development as known or projected. The average daily flow for domestic use shall be calculated at the minimum rate as follows:

- Single-Family (SF) Residence = 110 gpd per capita, 2.5 persons per residence for a flow of 275 gpd per SF residence.
- Multi-Family (MF) Residence = 110 gpd per capita, 2.5 persons per residence for a flow of 275 gpd per MF residence.
- Mobile Home Park (MHP) Unit = 110 gpd per capita, 2.5 persons per unit for a flow of 275 gpd per MHP unit.
- RV Unit = 55 gpd per capita, 2 persons per unit; for a flow of 110 gpd per RV unit.
- Flow demands for commercial, industrial, and special-type developments shall be established from Florida Administrative Code FAC 64E-6 guidelines, existing records of the last year maximum three-month average, or by using the best available data.

A minimum peak day factor shall be 2.5 times the average daily value. An equivalent Residential Unit (ERU) is defined as 275 gpd.

B. System Size Computation - The minimum design for water distribution systems shall provide for at least 100% of the combined average day demand rate times the peak factor at 3.5 plus the required fire flow. The

allowable minimum service pressure under such design conditions shall be 20 psi. Design computations shall be by the Hardy-Cross procedure, if done manually, or through the use of H2O NET Version 2.5, or other The Town of Fort Myers Beach approved model, if done by computer. H2O NET Version 2.5 shall be the preferred method in all cases with Hardy-Cross only being accepted for small system analysis. All design data and computer printouts or data disks shall be subject to review and approval by The Town of Fort Myers Beach. All water mains shall be sufficiently looped and in no case shall water mains be less than 8" in diameter unless specifically approved by The Town of Fort Myers Beach.

i. Minimum Water Main Size.

- One and two dwelling unit developments shall be no less than 8” in diameter.
- Multi-family developments with three to six dwelling units per building shall be no less than 8” in diameter.
- Multi-family developments composed of buildings with more than six dwelling units per building and not exceeding three stories in height shall be no less than 8” in diameter.
- Multi-family developments composed of buildings with more than six units per building or more than two stories in height shall be no less than 10” in diameter.
- All commercial developments shall be no less than 10” in diameter.
- All industrial developments and all hazardous storage areas shall be no less than 12” in diameter.
- Unless specifically approved by The Town of Fort Myers Beach for all dead end water mains 8” in diameter and larger a fire hydrant and fully restrained valve must be provided at the end of the main in lieu of a blow-off assembly.

C. Fire Flows

Fire protection and public water systems shall be independent systems, designed by a Florida Registered, Professional Engineer and constructed in accordance with county, state, and federal standards, including satisfaction of the domestic requirements established by the appropriate state agency and the fire protection requirements established by the Uniform Fire Code and The Town of Fort Myers Beach Land Development Code as amended from time to time.

D. Connection to Existing System

All connections to existing mains shall be made as authorized by the Owners of the existing system. Valves separating the mains being installed from existing mains shall be operated by or under the direction of the Town of Fort Myers Beach. The cost of the work in making the connections shall be paid for by the Contractor. A representative of The Town of Fort Myers Beach must be present at all tie-ins and wet taps.

In the event the proposed main is to be connected to a main which has one or more active services between the point of connection and the first existing line valve, a temporary plug or cap shall be installed on the new main until the pressure tests and disinfecting are complete. Upon satisfactory completion, the cap or plug shall be removed from both mains and the connection made with pipe, which has been swabbed out with a minimum of 50-PPM chlorine solution. The connection shall be made as swiftly as possible and any water in the ditch shall be kept below the level of the pipe.

In the event any existing customers will be without water while a connection is being made; the contractor shall notify them 72 hours in advance of when the water will be turned off and when he estimates service will be resumed. These connections shall be made at night unless an alternate tie-in time is approved by The Town of Fort Myers Beach. No customer shall be without water service for more than 4 hours unless specifically approved by the Town of Fort Myers Beach.

E. Tapping Sleeves

Tapping sleeves used to make "wet" taps into existing mains shall be rated for 150 psi working pressure and shall be constructed entirely of stainless steel; and shall be installed with stainless steel bolts. The Contractor shall determine the outside diameter and type of the existing main before ordering the sleeve. Size on size taps will only be allowed when connecting to C900 DR 18, C900 DR 14, and all ductile iron pipes. When other types of pipelines are encountered, the proposed tap shall be at least 2 diameter inches smaller than the diameter of the existing pipeline.

F. Fire Hydrants

Fire hydrants serving one or more buildings located on private property and or behind a fence or other barrier in which 24 hour access is not provided; The Town of Fort Myers Beach may require the installation of a double detector check valve assembly to be located at the right of way line. The fire hydrant(s), water main and all related appurtenances located

behind the first O.S. & Y. valve of the double detector check valve assembly will be considered private. It shall be the responsibility of the property owner to adequately maintain all private facilities.

In all cases fire hydrants shall be installed so that the 4 ½" streamer connection is no less than 18" and no more than 24" above finished grade.

Fire hydrants shall be spaced as follows:

- Hydrants for one to two dwelling unit developments shall be 400 feet apart as measured along the centerline of the street.

- Hydrants for multi-family developments with three to six dwelling units per building and not exceeding two stories in height shall be 400 feet apart measured along the centerline of the street.

- Hydrants for multi-family developments with more than six dwelling units per building or more than two stories in height shall be 400 feet apart as measured along the centerline of the street.

- Hydrants for commercial developments shall be 400 feet apart as measured along the centerline of the street.

- Hydrants for all industrial and hazardous storage areas, as defined in the Standard Building Code, shall be 300 feet apart as measured along the centerline of the street.

Hydrant barrels shall be painted AWWA Safety Yellow. They shall be designed for a working pressure of 150 psi and will conform to AWWA Standard C502, "Fire Hydrants for Ordinary Water Works Service."

Acceptable brands of fire hydrants are:

- Muller Centurion A-423
- Kennedy K-81A
- American Darling LCU B84B
- Clow Medallion
- U.S. Pipe Metropolitan 250 Model 94.

G. Hydrants (See Technical Specifications)

H. Hydrant Guard Posts/Bollards

The location of guard posts/bollards for hydrants shall be required in areas subject to traffic flow and maneuvering and approved by The Town of Fort

Myers Beach and the Engineer of Record. Guard posts/bollard shall be constructed of 6” diameter, Class 50, Ductile Iron Pipe 6’ long buried, 3’ below finished grade, filled with 2500 PSI concrete and painted AWWA safety yellow.

I. Valves and Valve Locations

Fully restrained, resilient seated gate valves shall be utilized on all water mains. For water main valves 20" or larger, a 4" valve bypass line shall be installed at all valves if deemed necessary by The Town of Fort Myers Beach.

Valves shall be provided at pipe terminations, all intersecting water mains, fire hydrants, on both sides of all canal crossings, and all other locations necessary to provide an operable, easily maintained and repaired water distribution system. Maximum length of water main between valves which can be used for shutting down the line for repair work shall not exceed 500 feet in commercial and industrial areas. The maximum length of pipe shutdown between valves, which can be used for shutdown for repair work in residential areas, shall not exceed 1,000 feet. All valves shall be tied by stationing for easy identification by field personnel.

Fire hydrants shall be installed with a valve at the connection to the main line. If the pipeline run for the fire hydrant, (fire lines), exceeds 100', a second fully restrained valve shall be required within 5’ of the hydrant base.

J. Pipe Depth

The standard minimum cover for water distribution systems shall be 30" from the top of pipe to finished grade. Should this design not be possible, alternate methods must be submitted to and approved by The Town of Fort Myers Beach. Where possible, maximum cover for water mains shall not exceed 48".

K. Air Venting

Where the water main profile is such that air pockets or entrapment occur which could result in flow blockage, automatic air release valves shall be provided. Air venting capabilities shall be provided for distribution mains by appropriately placing fire hydrants or utilizing the blow-off detail shown in Section 10. At critical points on major mains automatic air release assemblies shall be installed. All dead-end water mains, whether temporary or permanent, shall be equipped with a manually operated blow-off assembly at the terminal end.

L. Joint Restraining

Pressure pipe fittings and other appurtenances requiring restraint shall install joint restraint devices, manufactured restrained joint pipe and fittings or, if approved by The Town of Fort Myers Beach be braced with thrust blocks. Joint restraining systems shall be designed for the maximum pressure condition and the safe bearing load for horizontal and vertical thrust. At a minimum, the thrush restraining system shall have a working pressure equal to or greater than the pipe material maximum pressure rating. The Design Engineer in specifying all restraining devices shall determine a reasonable safety factor. All restrained fittings and joints shall be shown on the plan and profile and must be included on the record drawings. Refer to Section 10 for the minimum restraint schedule required by The Town of Fort Myers Beach.

A joint restraining schedule shall be the responsibility of the Design Engineer and shall be included in the design package. The restraining schedule shall be an integral part of the package submitted for approval by The Town of Fort Myers Beach and the permit agencies.

M. Electrolysis Prevention

All systems shall be designed to best avoid electrolytic action through the contact of dissimilar metals. Preventative action, if required, may consist of installing insulating or dielectric couplings between the two materials.

N. Dead End Lines

Dead end lines will not be allowed unless justified by the Engineer and specifically approved by The Town of Fort Myers Beach.

O. Water Main Location

Water main extensions are to conform to the existing water main design layout. Water mains are to be installed on the same side of the road as the existing main unless otherwise approved by The Town of Fort Myers Beach.

## 5.3 MATERIALS

A. Pipe

1. Ductile Iron Pipe

All water mains larger than 12” shall be constructed of Ductile Iron Pipe and shall be used for all vertical deflections ditch crossings,

subaqueous crossings, and all paved surfaces unless otherwise approved by The Town of Fort Myers Beach.

Ductile Iron Pipe shall be a minimum of Class 50 or pressure Class 250 and will be accepted in any diameter for use within the distribution system. Ductile Iron Pipe shall conform to the requirements of ANSI/AWWA C151, and shall be cement lined and conform to the requirements of ANSI Standard C104. Fittings for Ductile Iron Pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10. Mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11 and flanged joints shall conform to ANSI/AWWA 115/a21.51.

All aboveground pipes shall be painted blue. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.

Gaskets shall be a Buna N, Neoprene, or a Nitryl-based rubber product approved by the Myers. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.

2. Polyvinyl Chloride Pipe (PVC)

Unless otherwise specified and approved by The Town of Fort Myers Beach, all 4" through 12” diameter PVC pipe shall be rated per AWWA, C900, DR18, and Class 150. Water mains larger than 12” shall be constructed of Ductile Iron Pipe. (See Section 5.3, A.1.) All PVC pipe less than 4” in 2" diameter shall be Schedule 80 with a pressure rating of 200 psi solvent welded, including blow-off assemblies. PVC pipe will be acceptable for pipe diameters of 12” or less.

PVC pipe 4” in diameter or larger shall have provisions for expansion and contraction provided in the joints. All joints shall be designed for push-on make-up connections. Push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section, similar and equal to John's Mannville ring-type and Ethyl Belling or may be made with a separate twin gasketed coupling similar and equal to CertainTeed Fluid-Type.

High Density Polyethylene (HDPE) - The Town of Fort Myers Beach has the option of approving the use of HDPE up to 12” in

diameter for water main crossings of roadways, ditches, canals, and environmentally sensitive lands. HDPE water mains shall have the same equivalent internal diameter and equivalent pressure class rating as the corresponding PVC pipe, unless otherwise approved by The Town of Fort Myers Beach. HDPE must have at least three equally spaced horizontal blue marking stripes. For all roadway crossings a steel or DR 11 HDPE casing pipe must be provided. The Department of Transportation having jurisdiction of said road and right-of-way must grant specific approval.

3. Service Connections

All potable service taps shall be located in open/green areas unless specifically approved by The Town of Fort Myers Beach. Any service taps that are approved within a paved area, a 2" cast iron body gate valve shall be used in lieu of a corporation stop.

Service connections shall be installed at the locations and in the manner shown on the drawings. Refer to 5.3 for approved service connection materials.

Meters shall be placed or relocated within the right-of-way.

Service clamps for PVC mains shall be full-circle bearing types as shown on the details in Section 10 and double-strap tapped saddle service clamps for ductile iron mains.

Corporation stops and curb stops shall be fitted with a compression connection outlet with split-lock devices for polyethylene or copper pipe.

On curbed streets the exact location for each installed service shall be marked by etching or cutting a "W" in the concrete curb; where no curb exists or is planned, locations shall be adequately marked by a method approved by The Town of Fort Myers Beach.

Service connection shall not be installed on pipeline 16" and larger unless extenuating conditions exist and said connection is approved by The Town of Fort Myers Beach Director or designee.

When practical, in new residential, commercial, or/and industrial subdivisions, the corporation stop shall be located at the intersecting property line or in the center of the lot.

a. Polytubing Polyethylene Tubing Endopure PE3408 with ultra violet inhibitors and lifetime warranty, CTS Blue 3408

Polyethylene tubing or approved equal, will be acceptable in sizes from 3/4" to 2" in diameter. Tubing for service lines shall be of a type approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23°C, and shall be manufactured in accordance with the requirements of ASTM D 3350, D2737, AWWA C901-88 and shall be blue in color.

b. Fittings (See Technical Specifications)

c. Resilient, Wedge or Gate Valves and Boxes (See Technical Specifications)

d. Gate Valves and Boxes Greater Than 20" in Diameter (See Technical Specifications)

e. Check Valves (See Technical Specifications)

f. Backflow Prevention Devices (See Technical Specifications)

g. Meter Boxes

- Meters less than 1" shall be installed in a CDR WB00-1118-12 box with CDR WC00-1118-2C cover.

- Meters 1" through 2" shall be installed in a CDR WB-1730-12 box with CDR WC00-1730-2C cover.

- Meters larger than 2" shall be installed above ground and approved by The Town of Fort Myers Beach.

Meter boxes, which need to be replaced, shall be CDR R-1017-2C. Should just the cover need to be replaced it shall be CDR WC00-1730-2C.

h. Concrete (See Technical Specifications)

i. Sand (See Technical Specifications)

j. Valve Boxes

Cast iron valve boxes shall be provided for all valves installed underground which do not have extended operators such as is required by the plug valves. The valve boxes shall be adjustable to fit the designated depth of each cover

over the valve and shall be designed so as to prevent the transmission of surface loads directly to the valve or piping. Valve boxes shall have an interior diameter of not less than 5". The valve boxes shall be provided with covers marked with the word "WATER". The covers shall be so constructed as to prevent tipping or rattling. Valve boxes shall be manufactured by OPELIKA FOUNDRY COMPANY, Opelika, Alabama or TYLER PIPE DIVISION, Tyler, Texas or approved equal.

k. Air Release Valves (See Technical Specifications)

l. Restraining Devices (See Technical Specifications)

- Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Inc., Series 1100 Megalug (R), Star Pipe Products, L.P, or approved equal.

- Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint, Star Pipe Products L.P., or approved equal.

- Joint restraint devices for C-900, C905 PVC pipe used with ductile iron mechanical joint fittings shall be EBAA Iron Inc., Series 2000 PV, Uni-Flange 1300, Star Pipe Product, L.P., or approved equal.

- Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Inc., Series 1600 for C-900 PVC pipe, Series 2800 for bell restraint on C-905 PVC pipe or Uni-Flange Series 1300, 1360 or 1390 or ROMAC Series 600, Star Pipe Products L.P., or approved equal.

- C-900 or C-905 PVC fittings shall be restrained with EBAA Iron Inc., Series 2500 bell restraint for PVC fittings, Star Pipe Products, L.P, or an approved equal.

- Bolts and nuts shall be Ductile Iron or 300 Series Stainless Steel, T-Head type with hexagonal nuts. Bolts and nuts shall be machines through and nuts shall be tapped at right angles to a smooth bearing surface.

## 5.4 EXCAVATION, TRENCHING, BACKFILLING, AND RESTORATION

### A. General

The provisions set forth in this Section shall be applicable to all underground water piping installations regardless of location. Special design considerations shall require approval from The Town of Fort Myers Beach.

### B. Materials (See Technical Specifications)

1. Sheeting and Bracing (See Technical Specifications)

2. Concrete (See Technical Specifications)

### C. Workmanship (See Technical Specifications)

1. Trench Dimensions (See Technical Specifications)

2. Trench Grade (See Technical Specifications)

3. Utility Bedding (See Technical Specifications)

4. Unsuitable Material Below Trench Grade (See Technical Specifications)

5. Extra Utility Bedding Material (See Technical Specifications)

6. Excavated Material (See Technical Specifications)

7. Material Disposal (See Technical Specifications)

8. Borrow (See Technical Specifications)

9. Rock Excavation (See Technical Specifications)

10. Dewatering (See Technical Specifications)
11. Obstructions (See Technical Specifications)

12. Backfill (See Technical Specifications)

13. Protective Concrete Slab

14. Restoration (See Technical Specifications)

15. Protection and Restoration of Property (See Technical Specifications)

16. Cleanup (See Technical Specifications)

17. Excavation Site Safety (See Technical Specifications)

5.5 ADDITIONAL INSTALLATION REQUIREMENTS (See Technical Specifications)

A. Pipe

1. Inspection of Material (See Technical Specifications)

2. Pipe Cleanliness (See Technical Specifications)

3. Pipe Gradient (See Technical Specifications)

4. Pipeline Identification (See Technical Specifications)

5. Pipe Joint Deflection (See Technical Specifications)

6. Rejects (See Technical Specifications)

7. Polyvinyl Chloride Pipe (See Technical Specifications)

8. Restraining Devices Anchors (See Technical Specifications)

9. Joints (See Technical Specifications)

B. Installing Valves and Boxes (See Technical Specifications)

C. Installing Hydrants (See Technical Specifications)

D. Concrete Encasement

Concrete encasement shall be constructed in accordance with details as shown in Section 10 when:

1. A waterline crosses at a depth which provides less than 18" clear distance from a sewer line. Encasement shall extend a minimum of 10-feet on each side of the point of crossing. Encase the sewer main, unless specifically approved by The Town of Fort Myers Beach.

2. A waterline running parallel to a sewer line provides less than 10 feet separation. Encase the sewer main, unless specifically approved by The Town of Fort Myers Beach.

3. The Engineer has ordered the line encased and specifically approved by The Town of Fort Myers Beach.

The points of beginning and ending of pipe encasement shall be not more than 6" from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

E. Flush Out Connections

Flush out connections shall be installed on all dead end water mains at the locations and in accordance with the details shown in Section 10.

F. Casing Installations

1. General

The provisions of this section shall represent the minimum standards for the installation of casing pipe for water main pipeline.

Water mains to be placed under all Lee County Department of Transportation roadways shall be installed in a casing. The steel casing and procedures shall conform to the requirements of The Lee County DOT as outlined in "Administrative Code "AC-11-12" and any supplements thereto. All work and materials shall be subject to inspection by DOT. The Department's property and surface conditions shall be restored to the original condition in keeping with the Department's specifications and standards.

In general, all underground water lines crossing all existing or proposed Lee County roadways, Florida State Highways and railroads shall be installed under these traffic ways within steel casing pipe. Specific crossing requirements shall be obtained in advance from the authority having jurisdiction.
It shall be the responsibility of the developer or engineer to submit the necessary permit documents and data to the appropriate authority and receive approval thereof.
The Contractor shall maintain traffic on the roadway and shall keep all workmen and equipment clear of the travel way during the work. All safety regulations of the Department and any permit(s) shall be complied with.

2. Casing Pipe Material and Installation

Casing pipes crossing under County roadways shall be located at suitable approved alignments in order to eliminate possible conflict with existing or future Beach and structures with a minimum 30"

depth of cover between the top of the casing pipe and the surface of the roadway. Casings shall be prime steel pipe conforming to the requirements of ASTM Designation A-139. Unless otherwise approved by The Town of Fort Myers Beach, the minimum casing pipe size and wall thickness shall be as shown in the following table, for the water carrier pipe size indicated. For sizes not included therein, or for special design considerations, approval shall be obtained from The Town of Fort Myers Beach. PVC shall be an acceptable casing material for service lines.

For PVC and DIP Pressure Carrier Pipes

| Carrier Pipe Normal Size Inches | Casing Pipe Nominal Diameter Inches | Casing Pipe Wall Thickness Inches |
|---|---|---|
| 4 | 45 | 0.250 |
| 6 | 16 | 0.250 |
| 8 | 18 | 0.250 |
| 10 | 20 | 0.250 |
| 12 | 24 | 0.312 |
| 14 | 28 | 0.312 |
| 16 | 30 | 0.312 |
| 20 | 36 | 0.375 |
| 24 | 42 | 0.500 |

HDPE Carrier Pipe

HDPE may be used as the carrier pipe and casing pipe with approval from The Town of Fort Myers Beach. The HDPE casing shall be a minimum SDR 11 and there shall be a minimum of 4” clearance between the interior of the casing pipe and the outside of the carrier pipe, unless otherwise approved by The Town of Fort Myers Beach.

For casing pipe crossings under roadways, railroads, or other installations not within the jurisdiction of The Town of Fort Myers, the Contractor shall comply with the regulations of said authority in regard to design, specifications and construction. State Highway casing installations shall be as specified in the FDOT, "Utility Accommodation Guide", and for railroads, the American Railway Engineering Association, Part 5, Section 5.2, "Specifications for Pipelines Conveying Nonflammable Substances", shall be applicable. However, in no case shall the minimum casing pipe diameter and wall thickness, for a specific carrier pipe size, be less than that specified above.

3. Carrier Pipe

Water main carrier pipes to be installed within the casings shall be Restrained Joint Ductile Iron, or PVC Pipe in accordance with Section 5.3 and the requirements of the installation permit. Pipe and fittings shall comply with the applicable provisions of these Standards. Special supporting of the carrier pipe within the casing shall be required with a design approved by The Town of Fort Myers Beach.

Stainless steel carriers with Teflon skids, or The Booster Casing Spacers, being on center and restrained shall be the preferred method for installing the carrier pipe. Spacers shall be installed 7 feet, or less, on center. After the carrier pipe has been tested for leakage, the casing shall have the ends blocked with either an 8" wall of brick masonry with a weep hole installed near the bottom of each wall or Cascade Model CCES End Seals with stainless steel bands.

High-density polyethylene Raci casing spacers or approved equal can be used for all size PVC pipes and on DIP pipe with diameters 12” or less. The spacers shall be of a projection type with a minimum number of projections around the circumference totaling the number of carrier pipe diameter inches. Casing spacers shall be spaced every 6.5 ft. with double spacers on each end of the casing. The casing spacers shall provide a minimum safety factor of 2 to 1 to support the service load.

G. Testing and Disinfection

1. Flushing

All water mains shall be flushed to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 1.2 m/s (4 fps). Flushing shall be terminated at the direction of the Engineer. The Contractor shall dispose of the flushing water without causing a nuisance or property damage, and meet all regulatory requirements for the protection of the environment.

2. Hydrostatic Testing

The Contractor shall perform hydrostatic testing of all water distribution system as set forth in the following, and shall conduct said tests in the presence of representatives from The Town of Fort Myers Beach and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from The Town of Fort Myers Beach. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Hydrostatic testing shall be performed with a sustained pressure for a minimum of two (2) hours at 150 psi pressure or 2-1/2 times working pressure, whichever is higher, unless otherwise approved by The Town of Fort Myers Beach, for a period of not less than two (2) hours.

Testing and passing results shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standard C600. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD(P)^{0.5}}{133{,}200}$$

L = Allowable leakage in gallons per hour;
S = Length of pipe tested in feet;
D = Nominal diameter of the pipe in inches;
P = Average test pressure maintained during the leakage test in pounds per square inch
For 150 psi, L = (9.195 EE-5)SD

The testing procedure shall include the continued application of the specified pressure to the test system, for the two (2) hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

Should the test fail, necessary repairs shall be accomplished by the Contractor and the test repeated until results are within the established limits. The Contractor shall furnish the necessary labor, water, pumps, and gauges at specified location and number and all other items required to conduct the required water distribution system testing and perform necessary repairs.

3. Disinfection

Following acceptable pressure testing, the Contractor shall disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Advance notice of 24 hours shall be provided to The Town of Fort Myers Beach before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C601, "Disinfecting Water Main" and all appropriate approval agencies.

The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 12 hours or more of not less than 50 parts per million. Chlorine may be derived from Chlorine gas, or 70% (high-test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C601 as proposed by the Contractor and approved by the Engineer. Proposals as to method must be made prior to commencement of the disinfection process.

Following contact with chlorine solution, the system shall be thoroughly flushed out. Samples shall then be taken using sterile containers obtained from the County Health Department. Samples shall be taken by the Contractor and delivered by him to the County Health Department or approved laboratory for analysis.

If samples do not demonstrate satisfactory results, the disinfection procedure shall be repeated until two series of satisfactory samples are obtained, the period between such series of samples to be a minimum of 24 hours.

## 5.6 CROSS CONNECTION CONTROL POLICY

All projects must be designed to comply with The Town of Fort Myers Beach Utility Cross Connection Control Ordinance as amended from time to time.

A. Goal

The purpose of The Town of Fort Myers Beach Cross Connection Control Policy is to prevent contaminants and pollutants from entering the water distribution system. The program is intended to prevent water that has passed beyond the public water system and into private systems of customers, from re-entering the public distribution system and being subsequently delivered to other customers. The program aim is to protect The Town of Fort Myers Beach and its customers from contaminants

which could harm the quality and safety of the community water supply through backflow and/or cross connection.

In order to have an effective Cross Connection Control Policy, input and cooperation must be available between The Town of Fort Myers Beach and the customer, but must also include the Division of Codes and Building Services' plumbing official, who has primary responsibility over the customer's water system including new construction, alterations and repairs. The Public Health Officer (Florida Department of Health) has the responsibility of insuring that the water purveyor operates the public potable water system free of actual or potential sanitary hazards, including unprotected cross connections.

B. Definitions

1. Air Gap (AG)
A physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved Air Gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel - with a minimum distance of 3 inches.

2. Auxiliary Water Supply
Any water supply on or available to the premises other than the purveyor's public water supply. Auxiliary water is divided into 2 Categories:

a Health Hazard - Pond, Canal, River, and Well Water or Industrial Fluid that may be contaminated and is not tested.

b Non-Health Hazard - Water supplied by other water purveyors over which The Town of Fort Myers Beach has no sanitary control and re-use water that is under Public Health Dept. control.

3. Atmospheric Vacuum Breaker (AVB)
Consists of a float check, a check seat, and an inlet port, which prevents back siphonage by creating an atmospheric vent when there is a negative pressure in the water system.

4. Back Pressure
Means a pressure higher than the supply pressure caused by a pump, multi-storied building, or other means which may cause backflow.

5. Back Siphonage
Means a form of backflow due to a negative or sub-atmospheric pressure within a water system.

6. Backflow
Means the flow of water or other liquids, mixtures or substances into the distribution pipes of a potable supply of water form a source other than its intended source.

7. Backflow Prevention Device
Means a device or means to prevent backflow as described in the current Town of Fort Myers Beach Details for Backflow Prevention Devices.

8. Certified Tester
A Backflow Prevention Device Technician having completed a The Town of Fort Myers Beach approved training and certification program for the testing and repair of backflow prevention devices.

9. Cross-Connection
Means a connection or potential connection between any part of a potable water system and any other water supply systems, sewer drain, conduit, pool, storage reservoir, plumbing fixture or other device which contains or may contain contaminated or polluted water, sewage or liquid of unknown or unsafe quality capable of back flowing into the public water system. Bypass arrangements, jumper connections, swivel or changeable devices, hoses and other temporary or permanent devices through which or because of which backflow or back siphonage could occur.

10. Cross Connection Control
Means the enforcement of an Ordinance or other legal statement regulating cross-connections.

11. Customer
Means any person, firm or corporation, or government entity, using or receiving water from the Town of Fort Myers Beach potable water system.

12. Double Detector Check Valve (DDCV)
A double check valve in an unmetered main supply line, usually a fireline, with a smaller parallel flow detection line consisting of a meter and a double check having less pressure drop than the main device.

13. Double Check Valve Assembly (DCVA)
A DCVA consists of two internally loaded check valves, either spring loaded or weighted, installed as a unit between two resilient-seated shut off valves with properly located resilient-seated test cocks. This assembly shall only be used to protect against a non-health type hazard.

14. Dual Check Valve (DCV)
A backflow prevention device containing two check valves that are removable for maintenance and cleaning. Used for low hazard residential protection.

15. Hazard, Degree of
Means derived from an evaluation of the risk to public health and the adverse effect of the hazard upon the public water system.

16. Health Hazard
A cross connection or potential cross connection involving any substance that could, if introduced in the potable water supply, cause death, illness, spread disease or have probability of causing such effects. A contaminate.

17. Hose Bib Vacuum Breaker (HBVB)
Small devices used on hose faucets and sink outlets. Consists of a spring-loaded check valve that allows the device to vent to atmosphere when water is turned off.

18. Non-Health Hazard
A cross connection or potential cross connection involving any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable, if introduced into the public water system. A pollutant.

19. Plumbing Official
The Town of Fort Myers Division of Codes and Building Services Code Enforcement Official.

20. Pressure Vacuum Breaker (PVB)
A PVB assembly consists of an independently operating internally loaded check valve, an air inlet valve located on the discharge side of the check valve, with resilient-seated test cocks and resilient-seated shut off valves at each end of the assembly designed to prevent back siphonage. The PVB may not be subjected to back pressure.

21. Reduced Pressure Principle Assembly (RP)
The RP assembly consists of two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. These units are located between two resilient-seated shut off valves and are equipped with properly located resilient-seated test cocks. Assembly is to be used for High Hazard Protection.

22. Service Connection
Means the terminal end of service from the public potable water at the meter installation, which shall include the backflow prevention device when such device is installed adjacent to the water meter. That is, it is that point where the water purveyor loses jurisdiction and sanitary control over the water at its delivery to the consumer.

23. Water, Non-potable
Means water which is not safe for human consumption, or which is of questionable potability.

24. Water, Potable
Means water from any source which has been checked by the health department, and approved for human consumption.

25. Water Purveyor
Means the owner or operator of a public, potable water system. As used herein, the water purveyor shall be The Town of Fort Myers Beach.

C. Inspections and Installations

1. General

Due to changes in equipment, methods of manufacturing and additions to plants, buildings, etc., water usage requirements undergo continual change. As a result, new cross connections may be installed and existing protection may be bypassed, removed or otherwise made ineffective. Inspection and/or re-evaluation by The Town of Fort Myers Beach of the cross connection hazard and the backflow prevention device effectiveness will be required as deemed necessary by The Town of Fort Myers Beach.

To ensure the best possible protection to The Town of Fort Myers Beach water system, backflow prevention devices required by The Town of Fort Myers Beach shall be installed at the point of connection to the water system unless otherwise approved by The

Town of Fort Myers Beach. This shall be immediately after the water meter or at the customer's property line just after the point of connection.

The Town of Fort Myers Beach will utilize the standards established in the American Water Works Association (AWWA) M-14 Manual in determining the types of facilities requiring backflow prevention and the type of device needed at each facility to protect The Town of Fort Myers Beach water distribution system. The Town of Fort Myers Beach reserves the right to make unannounced visits to some premises when conducting cross connection surveys where:
As determined by The Town of Fort Myers Beach, backflow prevention will be required for single-family residential customers when their property is served by an auxiliary water supply or when a cross connection or potential for a cross connection is found on the customer's property. This does not limit the authority of The Town of Fort Myers Beach to inspect single family residential properties for the purpose of protecting the public water system.

2. Inspections for New Construction

New construction plans are to have a plan review followed by site inspections by the Plumbing Official to ensure conformance with the Standard Plumbing Codes.

During the pre-construction plan review meeting The Town of Fort Myers Beach will detail the customer's responsibilities concerning the requirements for backflow prevention device installation. Plan review and site inspections will be performed when deemed necessary by The Town of Fort Myers Beach to ensure Cross Connection Control Policy compliance.

3. Inspections for New Accounts on Existing Facilities

Upon application for water service, The Town of Fort Myers Beach will initiate a site survey to determine degree of hazard and customer requirements for The Town of Fort Myers Beach Cross Connection Control Policy compliance. This survey need not be a detailed inspection of the location or disposition of the water lines, but can be confined to establishing the water uses on the premises, the existence of cross connections, and the availability of auxiliary supplies. Should any devices or plumbing changes be required, a follow up inspection will be made of the same facilities at a later date.

Results of the Cross Connection Survey, summarizing the findings, will be made available to the customer. Actual or potential cross

connections found will be described along with the backflow prevention device required by The Town of Fort Myers Beach. The customer will be given a time limit for making the needed corrections. Time for making the corrections may vary depending on the severity of the cross connections involved and the difficulty in correcting the problems.

4. Retrofitting Facilities of Existing Customers

It is the intent of The Town of Fort Myers Beach retrofitting program to have backflow prevention protection on all existing water services that, in the opinion of The Town of Fort Myers Beach, possess a potential backflow hazard.
The Town of Fort Myers Beach will conduct a system wide survey of its customers in an effort to identify those facilities that present the highest hazard. A prioritized list of customers will be established based of degree of hazard ranging from high to low. A customer having an auxiliary water supply or other potential health hazard at their facilities will require a backflow prevention device as determined by The Town of Fort Myers Beach. The customer shall be required to purchase, install, test, and maintain these devices in accordance with The Town of Fort Myers Beach standards.

When it has been determined by The Town of Fort Myers Beach that a backflow prevention device is necessary due to a hazard or potential hazard to the public water supply, the customer will be notified as to the type of assembly required to meet The Town of Fort Myers Beach standards. After notification by The Town of Fort Myers Beach, either by verified personal contact or certified mail, the customer shall have The Town of Fort Myers Beach approved backflow prevention device installed. The customer shall have one (1) year from the date of notification to comply.

It is the intent of The Town of Fort Myers Beach to have an ongoing site inspection and retrofitting program for all facilities requiring backflow prevention with full implementation of the Cross Connection Control Program for existing high hazard facilities within six (6) years of The Town of Fort Myers Beach Cross Connection Control Ordinance approval date. Any existing backflow prevention device that has been properly installed and functioning will be allowed to continue in service unless the degree of hazard is such as to supersede its effectiveness or results in an unreasonable risk to public health, as determined by The Town of Fort Myers Beach. In such a case the customer must replace or upgrade the device to current The Town of Fort Myers Beach standards. Acceptable

devices may remain in service when The Town of Fort Myers Beach testing and maintenance requirements are met.

D. Testing of Backflow Prevention Devices

1. General

a. As part of a complete cross connection control program, it shall be the duty of the customer at any premises where Reduced Pressure backflow assemblies (RP), Double Check Valve assemblies (DCVA), Double Detector Check Valve assemblies (DDCV) and Pressure Vacuum Breakers (PVB) are installed to have thorough inspections and operational tests made at least once a year or more often, where deemed necessary by The Town of Fort Myers Beach. These inspections and tests shall be at the expense of the customer and be performed by a The Town of Fort Myers Beach approved certified backflow retention device technician using proper field test procedures with calibrated test equipment. All devices failing to meet the latest performance standards set forth by the American Water Works Association (ANSI/AWWA-C510-92 & C511-92), and the American Society of Sanitary Engineers (ASSE-1013, 1015 & 1020) or the Foundation for Cross Connection Control & Hydraulic Research at the University of Southern California, shall be repaired and retested within 30 days of the last test. devices which are found to have a history of not meeting these performance standards shall be placed on a semi-annual or quarterly testing schedule. Devices repeatedly found not to meet these Standards shall be replaced with new devices at the expense of the customer.

If routine testing indicates wear or other malfunction, the device shall be overhauled. Such an overhaul should consist of the replacement of all seats, diaphragms, gaskets which are subject to wear, and any other parts found to be worn or otherwise in questionable condition.

Any maintenance or repair as a result of testing shall be made at the expense of the customer and shall be performed by a The Town of Fort Myers Beach approved certified backflow prevention technician.

b. Any customers that require an uninterrupted supply of water, The Town of Fort Myers Beach will require the installation of

parallel backflow prevention assemblies of equal type to allow for testing, maintenance and repair.

