



## SECTION 221313 - SANITARY SEWERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Pipe and fittings.
2. Nonpressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.
6. Encasement for piping.
7. Manholes.

#### 1.2 DEFINITIONS

- A. Applicant: Entity which is financially responsible for the proposed sewer collection system construction or modification, and who shall maintain operational responsibility of said system unless fee simple title is granted to the Town of Surf City. The Applicant becomes the "Permittee" under the Town of Surf City when a Permit is issued, gaining new responsibilities and retaining all the same responsibilities as the Applicant has under the Town of Surf City's Code of Ordinances (hereinafter referred to as "Ordinance").
- B. Application: Form or forms provided by the Town of Surf City and completed by the Design Engineer and Applicant providing pertinent information regarding the design and the proposed construction or modification of sewer collection facilities. It includes all required associated documents.
- C. Approving Authority: Town Manager of the Town of Surf City, who shall be responsible for the administration of the delegated local permitting authority as outlined in the Ordinance, and shall be the designated party to receive service of documents pertaining to such programs.
- D. Approved Plans: Sewer system improvement plans, which have been reviewed by and received the approval of the Town and/or the appropriate state and local agencies.
- E. Contract Documents: The term "Contract Documents" shall refer to the project plans and specifications for sewer system improvements.
- F. Contractor: The person, business, or corporation responsible for the performance of utility construction work.
- G. Design Engineer: Professional Engineer, licensed to practice in the state of North Carolina, responsible for performing the design and preparing the drawings and specifications for the proposed sewer collection system construction or modification(s), construction administration and certifying the completion of such construction or modification(s) in accordance with the



approved plans, specifications, and permits. The design engineer has demonstrated special experience and knowledge regarding the design and operation of sewer improvements.

- H. Developer: The person(s) or corporation(s) financially responsible for the design and construction of a development for which wastewater service by the Town of Surf City will be requested.
- I. Documents: Any and all drawings, graphs, charts, calculations, compilations of data, writings, photographs, audio or video tape recordings, or other such records from which project pertinent information can be obtained, extracted, or translated in a usable form.
- J. Easement: A property right to use or control real property of another.
- K. FRP: Fiberglass-reinforced plastic.
- L. Inspector: The chief construction inspector, an assistant, or other representative duly authorized by the Town of Surf City.
- M. Invert: The lowest point in the internal cross section of a pipe or other culvert.
- N. Manual: The term "Manual" shall refer to all applicable standards, specifications, standard details, and policies contained in or referenced by this document.
- O. NCDENR: North Carolina Department of Environment and Natural Resources.
- P. Owner: The Town of Surf City.
- Q. PE: Polyethylene plastic.
- R. Permit (NCDENR Permit): Written document which is issued by the Town of Surf City, and its Approving Authority, in accordance with the Ordinance, describing the specific construction and/or improvement activity allowed, and including any and all general, supplemental and special conditions to the Permit, assigning construction responsibility under the Permit and providing operation responsibility (Town or Private), for the facilities upon completion of the permitted work.
- S. Permit Period: Duration during which a Permit is valid, commencing on the date of permit issuance by the Approving Authority, and unless suspended, modified or revoked for cause, shall be valid for the succeeding 12 months, or until work is complete, accepted and certified by the Design Engineer, whichever occurs first.
- T. Person: Individuals, sole proprietorships, partnerships, limited liability corporations, corporations, professional associations, firms, joint ventures, businesses, institutions, municipal or other local government subdivisions, governmental agencies, or any other body corporate or political, for profit or non-profit.
- U. Plans: The approved plans, profiles, standard details, supplemental plans, and working drawings, which show the location, dimensions, and details of the work to be done.
- V. Pipe Trench: The following terms are used in reference to excavation and backfill for pipes:



- W. Bedding: That portion of the pipe support structure bounded by the Foundation or undisturbed trench bottom, the trench walls and the bottom of the pipe.
- X. Final Backfill: That portion of the backfill lying above the Initial Backfill.
- Y. Foundation: That portion of the pipe support structure bounded by the undisturbed trench bottom, the trench walls, and the pipe Bedding.
- Z. Haunching: That portion of the pipe support structure bounded by the Bedding, the trench walls, the outside of the pipe and a horizontal plane having an elevation equal to that of the spring line of the pipe.
- AA. Initial Backfill: That portion of the backfill lying above the spring line (mid-line) of the pipe and below a horizontal plane having an elevation which is one (1) foot above the top of the pipe.
- BB. PP: Polypropylene plastic
- CC. Professional Engineer (PE): A person who has been duly licensed as a professional engineer by the North Carolina State Board of Examiners for Professional Engineers and Land Surveyors, with experience and special knowledge concerning sewer improvements.
- DD. PVC: Polyvinyl chloride plastic
- EE. Record Drawing: A complete set of drawings, consisting of one (1) hard copy, on bond paper and one (1) electronic copy, in PDF format, which can be printed out, but not modified and which shows actual installed or constructed conditions. Controlled location shall be based upon North American Datum of 1983 (NAD 83). Vertical control shall be based upon North American Vertical datum of 1988 unless no such control is available within 2,000' of the property, in which case the datum used in setting the control monument will be used
- FF. Required Fee: Fees levied by the Town of Surf City, as established in adoption of the Town of Surf City User Rates and Application Fee for construction observation, permit application, modification, or renewal, as well as administrative review.
- GG. Right-of-way: The land area between the back of curb or edge of pavement and the property boundary.
- HH. Service Lines: Small pipelines (sewer lines six (6) inches or less) connecting homes and buildings to the collection system.
- II. Sewer Collection System: The meaning as stated in North Carolina General Statute 143-213 (15) in its most current amended form.
- JJ. Standards: Where this Manual makes a reference to published standards such as ASTM, ANSI, AWWA, etc., the latest revisions of such standard shall apply.
- KK. Standard Specifications: The general term comprising all the directions, provisions, and requirements contained or referred to in this book entitled "Standard Specifications for the Town of Surf City" and in any subsequent revisions or additions to this book.



- LL. Sewer Service Area: Area described in North Carolina General Statute 143.215.1(f) and North Carolina General Statute 130A-317(d) as the "service area" for the Town. (The land area within which sewer service is or will soon be available).
- MM. Subgrade: That portion of the roadbed prepared as a foundation for the pavement structure.
- NN. Surf City Sewer Collection System: Part or portion of the facilities owned by the Town, which are used to collect and carry wastewater to the treatment works and ending at the sewer service lateral cleanout or other designated connection.
- OO. Town: Town of Surf City.

### 1.3 SUBMITTALS

- A. Product Data: For the following:
  - 1. Expansion joints and deflection fittings.
  - 2. Backwater valves.
- B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.
- C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- D. Profile Drawings: Show system piping in elevation. Draw profiles to horizontal scale of not less than 1 inch equals 50 feet and to vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.
- E. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.
- F. Field quality-control reports.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

### 1.5 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:



1. Notify Engineer no fewer than two (2) days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Engineer's written permission.

## PART 2 - PRODUCTS

### 2.1 MATERIAL IDENTIFICATION

- A. Each length of pipe shall have plainly and permanently marked thereon the following information, as well as any additional information specifically noted in the sections below:
  1. Pipe class or strength designation.
  2. Manufacturer's name or trademark.
  3. Nominal pipe size.

### 2.2 SERVICE CONNECTIONS

#### A. General Requirements

1. See design criteria contained herein for additional installation requirements.
2. Sewer laterals shall not be located in easements when gravity service can be provided to the property frontage at the street.
3. Each separately owned structure requires a separate tap to a public sewer.
4. All service connections to existing sanitary sewer mains shall be made by the Town. Service connections to new mains may be made by the Contractor, but must include the use of wye (not tee) connections. Taps onto new lines may only be approved by the Town Public Works Department.
5. All service lines with less than 3-ft of cover or deeper than 20-ft shall be made of ductile iron pipe.
6. Service lines between 3 and 8 feet in depth may require bedding as determined by the Town Public Works Department. PVC service lines between 8 and 20 feet in depth shall require Class I bedding from 4 inches below the service line to 4 inches above the service line.
7. Service connections made using a "ROMAC CB" sewer saddle shall be made only when the service line is iron pipe and only when the sewer main is 8", 10", or 12" diameter concrete, ductile iron, or PVC sewer pipe. This service connection shall not be used when the sewer main material is truss sewer pipe. The opening in the sewer main for the "ROMAC CB" sewer saddle shall be cut with a hydraulically or pneumatically driven circular tapping saw of the same nominal diameter as the sewer service line.
8. Individually owned structures shall require at least one sewer tap.
9. Service taps into mains shall be made on the top quarter of the main at a 45° angle to vertical with the wye saddle angled with the direction of flow in the main.
10. Services are to be done by auger unless otherwise approved by the Town.
11. Service connections to the main lines shall be perpendicular to the main line and shall extend to the edge of the right-of-way or easement line. 4 inch lines shall have a minimum slope of 0.60 ft./100 feet. Cleanouts shall be required on all sewer services with a maximum spacing of 50 feet on 4 inch services and 100 feet on 6 inch services. A



cleanout shall be placed on all service lines at the right-of-way line or at the edge of the easement.