During normal flow conditions both assemblies will remain open. During testing, one device is left open while the other is tested. Sizing of parallel assemblies will be governed by customer need. Usually the two parallel assemblies are one size smaller then the service size (e.g. two 3" devices on a 4" service line).
The Town of Fort Myers Beach will not allow an unprotected bypass around a backflow prevention device when the device is in need of testing, repair or replacement.

2. Field Test Procedures

a. The customer will coordinate with a The Town of Fort Myers Beach approved certified tester for a mutually agreeable time for the water service to be shut off during testing. Special arrangements may have to be made so that interruption of service will not create a hardship.

b. Properly identify the backflow prevention device to be tested by checking ID tag for manufacturer, model and serial number. Inspect the device assembly for the required components:

(1) Approved device

(2) Approved shut off valves

(3) Properly placed test cocks

c. The field test will be made using test equipment and test procedures conforming to those outlined in the "Manual of Cross Connection Control" published by the Foundation for Cross Connection Control and Hydraulic Research - University of Southern California. All test data shall be recorded on the proper Town of Fort Myers Beach forms with copies forwarded to The Town of Fort Myers Beach.

3. Frequency of Testing

a. It is essential that continuous pressure type backflow prevention devices (RP, DCVA, DDCV & PVB) be tested on a regular basis by a competent tester if these devices are to

be relied upon. Testing and/or proper maintenance must be utilized:

(1) Immediately following installation.

(2) At least annually, and more frequently where deemed necessary by The Town of Fort Myers Beach.

(3) Anytime devices have been disassembled for cleaning and repairs.

(4) Where there is indication that the device is not functioning properly. (relief valve discharging, leaking, or any suspected damage to internal or external parts).

b. The Town of Fort Myers Beach will notify the customer when tests are required and shall supply the necessary test forms. Forms can be obtained from The Town of Fort Myers Beach Engineering. Forms shall be completed and returned to The Town of Fort Myers Beach by the date indicated. All testing shall be at the expense of the customer.

4. Approved Certified Testers

Certified Backflow Prevention Device Testers must present documentation of training and submit a completed The Town of Fort Myers Beach Backflow Prevention Device Tester registration form to The Town of Fort Myers Beach. Testers approved by The Town of Fort Myers Beach shall have demonstrated competency in testing and repair of all approved backflow prevention devices to The Town of Fort Myers Beach satisfaction. Testers shall be knowledgeable of laws, rules and regulations applicable to backflow prevention devices, and have successfully completed the University of Florida Center for Training, Research and Education for Environmental Occupations (TREEO), Florida Water and Pollution Control Operators Association (FWPCOA), or other Certification programs approved by The Town of Fort Myers Beach.

A list of The Town of Fort Myers Beach approved certified backflow prevention device testers will be supplied to customers upon request.

The Town of Fort Myers Beach reserves the right to test any backflow prevention device at anytime as a quality control measure. Testers are required to perform accurate testing and reporting and

proper repair procedures. Testers will be removed from the list of The Town of Fort Myers Beach approved Backflow Prevention Device testers for failure to perform in accordance with The Town of Fort Myers Beach standards or if the Backflow Prevention Device Technician Certification expires.

E. Non-compliance

In the event that the customer does not abide by the standards set forth in The Town of Fort Myers Beach Cross Connection Control Policy the water purveyor reserves the right to discontinue water service immediately.

Upon written notification from The Town of Fort Myers Beach the customer shall act to install or repair, and/or test the backflow prevention device within the time frame set by The Town of Fort Myers Beach. Any customer water service not in compliance with the Cross Connection Control Policy at the end of the period allotted by The Town of Fort Myers Beach can be terminated immediately. Service will be restored when The Town of Fort Myers Beach standards are met.

F. Installers

The backflow prevention device installer's responsibility is to assure proper installation of approved devices in accordance with the manufacturer's installation instructions and those provided by The Town of Fort Myers Beach Cross Connection Control Policy. The installer is also responsible for making sure the device is working properly when it is installed. All Reduced Pressure Principle Assemblies, Double Check Valve Assemblies, and Pressure Vacuum Breaker Assemblies shall be tested following installation by a Certified Backflow, Backflow Prevention Device Tester approved by The Town of Fort Myers Beach. The following data shall be supplied by the customer to The Town of Fort Myers Beach immediately after installation:

1. Service address where device is located

2. Owner

3. Description of device's location

4. Date of installation

5. Type of device and size

6. Make, Model and serial number of device

7. Test results.

All backflow prevention device installations are to be performed in accordance with The Town of Fort Myers Plumbing Code criteria.

The Town of Fort Myers Beach may independently inspect and test any new installation at their discretion.

G. Backflow Prevention Device Standards

All backflow prevention devices, as described in "B. Definitions", approved for use by The Town of Fort Myers Beach shall be in compliance with the standards set forth by one or more of the following agencies. The Town of Fort Myers Beach reserves the right to state which standards apply if and when a conflict between standards exist.

AWWA - American Water Works Association

ANSI - American National Standards Institute

ASSE - American Society of Sanitary Engineers

FCCC&HR - Foundation of Cross Connection Control and Hydraulic Research - University of Southern California

The Town of Fort Myers Beach will maintain a list of approved device manufacturers for use in The Town of Fort Myers Beach potable water system.

Device specifications:

1. Air Gap (AG)

ANSI standard # A112.1.2
Good for toxic and non-toxic substances. Good for back pressure and backsiphonage. Air Gap must have a minimum separation of two times the inside diameter of the water supply outlet and the flood rim level of the basin or receptacle. An Air Gap shall not be less than 3 inches.

2. Reduced Pressure Principle Assembly (RP)

ANSI/AWWA standard # C511-92 ASSE standard # 1013
FCCC&HR standards

Good for toxic and non-toxic substances. Good against back pressure and backsiphonage. Installed a minimum of 18" above ground or flood level, to maximum of 30". Must be tested annually.

3. Double Check Valve Assembly (DCVA)

ANSI/AWWA standard # C510-92 ASSE standard # 1015 FCCC&HR standards Good for non-toxic substances only. Good for back pressure and backsiphonage. Installed a minimum of 12" above ground or flood level, to a maximum of 30". Must be tested annually.

4. Double Detector Check Valve Assembly (DDCV)

ANSI/AWWA standard # C510-92
ASSE standard # 1015
FCCC&HR standards
Used in unmetered fire line applications to detect low flow. Good for non-toxic substances only. Good for back pressure and backsiphonage. Installed a minimum of 30.5 (12") above ground or flood level, to a maximum of 30". Must be tested annually.

H. Backflow Prevention Device Standards

1. Pressure Vacuum Breaker (PVB)
ASSE standard # 1020
FCCC&HR standards
Good for toxic and non-toxic substances. Good for backsiphonage only. Can be installed under continuous pressure (control valves downstream). Base of the device must be installed a minimum of 12" above the highest outlet. Must be tested annually.

2. Dual Check Valve (DCV)

ASSE standard # 1024
For low hazard residential applications

3. Atmospheric Vacuum Breaker (AVB)

ASSE standard # 1001
FCCC&HR standards
Good for toxic and non-toxic substances. Good for back siphonage only. No control valves downstream of device - cannot remain under continuous pressure, no more than 12 hours service per day. Base of device must be installed a minimum of 6" above highest outlet.

4. Hose Bib Vacuum Breaker (HBVB)

ASSE standard # 1011
Good for back siphonage only. To be installed on hose threaded faucets. Not to be subjected to continuous pressure, no more than 12 hours service per day.

I. Typical Facilities Requiring Backflow Prevention Devices and Type of Devices Required

1. Facilities having the potential to contain cross connections which would, under adverse conditions, constitute a serious potential health hazard to the public water system that shall require Reduced Pressure Assemblies (RP) protection:

Auto & Truck Service Stations
Beauty Salons
Car Washes
Chemical or Biological Testing Labs Dry Cleaners & Laundries
Film Processing Labs
Food Processing and Preparation Facilities Hospitals
Irrigation Systems (using a health hazard auxiliary water supply)
Manufacturing Plants (using toxic substances)
Medical Clinics
Morgues
Multi-story Buildings
Pest Control Companies Strip Malls
Super Markets
Veterinarians

2. Facilities having a potential of moderate health hazard or low health hazard situations shall require either RP or DCVA protection, as determined by site survey:

Auto Parts Stores
Barber Shops
Beverage & Liquor Stores
Convenient Stores (not selling gas) Department Stores
Hardware Stores
Health Clubs
Large Church Facilities
Lumber Yards
Motels
Multi-Family Structures Consisting of 3 Units or More Served by a Single Meter Pools & Clubhouses

Used Car Lots
Banks
Office Buildings
Small Churches
Small Retail Outlets

3. PVB assembles shall be used typically on irrigation systems not utilizing an auxiliary water supply and not having elevated sprinkler heads.

4. Dual Check Valves (DCV) shall be utilized at the service connections of private residences that pose a low potential health hazard.
5. Use of AVB and HBVB devices will be restricted to use on internal plumbing (lab sinks, garbage can washers, and hose bibs etc.). AVB's are not to be used for containment at the service connection.

J. Tank Trucks

Temporary cross connections are commonly created when water is drawn from the potable water system to fill tank trucks, dilute chemicals and pesticides or to rinse tanks. A properly tested Reduced Pressure Principle Device Assembly (RP) shall be installed on any portable water hauling, spraying or cleaning unit that has the capacity of connection to any potable water supply, which does not contain a built in approved Air Gap.

K. Portable Water Meters

All temporary, portable or hydrant meters furnished by The Town of Fort Myers Beach shall have an approved Reduced Pressure Principle Device Assembly installed immediately downstream of the meter. These Backflow Prevention Device Assemblies will be supplied by The Town of Fort Myers Beach. The contractor or customer will provide the necessary protection and physical support for the meter and backflow prevention device assembly.

No permanently installed meter shall be used for construction purposes without a proper backflow prevention device installed.

L. Fire Line Protection

All new fire lines not having an auxiliary water supply or chemical additives will require Double Detector Check Valve protection.

All new fire lines utilizing the potable water supply with an auxiliary water supply shall be required to have a Reduced Pressure Principle Detector

Assembly. The Town of Fort Myers Beach maintains the authority to perform site inspections as deemed necessary.

Any unacceptable backflow prevention devices on existing fire lines or those fire lines presently unprotected against backflow shall be required to comply with the above current The Town of Fort Myers Beach fire line protection standards.

M. Residential Customers

Residential customers, including those in multi-family units, having auxiliary water supplies or other potential health hazards on their premises shall require backflow prevention devices, as determined by The Town of Fort Myers Beach. These customers shall be required to purchase, install, test, and maintain these devices in accordance with The Town of Fort Myers Beach standards.

PART C

INCLUSION OF
FLORIDA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS AND STANDARD SPECIFICATIONS

All design standards, specifications and details of the latest edition of the Florida Department of Transportation ("FDOT") Standard Specifications for Road and Bridge Construction, as amended, shall apply to and form a part of this contract as if fully written herein. Where a FDOT section is cited that contains references to other sections, they shall also be included as though written herein.

Revisions, deletions, and/or additions to the FDOT Standard Specifications are contained in the technical specifications included in this project manual.

Where a reference is made to "department" or "department's representative" in the FDOT Standard Specifications and Technical Specifications, it shall mean "owner' or "contractor", as applicable.

Where FDOT Standard Specifications refer to the "engineer', "engineer of tests", or "division of tests", it shall be understood to mean the engineer or the Owner as stated in the contract documents.

Construction shall be in accordance with the FDOT Design Standards 2014 Edition and applicable revisions found at: http://www.dot.state.fl.us/rddesign/ds/14/stds.shtm
These standards shall be followed as if included herein.

Construction shall be in accordance with the FDOT Standard Specifications for Road and Bridge Construction 2014 as amended on or before July 1, 2014 at:
http://www.dot.state.fl.us/specificationsoffice/implemented/specbooks/2014/2014bk.shtm.
These specifications shall be followed as if included herein.

Method of measurement and basis of payment for material and work performed in conformance with the FDOT Standard Specifications and Technical Specifications shall be as indicated in Section 01026 – Measurement & Payment. The lump sum and/or unit cost bid shall be full compensation for labor, equipment, materials, and incidentals necessary to complete the work in conformance with the contract documents.

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PART D

INCLUSION OF
THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
FOR STREETS AND HIGHWAYS

Any traffic control device design or application provision contained in this Manual shall be in accordance with of the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), as amended, shall apply to and form a part of this contract as if fully written herein. Where a MUTCD section is cited that contains references to other sections they shall also be included as though written herein. The MUTCD can be found at: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1r2edition.pdf, The MUTCD shall be followed as if included in full herein.

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# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.00
## FMB DETAIL INDEX

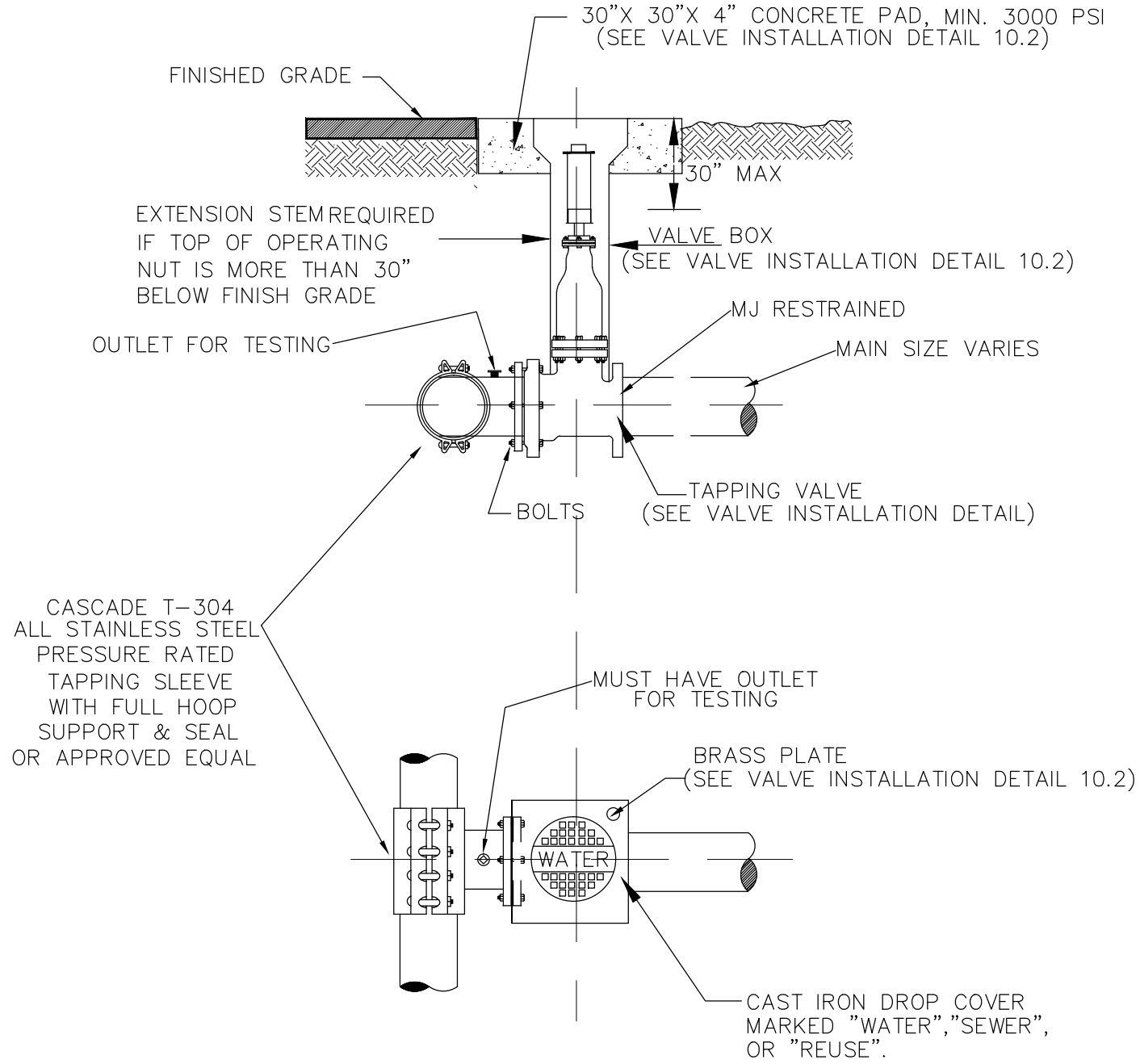
### SHEET INDEX



DATE: 08/06/14

NOT TO SCALE

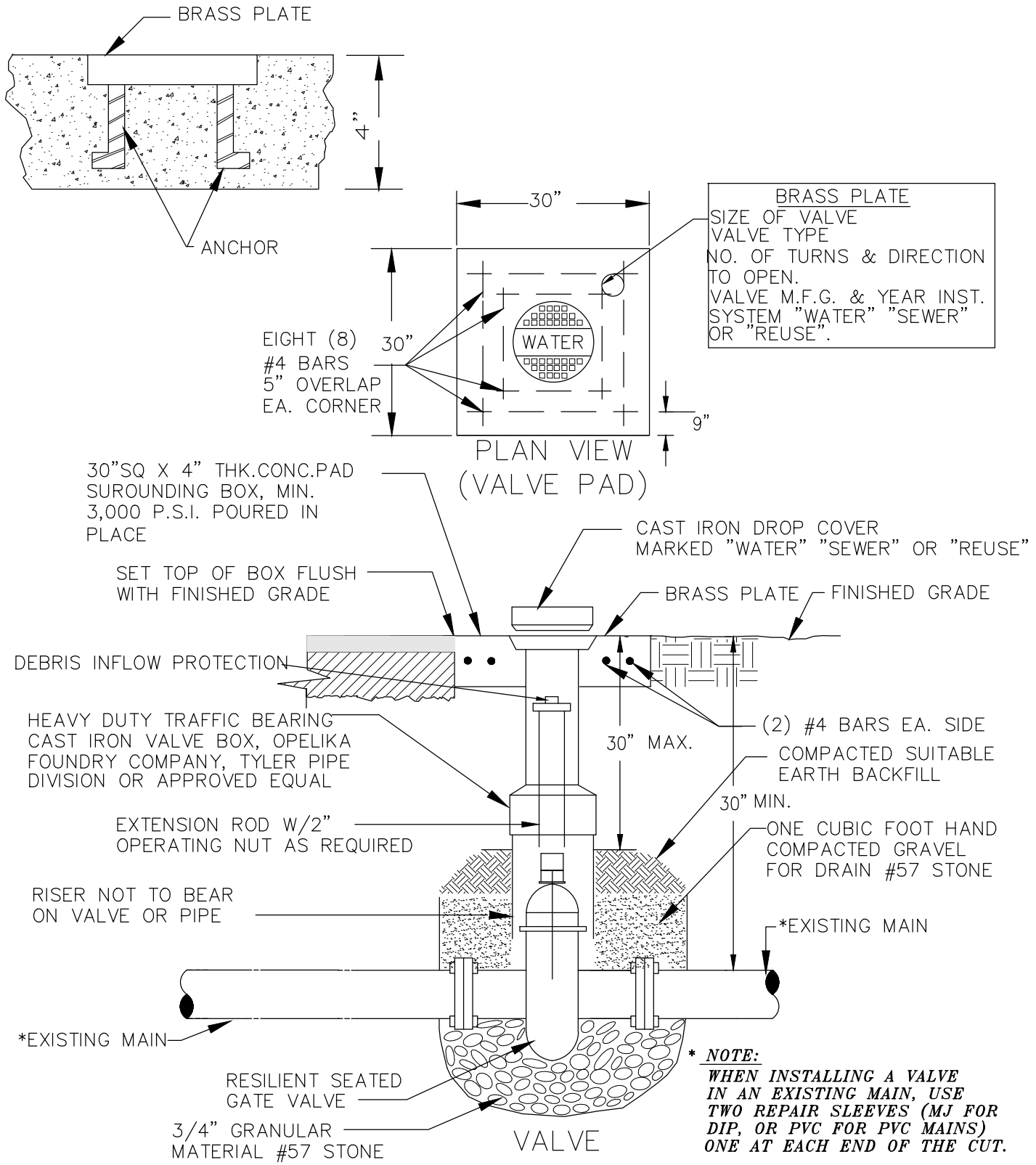
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.1
## TAPPING SLEEVE AND VALVE




DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.2
## GATE VALVE INSTALLATION




* ***NOTE:***
***WHEN INSTALLING A VALVE IN AN EXISTING MAIN, USE TWO REPAIR SLEEVES (MJ FOR DIP, OR PVC FOR PVC MAINS) ONE AT EACH END OF THE CUT.***

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.3
## TEMPORARY CONSTRUCTION WATER SERVICE

CONTRACTOR/CUSTOMER SHALL APPLY AT TOWN OF FORT MYERS BEACH FOR TEMPORARY WATER SERVICE THREE DAYS PRIOR TO REQUIRED SERVICE DATE.

THE METER ONLY WILL BE FURNISHED AND INSTALLED BY TOWN OF FORT MYERS BEACH, OR THE UTILITIES CONTRACT OPERATOR.
ALL FITTINGS, PIPING, VALVES AND MATERIALS INCLUDING THE FMB APPROVED REDUCED PRESSURE BACKFLOW PREVENTION DEVICE SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR/CUSTOMER.

CONTRACTOR/CUSTOMER FURNISHED REDUCED PRESSURE BACKFLOW PREVENTION DEVICE MUST BE INSTALLED WHEN METER IS INSTALLED BY TOWN OF FORT MYERS BEACH. THE APPROVED BACKFLOW PREVENTION DEVICE SHALL BE TESTED AND CERTIFIED BY TOWN OF FORT MYERS BEACH UTILITIES APPROVED CERTIFIED BACKFLOW PREVENTION TECHNICIAN (FURNISHED BY CONTRACTOR/CUSTOMER) AT TIME OF METER INSTALLATION.

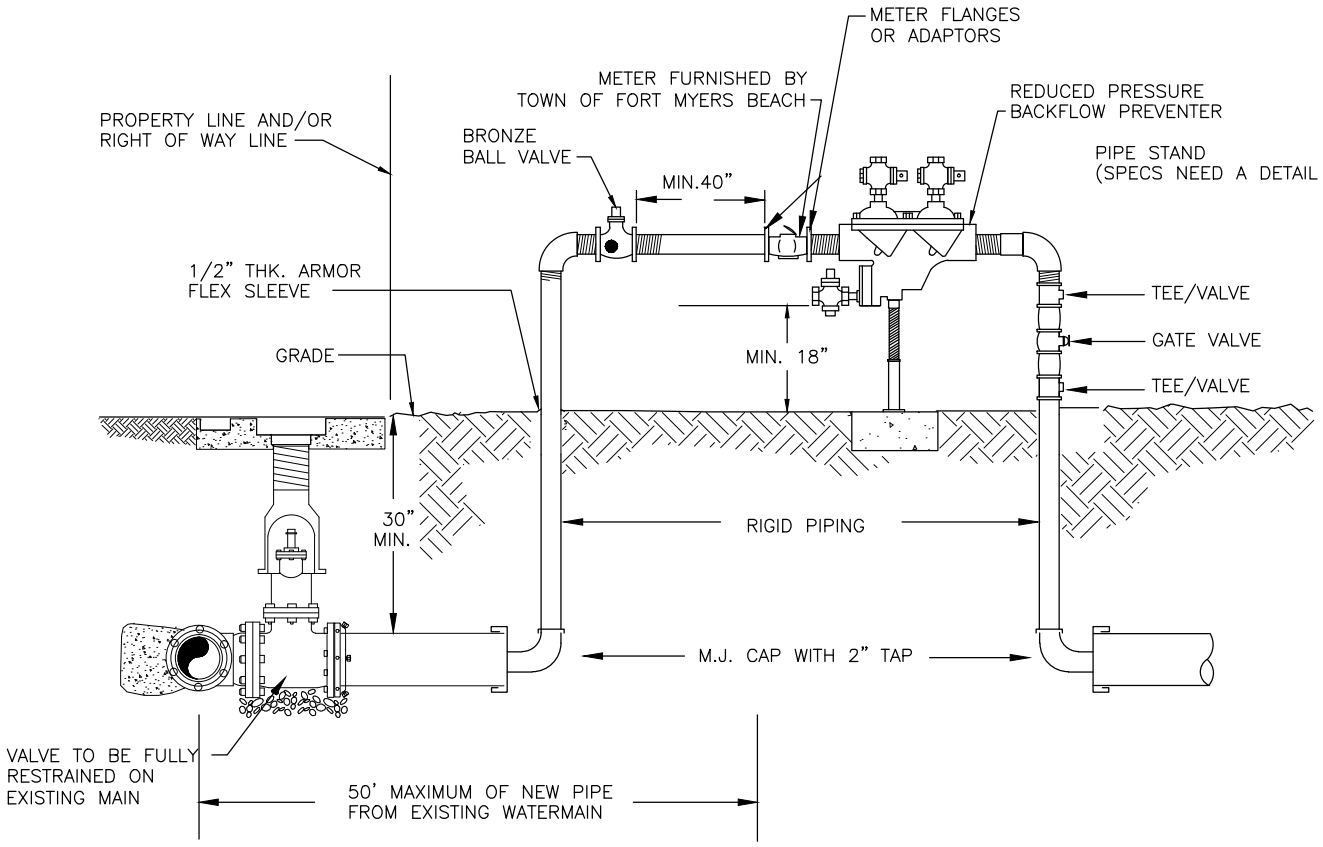
CONTRACTOR/CUSTOMER SHALL PROTECT THE ASSEMBLY FROM DAMAGE.

TEMPORARY CONSTRUCTION JUMPER/METER ASSEMBLY SHALL NOT BE REMOVED UNTIL SYSTEM IS ACCEPTED AND DEPARTMENT OF HEALTH CERTIFICATION AND CLEARANCE FOR SERVICE FORM HAS BEEN RECEIVED BY TOWN OF FORT MYERS BEACH.

WHEN THE NEW SYSTEM IS ACCEPTED, THE TEMPORARY CONSTRUCTION JUMPER METER ASSEMBLY MUST BE COMPLETELY REMOVED FROM M.J. CAP TO M.J. CAP AND A NEW WATER MAIN PIPE IS TO BE CHLORINATED AND INSTALLED.

BY APPLYING FOR SERVICE, CONTRACTOR/CUSTOMER AGREES TO TAKE WATER SERVICE FROM TOWN OF FORT MYERS BEACH IN ACCORDANCE WITH THE APPROPRIATE RATE SCHEDULE AND IN ACCORDANCE WITH TOWN OF FORT MYERS BEACH RULES AND REGULATION.

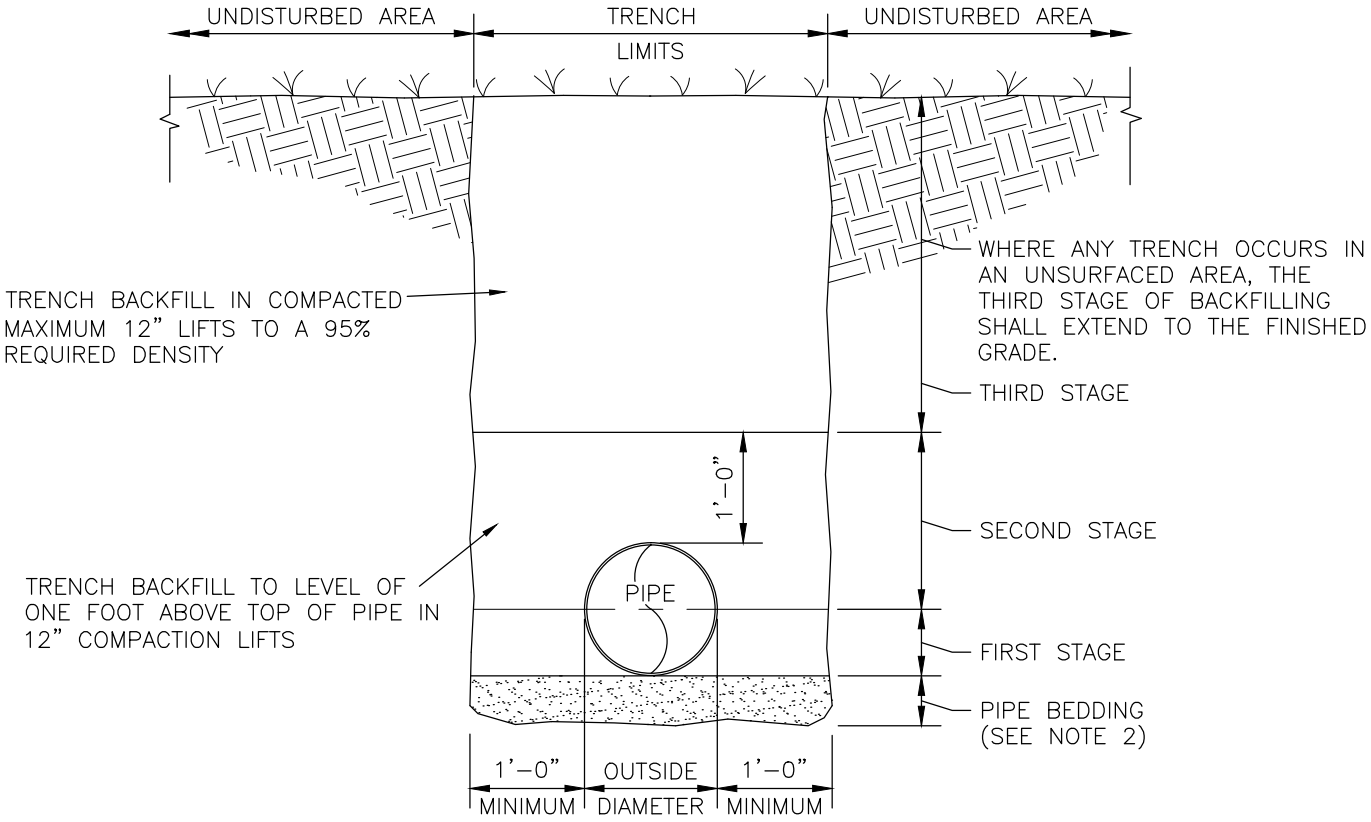
CONTRACTOR/CUSTOMER IS RESPONSIBLE FOR BACTERIALOGICAL TESTING AFTER CONNECTION OF TEMPORARY WATER SERVICE.




DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.4
## UNPAVED AREA TRENCH BACKFILL DETAIL



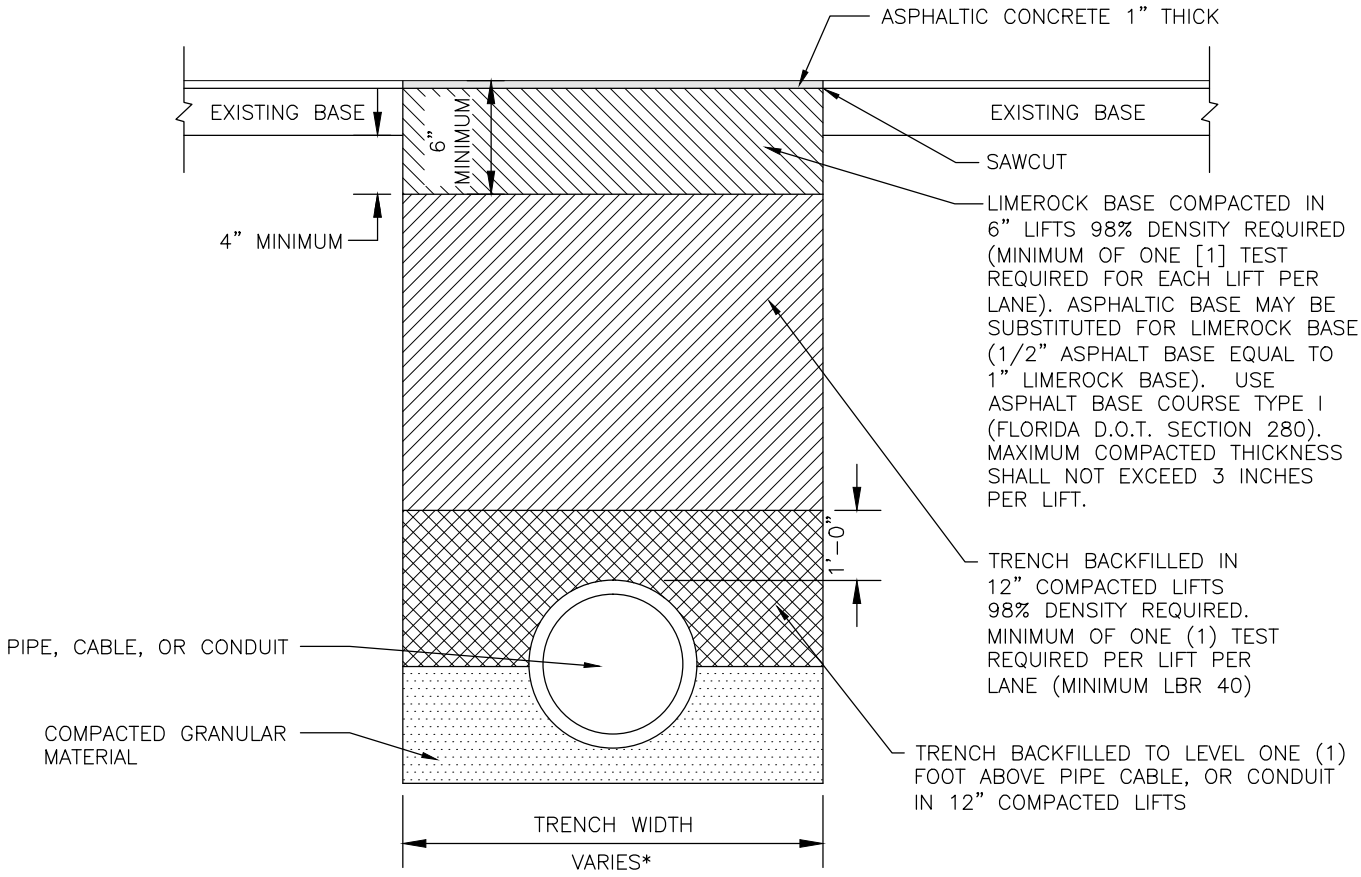

NOTES:

1. BACKFILL SHALL BE OF SUITABLE MATERIAL REMOVED FROM EXCAVATION EXCEPT WHERE OTHER MATERIAL IS SPECIFIED. BACKFILL MATERIAL SHALL CONSIST OF EARTH, LOAM, SANDY CLAY, GRAVEL, CRUSHED LIMESTONE, OR OTHER APPROVED MATERIAL. REFER TO TECHNICAL SPECIFICATIONS FOR DETAIL REQUIREMENTS.
2. IF TRENCH BOTTOM CONTAINS ROCK, THEN A MINIMUM OF A 6" PIPE BEDDING SHALL BE USED

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.4a
## ROAD AND TRENCH RESTORATION
## FOR LOCAL ROADS




*TRENCH WIDTH = PIPE OUTSIDE DIAMETER PLUS 2 FEET

NOTES:

1. ALL MODIFIED PROCTOR AND DENSITY TESTS SHALL BE TAKEN BY A CERTIFIED LABORATORY.
2. ALL TESTS SHALL BE COMPLETED AND SHALL MEET MINIMUM DENSITY REQUIREMENTS PRIOR TO ADDITIONAL BACKFILLING.
3. RIGHT-OF-WAY PERMIT STIPULATIONS OVERRIDE THIS DETAIL WHERE TRENCH IS LOCATED WITHIN A COUNTY RIGHT-OF-WAY.

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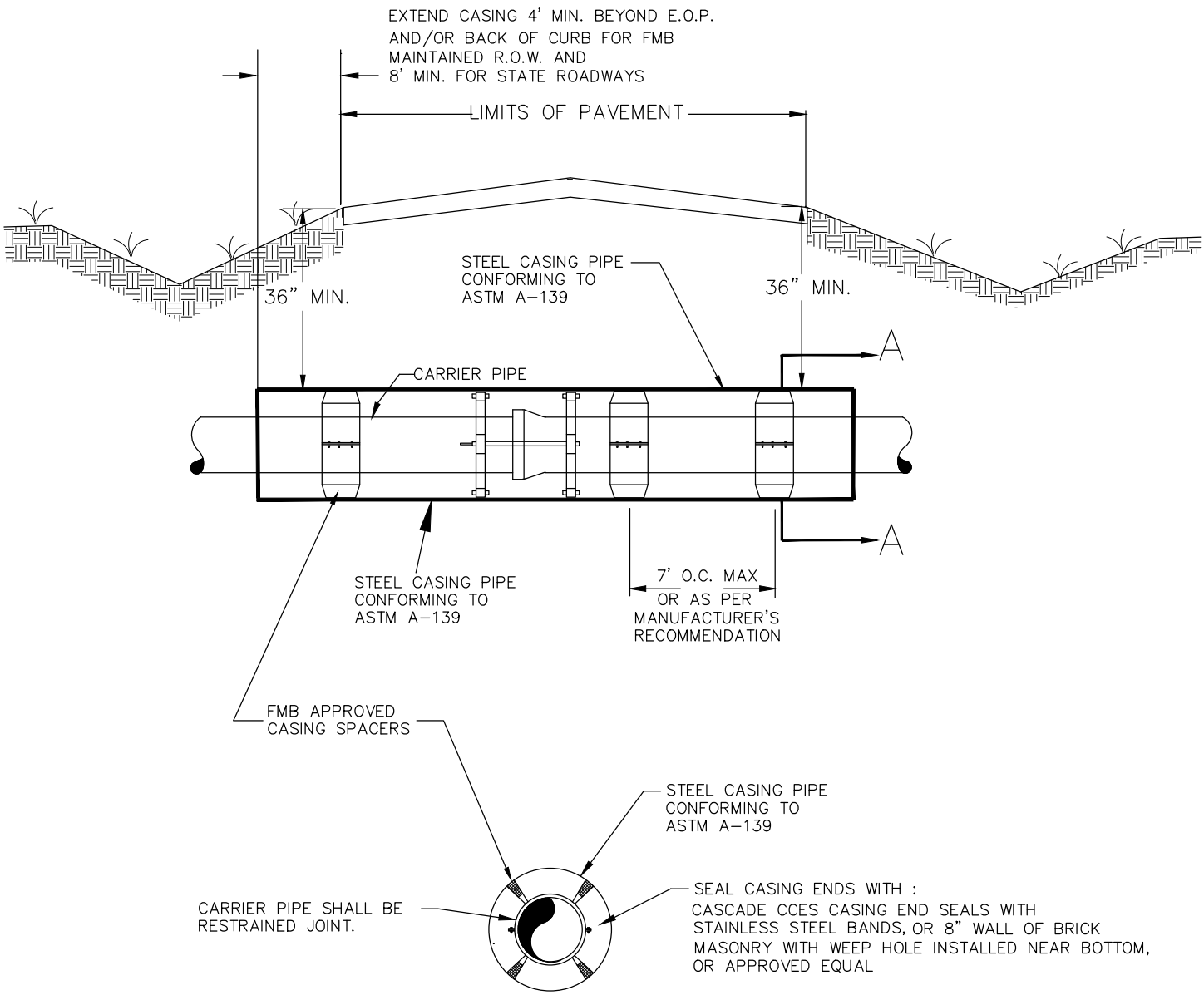
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.5
## JACK AND BORE

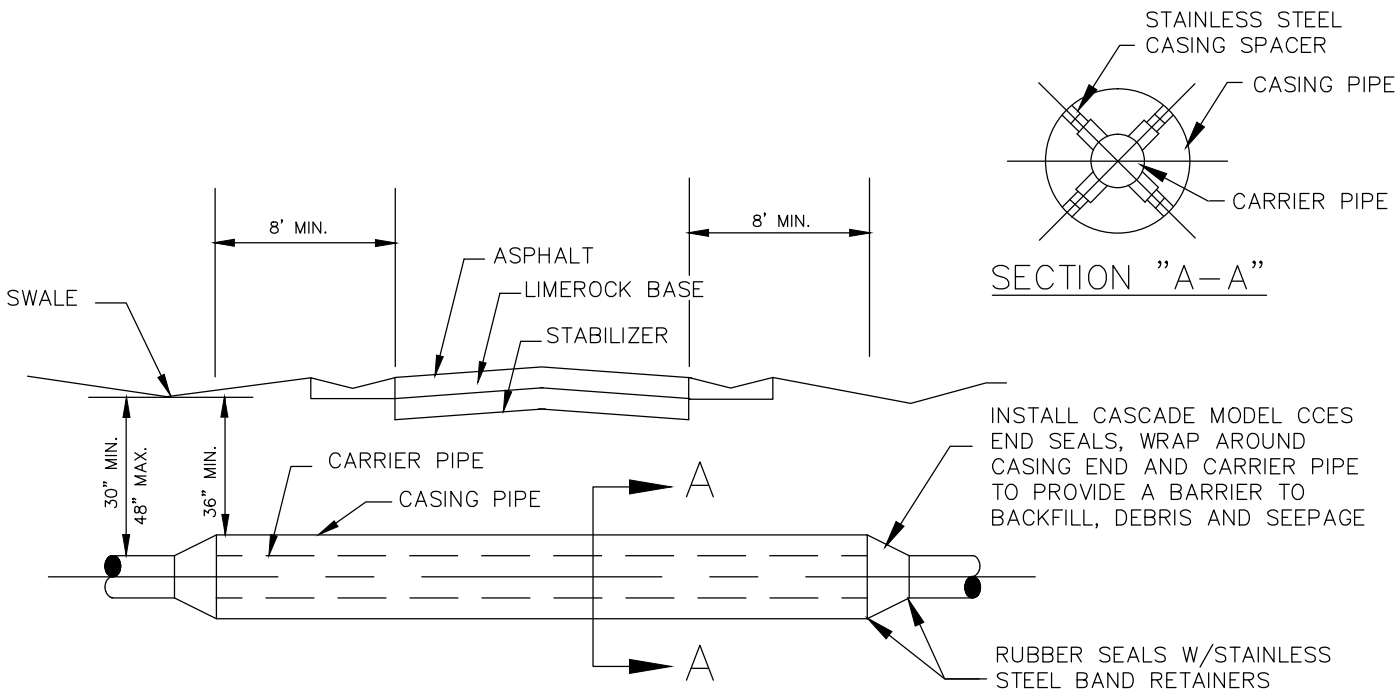



SECTION "A-A"

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.5a
## JACK AND BORE




### SPACERS

ALL CASING SPACERS SHALL BE OF THE TYPE MANUFACTURED BY PIPELINE SEAL AND INSULATORS, MODEL C8G–2 16–INCH AND SMALLER, AND MODEL C12G–2 18–INCH THRU 36–INCH, OR APPROVED EQUAL BY ENGINEER. ALL CASING SPACERS LARGER THAN 36–INCH SHALL BE FACTORY DESIGNED, TAKING IN CONSIDERATION THE WEIGHT OF THE CARRIER PIPE FILLED WITH WATER. ALL CALCULATIONS AND DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

### PLACEMENT OF SPACERS

1) GENERAL – ONE SPACER SHALL NOT BE PLACED MORE THAN TWO FEET FROM EACH END OF CASING. SUBSEQUENT SPACERS SHALL BE PLACED AT 8'–10" INTERVALS WITHIN THE CASING, OR IN ACCORDANCE WITH THE PIPE MANUFACTURING RECOMMENDATIONS.

2) PVC CARRIER – ONE SPACER SHALL BE PLACED ON THE SPIGOT END OF EACH SEGMENT AT THE LINE MARKING THE LIMIT OF INSERT INTO THE BELL OF THE JOINT SO THAT THE SPACER PUSHES THE JOINT AND RELIEVES COMPRESSION WITHIN THE JOINT. SUBSEQUENT SPACERS SHALL BE PLACED AT 8'–0" INTERVALS, OR IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS.

### CARRIER PIPE

CARRIER PIPE SHALL BE CENTERED WITHIN CASING BY USE OF PSI 304 STAINLESS STEEL CASING SPACERS AS MANUFACTURED BY PIPELINE SEAL AND INSULATORS MFG. COMPANY OR APPROVED EQUAL.

### CASING PIPE

CASING PIPE SHALL BE PRIME STEEL PIPE CONFORMING TO THE REQUIREMENTS OF ASTM DESIGNATION A–139.

### NOTE:

UNDERGROUND CROSSING REQUIRED A MINIMUM VERTICAL CLEARANCE OF 48" BELOW PAVEMENT SURFACE FOR FREEWAYS, 36" FOR OTHER HIGHWAYS OR 30" BELOW UNPAVED GROUND INCLUDING DITCH GRADE PER F.D.O.T.

UP TO 14" CARRIER PIPE – 4 REQ'D.
OVER 14" THROUGH 36" CARRIER PIPE – 6 REQ'D.
OVER 36" THROUGH 48" CARRIER PIPE – 7 REQ'D.

| CARRIER PIPE NOMINAL SIZE INCHES | CASING PIPE OUTSIDE DIAMETER INCHES | CASING PIPE WALL THICKNESS INCHES |
|---|---|---|
| 4" | 16" | 0.250" |
| 6" | 18" | 0.250" |
| 8" | 20" | 0.250" |
| 10" | 22" | 0.250" |
| 12" | 26" | 0.312" |
| 14" | 28" | 0.312" |
| 16" | 30" | 0.312" |
| 18" | 34" | 0.375" |
| 20" | 36" | 0.375" |
| 24" | 42" | 0.500" |

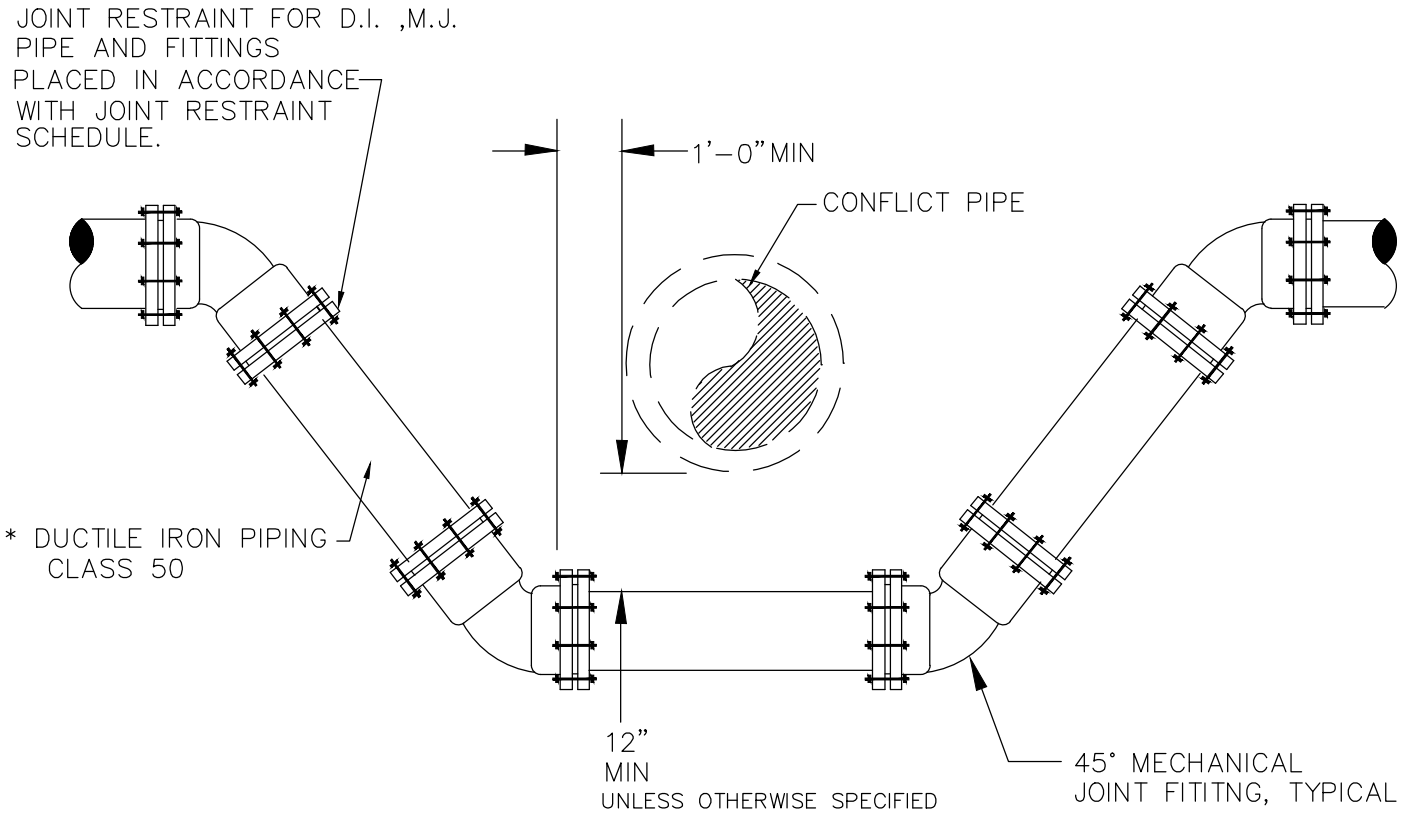
DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.6
## WATER PRESSURE LINE VERTICAL OFFSET
## WITH DUCTILE IRON MJ FITTINGS & PIPE

JOINT RESTRAINT DEVICES FOR MECHANICAL JOINT DUCTILE IRON FITTINGS & PIPING SHALL BE:

EBAA IRON INC., –SERIES 1100,
STAR PIPE PRODUCTS RESTRAINTS
OR APPROVED EQUAL




* IF MECHANICAL JOINT DUCTILE IRON FITTINGS ARE USED IN CONJUNCTION WITH P.V.C. PIPE, RESTRAINT DEVICES SHALL BE:

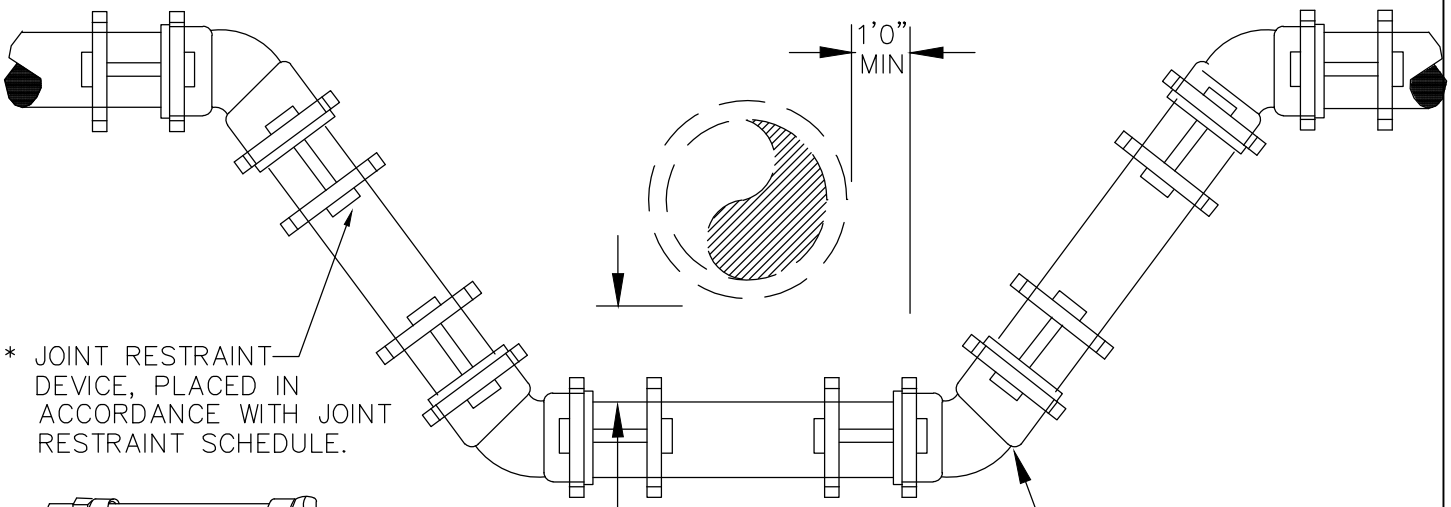
EBAA IRON INC., –SERIES 2000 PV
UNIFLANGE –SERIES 1300
STAR PIPE PRODUCTS RESTRAINTS
OR APPROVED EQUAL

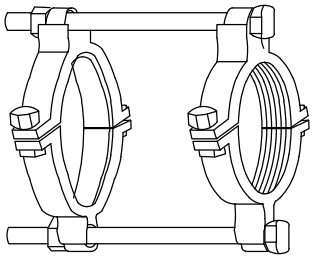
DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.7
## WASTE WATER FORCE MAIN VERTICAL OFFSET WITH FITTINGS, (P.V.C.)

JOINT RESTRAINT FOR PUSH–ON JOINT
P.V.C. OR D.I.P. FITTINGS & PIPING
SIZE AND TYPE AS SPECIFIED ON PLAN



*JOINT RESTRAINING DEVICES FOR PUSH–ON JOINT P.V.C. OR D.I.P. FITTINGS & PIPING SHALL BE:

EBAA IRON INC., –SERIES 1600, 1700, OR 2800
UNIFLANGE –SERIES 1300, 1360, OR 1390
ROMAC –SERIES 600
STAR PIPE PRODUCTS RESTRAINTS
OR APPROVED EQUAL

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.8
## THRUST BLOCK DETAIL FOR EXISTING A/C PIPE

| PIPE SIZE | HORIZONTAL BENDS | | | | VERTICAL OFFSETS | | DEAD ENDS Lr (FT.) |
|---|---|---|---|---|---|---|---|
| | 90° BENDS Lr (FT.) | 45° BENDS Lr (FT.) | 22.5° BENDS Lr (FT.) | 11.25° BENDS Lr (FT.) | 45° BENDS (SEE NOTE 2) Lhs (FT.) | 45° BENDS (SEE NOTE 2) Lls (FT.) | |
| 4" | 17 | 8 | 4 | 2 | 16 | 4 | 38 |
| 6" | 24 | 10 | 5 | 3 | 22 | 6 | 53 |
| 8" | 31 | 13 | 7 | 4 | 29 | 7 | 70 |
| 10" | 37 | 16 | 8 | 4 | 35 | 9 | 84 |
| 12" | 43 | 18 | 9 | 5 | 41 | 10 | 99 |
| 16" | 55 | 23 | 11 | 6 | 53 | 13 | 127 |
| 20" | 66 | 28 | 13 | 7 | 64 | 15 | 153 |
| 24" | 76 | 32 | 15 | 8 | 74 | 18 | 179 |

| TEES | | | | REDUCERS (SEE NOTES) | |
|---|---|---|---|---|---|
| RUN SIZE | BRANCH SIZE | Lrn (FT.) | Lbr (FT.) | SIZE | L(B) (FT.) |
| 4" | 4" | 10 | 2 | 6 X 4 | 28 |
| 6" | 6" | 10 | 16 | 8 X 6 | 30 |
| | 4" OR LESS | 10 | 1 | 8 X 4 | 50 |
| 8" | 8" | 10 | 32 | 10 X 8 | 28 |
| | 6" | 10 | 4 | 10 X 6 | 52 |
| | 4" OR LESS | 10 | 1 | 12 X 10 | 29 |
| 10" | 10" | 10 | 46 | 12 X 8 | 52 |
| | 8" | 10 | 22 | 16 X 12 | 54 |
| | 6" OR LESS | 10 | 1 | 16 X 10 | 75 |
| 12" | 12" | 10 | 60 | 20 X 16 | 54 |
| | 10" | 10 | 38 | 20 X 12 | 96 |
| | 8" | 10 | 12 | 24 X 20 | 54 |
| | 6" OR LESS | 10 | 1 | 24 X 16 | 98 |
| 16" | 16" | 10 | 87 | | |
| | 12" | 10 | 45 | | |
| | 10" | 10 | 20 | | |
| | 8" OR LESS | 10 | 1 | | |
| 20" | 20" | 10 | 113 | | |
| | 16" | 10 | 75 | | |
| | 12" | 10 | 29 | | |
| | 10" OR LESS | 10 | 1 | | |
| 24" | 24" | 10 | 138 | | |
| | 20" | 10 | 103 | | |
| | 16" | 10 | 63 | | |
| | 12" OR LESS | 10 | 1 | | |

NOTES:

1. LENGTH SHOWN ON THIS TABLE ARE TO BE INTERPRETED AS FOLLOWS:
   Lhs = RESTRAINED LENGTH FROM HIGH SIDE FITTING OF A VERTICAL BEND.
   Lls = RESTRAINED LENGTH FROM LOW SIDE FITTING OF A VERTICAL BEND.
   Lr = RESTRAINED LENGTH FROM BOTH SIDES OF FITTING.
   Lrn = MINIMUM LENGTH TO FIRST JOINT OF RUN BOTH SIDES.
   Lbr = RESTRAINED LENGTH REQUIRED ON BRANCH FROM FITTINGS.
   L(B) = RESTRAINED LENGTH ON LARGE SIDE OF REDUCER.

2. A SAFETY FACTOR OF 1.5 IS USED FOR VERTICAL OFFSETS TO COMPENSATE FOR SATURATED SOIL CONDITIONS.

3. THE FOLLOWING ARE ASSUMED:
   4"–10" PIPE HAS A 30" MIN. COVER
   12"–24" PIPE HAS 36" MIN. COVER
   4"–24" PIPE IS PVC

4. VALVES SHALL BE RESTRAINED ON EITHER SIDE OF THE FITTING AS A MINIMUM. IN LINE VALVES SHALL HAVE NO FITTINGS WITHIN THE LENGTHS SHOWN ON THIS TABLE FOR THE SAME SIZE DEAD END. IN CASES WHERE THIS LENGTH CAN NOT BE PROVIDED FREE OF FITTINGS. ADDITIONAL RESTRAINT SHALL BE REQUIRED AS APPROVED BY ENGINEER.

5. ALL DEAD END LINES, PERMANENT OR TEMPORARY, SHALL BE RESTRAINED PER THE ABOVE RESTRAINT TABLE.

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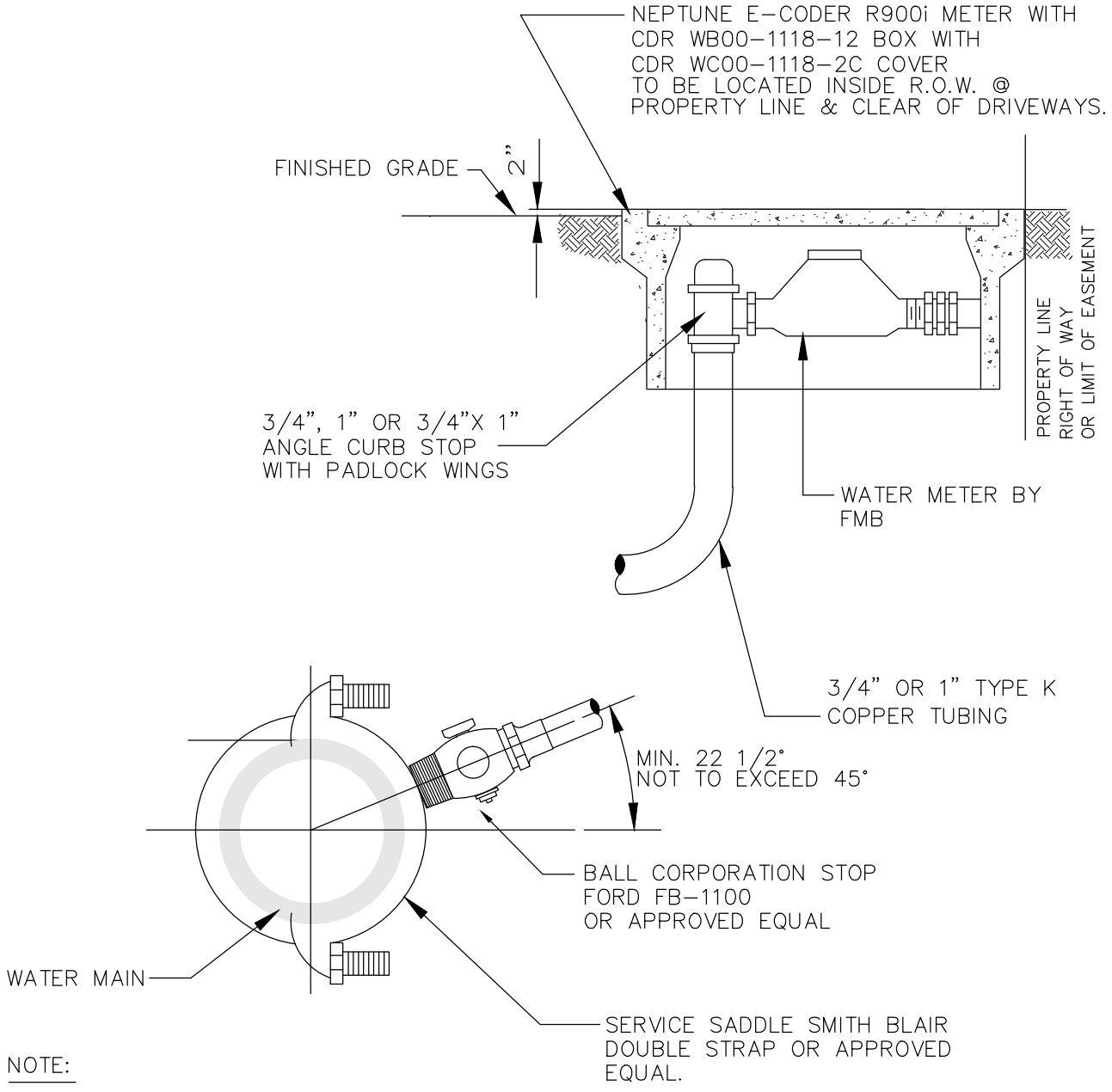
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.9
## WATER SERVICE INSTALLATION
## 5/8" THROUGH 1"




NOTE:

1. TUBING UNDER ROADWAY SHALL BE ENCASED IN 2" P.V.C. PIPE SCHEDULE 40 MINIMUM AND EXTEND 4 FEET BEYOND THE EDGES OF PAVEMENT OR BACK OF CURB.
2. CURB STOP SHALL BE FORD TYPE KV43-332W FOR 3/4", KV43-342W FOR 1" X 3/4" OR KV43-444W FOR 1" OR APPROVED EQUAL

ALTERNATIVE:

POLYETHYLENE, PE 3408 (200 PSI SDR 9, ASTM D3350), TUBING MAY BE SUBSTITUTED. COLOR FOR WATER SHALL BE BLUE.

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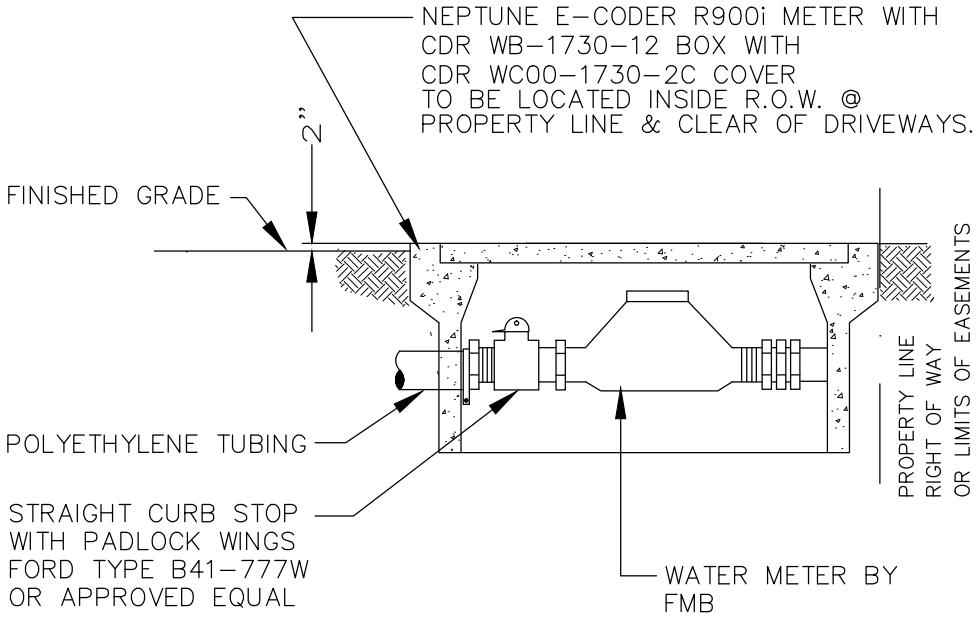
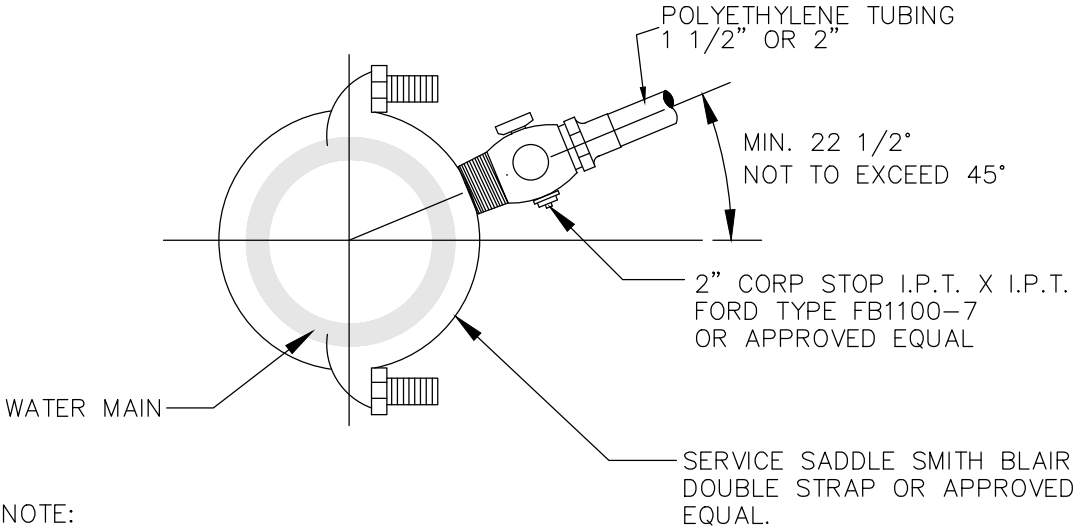
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.10
## WATER SERVICE INSTALLATION
## 1-1/2" THROUGH 2"




NOTE:

1. TUBING UNDER ROADWAY SHALL BE ENCASED IN P.V.C. PIPE SCHEDULE 40 MINIMUM AND EXTEND 4 FEET BEYOND THE EDGES OF PAVEMENT OR BACK OF CURB.

ALTERNATIVE:

POLYETHYLENE, PE 3408 (200 PSI SDR 9, ASTM D3350), TUBING MAY BE SUBSTITUTED. COLOR FOR WATER SHALL BE BLUE.