12. Service lines shall not be installed into manholes unless pre-approved by the Town Public Works Department.
13. Final Backfill
  - a. Final backfill shall be of a suitable material removed from excavation except where other material is specified. Debris, frozen material, large clods or stones, organic matter, or other unstable materials shall not be used for final backfill within 2 feet of the top of the pipe. Stones used in backfills shall not be greater than 6 inches along any axis.
  - b. Final backfill shall be placed in such a manner as not to disturb the alignment of the pipe.

### 2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

### 2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. CISPI-Trademark, Shielded Couplings:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ANACO-Husky.
    - b. Dallas Specialty & Mfg. Co.
    - c. Fernco Inc.
    - d. Mission Rubber Company; a division of MCP Industries, Inc.
    - e. Stant; a Tompkins company.
    - f. Tyler Pipe.
    - g. Approved Equal.
  2. Description: ASTM C 1277 and CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

### 2.5 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

- A. Pipe: ASTM A 746, for push-on joints.
- B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.



- C. Compact Fittings: AWWA C153, ductile iron, for push-on joints.
- D. Gaskets: AWWA C111, rubber.

## 2.6 DUCTILE-IRON, PRESSURE PIPE AND FITTINGS

### A. Push-on-Joint Piping:

- 1. Pipe: AWWA C151.
- 2. Standard Fittings: AWWA C110, ductile or gray iron.
- 3. Compact Fittings: AWWA C153.
- 4. Gaskets: AWWA C111, rubber, of shape matching pipe and fittings.

### B. Mechanical-Joint Piping:

- 1. Pipe: AWWA C151, with bolt holes in bell.
- 2. Standard Fittings: AWWA C110, ductile or gray iron, with bolt holes in bell.
- 3. Compact Fittings: AWWA C153, with bolt holes in bells.
- 4. Glands: Cast or ductile iron; with bolt holes and high-strength, cast-iron or high-strength, low-alloy steel bolts and nuts.
- 5. Gaskets: AWWA C111, rubber, of shape matching pipe, fittings, and glands.

## 2.7 PVC PIPE AND FITTINGS

### A. PVC Type PSM Sewer Piping:

- 1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
- 2. Fittings: ASTM D 3034, PVC with bell ends.
- 3. Gaskets: ASTM F 477, elastomeric seals.

### B. PVC Pressure Piping:

- 1. Pipe: AWWA C900, Class 150 and Class 200 PVC pipe with bell-and-spigot ends for gasketed joints.
- 2. Fittings: AWWA C900, Class 150 and Class 200 PVC pipe with bell ends.
- 3. Gaskets: ASTM F 477, elastomeric seals.

### C. PVC Sewer-Service Piping:

- 1. Pipe: ASTM D 1785, Schedule 40 PVC, with plain ends for solvent-cemented joints.
- 2. Fittings: ASTM D 2466, Schedule 40 PVC, socket type.

## 2.8 NONPRESSURE-TYPE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.



B. Sleeve Materials:

1. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Ring-Type, Flexible Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Fernco Inc.
  - b. Mission Rubber Company; a division of MCP Industries, Inc.
  - c. Approved Equal.
2. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

D. Nonpressure-Type, Rigid Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. ANACO-Husky.
  - b. Approved Equal.
2. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling, molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

## 2.9 PRESSURE-TYPE PIPE COUPLINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Dresser, Inc.
2. Ford Meter Box Company, Inc. (The); Pipe Products Div.
3. JCM Industries, Inc.
4. Romac Industries, Inc.
5. Smith-Blair, Inc.; a Sensus company.
6. Victaulic Depend-O-Lok, Inc.
7. Hymax.
8. Approved Equal.

B. Tubular-Sleeve Couplings: AWWA C219, with center sleeve, gaskets, end rings, and bolt fasteners.



- C. Metal, bolted, sleeve-type, reducing or transition coupling, for joining underground pressure piping. Include 200 psig minimum pressure rating and ends of same sizes as piping to be joined.
- D. Center-Sleeve Material: Manufacturer's standard.
- E. Gasket Material: Natural or synthetic rubber.
- F. Metal Component Finish: Corrosion-resistant coating or material.

## 2.10 CLEANOUTS

### A. Cast-Iron Cleanouts:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.
  - d. Tyler Pipe.
  - e. Watts Water Technologies, Inc.
  - f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
  - g. Approved Equal.
- 2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
- 3. Top-Loading Classification(s): Medium Duty.
- 4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

### B. PVC Cleanouts:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Canplas LLC.
  - b. IPS Corporation.
  - c. NDS.
  - d. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
  - e. Sioux Chief Manufacturing Company, Inc.
  - f. Zurn Light Commercial Products Operation; Zurn Plumbing Products Group.
  - g. Approved Equal.
- 2. Description: PVC body with brass threaded plug and cast iron cleanout box. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.



## 2.11 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Material: Linear low-density polyethylene film of 0.008-inch (0.20-mm) or high-density, cross-laminated polyethylene film of 0.004-inch (0.10-mm) minimum thickness.
- C. Form: Sheet or tube.
- D. Color: Black.

## 2.12 MANHOLES

## A. Standard Precast Concrete Manholes:

- 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
- 2. Diameter: 48 inches minimum unless otherwise indicated, 60 inches for air relief.
- 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
- 4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
- 5. Riser Sections: 4 inch minimum thickness, of length to provide depth indicated.
- 6. Top Section: Eccentric-cone type, with top of cone of size that matches grade rings.
- 7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
- 8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
- 9. Steps: Individual FRP steps or FRP ladder; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12 to 16 inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
- 10. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
- 11. Grade Rings: Reinforced-concrete rings, 6 to 9 inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

## B. Designed Precast Concrete Manholes:

- 1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
- 2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
- 3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
- 4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.



5. Steps: Individual FRP steps or FRP ladder; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
6. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers:

1. Description: Ferrous; 24 inch ID by 7- to 9 inch riser, with 4 inch minimum-width flange and 26 inch diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

D. Manhole-Cover Inserts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. FRW Industries; a Syneco Systems, Inc. company.
  - b. Knutson Enterprises.
  - c. L. F. Manufacturing, Inc.
  - d. Parson Environmental Products, Inc.
  - e. Approved Equal.
2. Description; Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.
3. Type: Drainage with vent holes.

## 2.13 CONCRETE

A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.



- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    - a. Invert: 0.1' through manhole.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
  - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

## 2.14 REPAIRS

- A. PVC Pipe: Replace damaged section with PVC Pipe and install a Fernco coupling at each end encased in concrete.
- B. HDPE Pipe: Replace damaged section with new HDPE pipeline section and install electrofusion couplings at both ends; minor breaches may be repaired with an electrofusion repair coupling as deemed appropriate by manufacturer's representative.

## PART 3 - EXECUTION

### 3.1 PIPING INSTALLATION

- A. General Locations and Arrangements: Standard details plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.



- F. Install gravity-flow, nonpressure, drainage piping according to the following:
1. Install piping pitched down in direction of flow, at minimum slope as complies with NCDENR Minimum Design Criteria.
  2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
  3. Install piping with 36-inch minimum cover.
  4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
  5. Install hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
  6. Install ductile-iron, gravity sewer piping according to ASTM A 746.
  7. Install PVC profile sewer piping according to ASTM D 2321 and ASTM F 1668.
  8. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
  9. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
- G. Install force-main, pressure piping according to the following:
1. Install piping with restrained joints at tee fittings and at horizontal and vertical changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
  2. Install piping with 36-inch minimum cover.
  3. Install ductile-iron pressure piping according to AWWA C600 or AWWA M41.
  4. Install ductile-iron special fittings according to AWWA C600.
  5. Install PVC pressure piping according to AWWA M23 or to ASTM D 2774 and ASTM F 1668.
  6. Install PVC sewer-service piping according to ASTM D 2774 and ASTM F 1668.
- H. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:
1. Hub-and-spigot, cast-iron soil pipe.
  2. Hubless cast-iron soil pipe and fittings.
  3. Ductile-iron pipe and fittings.
  4. Expansion joints and deflection fittings.
- I. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

### 3.2 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure, drainage piping according to the following:
1. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
  2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.



3. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
4. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
5. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
6. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
7. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
8. Join dissimilar pipe materials with nonpressure-type, rigid couplings.