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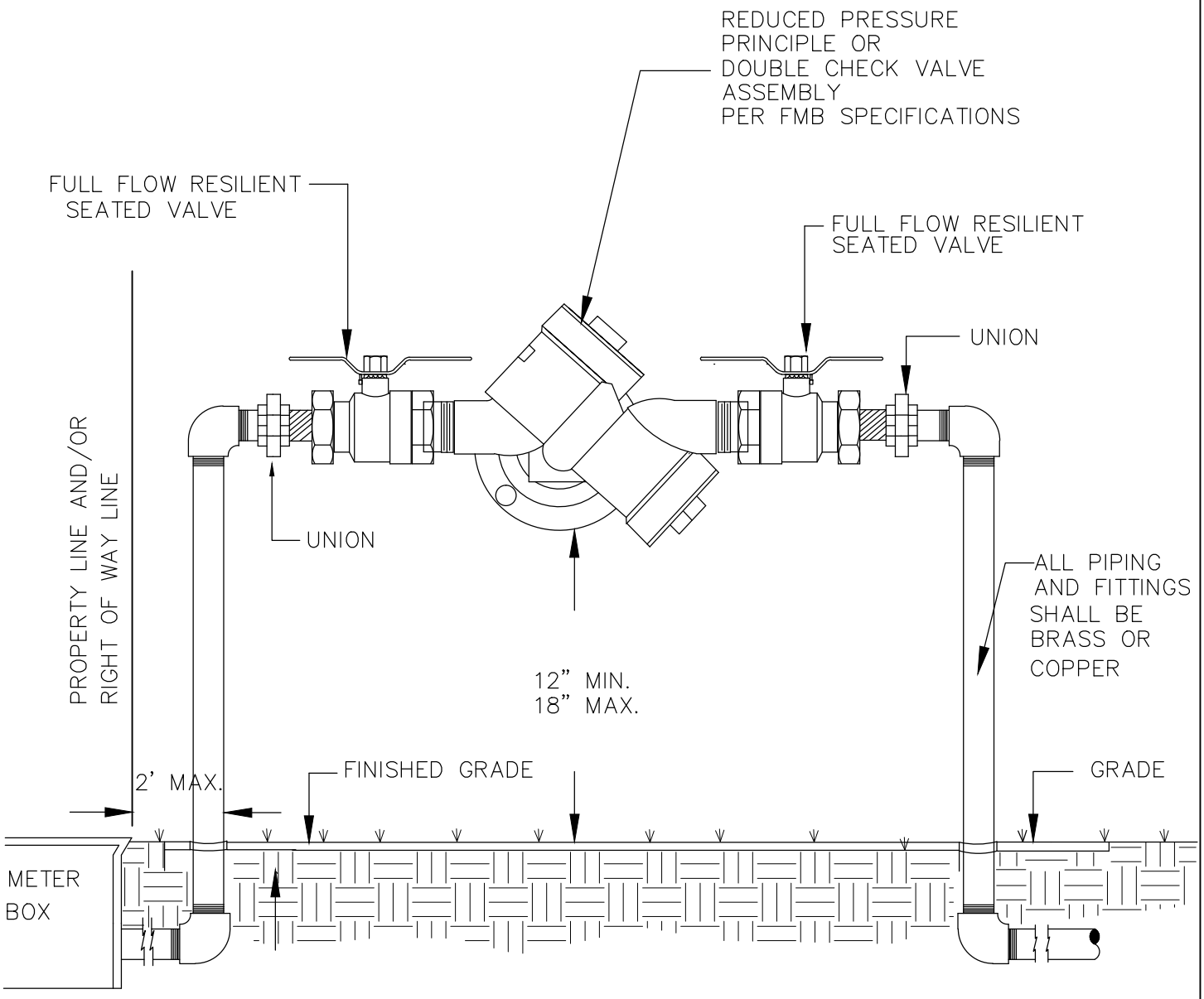
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.11
## 3/4" TO 2"CROSS CONNECTION CONTROL ASSEMBLY



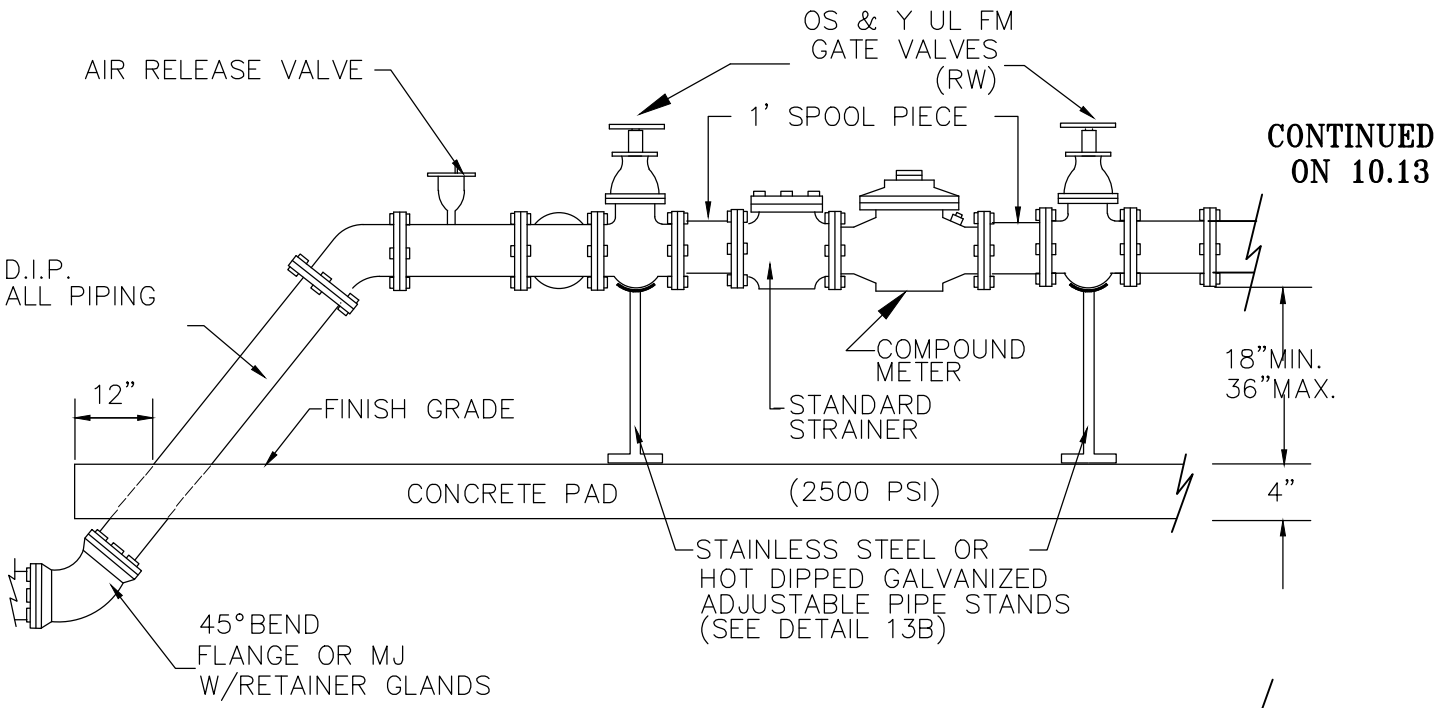

NOTES: 1. DIELECTRIC UNIONS REQUIRED
2. INITIAL AND ANNUAL DEVICE TESTING REQUIRED

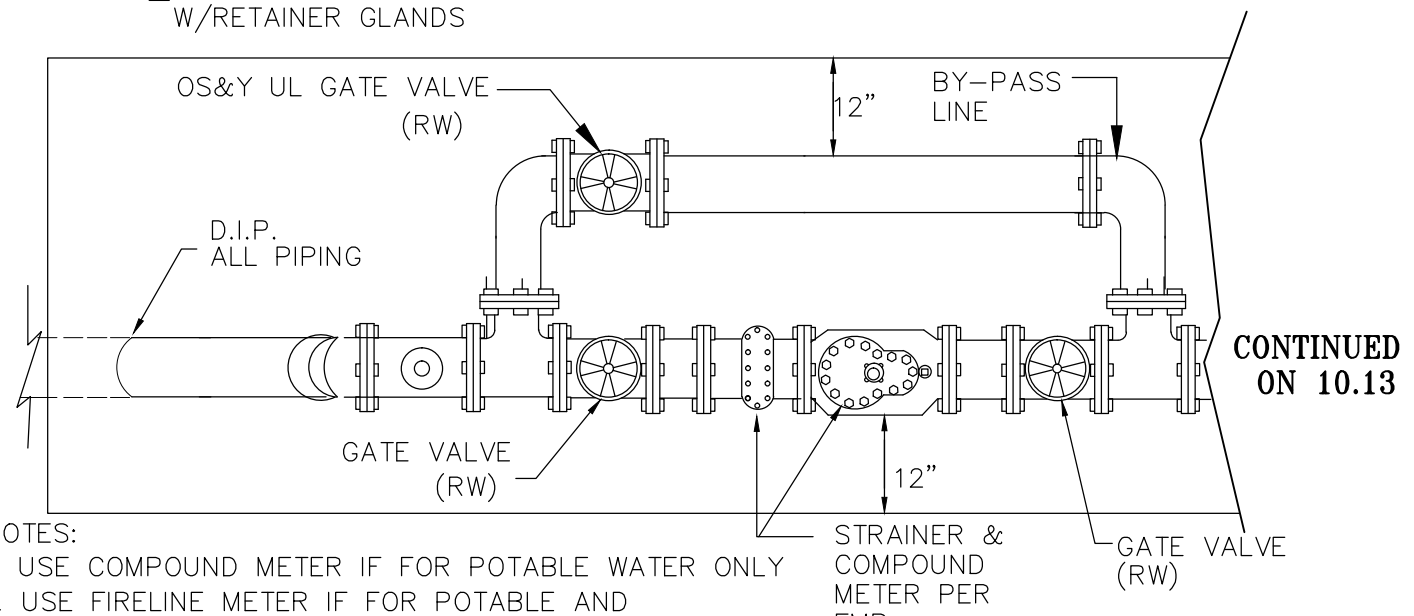
DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.12

## 2 1/2" OR LARGER COMPOUND METER AND/OR CROSS CONNECTION CONTROL ASSEMBLY




NOTES:

1. USE COMPOUND METER IF FOR POTABLE WATER ONLY
2. USE FIRELINE METER IF FOR POTABLE AND FIRE SUPPRESSION BOTH
3. ALL PIPING BETWEEN THE BELOW GROUND 45° BENDS AND THROUGH THE ASSEMBLY SHALL BE DIP, PRESSURE CLASS 350 ABOVE GROUND DIP SHALL BE FLANGED

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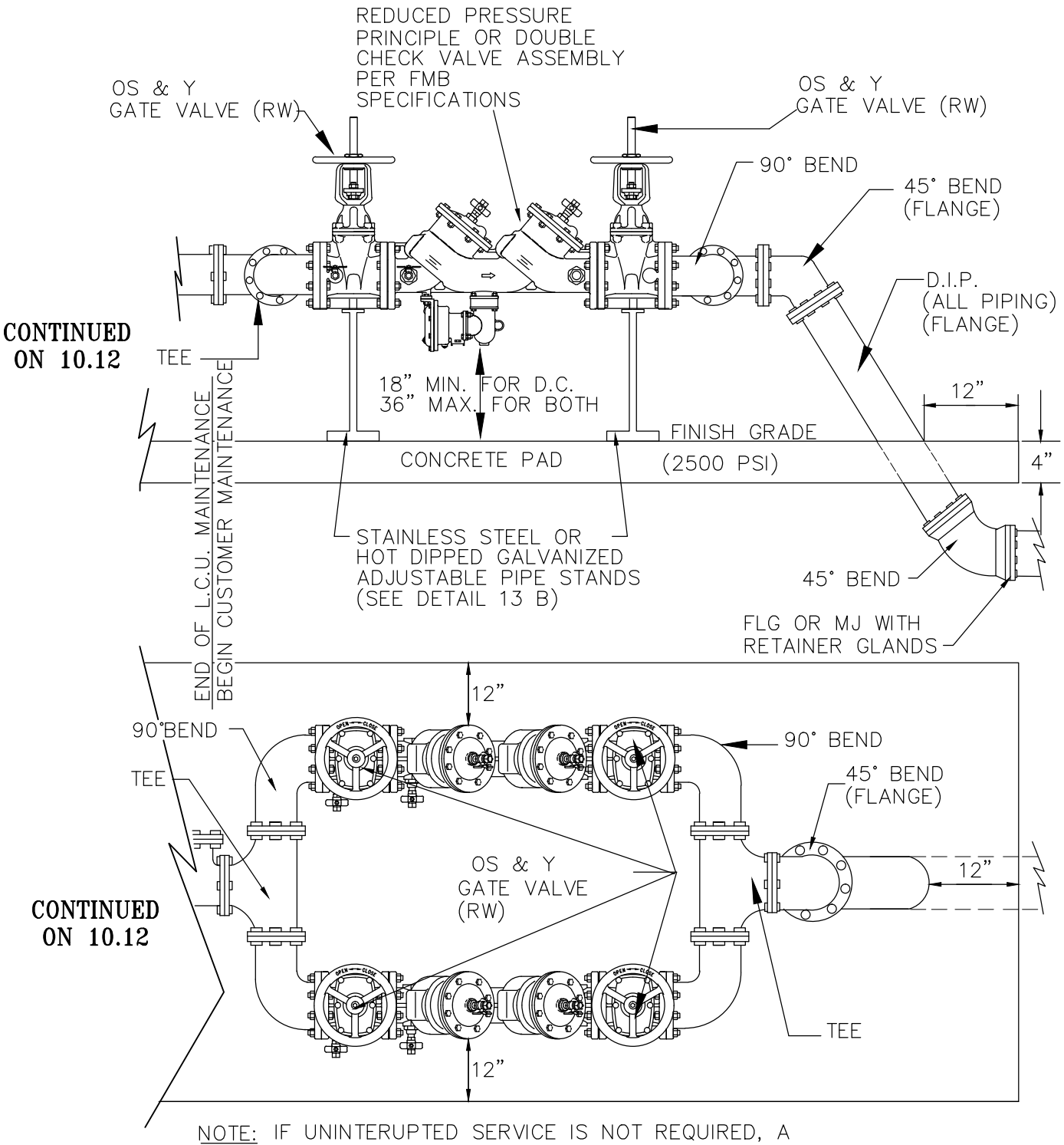
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.13

## 2 1/2" OR LARGER COMPOUND METER AND/OR CROSS CONNECTION CONTROL ASSEMBLY

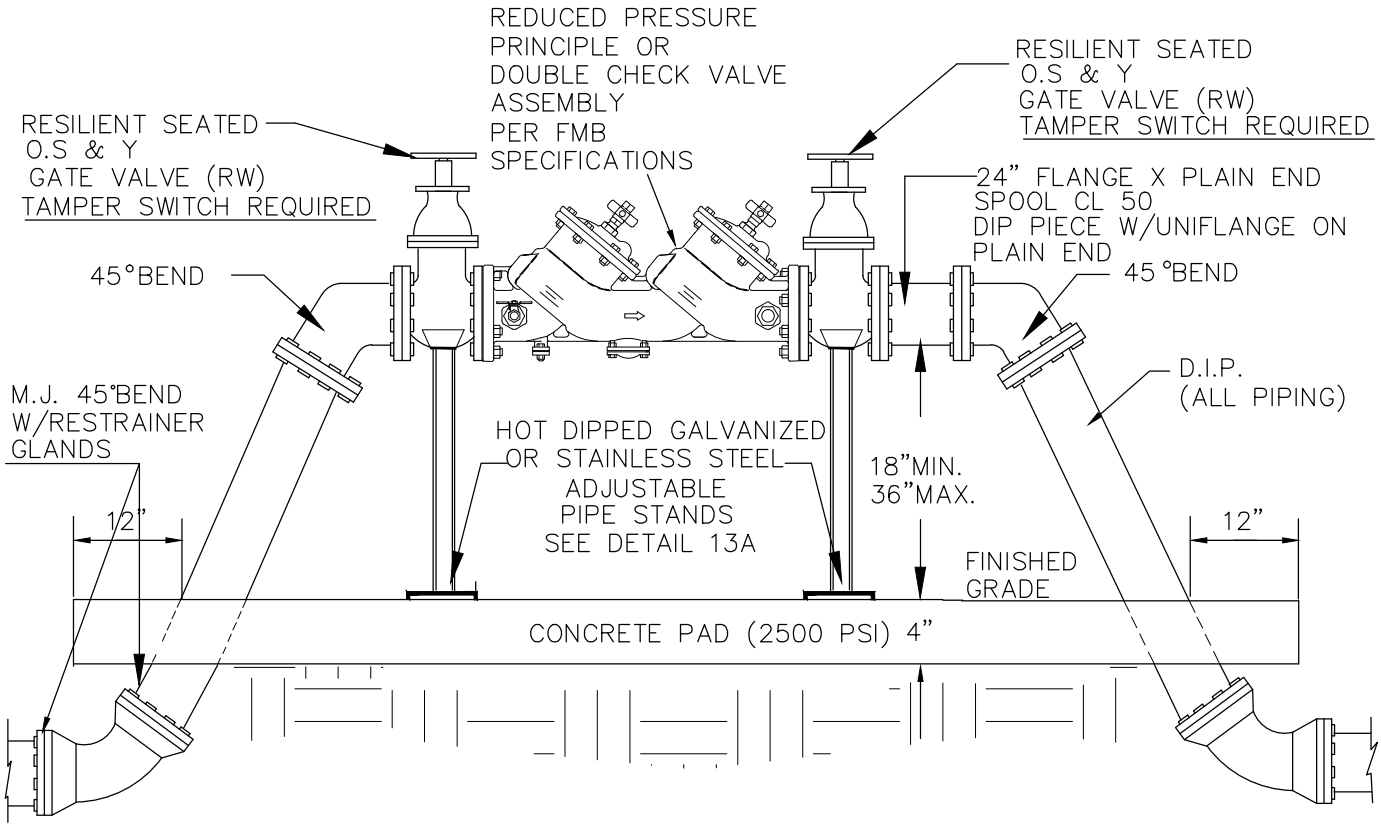


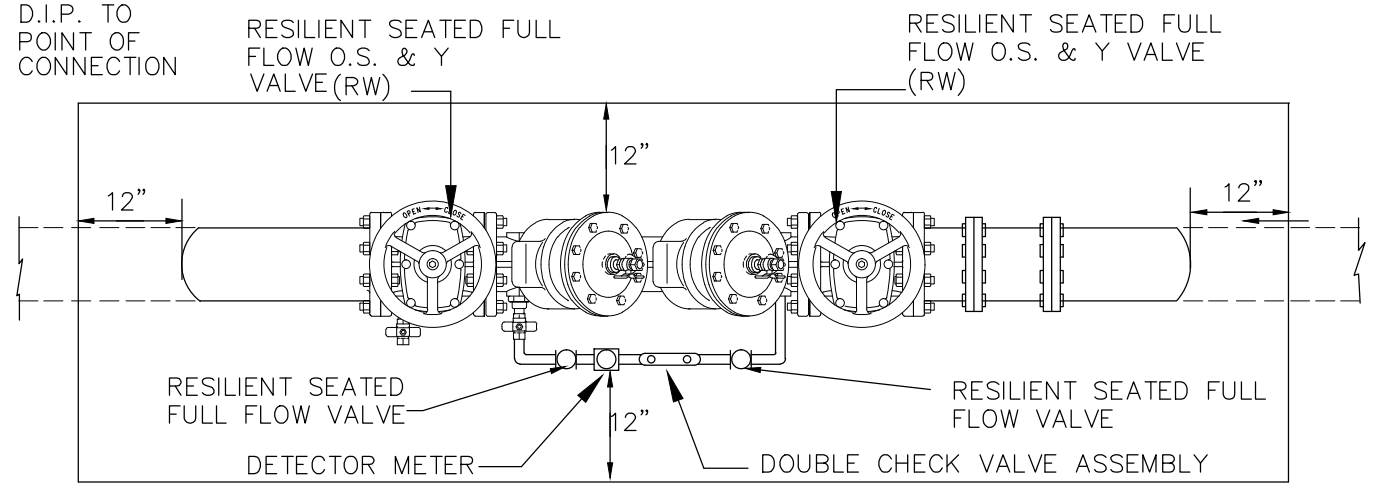

NOTE: IF UNINTERUPTED SERVICE IS NOT REQUIRED, A SINGLE BACKFLOW PREVENTION DEVICE MAY BE INSTALLED, AND TEES AND BENDS ELIMINATED.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.14
## 2 1/2" CROSS CONNECTION CONTROL ASSEMBLY



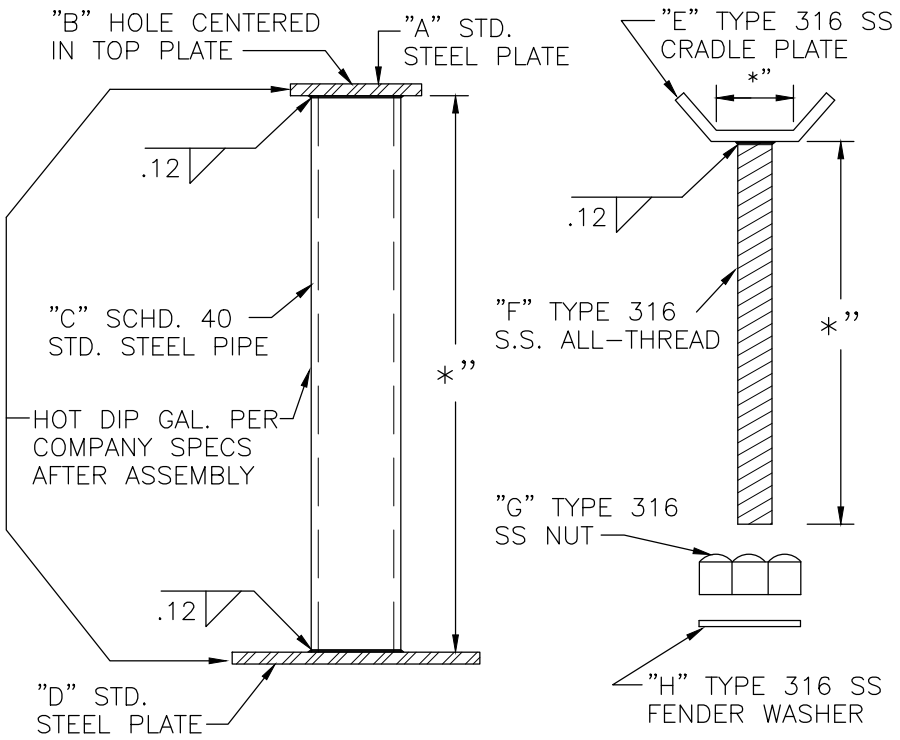




NOTE: 1. PAINT IN ACCORDANCE WITH FMB OPERATIONS MANUAL.
2. ALL PIPING BETWEEN THE BELOW GROUND 45 BENDS AND THROUGH THE ASSEMBLY SHALL BE DIP, PRESSURE CLASS350 ABOVE GROUND DIP SHALL BE FLANGED

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.15
## PIPING SUPPORT



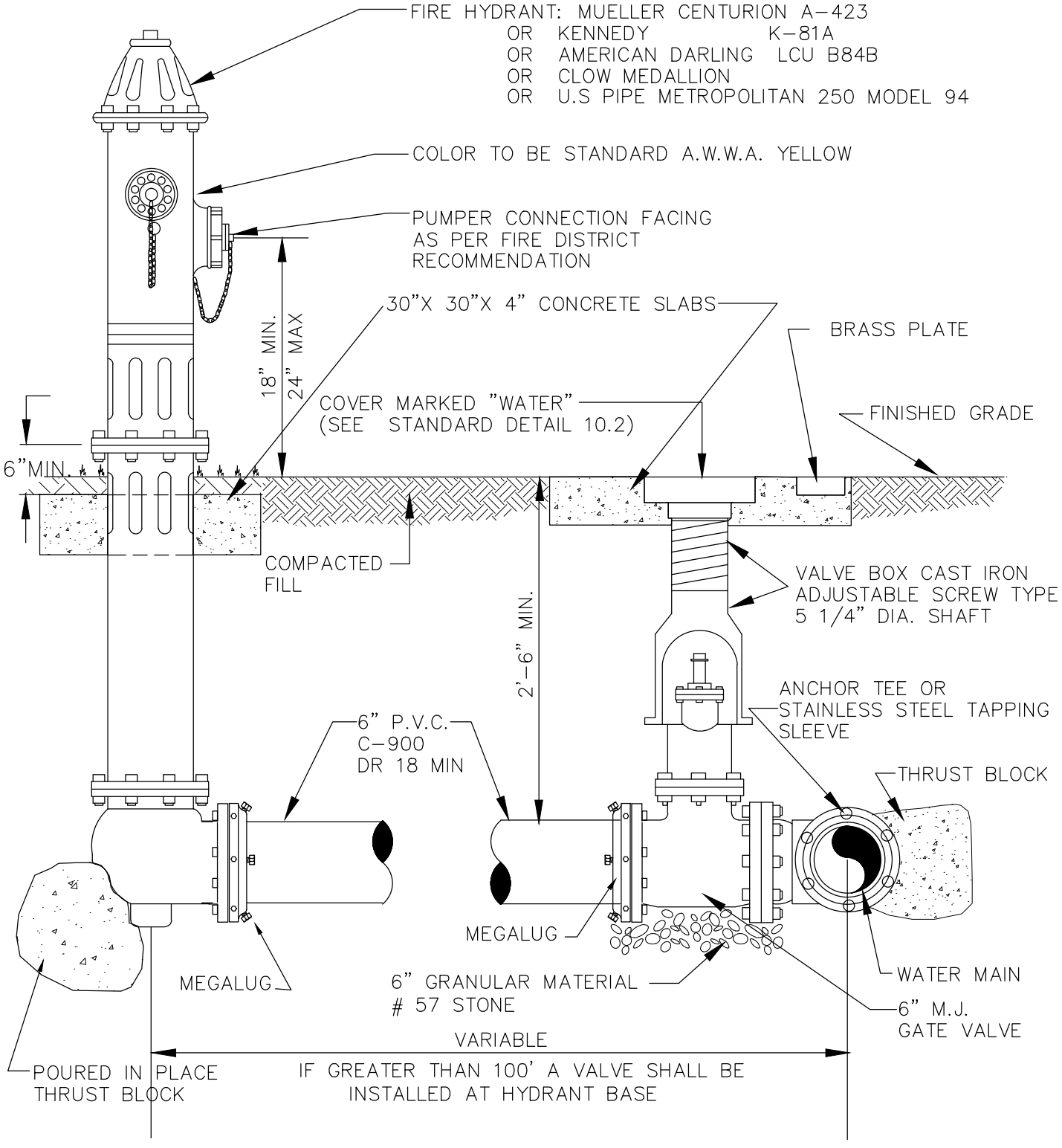

* LENGTH VARIES DEPENDING ON OBJECT BEING SUPPORTED
SEE TABLE THIS SHEET FOR DIMENSIONS A THRU H

| PIPING SUPPORT DIMENSIONS | | | |
|---|---|---|---|
| | FOR 3/4" & 1" | FOR 1-1/2" TO 3" | FOR 4" & LARGER |
| A | 1/4" x 3" x 3" | 1/4"x3-1/4"x3-1/4" | 1/4" x 5" x 5" |
| B | 1.0" | 1.0" | 1-1/2" |
| C | 2.0" | 2-1/2" | 4" |
| D | 1/4" x 6" x 6" | 1/4" x 8" x 8" | 1/4" x 10" x 10" |
| E | 1/4" x 2" X 4" | 1/2" x 2" X 4" | 1/2" x 4" x 6" |
| F | 3/4" | 7/8" | 1-1/4" |
| G | 3/4" | 7/8" | 1-1/4" |
| H | 1.0" | 1.0" | 1-1/2" |

DATE: 08/06/14

NOT TO SCALE

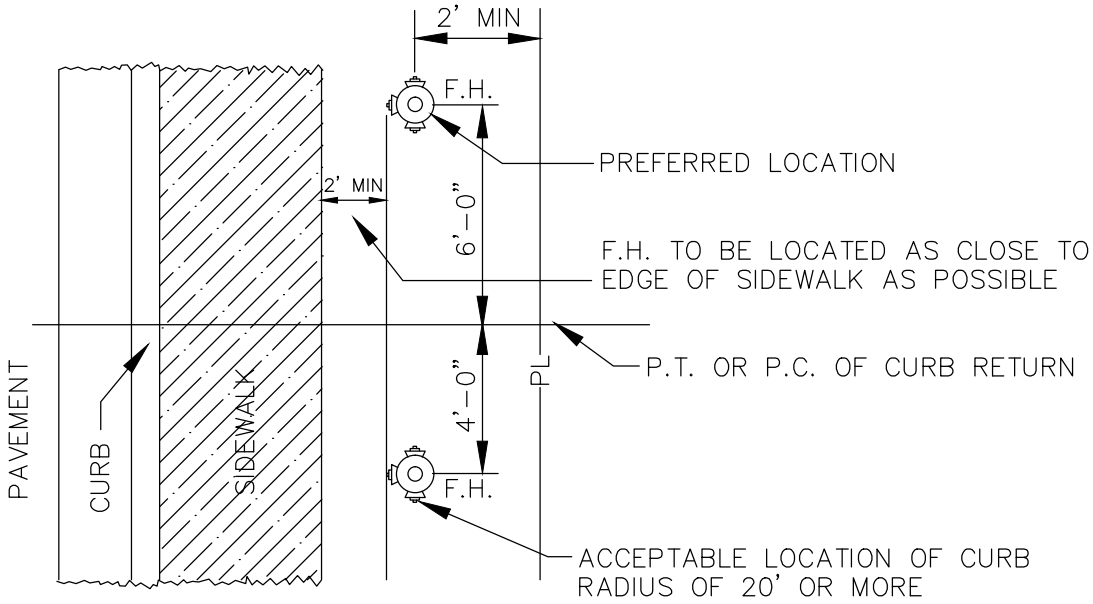
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.16
## FIRE HYDRANT ASSEMBLY

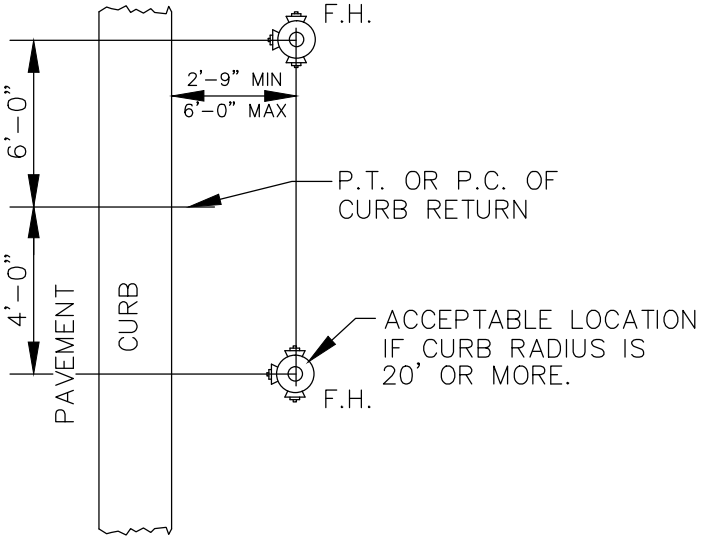



DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.17
## FIRE HYDRANT LOCATIONS/CLEARANCE

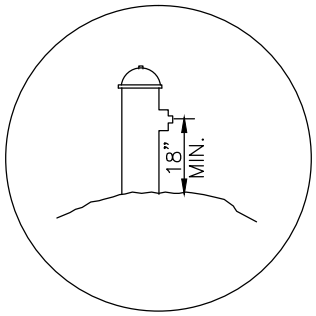


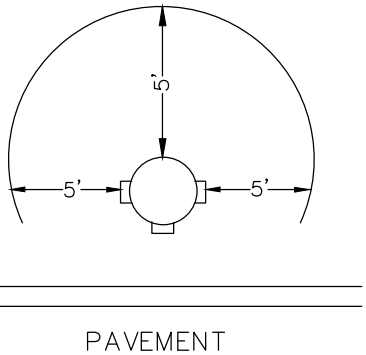




NOTES

1. OBSTRUCTIONS SUCH AS UTILITY POLES, STREET SIGNS, IRRIGATION BOXES, FENCES, ETC. SHALL NOT BE PLACED BETWEEN CURB AND HYDRANT.
2. SOME LOCATIONS APPLY AT EITHER END OF CURB RETURNS.
3. DIMENSION SHOWN OF CONSTRUCTION DRAWINGS SUPERCEDE LOCATIONS SHOWN HERE.

PARKWAY AREA OR NO SIDEWALK




REQUIRED HYDRANT CLEARANCE

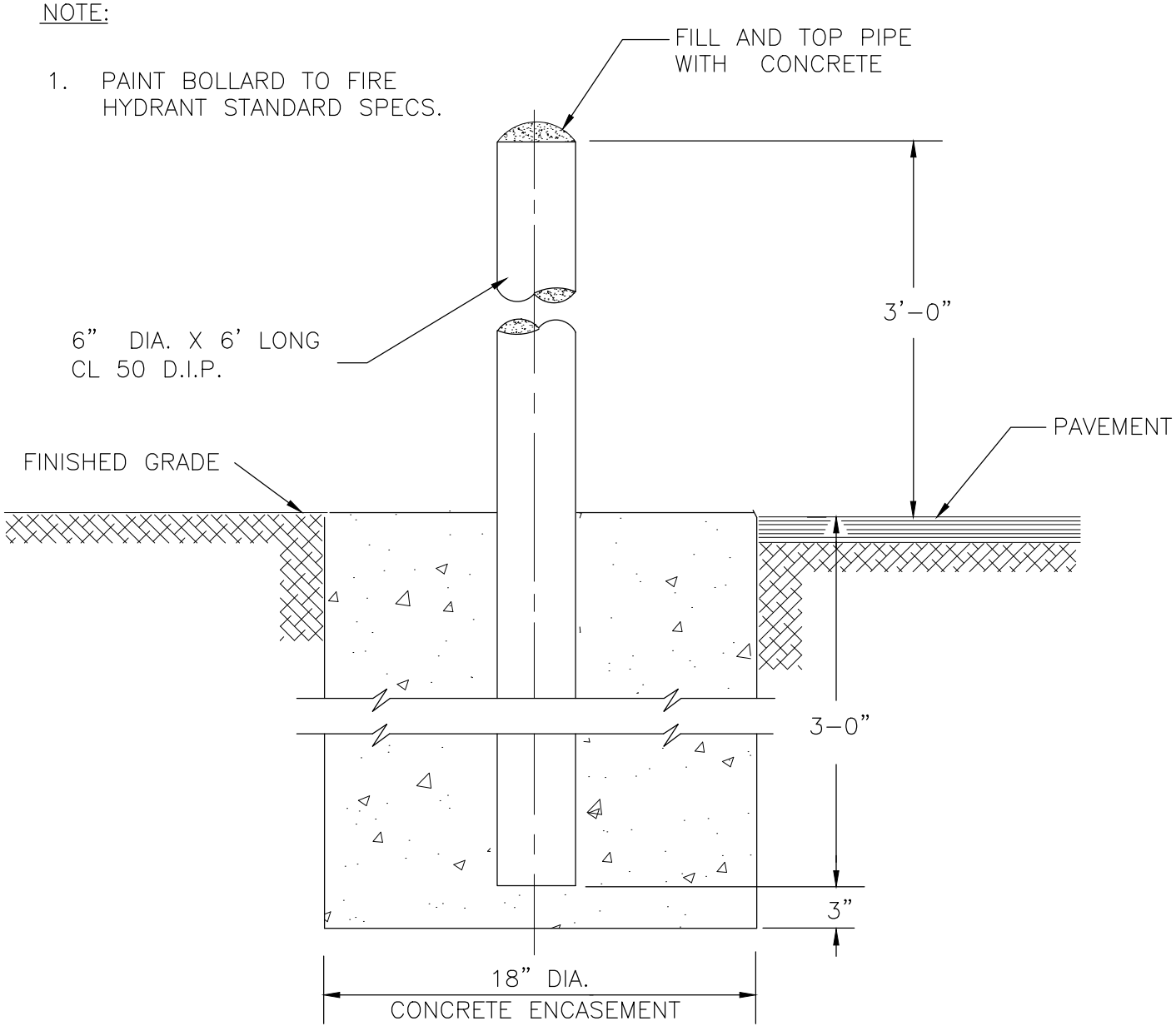
DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.18
## BOLLARD POST DETAIL

NOTE:

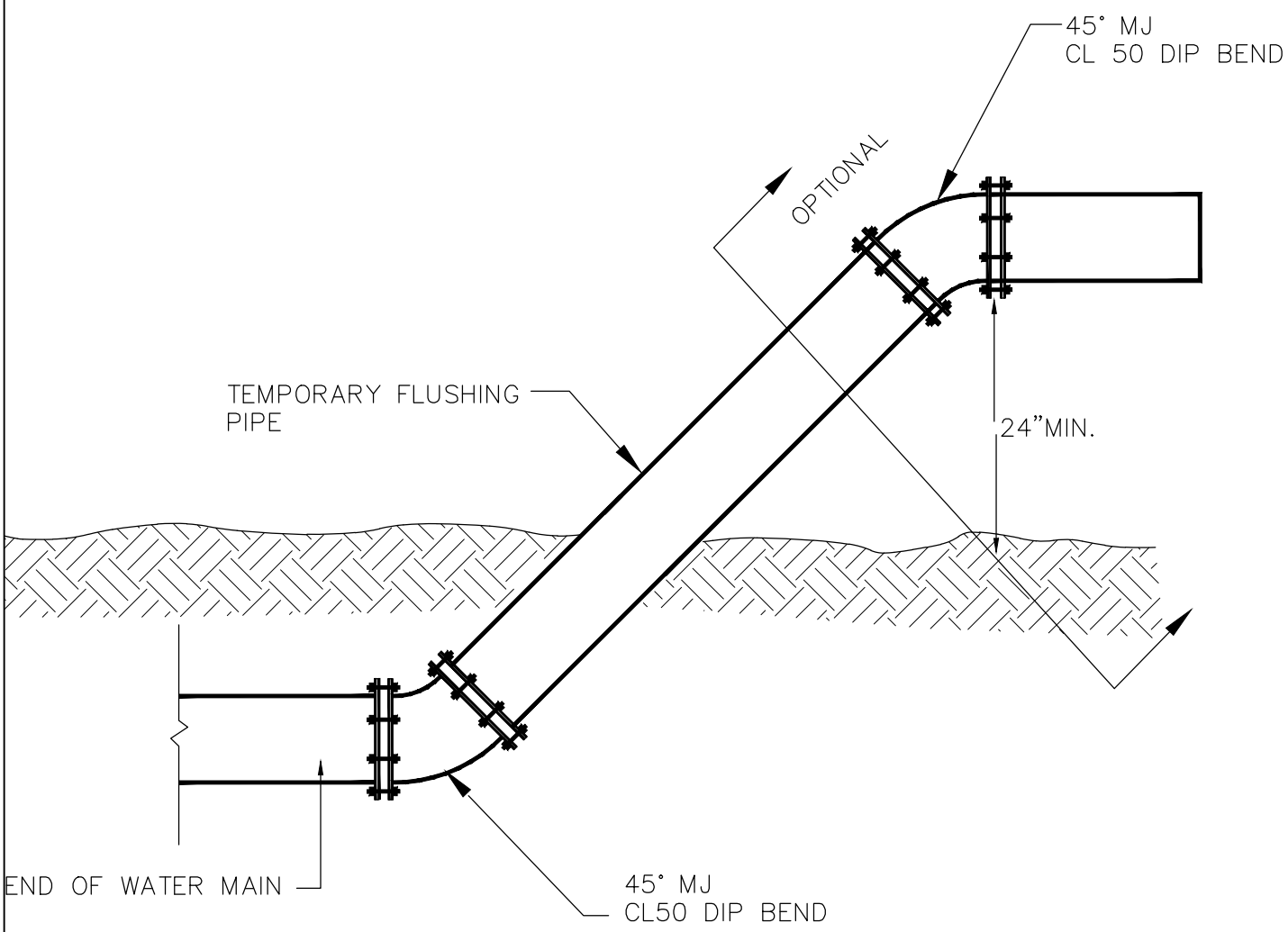
1. PAINT BOLLARD TO FIRE HYDRANT STANDARD SPECS.




DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.19
## WATER MAIN FLUSHING DETAIL



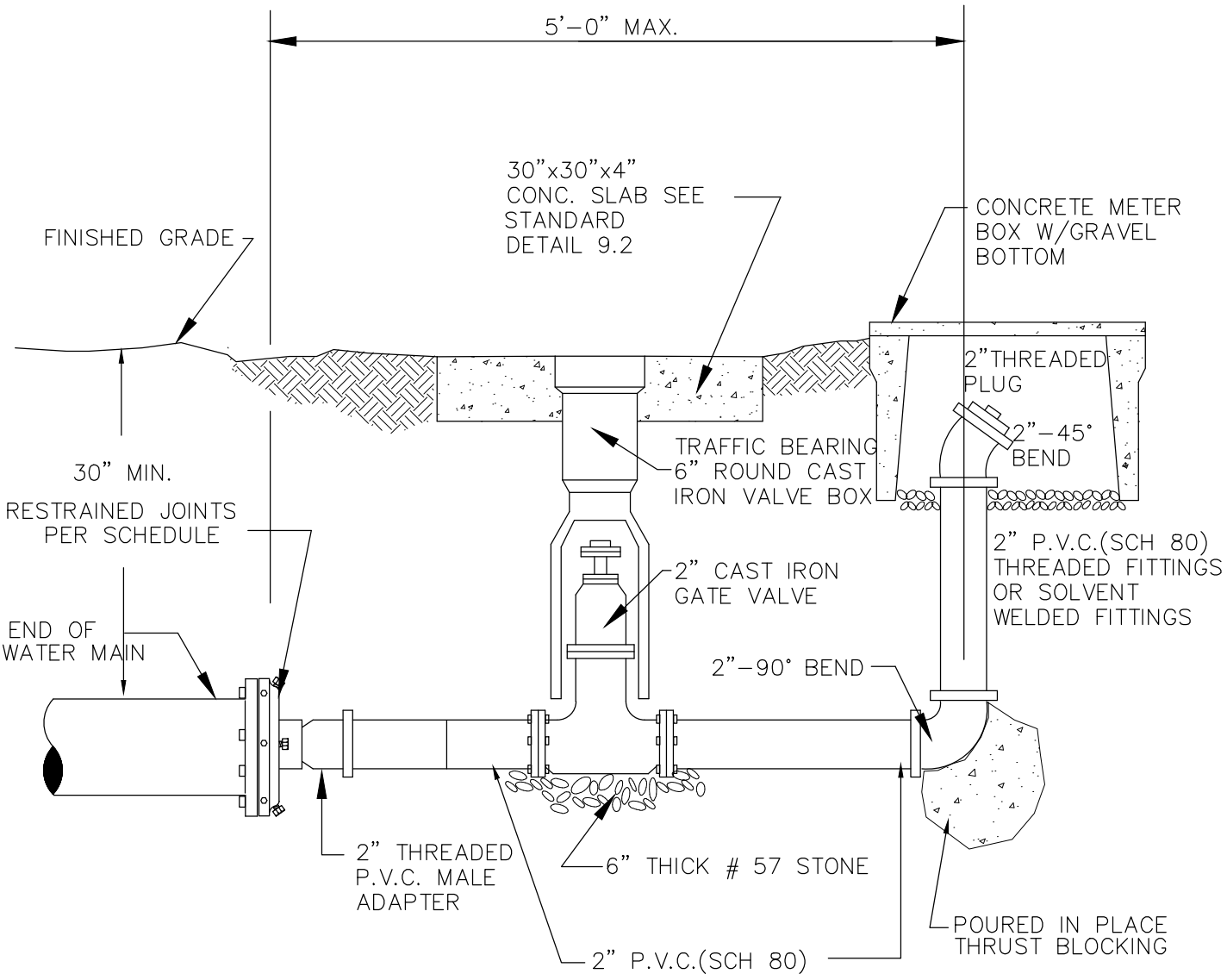

## NOTES:

1. FLUSHING DETAIL TO BE USED ON WATER LINES > 8" DIAMETER.
2. FLUSHING PIPE SHALL BE THE SAME DIAMETER AS WATER MAIN.
3. AFTER FLUSHING HAS BEEN COMPLETED, CONTRACTOR SHALL INSTALL BLOW OFF PER STANDARD DETAIL.
4. CONTRACTOR SHALL PROVIDE ADEQUATE DRAINAGE FOR FLUSHED WATER.
5. PROVIDE M.J.CAP IF ASSEMBLY IS LEFT IN PLACE OVERNIGHT

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.20
## BLOW OFF DETAIL



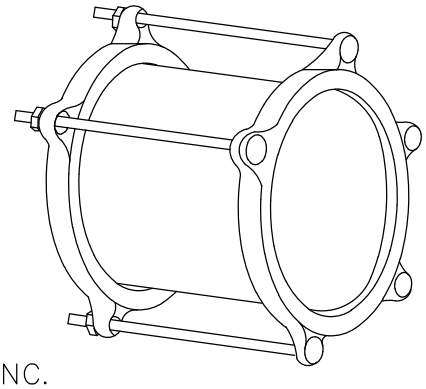

DATE: 08/06/14

NOT TO SCALE

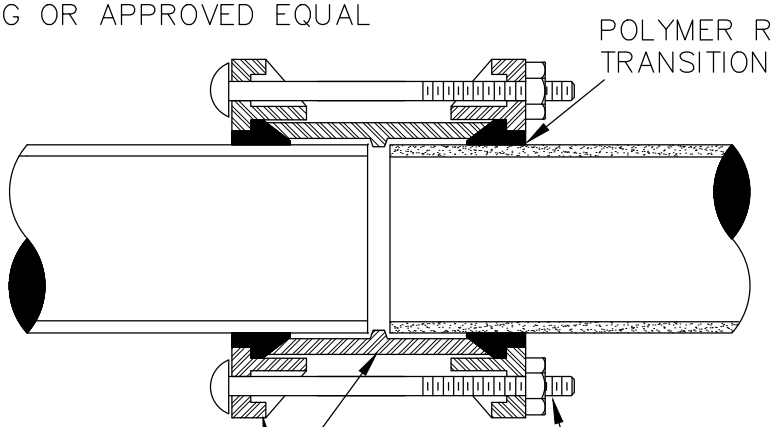
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.21

## DUCTILE IRON
## TRANSITION COUPLING

JOINS CAST IRON, DUCTILE IRON, ASBESTOS–CEMENT, C–900 AWWA C–900 & C–905 BY MECHANICAL JOINT COMPRESSION COUPLING



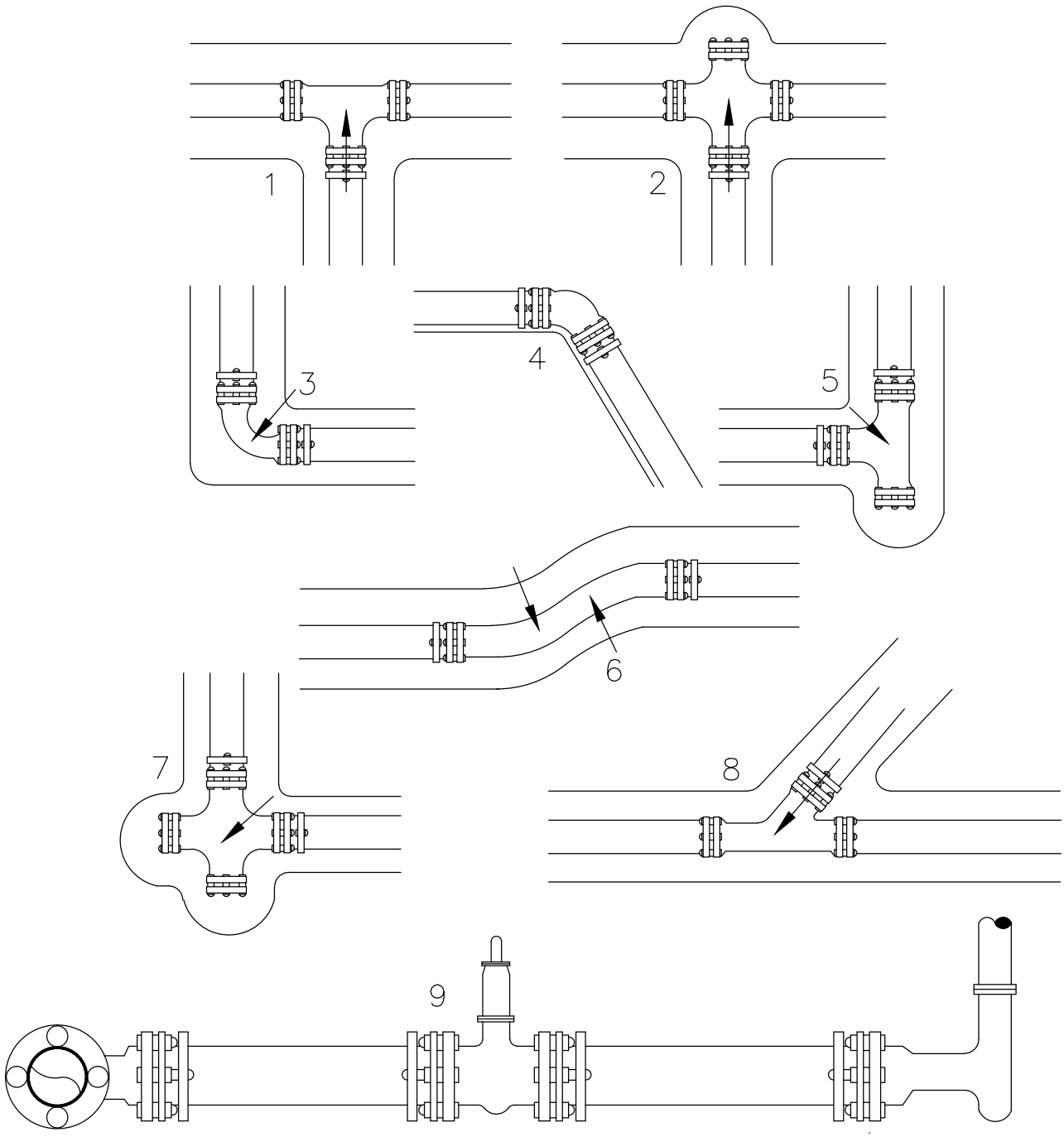
JCM INDUSTRIES, INC.
212 DUCTILE IRON TRANSITION
COUPLING OR APPROVED EQUAL




DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.22
## THRUST RESTRAINING

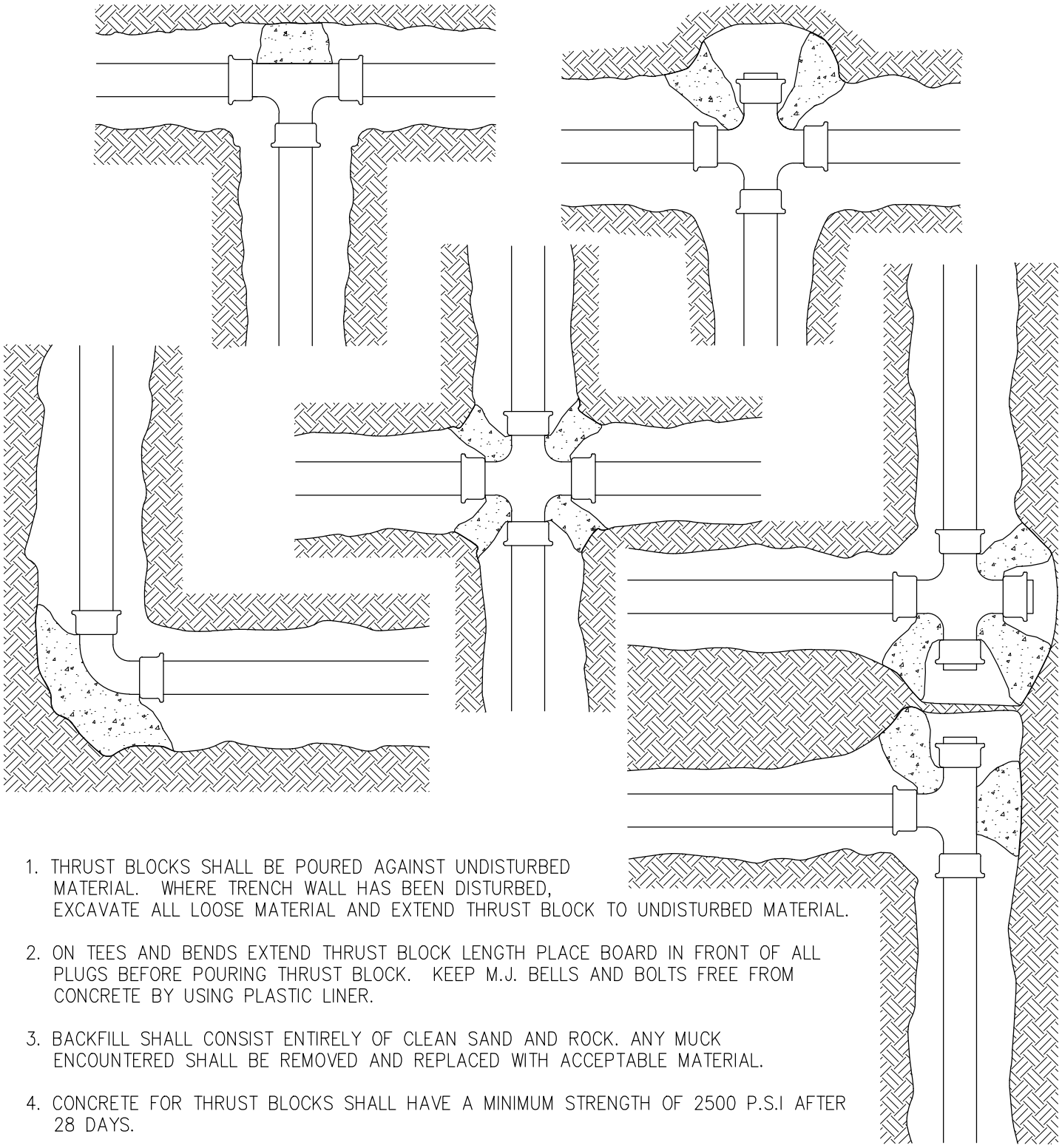



1. THRU LINE CONNECTION,
2. THRU LINE CONNECTION, CROSS USED AS
3. DIRECTION CHANGE, ELBOW
4. DIRECTION CHANGE, VERTICEL, BEND
5. DIRECTION CHANGE, TEE USED
6. OFFSET CHANGE
7. DIRECTION CHANGE, CROSS USED AS ELBOW
8. TEE WYE LINE CONNECTION,
9. HYDRANT RUNOUT

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.23
## THRUST BLOCKING DETAILS



1. THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED MATERIAL. WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE ALL LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL.

2. ON TEES AND BENDS EXTEND THRUST BLOCK LENGTH PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCK. KEEP M.J. BELLS AND BOLTS FREE FROM CONCRETE BY USING PLASTIC LINER.

3. BACKFILL SHALL CONSIST ENTIRELY OF CLEAN SAND AND ROCK. ANY MUCK ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.

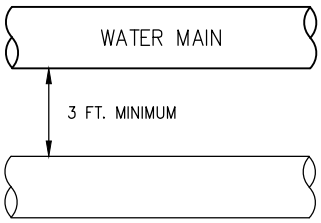
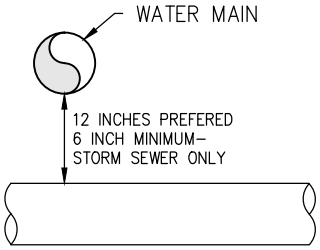
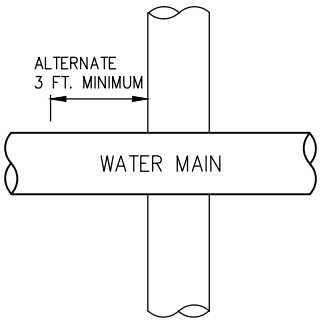
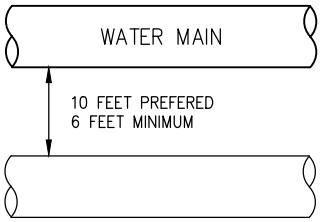
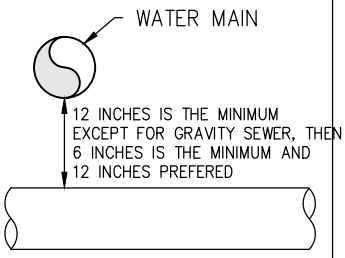
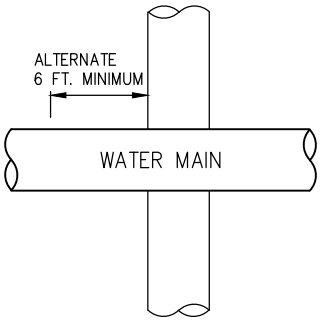
4. CONCRETE FOR THRUST BLOCKS SHALL HAVE A MINIMUM STRENGTH OF 2500 P.S.I AFTER 28 DAYS.

5. THRUST BLOCK SITES COMPUTED AT 150 P.S.I PRESSURE AND 2000 P.S.F SOIL BEARING CAPACITY.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.24
## MAIN SEPARATION TABLE

| OTHER PIPE | HORIZONTAL SEPERATION | CROSSING | JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED) |
|---|---|---|---|
| • STORM SEWER<br>• STORMWATER FORCE MAIN<br>• RECLAMED WATER |  |  |  |
| • GRAVITY OR LOW PRESSURE SANITARY SEWER (1)<br>• SANITARY SEWER FORCE MAIN<br>• SEPTIC TANKS (2) |  |  |  |

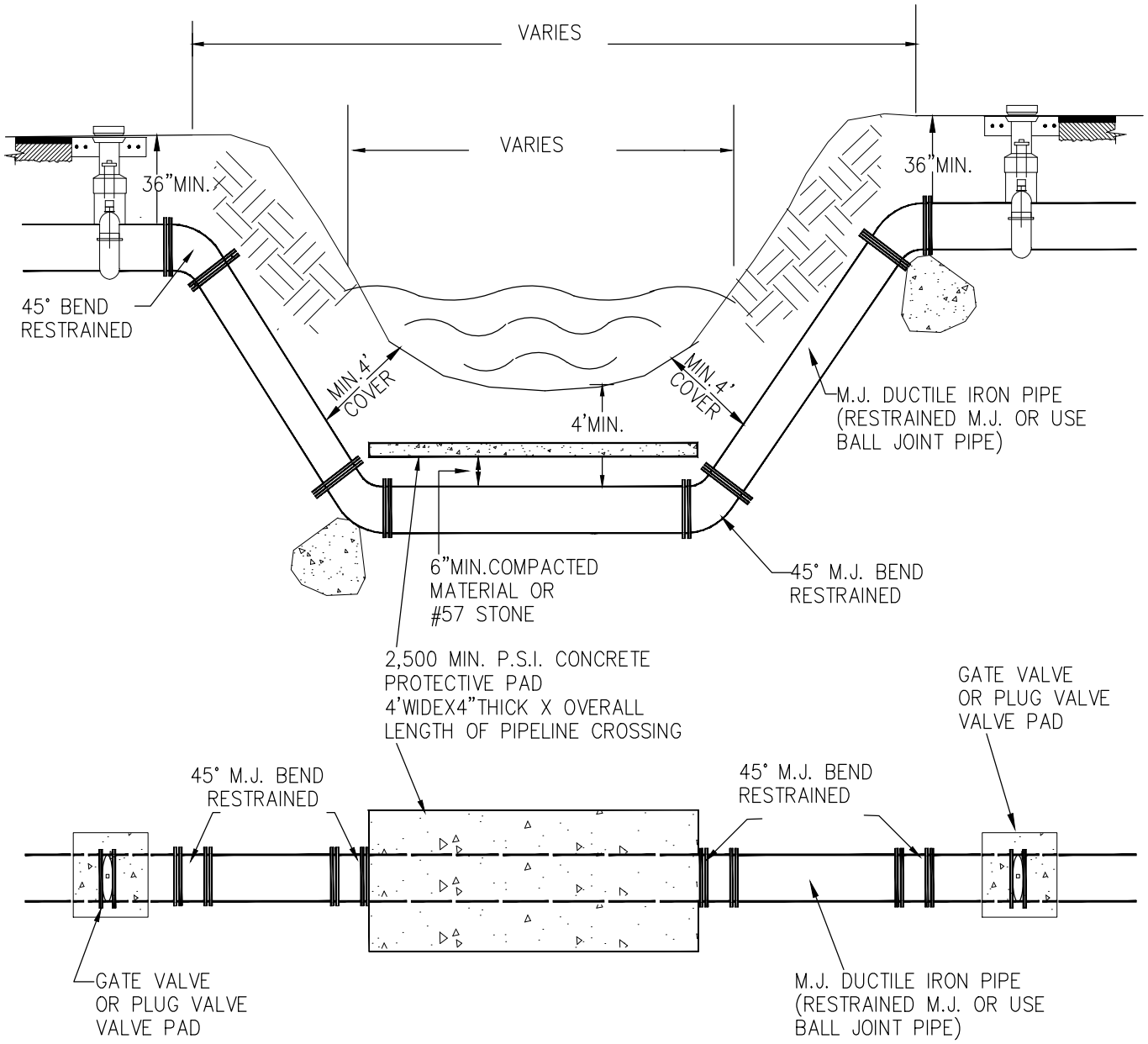
NOTE:

1. 3 FEET FOR GRAVITY TYPE SANITARY SEWERS WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY TYPE SANITARY SEWER.
2. THE SEPARATION BETWEEN POTABLE WATER, RECLAIMED WATER AND OSTDS (SEPTIC TANKS) SHALL BE 10 FEET.
3. WATER MAIN SHALL CROSS ABOVE OTHER PIPE. WHEN WATER MAIN SHALL BE BELOW OTHER PIPE THE MINIMUM SEPARATION SHALL BE 18 INCHES.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.25
## SUBAQUEOUS CROSSING

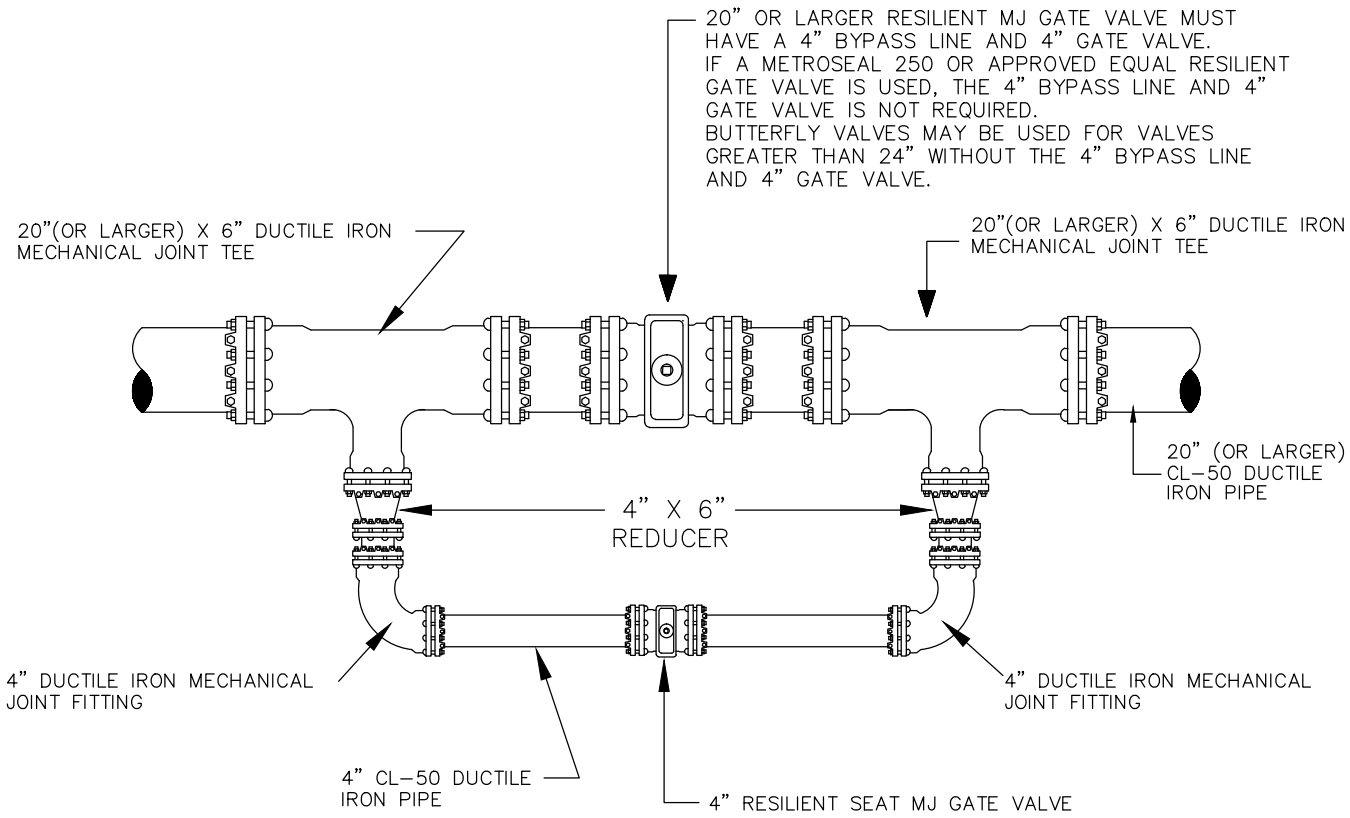


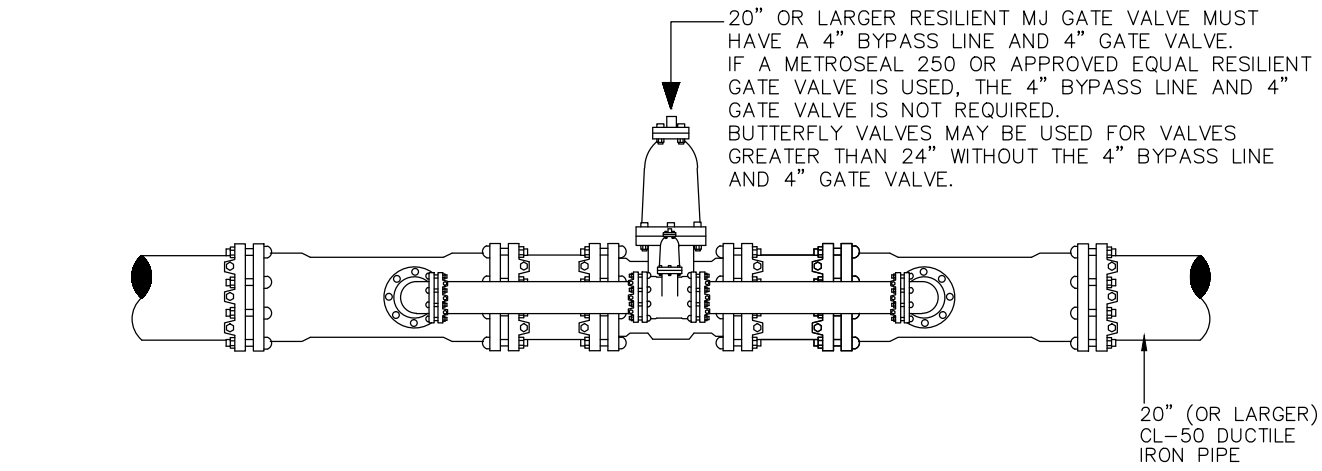

NOTES:
USE PVC C-900 DR 14 MIN, FOR ALL SEWAGE FORCE MAINS
USE CLASS 52 MIN. DIP FOR ALL WATER MAINS.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.26
## 20" AND LARGER VALVE INSTALLATION



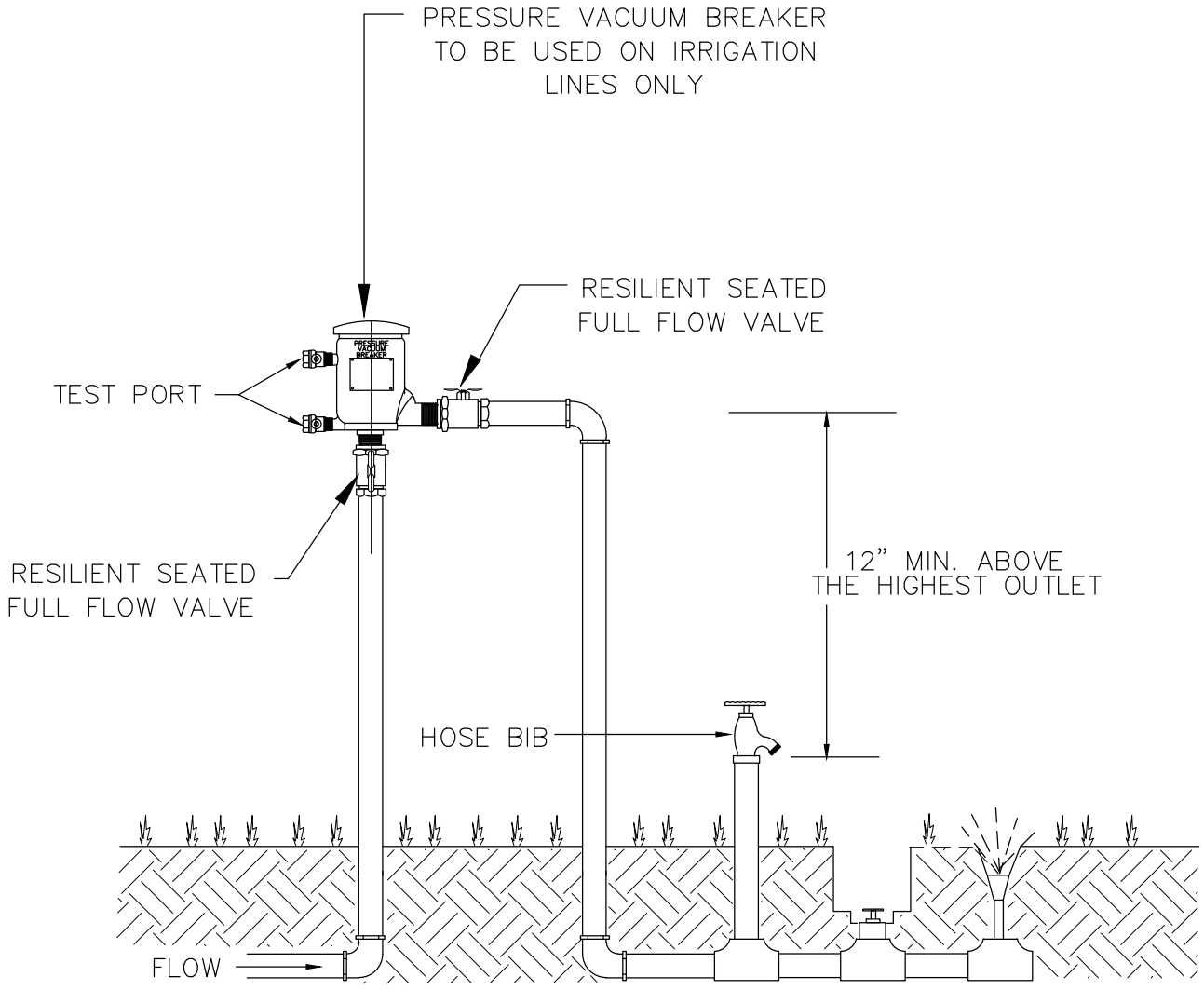




ALL JOINTS MUST BE RESTRAINED IN ACCORDANCE TO TECH. SPECS.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.27
## PRESSURE VACUUM BREAKER



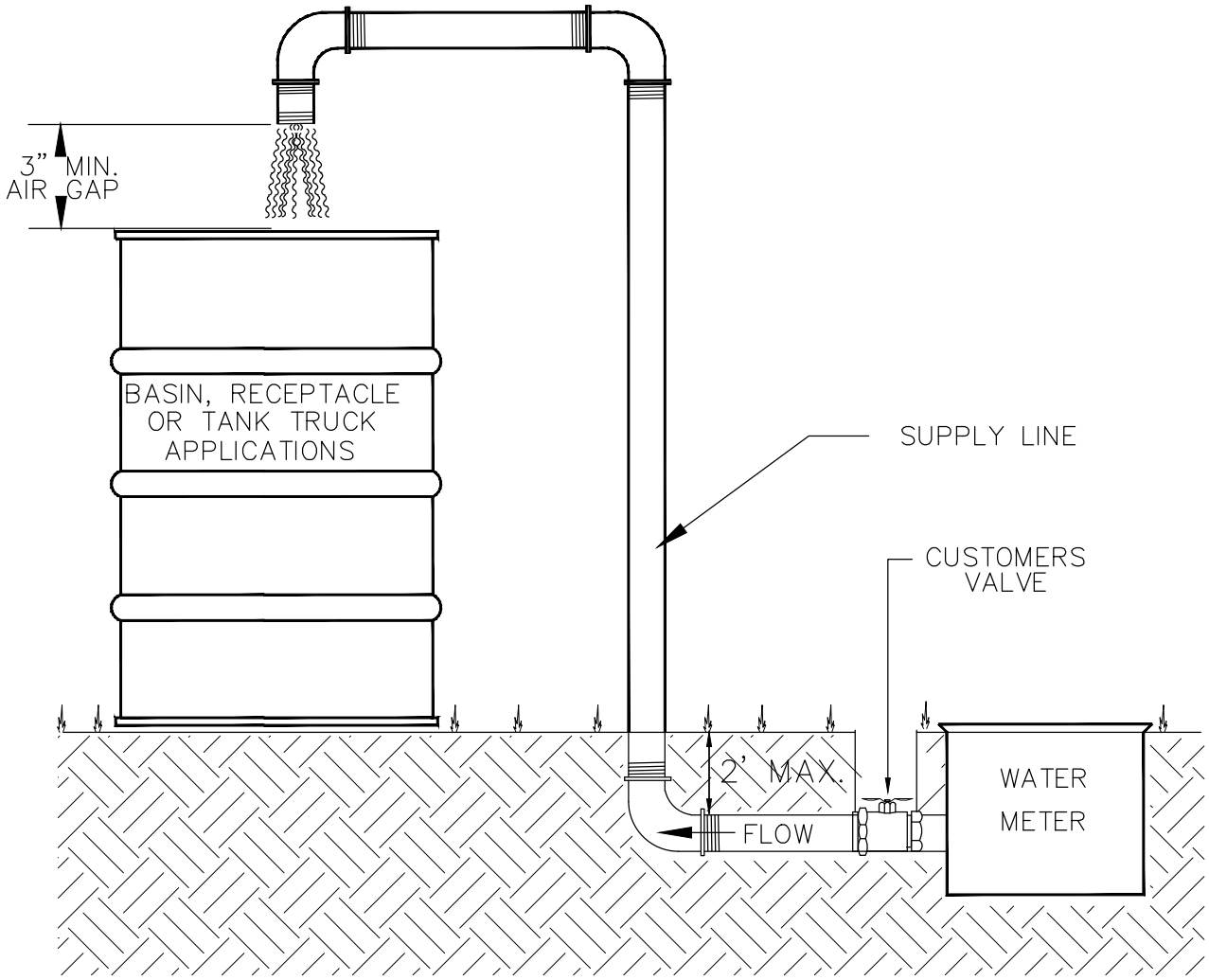

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.28
## AIR GAP DETAIL

NOTE:

AIR GAP MUST HAVE A MINIMUM SEPARATION OF TWO TIMES THE INSIDE DIAMETER OF THE SUPPLY PIPE MEASURED VERTICALLY ABOVE THE TOP RIM OF THE VESSEL, WITH A MINIMUM DISTANCE OF THREE INCHES.