B. Join force-main, pressure piping according to the following:

1. Join ductile-iron pressure piping according to AWWA C600 or AWWA M41 for push-on joints.
2. Join ductile-iron special fittings according to AWWA C600 or AWWA M41 for push-on joints.
3. Join PVC pressure piping according to AWWA M23 for gasketed joints.
4. Join PVC sewer-service piping according to ASTM D 2855.
5. Join dissimilar pipe materials with pressure-type couplings.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
  - a. Rigid couplings for pipes of same or slightly different OD.
  - b. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
2. Use pressure pipe couplings for force-main joints.

### 3.3 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Install FRP manholes according to manufacturer's written instructions.
- D. Form continuous concrete channels and benches between inlets and outlet.
- E. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 6 inches above finished surface elsewhere unless otherwise indicated.
- F. Install manhole-cover inserts in frame and immediately below cover.



### 3.4 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

### 3.5 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
  - 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
  - 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
  - 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, capped 3" below grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

### 3.6 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains.
- B. Connect force-main piping to building's sanitary force mains.
- C. Make connections to existing piping and underground manholes.
  - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
    - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.



4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### 3.7 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
  1. If manhole depth is 48" or less, remove manhole and close open ends of remaining piping.
  2. If manhole depth is greater than 48", remove top of manhole down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

### 3.8 IDENTIFICATION

- A. Metallic pipes:
  1. Install continuous underground detectable green warning tape at 12" above center of pipe during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.
  2. Install tracer wire at 12" above center of pipe during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.
- B. Non-metallic pipes:
  1. Install continuous underground detectable green warning tape taped to top of center of pipe during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.
  2. Install tracer wire taped to top of center of pipe during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

### 3.9 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  1. Submit separate report for each system inspection.
  2. Defects requiring correction include the following:



- a. Deflection.
  - b. Damage: Crushed, broken, cracked, or otherwise damaged piping.
  - c. Infiltration: Water leakage into piping.
  - d. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.

B. Testing Requirements.

1. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  - a. Do not enclose, cover, or put into service before inspection and approval.
  - b. Test completed piping systems according to requirements of authorities having jurisdiction.
  - c. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  - d. Submit separate report for each test.
  - e. The Contractor shall furnish all materials, labor, and equipment to perform all testing. Water for testing purposes may be provided by the Town and arranged for by the Contractor. The Contractor shall coordinate with the Town of Surf City for the use of water for testing.
  - f. Temporary taps and air releases shall be permissible to facilitate testing.
  - g. All testing shall be performed in the presence of the applicant, the Professional Engineer, or other authorized representative.
  - h. The results of all testing shall be maintained by the applicant as part of the construction record documentation as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
2. General:
  - a. The Contractor shall furnish all materials, labor, and equipment to perform all testing. Water for testing purposes may be obtained from the Town of Surf City. The Contractor shall reimburse the Town for all water used; based upon the Town's water rate structure.
  - b. All water or wastewater used during testing of the pump station, forcemain, or any of the systems described in this section, must be returned to the Town of Surf City sanitary sewer system after proper coordination with the Town of Surf City.
  - c. Before the operational tests are conducted, the required copies of the Operation and Maintenance Manuals shall be delivered to the Town.
  - d. The Town reserves the right to require further testing, as necessary, to assure that all components and infrastructure are performing in accordance with the manufacturer recommendations and Town specifications. All testing, repairs and/or readjustments, and necessary re-testing, shall be at no additional cost to the Town.
  - e. All on-site testing and/or installation verification shall be performed in the presence of the Inspector or other representative authorized by the Town.