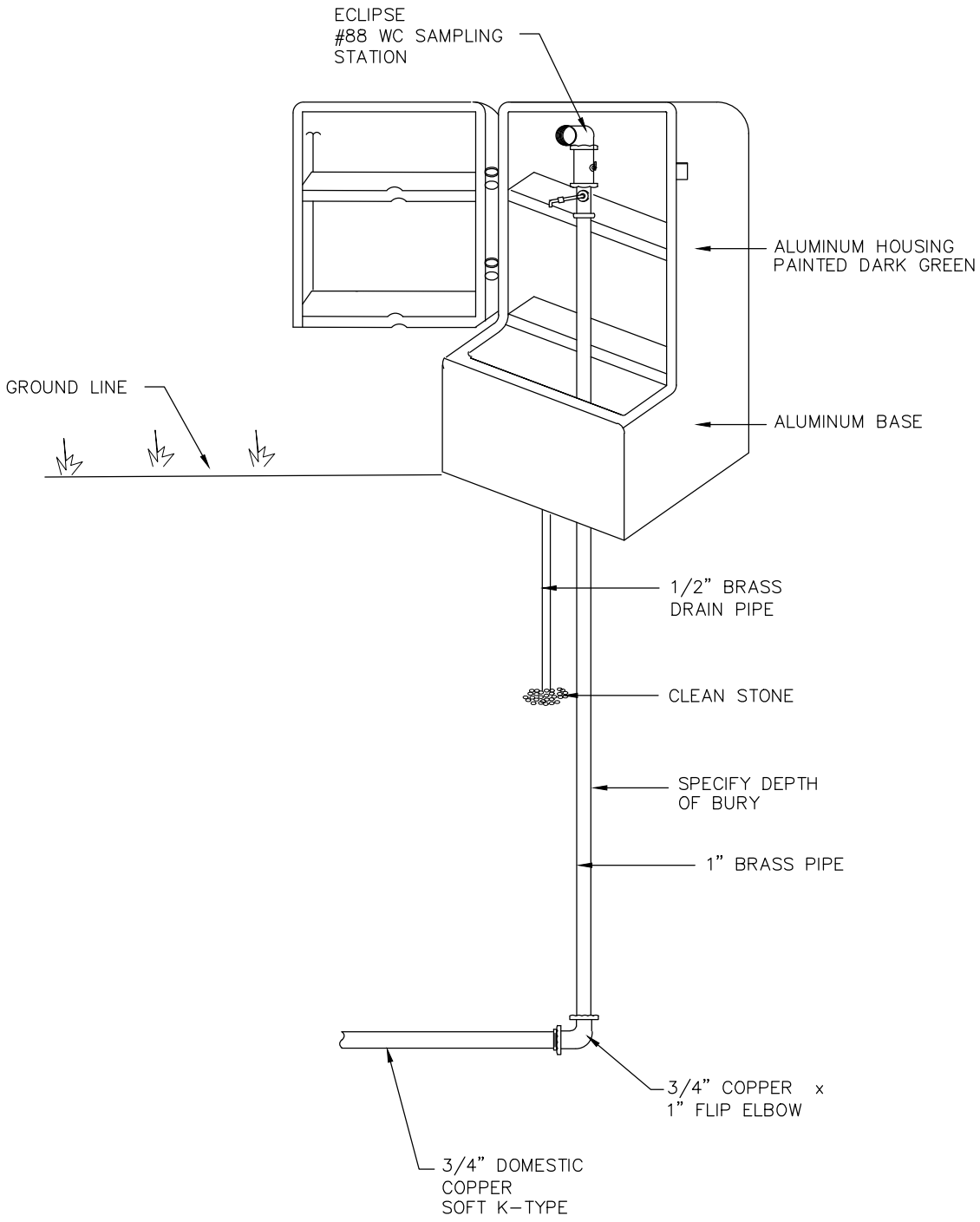

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.29
## BACTERIA SAMPLE VALVE

NOTE:

LINE EXTENSIONS OF BETWEEN 500 AND 3,000 FEET REQUIRE THE INSTALLATION OF A SAMPLING STATION AT THE RIGHT-OF-WAY LINE ON A METER SERVICE OR AS DIRECTED BY FMB.
SAMPLING STATIONS ARE THEN TO BE INSTALLED FOR EACH ADDITIONAL, OR PART OF 2,500 FEET OF LINE INSTALLED.

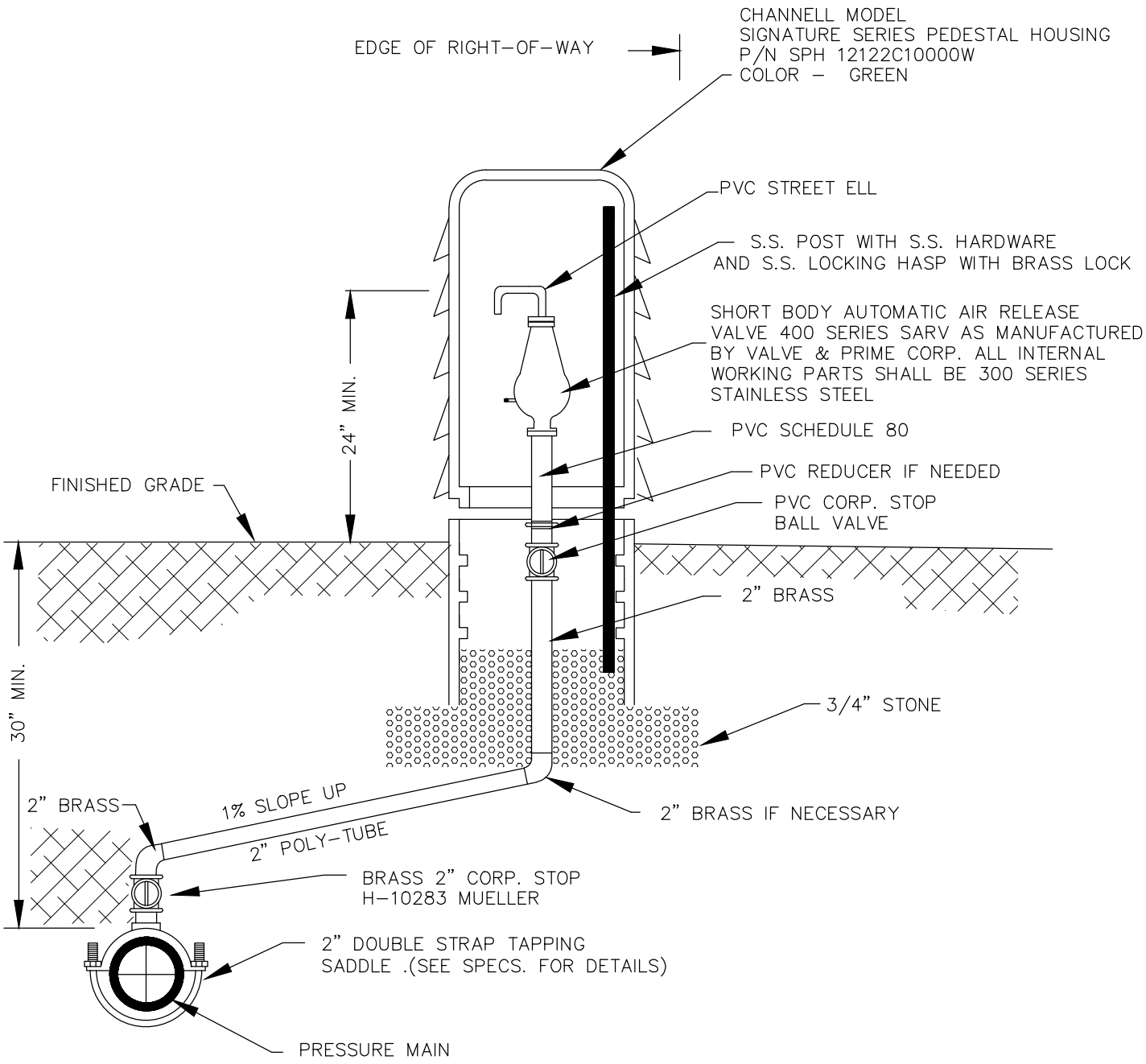



*ECLIPSE NO. 88WC SAMPLING STATION OR EQUAL*

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.30
## AUTOMATIC AIR RELEASE VALVE (WATER)

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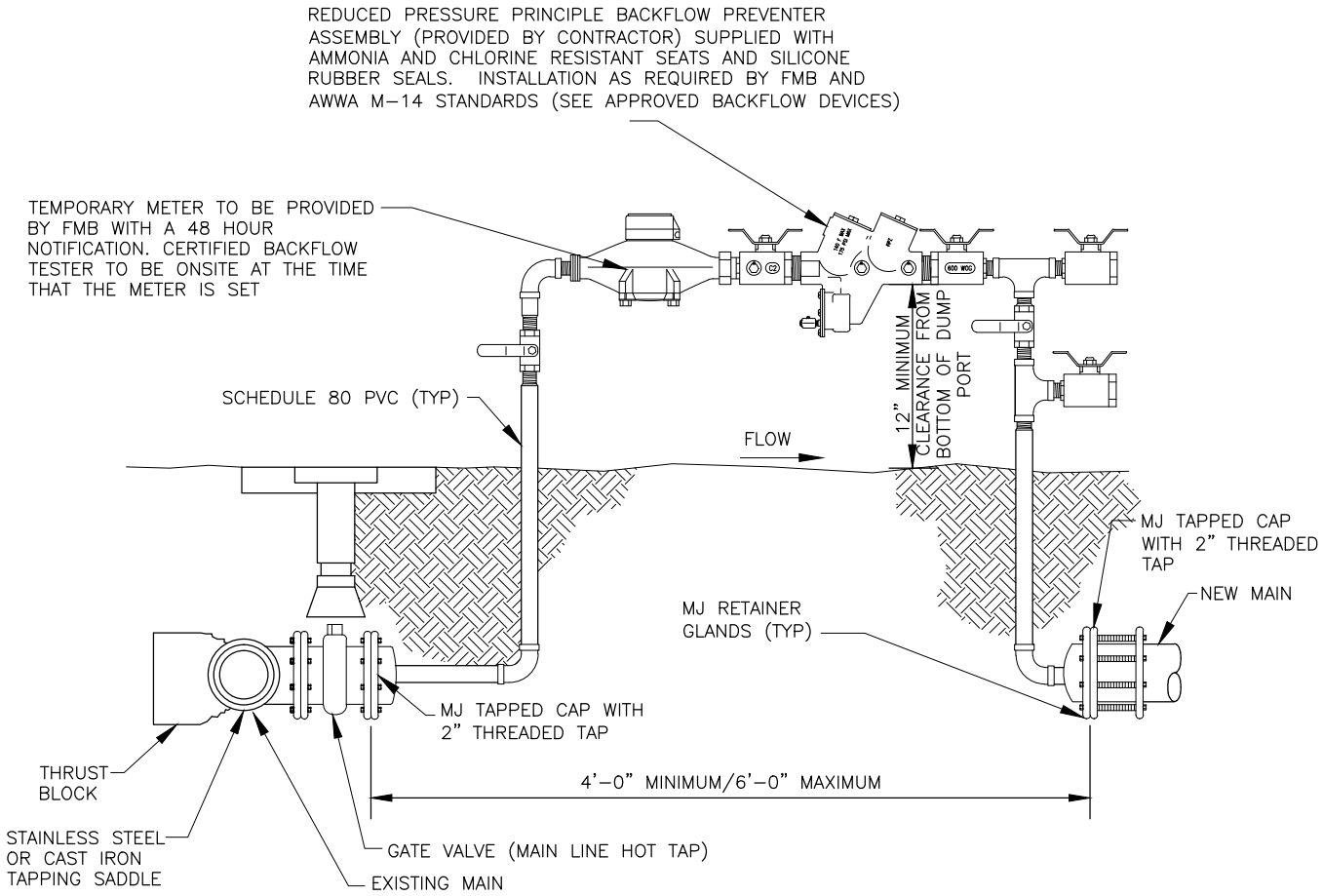
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.31
## CONNECTION TO EXISTING WATER MAIN
## (GAP CONFIGURATION)




NOTES:

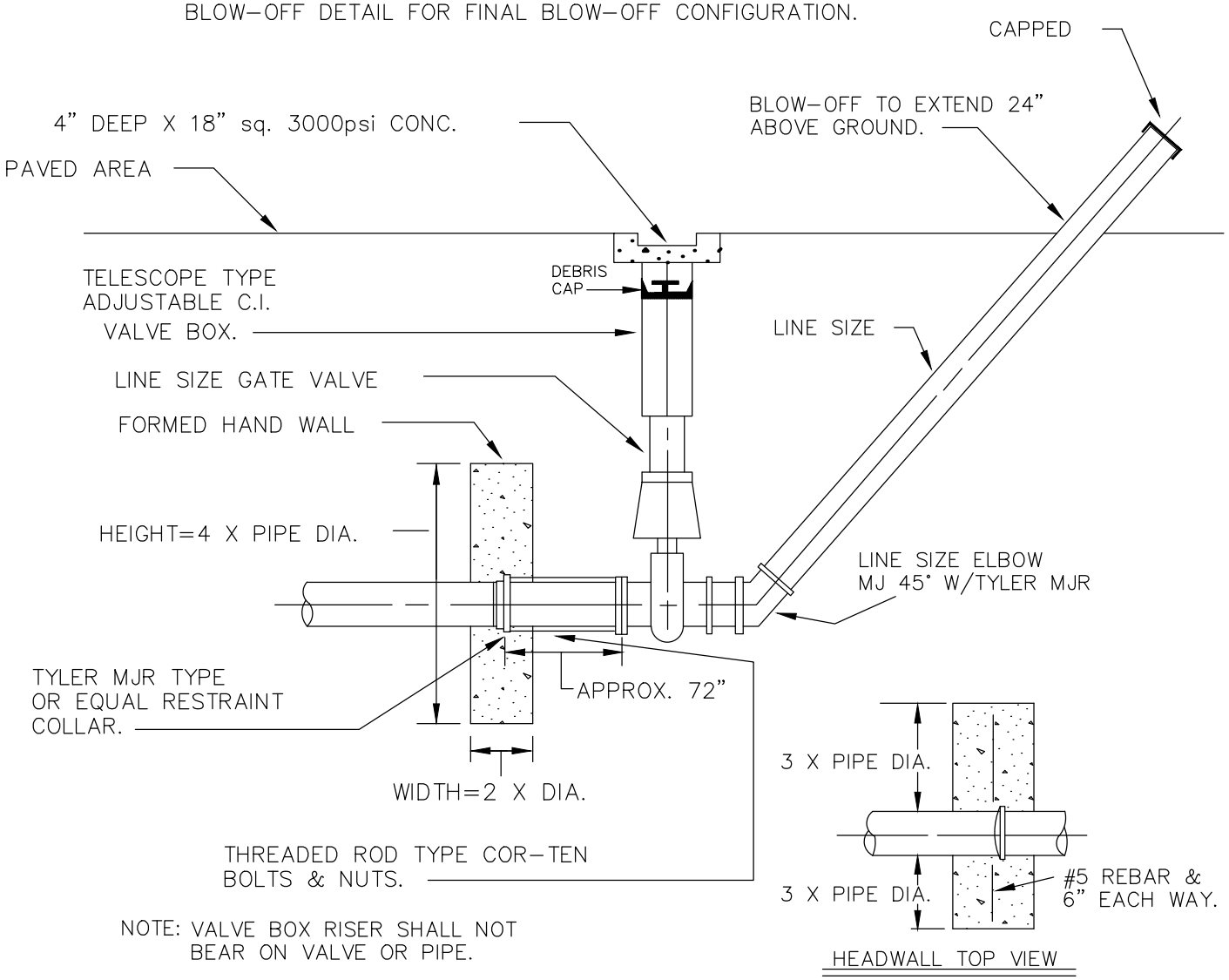
1. FINAL CONNECTION TO BE WITNESSED BY FMB WATER DISTRIBUTION.
2. MJ TAPPED CAPS TO BE PROPERLY RESTRAINED.
3. INSTALL JUMPER TAP SYSTEM FOR TEMPORARY METER DOWNSTREAM OF BLIND FLANGE FOR CONSTRUCTION WATER.
4. TAPPING SADDLES MAY BE EITHER STAINLESS STEEL OR DUCTILE IRON. ALL TAPPING SADDLES FOR ASBESTOS CEMENT PIPE SHALL BE STAINLESS STEEL.
5. JUMPER ASSEMBLY MUST BE MINIMUM OF 18" ABOVE FINISHED GRADE.
6. BACKFLOW ASSEMBLY REQUIRES INITIAL CERTIFICATION BY CERTIFIED BACKFLOW TESTER.
7. THIS ASSEMBLY SHALL ONLY BE USED IF NO COMBUSTIBLES WILL BE ON SITE. IF COMBUSTIBLES ARE BROUGHT ON SITE, THEN THE TEMPORARY BACKFLOW PREVENTERS AND FIRE PROTECTION METER TIE–IN ASSEMBLY SHALL BE USED.
8. THIS ASSEMBLY IS NOT APPROVED TO PROVIDE FIRE PROTECTION WATER TO THE SITE DURING CONSTRUCTION. ASSEMBLY NOT TO BE REMOVED AND SPOOL PIECE INSTALLED FOR FINAL CONNECTION UNTIL AFTER TESTING, BACTERIAL CLEARANCE, FINAL INSPECTION AND FMB ACCEPTANCE.
9. GAP CONFIGURATION TO BE INSTALLED WITHIN 24 HOURS OR LESS AT THE DISCRETION OF THE WATER DISTRIBUTION DEPARTMENT.
10. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.32
## TEMPORARY BLOW OFF

NOTE: TEMPORARY BLOW-OFF TO REMAIN IN PLACE UNTIL DISTRIBUTION SYSTEM HAS BEEN FLUSHED. AFTER CLEARANCE IS OBTAINED REFER TO PERMANENT BLOW-OFF DETAIL FOR FINAL BLOW-OFF CONFIGURATION.

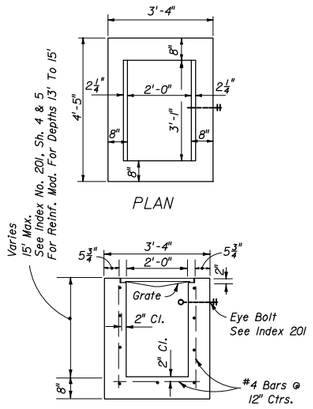



NOTE: VALVE BOX RISER SHALL NOT BEAR ON VALVE OR PIPE.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.33
## DITCH BOTTOM INLETS
## TYPES C, D, E, & H

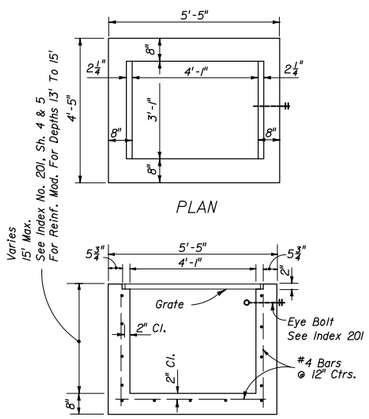



PLAN

SECTION

TYPE C

Recommended Maximum Pipe Size:
2'-0" Wall-18" Pipe
3'-1" Wall-24" Pipe

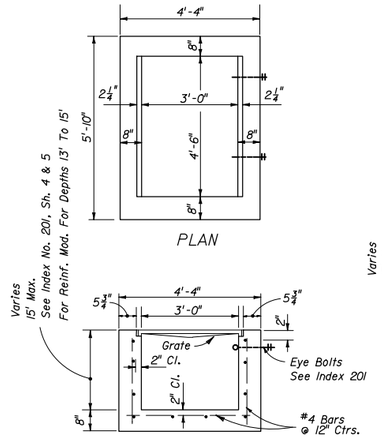



PLAN

SECTION

TYPE D

Recommended Maximum Pipe Size:
3'-1" Wall-24" Pipe
4'-1" Wall-36" Pipe

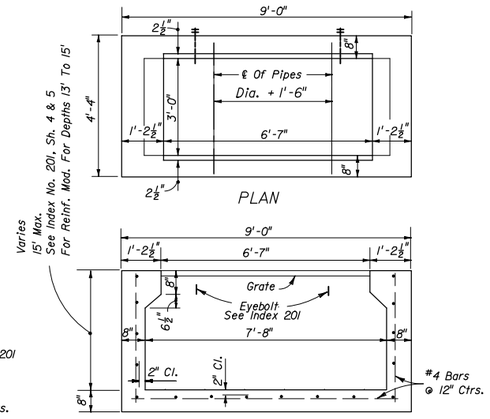



PLAN

SECTION

TYPE E

Recommended Maximum Pipe Size:
3'-0" Wall-24" Pipe
4'-6" Wall-42" Pipe

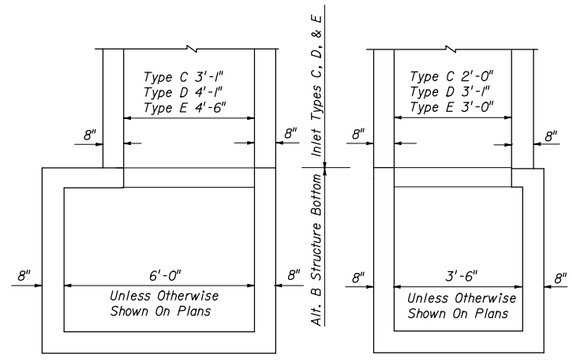



PLAN

SECTION

TYPE H

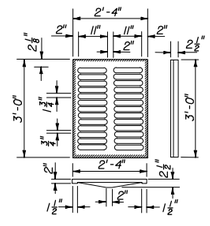
Recommended Maximum Pipe Size:
3'-0" Wall-24" Pipe
7'-8" Wall-1-66" Pipe
2-30" Pipe



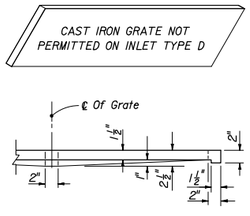

NOTE: Alt. B Structure Bottom Only. See Index No. 200

STRUCTURE BOTTOM FOR INLETS TYPE C, D & E

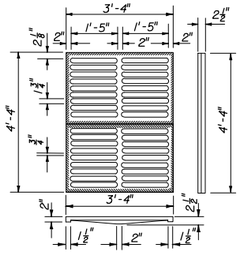
## INLETS



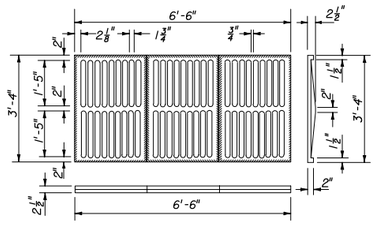

TYPE C
Approx. Weight 235 Lbs.




HALF SECTION CAST IRON GRATES

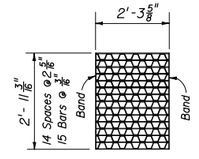



TYPE E
Approx. Weight 465 Lbs.

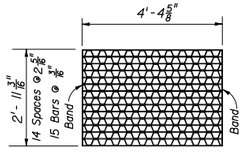



TYPE H
Approx. Weight 725 Lbs.

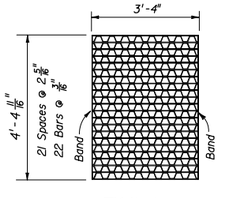
## CAST IRON GRATES



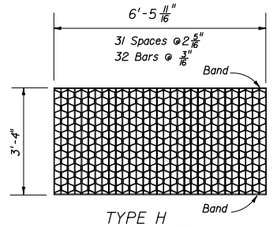

TYPE C
Straight Bars 2"x ⅜"
Reticuline Bars 1¼" x ⅜"
Bands 1½"x¼"
Approx. Weight 100 Lbs.




TYPE D
Straight Bars 2"x ⅜"
Reticuline Bars 1¼" x ⅜"
Bands 1½"x¼"
Approx. Weight 180 Lbs.




TYPE E
Straight Bars 2"x ⅜"
Reticuline Bars 1¼" x ⅜"
Bands 1½"x¼"
Approx. Weight 215 Lbs.




TYPE H
Straight Bars 2"x ⅜"
Reticuline Bars 1¼" x ⅜"
Bands 1½"x¼"
Approx. Weight 315 Lbs.

NOTICE: Steel Grates Are Required On Inlets With Traversable Slots And On Inlets where Bicycle Traffic Is Anticipated.

## STEEL GRATES

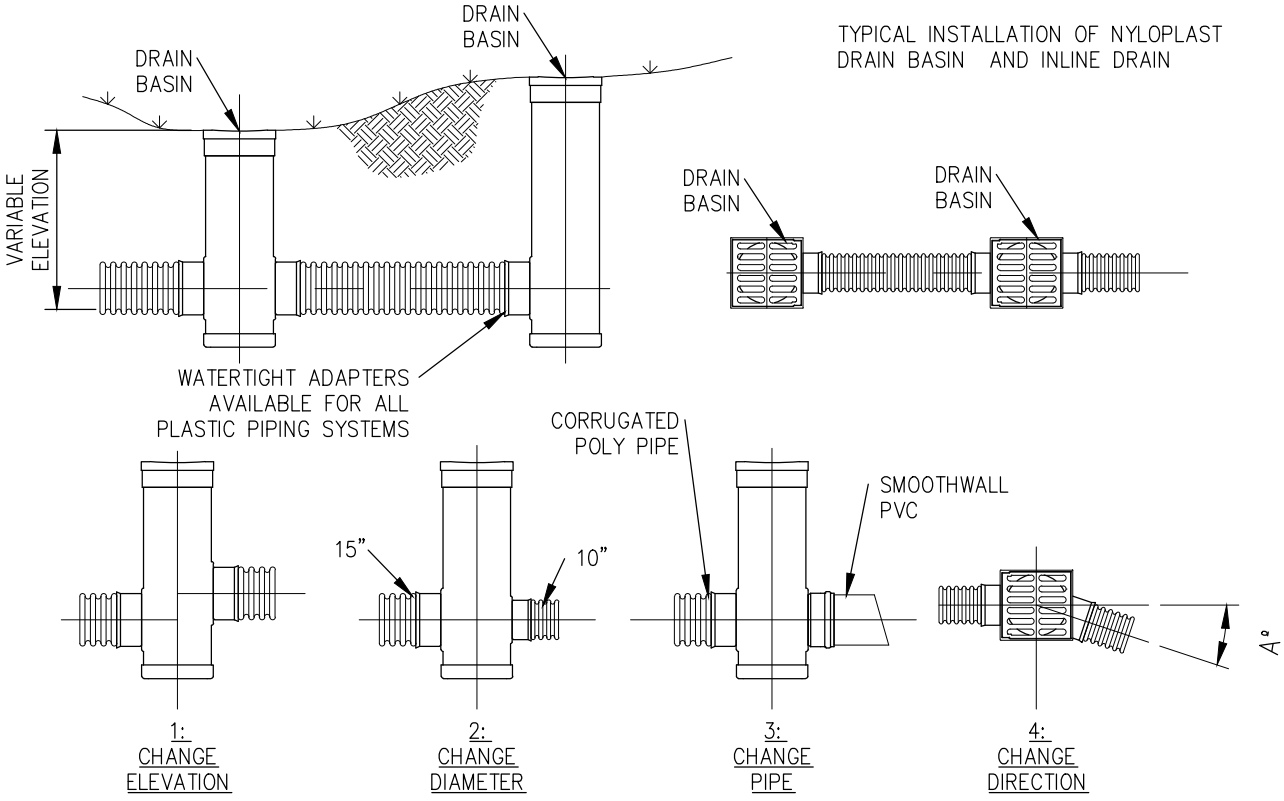
### GENERAL NOTES

1. These inlets are suitable for bicycle and pedestrian areas and are to be used in ditches, medians and other areas subject to infrequent traffic loadings but are not to be placed in areas subject to any heavy wheel loads.
2. Inlets subject to minimal debris should be constructed without slots. Where debris is a problem inlets should be constructed with slots. Slotted inlets located within roadway clear zones and in areas accessible to pedestrians shall have traversable slots. The traversable slot modification is not adaptable to inlet Type H. Slots may be constructed at either or both ends as shown on plans.
3. Steel grates are to be used on all inlets where bicycle traffic is anticipated. Steel grates are to be used on all inlets with traversable slots. Either cast iron or steel grates may be used on inlets without slots where bicycle traffic is not anticipated. Either cast iron or steel grates may be used on all inlets with non-traversable slots. Subject to the selection described above, when Alternate G grate is specified in the plans, either the steel grate, hot dipped galvanized after fabrication, or the cast iron grate may be used, unless the plans stipulate the particular type.
4. Recommended maximum pipe sizes shown are for concrete pipe. Pipe sizes larger than those recommended must be checked for fit.
5. All exposed corners and edges of concrete are to be chamfered ¾".
6. Pavement to be used on inlets without slots and inlets with non-traversable slots only when called for in the plans; but required on all traversable slot inlets. Cost to be included in contract unit price for inlets. Quantities shown are for information only.
7. Traversable slots constructed in existing inlets shall be paid for as inlets partial, and shall include the cost for slot openings, paving and any required replacement grates.
8. Sodding to be used on all inlets not located in paved areas and paid for under contract unit price for Sodding SY.
9. For supplementary details see Index No. 201.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.34
## YARD DRAIN DETAIL

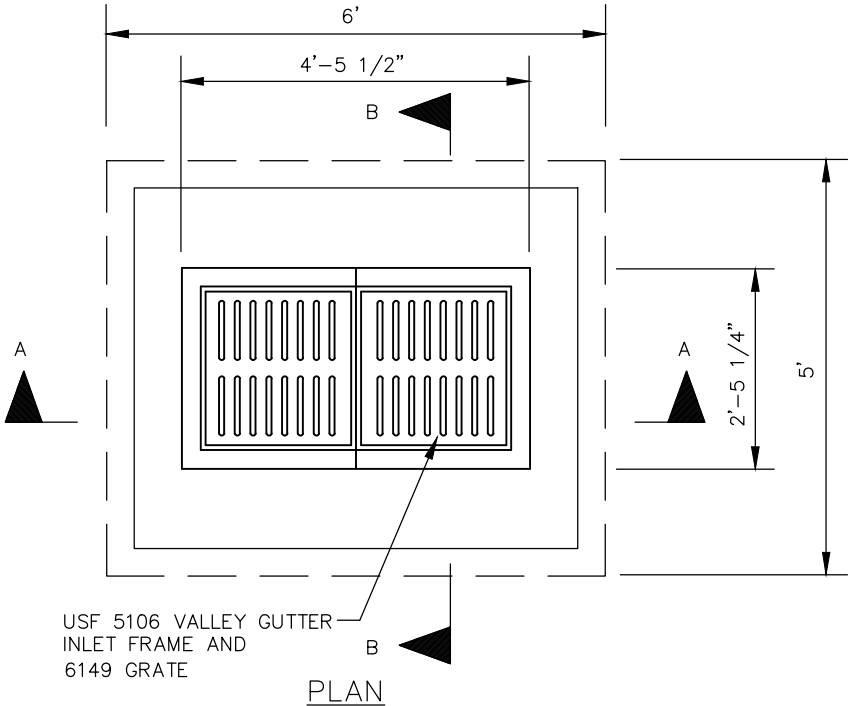



NOTE:
PER NYLOPLAST–ADS DRAIN BASIN SPECIFICATIONS

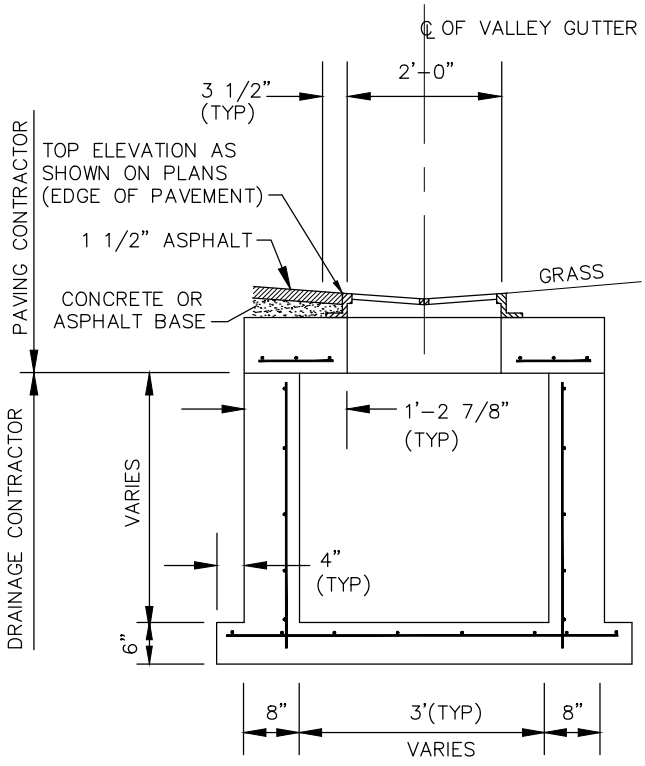
DATE: 08/06/14

NOT TO SCALE

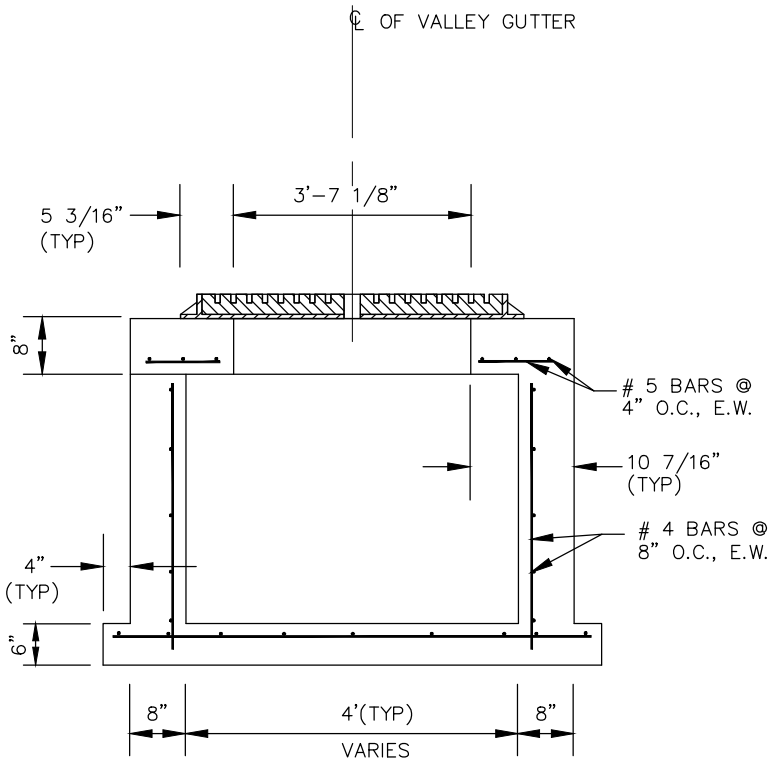
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.35
## VALLEY GUTTER INLET DETAIL




PLAN




SECTION B–B

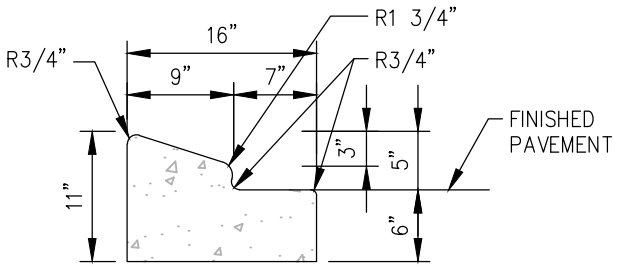



SECTION A–A

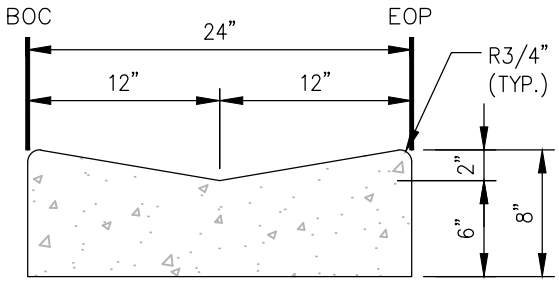
DATE: 08/06/14

NOT TO SCALE

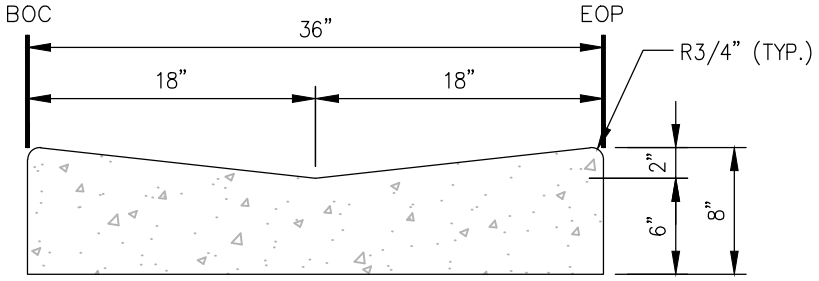
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.36
## GUTTER DETAILS