- f. All testing, installation verification, and training, shall be performed in the presence of, or by, an experienced, competent, and authorized manufacturers' representative.
  - g. Factory testing shall consist of testing all operating functions of the equipment under varying operating conditions to assure that it will perform as specified. Any specific testing that may be required is discussed under the individual equipment items below. Results of factory testing shall be presented to the Town prior to delivery of the equipment.
  - h. Installation verification shall consist of a visit to the site by a manufacturer's representative to inspect, check, adjust if necessary, and approve the equipment installation. The manufacturer's representative shall certify that the equipment has been properly installed and lubricated, is in accurate alignment, and is free from any undue stress imposed by connecting piping or anchor bolts. Any specific verification requirements are discussed under the individual equipment items below. Results of the installation verification shall be presented to the Town prior to start-up of the equipment.
  - i. On-site testing shall consist of all manual and automatic operating functions under various operating conditions, including full load conditions. The equipment shall also be tested under adverse or emergency conditions. All alarms and remote signals shall also be tested. Any specific testing that may be required is discussed under the individual equipment items below. Results of the on-site testing shall be presented to the Town prior to final acceptance of the project.
  - j. All functions and systems of the pump station, even those not specifically listed below, shall be tested to ensure proper operation under normal and emergency situations.
  - k. All defective equipment or malfunctioning systems shall be replaced or corrected, and the full system placed in a fully operational condition to the satisfaction of the Town, at no cost to the Town.
  - l. Results of all factory testing, installation certifications, and on-site operational testing shall be provided to the Town of Surf City in the final construction documents as described in the Submittals portion of this specification section.
3. Gravity sewers.
- a. Gravity sewer pipes.
    - 1) Deflection Test.
      - a) The mandrel (go/no-go) deflection test must be performed on each line prior to acceptance.
      - b) The test shall be conducted after the final backfill has been in place at least 30 days to permit stabilization of the soil-pipe system. As an alternative to waiting 30 days to permit stabilization of the soil-pipe system, the Town will accept certification from a soil testing firm verifying that the backfill of the trench has been compacted to at least 95% maximum density.
      - c) The Contractor shall supply the mandrel used for the test. The mandrel device shall be a ball or cylinder of size not less than 95% of the nominal pipe size.
  - b. Manholes.



- 1) Vacuum test.
  - a) All newly installed manholes shall pass a vacuum test in accordance with ASTM C 1244-93. The Contractor shall supply all equipment and materials necessary to vacuum test the manholes.
  - b) Vacuum Testing shall not be initiated until the manholes and all specified coatings and lining materials have been cured in accordance with manufacturer recommendations.
  - c) The Town’s representative shall be present and witness all vacuum testing.
  - d) The following vacuum testing criteria shall apply for compliance with the testing procedure.
    - (i) A vacuum of 10-inches of mercury shall be drawn with an approved vacuum testing unit.
    - (ii) The testing time shall not be measured until after the vacuum pump has been shut off.
    - (iii) The time required for the vacuum to drop from 10-inches to 9-inches of mercury shall meet or exceed the values listed in the following table: 41
    - (iv) Manhole Vacuum Testing Time

Depth (feet)	Manhole Diameter (inches)		
	48	60	72
	Time (seconds)		
8’	20	26	33
10’	25	33	41
12’	30	39	49
14’	35	48	57
16’	35	48	57
18’	45	59	73
20’	50	65	81
22’	55	72	89
24’	59	78	97
26’	64	85	105
28’	69	91	113
30’	74	98	121

- 4. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
  - a. Test plastic gravity sewer piping according to ASTM F 1417.
  - b. Test concrete gravity sewer piping according to ASTM C 924.
- 5. Forcemains.
  - a. Prior to testing any segment of forcemain, care shall be taken to prevent the pipe from moving while under pressure.



- b. Water used for testing forcemain installations shall either be disposed in a nearby sanitary sewer, as authorized by the local sewer authority, or in another location in accordance with state and federal laws and regulations.
- c. Hydrostatic Pressure Test.
  - 1) A hydrostatic pressure test shall be performed on each segment of installed forcemain. Perform test as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains. Test at pressure not less than 1.5 times the maximum system operating pressure, but not less than 150 psig.
    - a) Ductile-Iron Piping: Test according to AWWA C600, "Hydraulic Testing" Section.
    - b) PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
  - 2) The pressure test may be performed concurrently or separately with the leakage test.
- d. Leakage Tests

- 1) A leakage test shall be performed on each segment of installed forcemain at the hydrostatic pressure test stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
- 2) Leakage shall be measured with a calibrated test meter and shall not exceed the amount given by the following formula:

$$L = \frac{SD \sqrt{P}}{148,000}$$

L = Allowable leakage (gallons per hour)  
S = Length of pipe segment tested (feet)  
D = Nominal diameter of pipe segment tested (inches)  
P = Test pressure (pounds per square inch)

All visible leaks shall be repaired regardless of the amount of leakage. If leakage exceeds this rate, the applicant is responsible for assuring that the cause of test failure is determined, all necessary repairs are made, and repeating the test until the forcemain segment passes.

- 3) The leakage test may be performed concurrently or separately with the pressure test.
- 4) Each layer of fill or backfill over the forcemain shall be compacted to a density needed to accommodate the use of the forcemain installation area or otherwise may be required (e.g., encroachment agreement with the North Carolina Department of Transportation, etc.).