TYPE "A" CURB




2' VALLEY GUTTER




3' VALLEY GUTTER

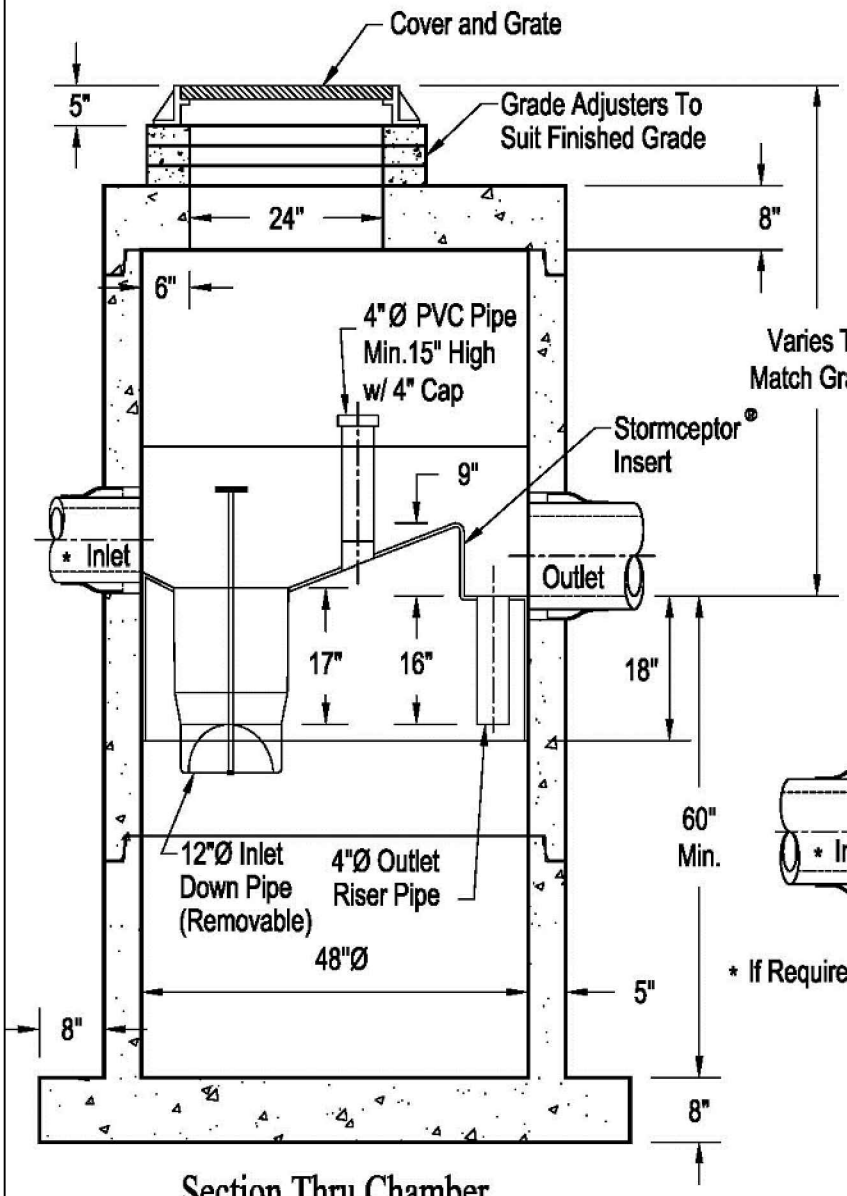
DATE: 08/06/14

NOT TO SCALE

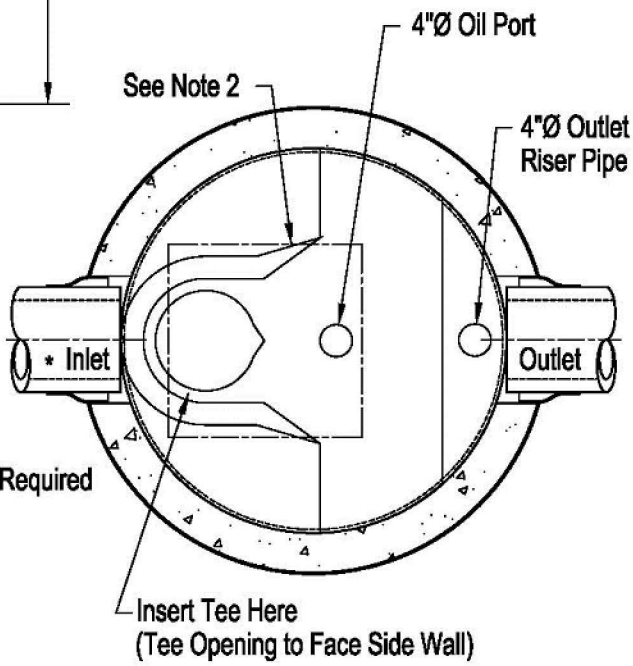
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.37

STC 450i PRECAST CONCRETE STORMCEPTOR

## STC 450i Precast Concrete Stormceptor®
## (450 U.S. Gallon Capacity)




Section Thru Chamber




Plan View

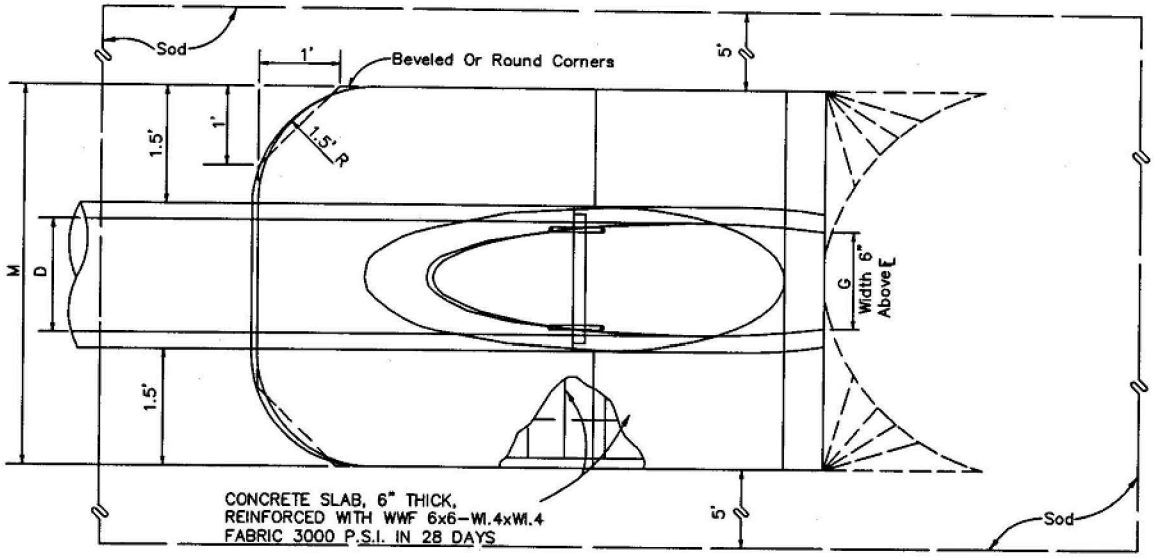
DATE: 08/06/14

NOT TO SCALE

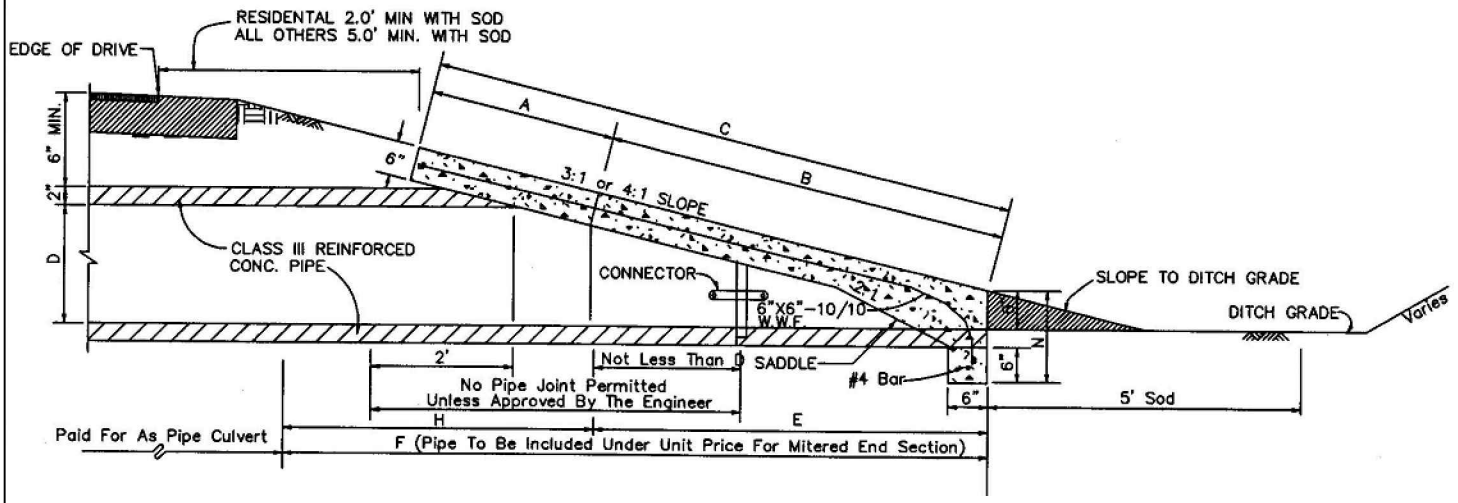
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.38

## MITERED END SECTION - ROUND CONCRETE PIPE

| DIMENSIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| D | A | B | C | E | F | G | H | M Single Pipe |
| 15" | 2.27' | 4.09' | 6.36' | 4.03' | 8' | 1.22' | 4.0' | 4.63' |
| 18" | 2.36' | 5.12' | 7.48' | 5.03' | 9' | 1.41' | 4.0' | 4.92' |
| 24" | 2.53' | 7.18' | 9.71' | 7.03' | 11' | 1.73' | 4.0' | 5.50' |
| 30" | 2.70' | 9.25' | 11.95' | 9.03' | 13' | 2.00' | 4.0' | 6.08' |
| 36" | 2.87' | 11.31' | 14.18' | 11.03' | 15' | 2.24' | 4.0' | 6.67' |
| 42" | 3.05' | 13.37' | 16.42' | 13.03' | 17' | 2.45' | 4.0' | 7.25' |
| 48" | 3.22' | 15.43' | 18.65' | 15.03' | 19' | 2.65' | 4.0' | 7.83' |
| 54" | 3.39' | 17.49' | 20.88' | 17.03' | 21' | 2.83' | 4.0' | 8.42' |
| 60" | 3.56' | 19.55' | 23.11' | 19.03' | 23' | 3.00' | 4.0' | 9.00' |




TOP VIEW–SINGLE PIPE




DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.39a
## ALUMINUM PEDISTRIAN GUARD RAIL

### NOTES

*PIPE RAILING & POSTS:*
Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

| RAILING MEMBER DIMENSIONS TABLE | | | |
|---|---|---|---|
| MEMBER | DESIGNATION | OUTSIDE DIMENSION | WALL THICKNESS |
| Posts | 2" NPS (Sch. 40) | 2.375" | 0.154" |
| Rails | 2" NPS (Sch. 40) | 2.375" | 0.154" |
| Rail Joint/Splice Sleeves | 1½" NPS (Sch. 40) | 1.900" | 0.145" |
| Handrails Joint/Splice Sleeves | 1" NPS (Sch. 40) | 1.315" | 0.133" |
| Handrails | 1½" NPS (Sch. 40) | 1.900" | 0.145" |
| Handrail Support Bar | 1" Ø Round Bar | 1.000" | N/A |

*BASE PLATES:*
Base Plates shall be in accordance with ASTM B209, Alloy 6061-T6.

*SHIM PLATES:*
Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

*COATINGS:*
The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

*ANCHOR BOLTS:*
Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

*RESILIENT AND NEOPRENE PADS:*
Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

*JOINTS:*
All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

*WELDING:*
All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required.

*SHOP DRAWINGS:*
Details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

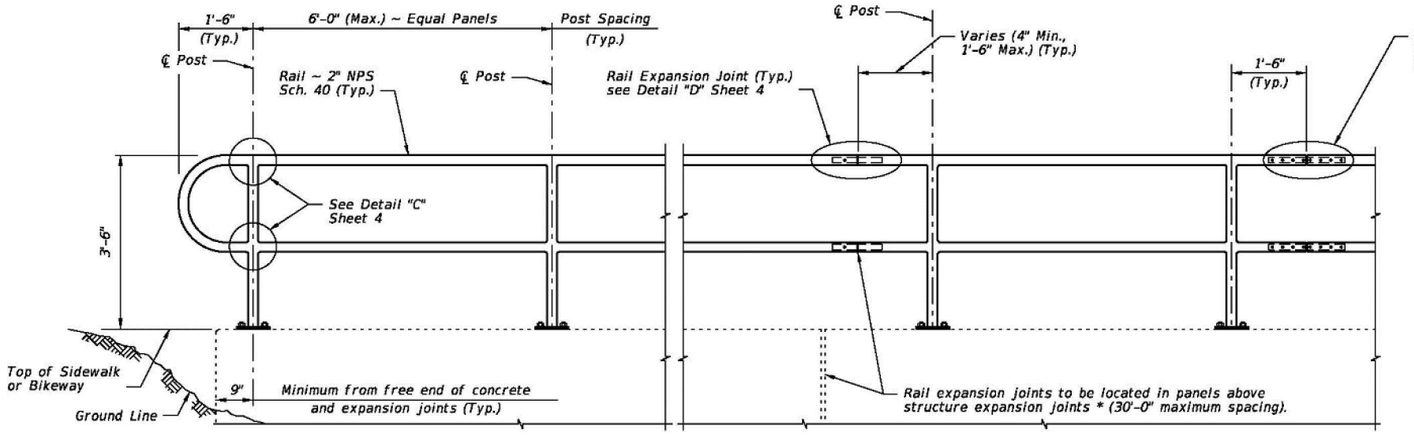
*PAYMENT:*
Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Aluminum), LF (Item No. 515-1-2). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

FOR MORE INFORMATION REFER TO FDOT INDEX 870 (SHEETS 1-5).

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.39b
## ALUMINUM PEDISTRIAN GUARD RAIL



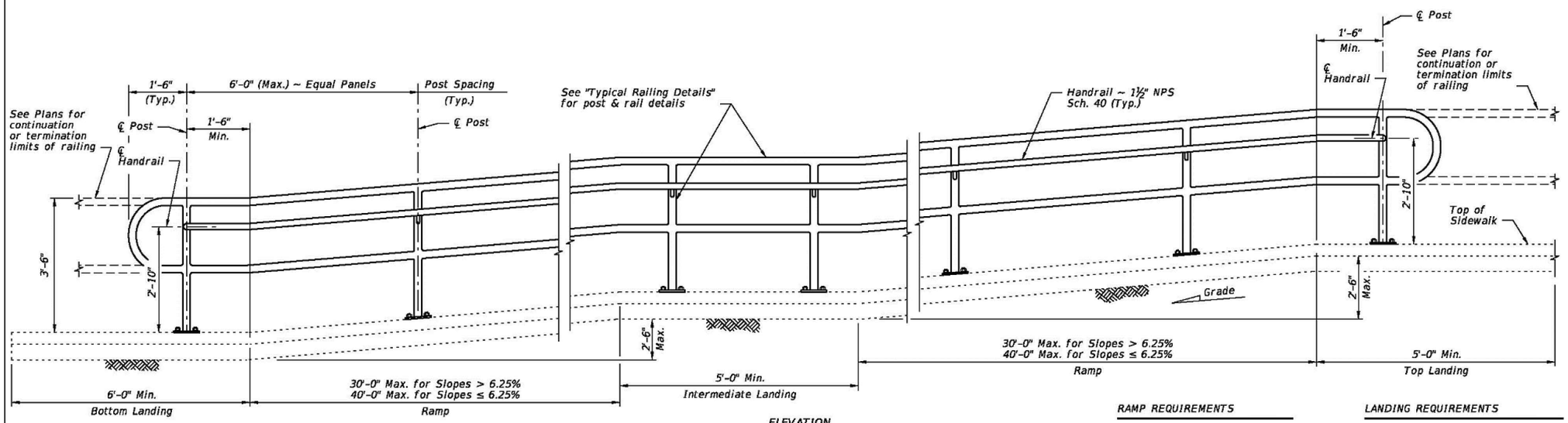

ELEVATION

NOTES:
NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:
* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:
For Details "C", "D" and "E", see Sheet 4.

## TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%




ELEVATION
(Showing Inside Face of Railing)

RAMP REQUIREMENTS

For slopes greater than 5%:
Max. ramp slope = 8.33%
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

Max. landing slope = 2%
Max. landing cross-slope = 2%

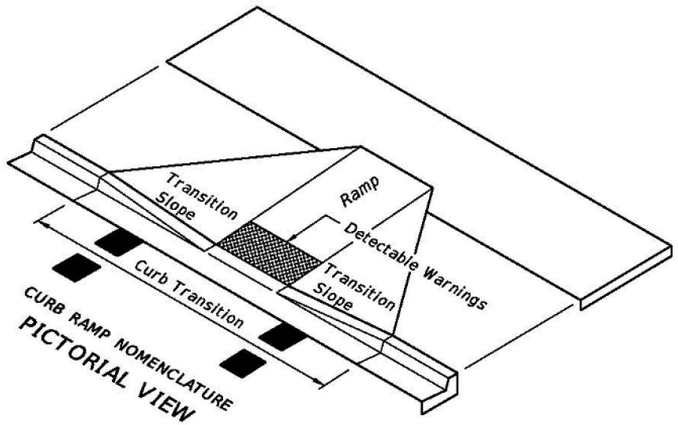
## RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

FOR MORE INFORMATION REFER TO FDOT INDEX 870 (SHEETS 1-5).

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.40
## DETECTABLE WARNING AND SIDEWALK CURB RAMPS




### LEGEND

Detectable Warnings

FOR MORE INFORMATION REFER TO FDOT INDEX 304 (SHEETS 1-7).

### GENERAL NOTES

1. Sidewalk curb ramps shall be constructed at locations that will provide continuous unobstructed pedestrian circulation path to pedestrian areas, elements and facilities within the right of way and to accessible pedestrian routes on adjacent sites. Curbed facilities with sidewalks and those without sidewalks are to have curb ramps constructed for all intersections and turnouts with curbed returns. To accommodate curb ramps, partial curb returns are to extend to the limits prescribed in Index No. 515. Ramps constructed at locations without sidewalks are to have a landing constructed at the top of each ramp, see LANDINGS FOR CURB RAMPS WITHOUT SIDEWALKS.

2. When altering existing pedestrian facilities, where existing restricted conditions preclude the accommodation of a ramp slope of 1:12, a ramp slope between 1:12 and 1:10 is permitted for a rise of 6" maximum. Where compliance with the requirements for cross slope cannot be fully met, the minimum feasible cross slope shall be provided. Ramp slopes are not required to exceed 15' in length.

3. If sidewalk curb ramps are located where pedestrians must walk across the ramp, then provide transition slopes to the ramp; otherwise a sidewalk curb may be required.

4. All sidewalks, ramps, and landings with a cross slope of 0.02 shown in this Index are 0.02 maximum. All ramp slopes shown in this Index as 1:12 are 1:12 maximum. Landings shall have slopes less than or equal to 0.02 in any direction.

5. Grade breaks at the top and bottom of ramps shall be parallel to each other and perpendicular to the direction of the ramp slope.

6. Where a sidewalk curb ramp is constructed within existing curb, curb and gutter and/or sidewalk, the existing curb or curb and gutter shall be removed to the nearest joint beyond the curb transition or to the extent that no remaining section of curb or curb and gutter is less than 5' long. Existing sidewalks shall be removed to the nearest joint beyond the transition slope or to the extent that no remaining section of sidewalk is less than 5' long. For CONCRETE SIDEWALK details refer to Index 310.

7. Sidewalk curb ramp alpha-identifications are for reference purposes (plans, permits, etc.). Alpha-identifications CR-I and CR-J were intentionally omitted.

8. Detectable warnings shall extend the full width of the ramp and to a depth of 2'. Detectable warnings shall be constructed in accordance with Specification Section 527. For the layout of detectable warnings, refer to the TYPICAL PLACEMENT OF DETECTABLE WARNINGS details. Detectable warnings shall not be provided on transition slopes.

9. When detectable warnings are placed on a slope greater than 5%, domes shall be aligned with the centerline of the ramp; otherwise domes are not required to be aligned.

10. Detectable warnings shall be required on sidewalks at:
    a. Intersecting roads,
    b. Median Crossings greater than or equal to 6' in width,
    c. Railroad Crossings,
    d. Signalized driveways.

11. Detectable Warnings - Acceptance Criteria:
    a. Color and texture shall be complete and uniform.
    b. 90% of individual truncated domes shall be in accordance with the Americans with Disabilities Act Standards for Transportation Facilities, Section 705.
    c. There shall be no more than 4 non-compliant domes in any one square foot.
    d. Non-compliant domes shall not be adjacent to other non-compliant domes.
    e. Surfaces shall not deviate more than 0.10" from a true plane.

12. Detectable warnings shall be installed no greater than 5' from the back of curb or edge of pavement.

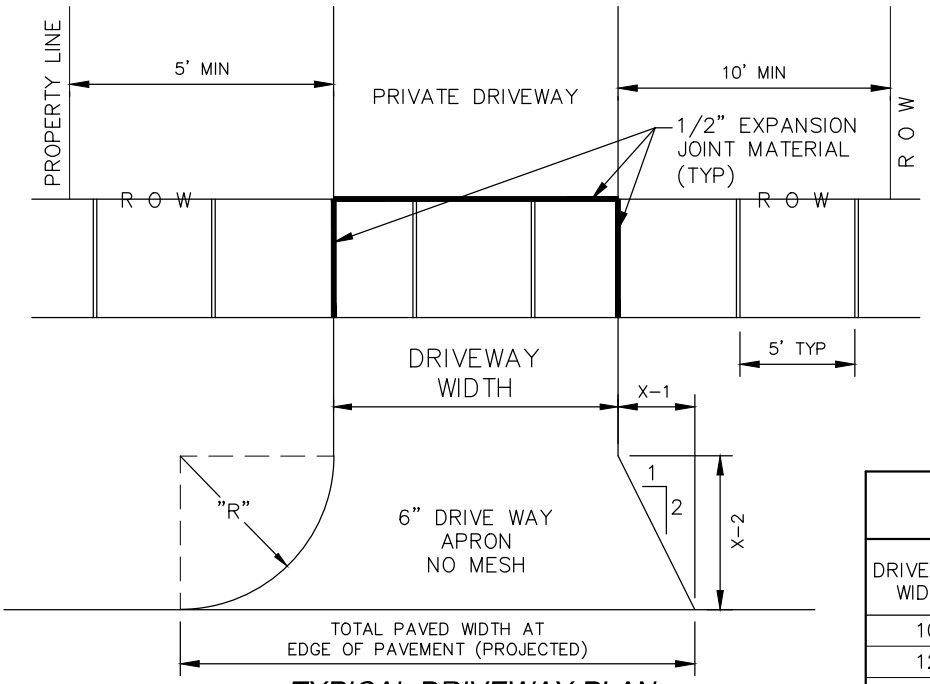
13. Detectable warnings shall not be installed over grade breaks.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.41
## DRIVEWAY & SIDEWALK
## SINGLE FAMILY & DUPLEX

**TO BE ADA COMPLIANT**
CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.

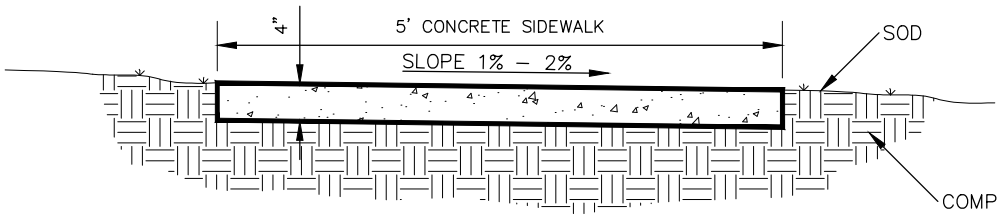



*TYPICAL DRIVEWAY PLAN*

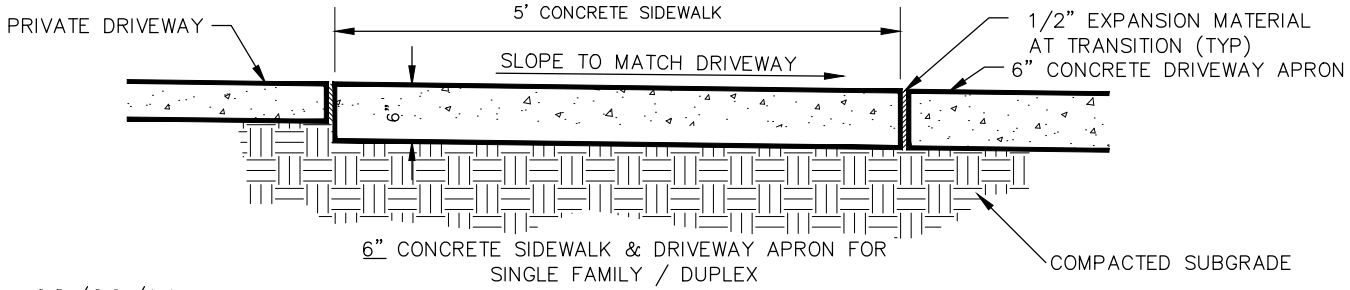
**MINIMUM DRIVEWAY DIMENSION COMBINATION**

| DRIVEWAY WIDTH | RADIUS FILLET | | TURNOUT | | |
|---|---|---|---|---|---|
| | R | TOTAL WIDTH | X-1 | X-2 | TOTAL WIDTH |
| 10 | 10.0 | 30 | 10.0 | 8.0 | 30 |
| 12 | 9.0 | 30 | 9.0 | 7.0 | 30 |
| 13 | 8.5 | 30 | 8.5 | 6.5 | 30 |
| 14 | 8.0 | 30 | 8.0 | 6.0 | 30 |
| 15 | 7.5 | 30 | 7.5 | 5.5 | 30 |
| 16 | 7.0 | 30 | 7.0 | 5.0 | 30 |
| 17 | 6.5 | 30 | 6.5 | 4.5 | 30 |
| 18 | 6.0 | 30 | 6.0 | 4.0 | 30 |
| 19 | 5.5 | 30 | 5.5 | 4.0 | 30 |
| 20 | 5.0 | 30 | 5.0 | 4.0 | 30 |
| 21 | 4.5 | 30 | 4.5 | 3.0 | 30 |
| 22 | 4.0 | 30 | 4.0 | 3.0 | 30 |
| 24 | 3.0 | 30 | 3.0 | 3.0 | 30 |

**NOTES**
1. TURNOUT (DIMENSIONS X-1 & X-2) SHALL BE REQUIRED WHEN USING CONCRETE UNLESS OTHERWISE APPROVED.
2. WHERE GUTTER IS USED THE DIMENSIONS SHOWN SHALL BE AS PROJECTED FROM EDGE OF PAVEMENT.
3. FLORIDA D.O.T. PRIMARY, SECONDARY AND COUNTY ARTERIAL STREETS REQUIRE MINIMUM DIMENSIONS OF 12 FOOT DRIVE WIDTH WITH A MINIMUM RADIUS OF 15 FOOT. (REGARDLESS OF DRIVE WIDTH – A 15 FOOT RADIUS WILL BE REQUIRED.
4. THESE DIMENSIONS ARE NOT APPLICABLE TO DRIVEWAYS CONSTRUCTED AROUND CUL-DE-SACS AND SHARP RADIUS. CONTACT ENGINEERING DEPARTMENT FOR DETAILS CONCERNING VARIANCES.




*STANDARD SIDEWALK SECTION OTHER THAN AT DRIVEWAY*




*STANDARD SIDEWALK SECTION AT DRIVEWAY*

DATE: 08/06/14

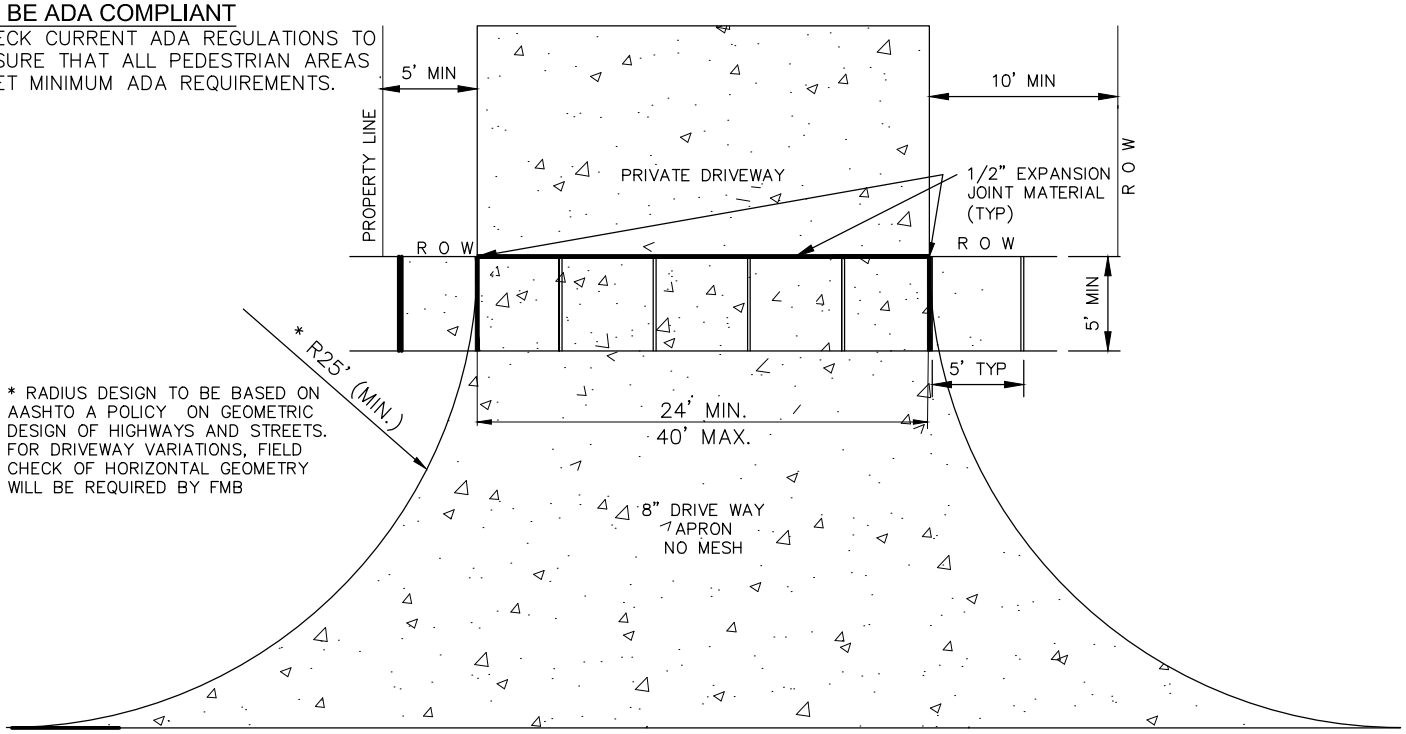
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.42

## DRIVEWAY & SIDEWALK
## COMMERCIAL/INDUSTRIAL

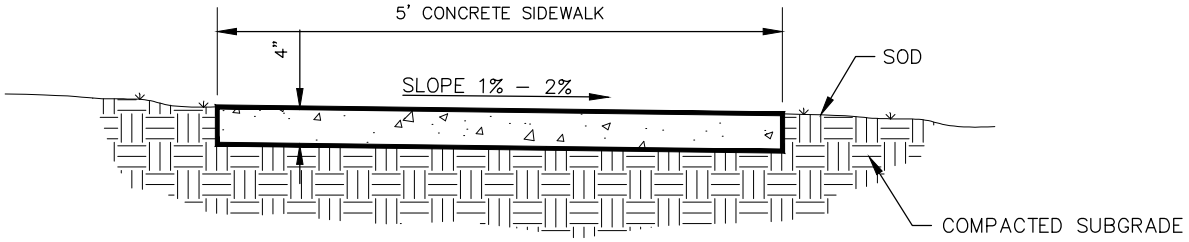
TO BE ADA COMPLIANT

CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.