6. Pump Station Testing
  - a. Factory Testing
    - 1) All pumps shall be tested by the manufacturer in accordance with the appropriate HI standard prior to shipment for installation.
    - 2) The results of all factory testing shall be maintained by the applicant as part of the construction record documentation as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
  - b. Drawdown Testing
    - 1) Following installation, each pump in the pump station shall be subjected to a drawdown test or other similar testing procedure to confirm that the pump is operating at or near the required design operating point(s).
    - 2) The drawdown test shall be performed in the presence of the applicant, the PE, or other authorized representative.
    - 3) The results of all drawdown testing shall be maintained by the applicant as part of the construction record documentation as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
  - c. Witnessed Testing
    - 1) Consideration shall be given by the applicant to require a witnessed test for large pumps, pumps in critical installations, or pump replacement/repair situations.
    - 2) All witnessed testing shall be performed in accordance with the appropriate HI standard.
    - 3) Witnessed testing shall be performed in the presence of the applicant, the PE, or other authorized representative.
    - 4) The results of all witnessed testing shall be maintained by the applicant as part of the construction record documentation as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
  - d. Electrical and Instrumentation/Control System Testing
    - 1) The applicant shall ensure that a formal testing program of all electrical as well as instrumentation and control systems installed at the pump station is developed and performed.
    - 2) The program may consist of a combination of unwitnessed/witnessed factory tests, field readiness tests, and witnessed field tests. At a minimum, however, the applicant shall witness a field test of the pump station's electrical and instrumentation/control systems. The basic functions which shall be tested for operation as intended by the pump station design shall include, but shall not be limited to, the following:
      - a) Pump operational functions.
      - b) Level-sensing equipment.



- c) Alarm system.
  - d) Telemetry system.
  - e) Stand-by or emergency power system.
- 3) All testing of the electrical and instrumentation/control systems shall be performed in the presence of the applicant, the PE, or other authorized representative.
- 4) The results of all testing shall be maintained by the applicant as part of the construction record documentation as stipulated in the NCDENR Minimum Design Criteria for the Permitting of Pump Stations and Force Mains.
- e. Watertightness Testing
- 1) Wetwells and other wastewater-containing structures at the pump station shall be inspected and tested for watertightness.
  - 2) The watertightness test for the wetwell and other wastewater-containing structures at the pump station shall be completed separately and independently of the leakage test performed on the forcemain as required in Section 6.04D.
  - 3) The watertightness test shall be performed in the presence of the applicant, the PE, or other authorized representative.
  - 4) The watertightness test shall be performed in accordance with ACI 350.1R "Testing Reinforced Concrete Structures for Watertightness," AWWA D100 "Welded Steel Tanks for Water Storage," or the manufacturer's recommendations. A vacuum test method in accordance with ASTM C1244 "Standard Test Method for Concrete Sewer Manholes by Negative Test Pressure (Vacuum) Test" may be used for small diameter wetwells in lieu of a hydraulic test
    - a) Unless the pump station wetwell is constructed of cast-in-place concrete, testing shall not commence until the structure being tested has been fully assembled and backfilling is complete.
    - b) All inlets and outlets in the structure shall be temporarily plugged and braced or otherwise sealed prior to initiating the test.
    - c) Pump station wetwells that fail to meet the watertightness test requirements shall be inspected, made watertight, and retested until the test passage is assured.
  - 5) The results of all watertightness testing shall be maintained by the applicant as part of the construction record documentation as stipulated in Section 1.03B.

### C. Inspections

- 1. All materials and equipment used in the construction of the wastewater pumping system must be verified for compliance with the specifications (or other approval granted by the Town) by the Engineer prior to installation. Non-conforming materials or equipment shall be immediately removed from the job site.
- 2. Compliance with plans and specifications shall be verified on a regular basis by the Engineer.