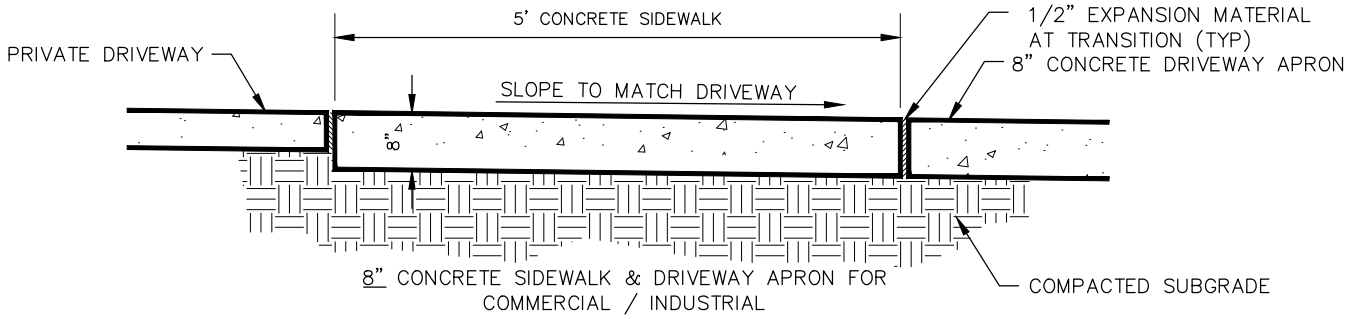



* RADIUS DESIGN TO BE BASED ON AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS. FOR DRIVEWAY VARIATIONS, FIELD CHECK OF HORIZONTAL GEOMETRY WILL BE REQUIRED BY FMB

*TYPICAL DRIVEWAY PLAN*




*STANDARD SIDEWALK SECTION OTHER THAN AT DRIVEWAY*



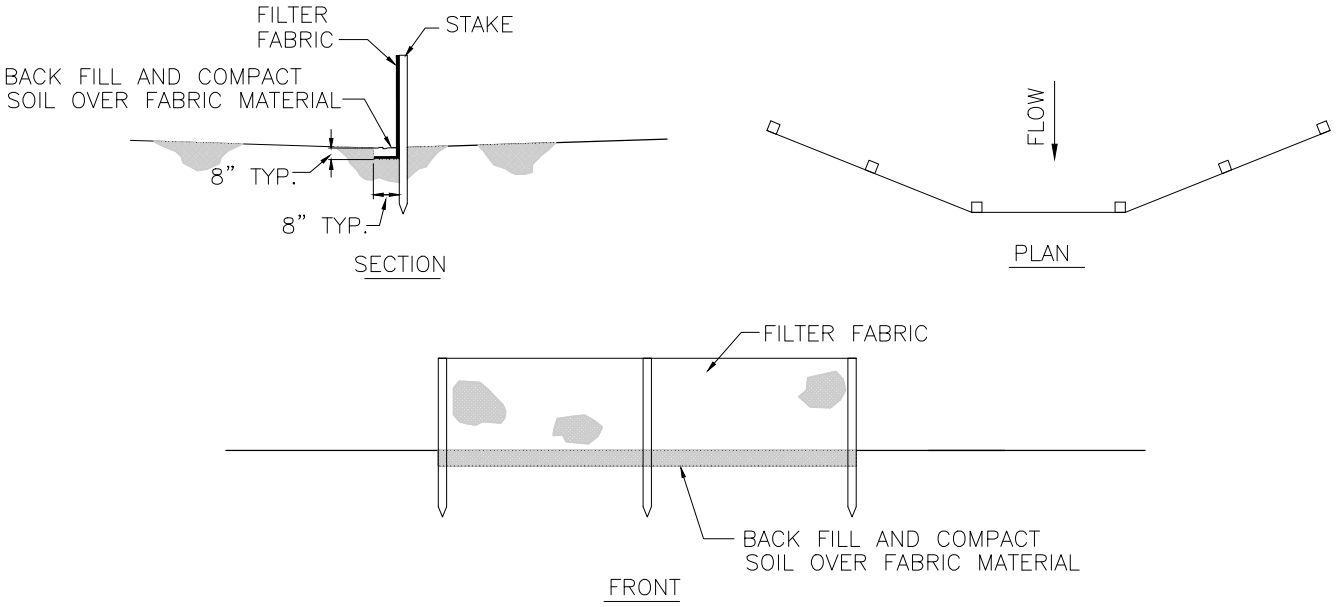

*STANDARD SIDEWALK SECTION AT DRIVEWAY*

DATE: 08/06/14

NOT TO SCALE

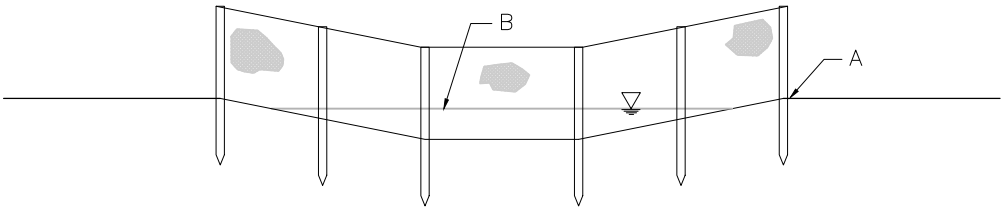
# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.43

## SEDIMENT CONTROL
## FILTER BARRIER DETAILS

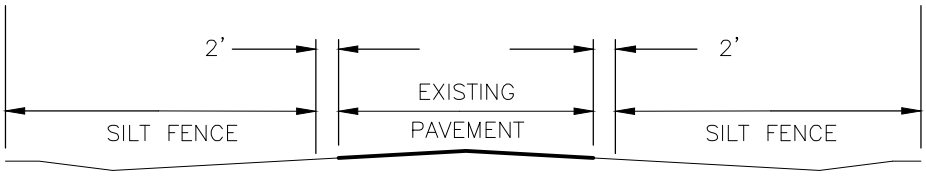



### FILTER BARRIER

POINTS "A" SHOULD BE HIGHER THAN POINT "B"




### PROPER PLACEMENT OF FILTER BARRIER IN DRAINAGE WAY

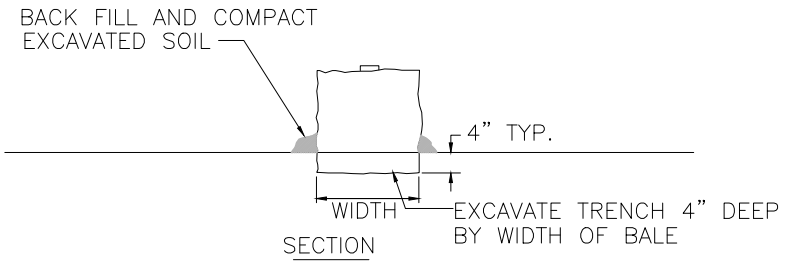


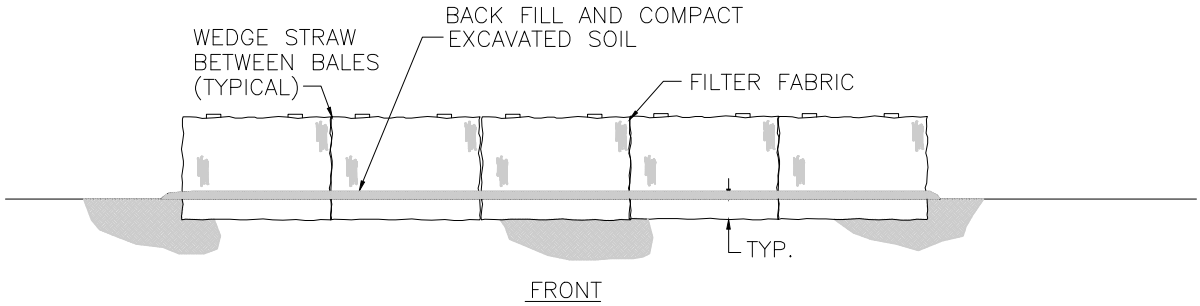

### TYPICAL SILT FENCE DEPLOYMENT AT ROADWAYS

DATE: 08/06/14

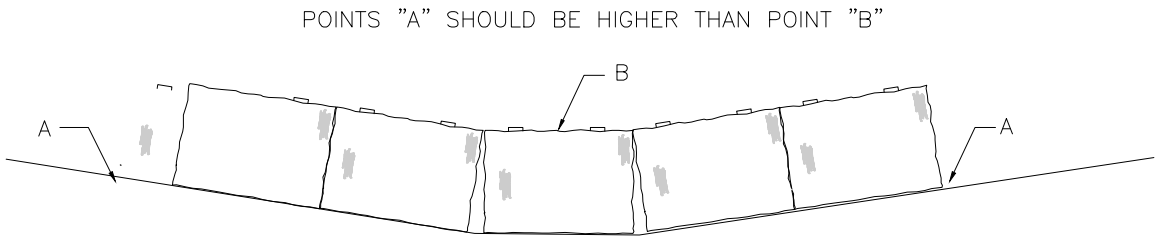
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.44
## SEDIMENT CONTROL
## STRAW BALE BARRIER DETAILS




## STRAW BALE BARRIER




## PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.45

## SEDIMENT CONTROL
## GENERAL NOTES

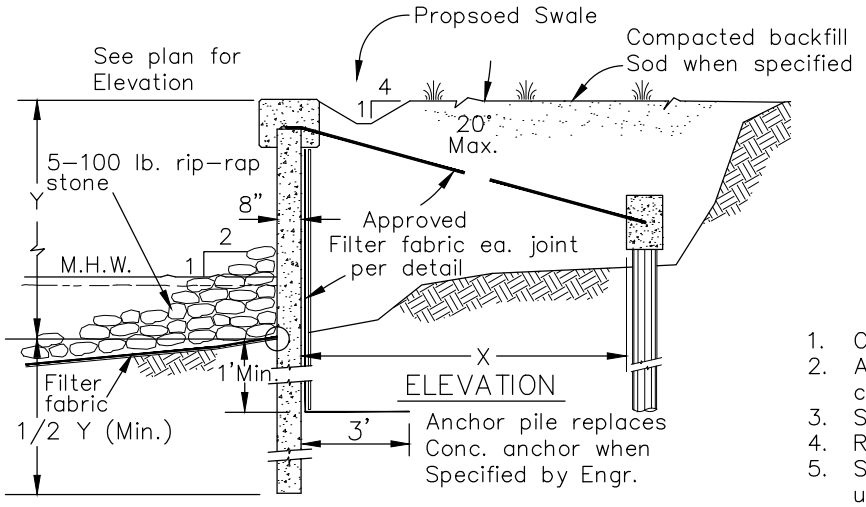
1. Built–up sediment will be removed from silt fencing and any other structural control when it has reached one–half the height of the fence.
2. Temporary and permanent seeding, sodding and planting will be inspected for bare spots, washouts, and healthy growth.
3. Stabilized construction entrances and roadways shall be maintained to prevent clogging of rock bedding which may impede the usefulness of the structure.
4. Any hay bales shall be replaced every three (3) months or when they have served their usefulness so as not to block or impede storm flow or drainage.
5. Floating turbidity barriers will be maintained with respect to depth of sediment and to ensure that the fabric is attached securely to the floats and anchored properly at the bottom for proper sediment control.
6. Disturb only the area that is needed for construction.
7. When possible, clear land in stages. Clear and finish construction on one piece of land then move on to the next.
8. The Contractor will be responsible for the maintenance and repairs of erosion and sediment control devices, and removal of erosion and sediment devices in accordance with the project SWP3.
9. Permanent erosion control measures such as seeding, mulching, laying down of geotextiles or chemical stabilization shall be in place within fourteen (14) days of any completed construction activity for areas where construction has ended temporarily for twenty–one (21) days
10. Seed should only be used during periods that adequate rainfall is anticipated. Otherwise, seed should be used with another stabilization practice or another practice should be used.
11. Buffer zones will be placed adjacent to construction site (behind structural control) to improve water quality, where practical.
12. All disturbed areas should be permanently seeded or sodded within fourteen (14) days of construction completion or in accordance with SFWMD requirements.
13. In addition to the placing of filter fabric in accordance with the inlet erosion control detail the contractor will be responsible for the temporary plugging of the 3" orifice that is precast into the side of all proposed drainage inlets during construction. The contractor will also be responsible for removal of said plug upon completion of the project.
14. All erosion control measures shown are recommended and may be modified as needed by the contractor depending on site conditions.
15. All silt fence and safety barrier to remain in place until completion of construction.
16. Silt fence and/or safety barrier to be placed around all "native vegetation to remain"

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.46

## SEAWALL SYSTEM
## TYPICAL DETAIL 1 OF 2

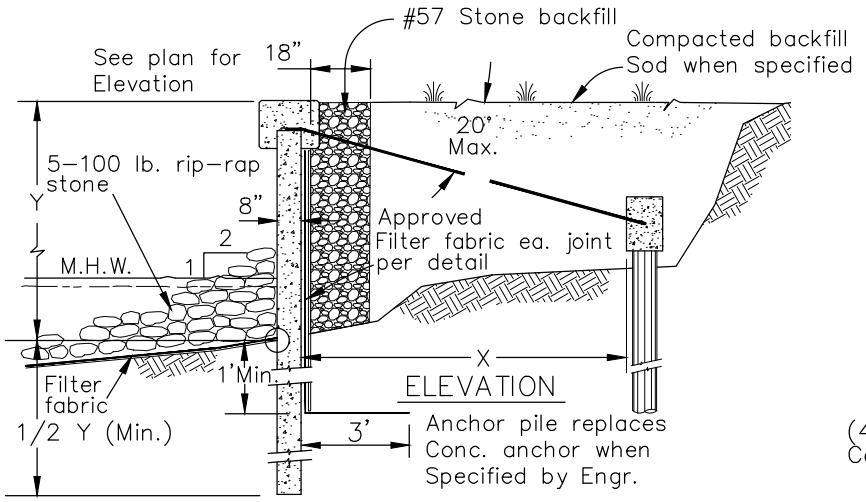



OPTION "A" (SWALE)

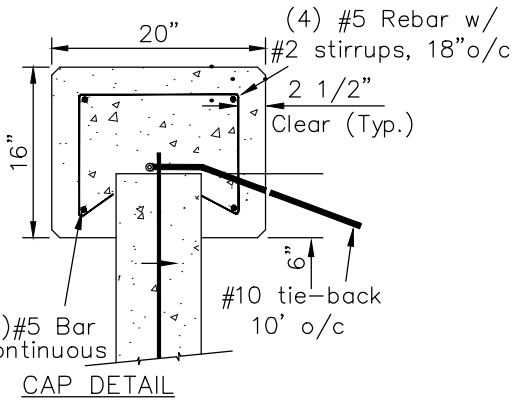
| Filter fabric tail | | | | | | | |
|---|---|---|---|---|---|---|---|
| X | 8' | 10' | 12' | 15' | 18' | 20' | 25' |
| Y | 3' | 4' | 5' | 6' | 7' | 8' | 10' |

NOTES:

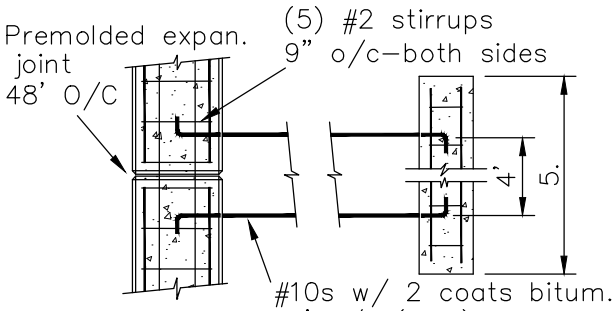
1. Chamfer exposed edges 3/4" (typ.).
2. All concrete to be 3,500 p.s.i. at 28 day cure with fiber mesh reinforcing.
3. State permit required.
4. Rip–Rap shall run along 100% of seawall.
5. See plan for Toe Elevation of Rip–rap used when M.H.W. is 1 ft. or higher above toe of seawall



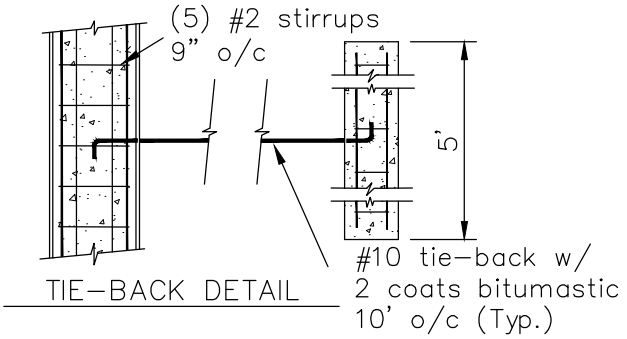

OPTION "B" (#57 STONE)




CAP DETAIL




TIE–BACK DETAIL



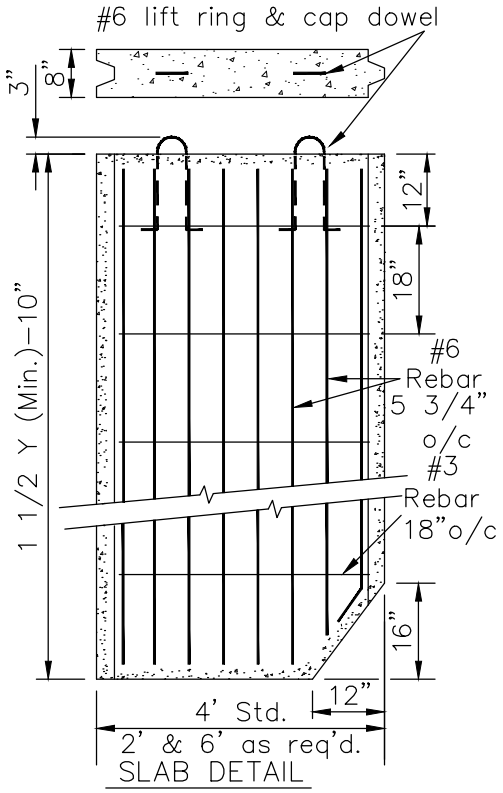

TIE–BACK DETAIL

DATE: 08/06/14

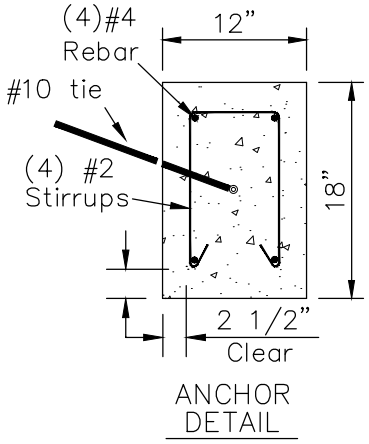
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.47

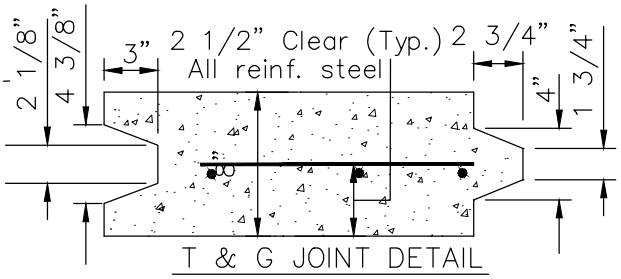
## SEAWALL SYSTEM
## TYPICAL DETAIL 2 OF 2



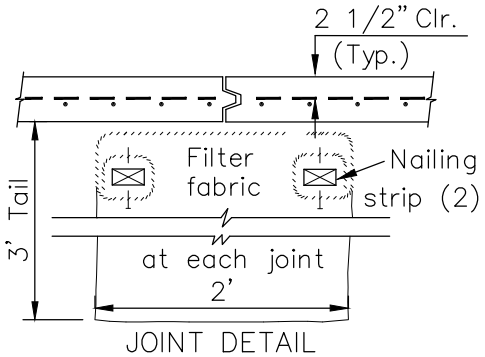

SLAB DETAIL




ANCHOR DETAIL




T & G JOINT DETAIL




JOINT DETAIL

NOTES:

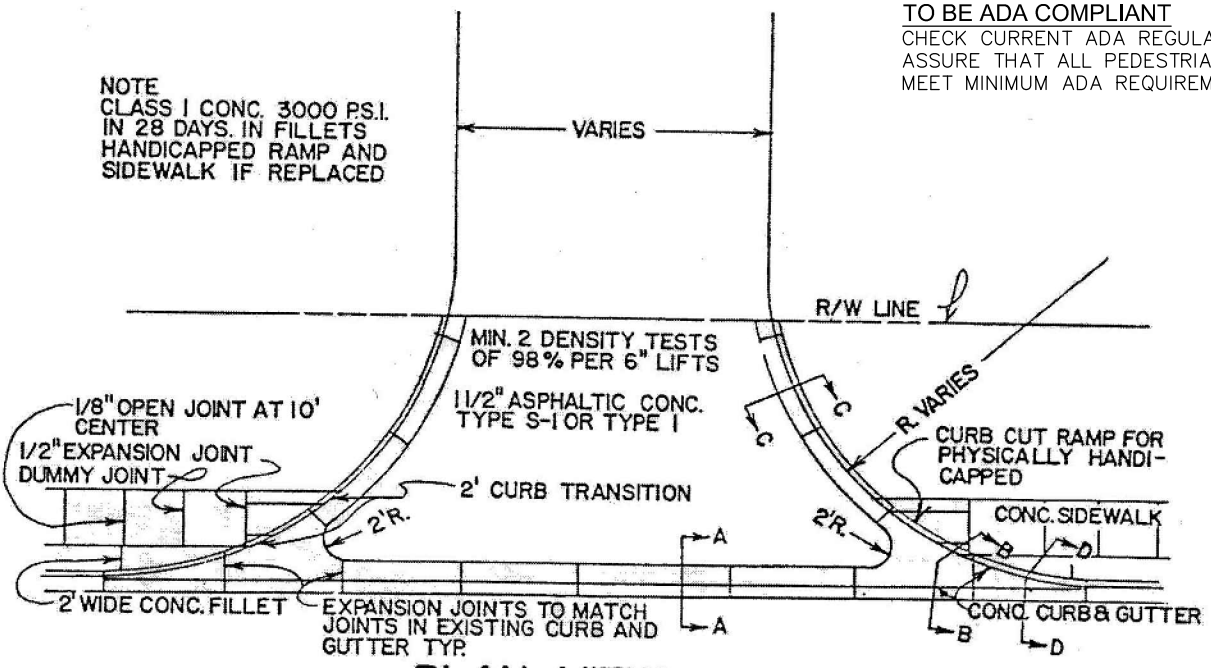
1. Chamfer exposed edges 3/4" (typ.).
2. All concrete to be 3,500 p.s.i.at 28 day cure with fiber mesh reinforcing.
3. State permit required.

DATE: 08/06/14

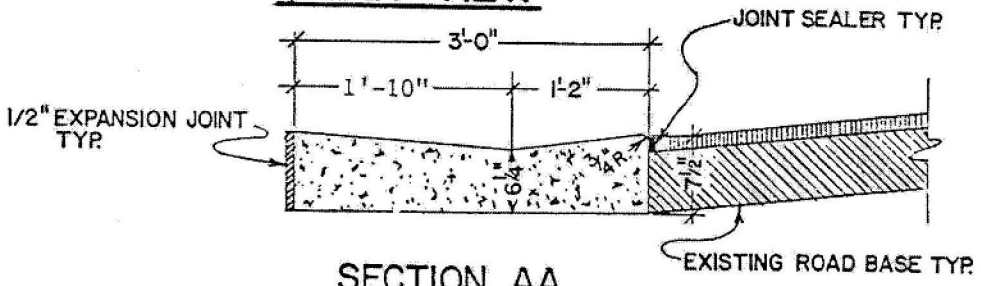
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.48
## CURB ACCESS WITH HANDICAPPED RAMP

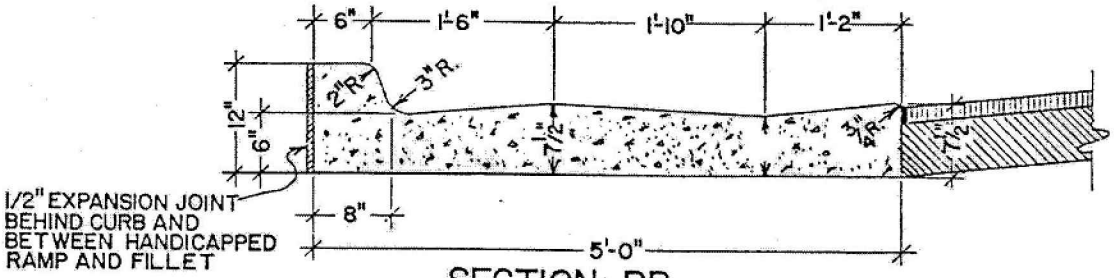
**TO BE ADA COMPLIANT**
CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.



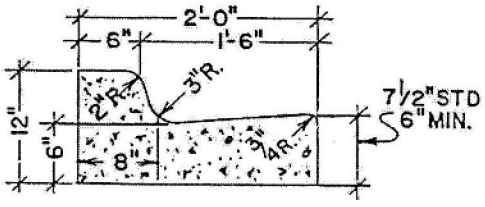

## PLAN VIEW



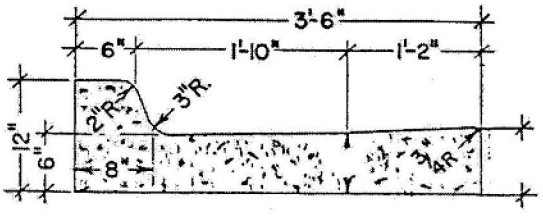

## SECTION AA




## SECTION BB




## SECTION CC



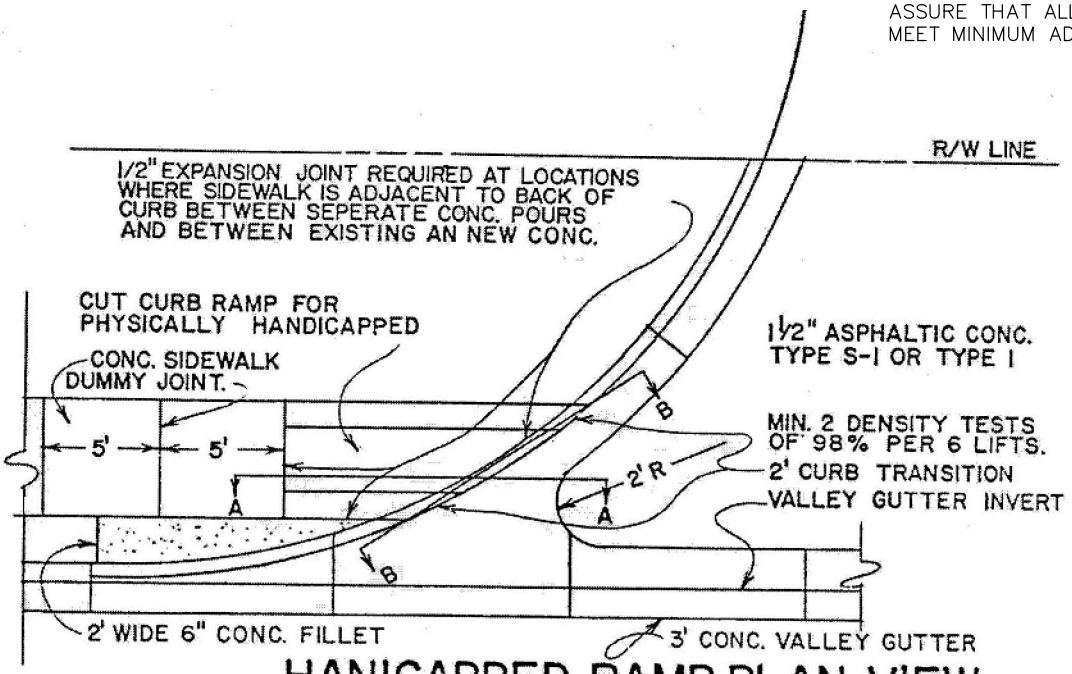

## SECTION DD

DATE: 08/06/14

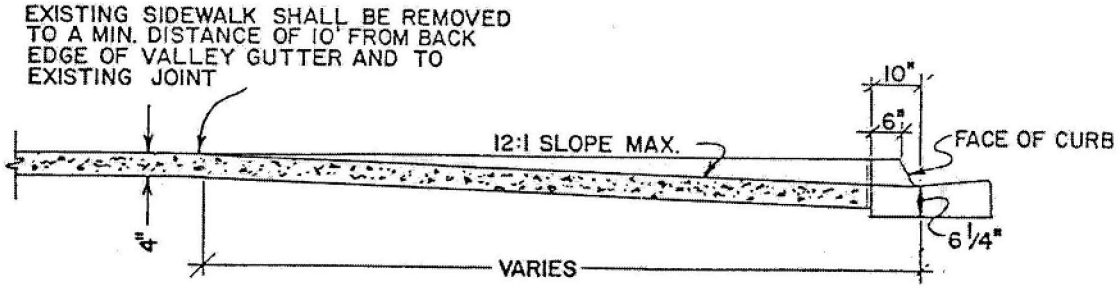
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.49
## CURB ACCESS WITH HANDICAPPED RAMP

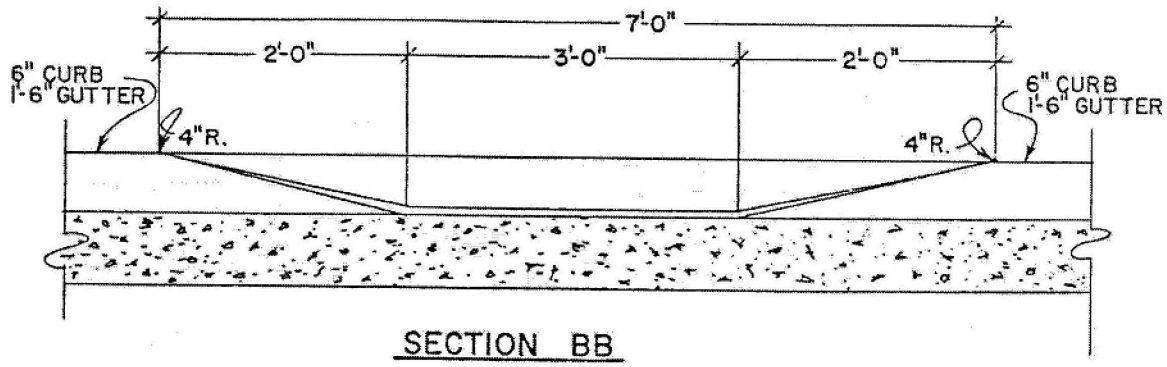
**TO BE ADA COMPLIANT**
CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.




HANICAPPED RAMP PLAN VIEW




SECTION AA



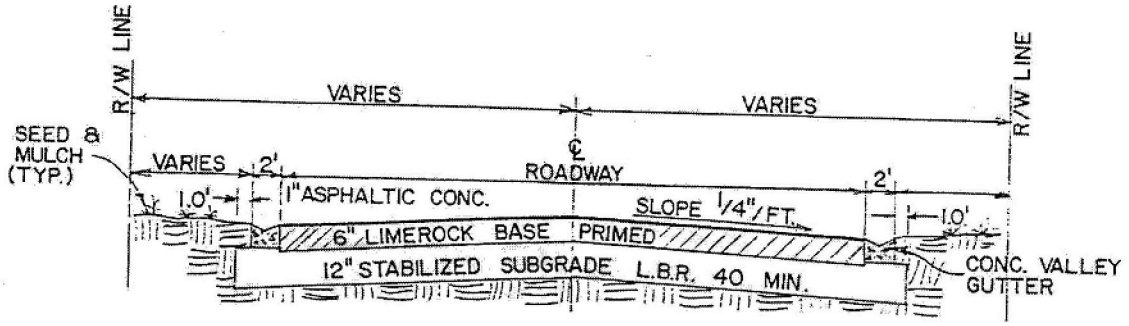

SECTION BB

DATE: 08/06/14

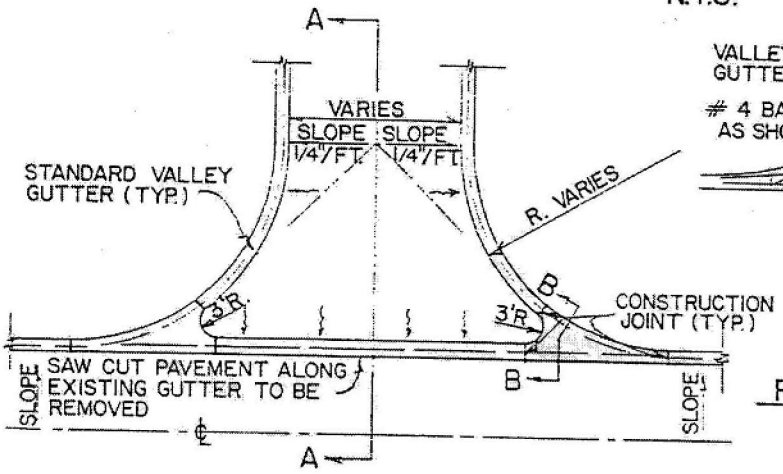
NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.50

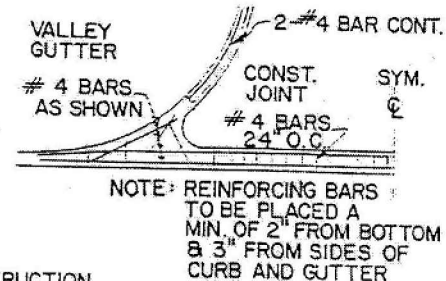
## VALLY GUTTER
## INTERSECTION DETAIL



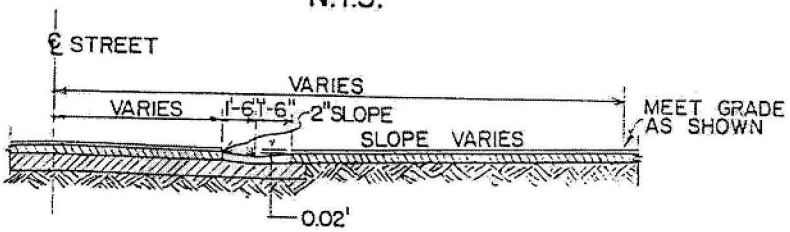

TYPICAL ROAD SECTION
N.T.S.



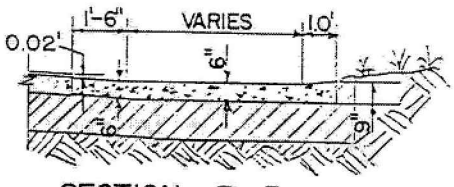

PLAN VIEW
STANDARD VALLEY GUTTER CROSSING
N.T.S.




REINFORCING DIAGRAM
N.T.S.




SECTION A-A
N.T.S.




SECTION B-B
N.T.S

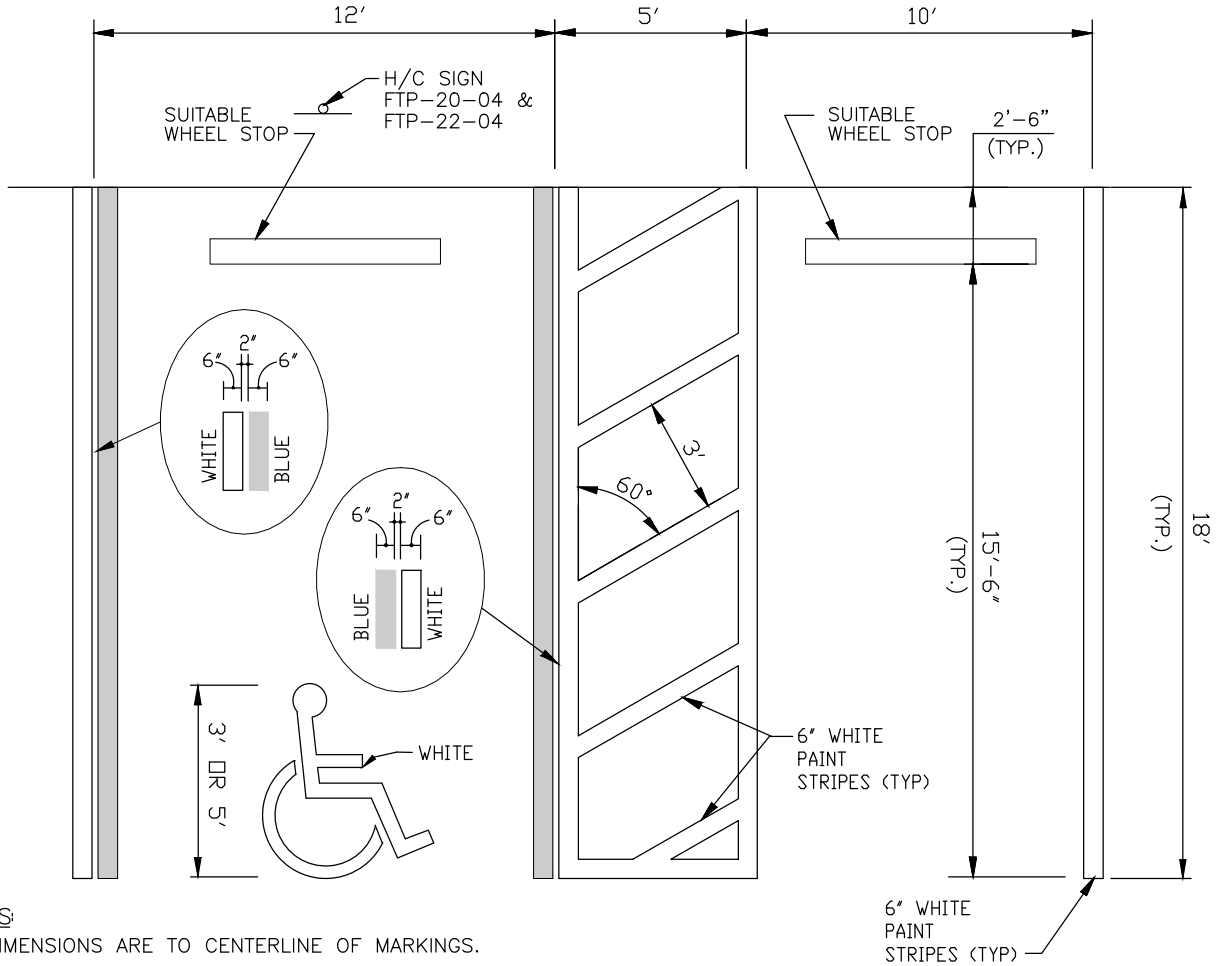
TO BE ADA COMPLIANT
CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.

DATE: 08/06/14

NOT TO SCALE

# TOWN OF FT. MYERS BEACH
# STANDARD DETAIL NO. 10.51
## A.D.A. ACCESSIBLE / STANDARD PARKING DETAIL

**TO BE ADA COMPLIANT**
CHECK CURRENT ADA REGULATIONS TO ASSURE THAT ALL PEDESTRIAN AREAS MEET MINIMUM ADA REQUIREMENTS.




NOTES:
1. DIMENSIONS ARE TO CENTERLINE OF MARKINGS.
2. BLUE PAVEMENT MARKINGS SHALL BE TINTED TO MATCH 15180 OF FEDERAL STANDARDS 595a.
3. THE FTP-22-04 PANEL SHALL BE MOUNTED BELOW THE FTP-20-04 SIGN.

DATE: 08/06/14

NOT TO SCALE