## D. Repairs

1. PVC Pipe - Replace damaged section with PVC Pipe and install a Fernco coupling at each end encased in concrete.
2. HDPE Pipe - Replace damaged section with new HDPE pipeline section and install electrofusion couplings at both ends; minor breaches may be repaired with an electrofusion repair coupling as deemed appropriate by manufacturer's representative.
3. Installation
  - a. All repairs to damaged sanitary sewer lines in paved areas shall be backfilled with ABC stone (crusher run) to a density of 95 percent Standard Proctor.
  - b. All repairs to damaged sanitary sewer lines shall be bedded with 6-inches of washed stone and compacted to a minimum of 95% Standard Proctor density before installing the new joint of ductile iron.
4. Operational Test
  - a. Before the operational test is conducted, the required copies of the Operation and Maintenance Manuals shall be delivered to the Town of Surf City and the wetwell shall be thoroughly cleaned to remove dirt, mud, gravel and other foreign debris. The operational test shall check the proper functioning of the pumps and pump controls. The pump and motor serial numbers shall be verified. All components and motor serial numbers shall be verified. All components of the pump station shall be checked to ensure that they are capable of performing the service intended. The operational test shall be performed by the Town of Surf City. The Contractor or Developer shall ensure that a representative from the pump station equipment manufacturer is present at the operational test to review proper operation of the equipment with the Town of Surf City personnel.
5. Air Test
  - a. The air test shall, as a minimum, conform to the test procedure described in ASTM C-828-86 for clay pipe, ASTM C 924 for concrete pipe, and for other materials, test procedures approved by the Division of Environmental Management and the Town of Surf City.
  - b. Low-pressure air testing shall be performed on all sewer mains before the laterals or stubs are installed on the line, and after the trench has been backfilled to finished grade. Plugs shall be installed at each manhole to seal off the test section. The line will be pressurized with a single hose and monitored by a separate hose connection from the plug. Air then shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig.
  - c. The air pressure shall then be allowed to stabilize for a minimum of 2 minutes at no less than 3.5 psig (plus groundwater pressure, if any). When the pressure reaches 3.5, the time required for the pressure to drop 1.0 psi will be observed and recorded. The line shall be "acceptable" if the pressure does not drop more than 1.0 psi in the time prescribed for the test in the Sanitary Sewer Air Test table found in the Details.
  - d. If the section fails to meet these requirements, the source of leakage shall be repaired and the pipe section re-inspected.
  - e. The Town may require that an infiltration test be performed that shall not exceed 100 GPD/inch/mile.



6. Visual Testing and Observation
  - a. All materials used must be approved by the Town prior to installation. Rejected materials shall be immediately removed from the job.
  - b. Gravity sanitary sewer lines shall be clean and free from obstructions, and shall be visually inspected from every manhole. Lines which do not exhibit a true line and grade or which have structural defects shall be corrected. Sanitary sewer service connections shall be visually inspected prior to backfilling.
  
7. Video Assessment and Cleaning
  - a. As a final measure required for acceptance, the Contractor shall clean and televise all newly installed sewer mains prior to acceptance by the Town. The Contractor shall televise the sewer main and all lateral connections installed from the upstream to downstream manhole with no reverse setups or cutaways. Throughout shooting, the camera shall be panned and tilted for a complete view of the main. Lighting shall be adequate to view the entire sewer main and service connections from beginning to end. The video inspection shall be submitted to the Town on a videotape or DVD and formatted with software compatible and readable by the Town of Surf City. The Town shall not be responsible for purchasing additional software necessary to view the videos.
  - b. The camera shall be advanced at a uniform rate that allows a full and thorough inspection of the new sewer main. The camera shall be a color, pan, and tilt camera. The picture quality and resolution shall be acceptable and sufficient to allow a complete inspection with no lapses in coverage. The length of the sewer main shall be measured and recorded on the video screen. The distance counter shall be calibrated before shooting the inspection video.
  - c. The Contractor shall clean the sewer mains ahead of video inspection with a high-velocity water jet. The video inspection shall take place within 2-hours of cleaning operations as witnessed by the Town. All construction debris shall be collected and removed in the downstream manhole and shall not be released into the sewer system.
  - d. The Town's representative shall be present throughout the cleaning and televising of the sewer mains to verify that the video work complies with the specifications.
  - e. Prior to submitting the video's to the Town, the Contractor shall label the videos with the following information:
    - 1) Name of the Project/Development.
    - 2) Name and contact information of responsible party.
    - 3) Date of televising.
    - 4) Manhole identification as shown on the design plans.

### 3.10 CLEANING

- A. Clean dirt and superfluous material from interior of piping.



3.11 REPAIRS

- A. All repairs to damaged sanitary sewer lines in paved areas shall be backfilled with ABC stone (crusher run) to a density of 95% Standard Proctor.
- B. All repairs to damaged sanitary sewer lines shall be bedded with 6-inches of washed stone and compacted to a minimum of 95% Standard Proctor density before installing the new joint of ductile iron.

END OF SECTION 221313