

CITY OF TORRINGTON

ADDITIONS AND AMENDMENTS

TO THE

WYOMING PUBLIC WORKS

STANDARD SPECIFICATIONS

2015 EDITION

The City of Torrington has adopted the following additions, modifications, and deletions to the Wyoming Public Works Standard Specifications, 2015 Edition.

DIVISION 1: GENERAL REQUIREMENTS

SECTION 01041 – PROJECT COORDINATION

1.03 – Coordination with Owner and Engineer:

ADD the following to parts A and B:

- A. Bench marks and survey stakes shall be preserved by Contractor and in the case of their destruction they will be replaced by Engineer at Contractor's expense.
- B. Contractor shall correct work failing such tests and test corrected work by an independent testing laboratory at Contractor's expense. Selection of testing laboratory employed by Contractor shall be subject to approval of Engineer.

DIVISION 2: SITE WORK

SECTION 02190 – AGGREGATES

2.03 – Aggregate for Untreated Sub-Base and Base:

AMEND last entry in Table under part B item 3 to read:

<u>Sieve Designation</u>	<u>Grading D</u>
#200	2 – 15

2.08 – Aggregate for Plant Mix Wearing Course:

AMEND last two entries in Table under part A to read:

<u>Sieve Designation</u>	<u>% By Weight Passing (Type A)</u>
#8	10 - 25
#200	2 - 15

SECTION 02210 – EXCAVATION AND EMBANKMENT

3.02 – Moisture and Density Control:

AMEND first sentence in part A to read:

- A. The Contractor shall provide proper compaction as required to obtain the density of 95% of maximum dry density or as approved by Engineer for all backfills placed and no separate pay compensation shall be allowed for compaction.

SECTION 02225 – TRENCH BACKFILL

3.01 – Construction:

AMEND part B item 4 to read:

4. Surfaces for trenches in gravel streets and alleys shall be restored to their original shape and the surfacing material shall be of equal quality and thickness to the original surface, but in no case shall the depth of base be less than twelve inches (12”) in streets and six inches (6”) in alleys. Gravel surfacing material shall be approved by the Engineer. Care shall be taken to not contaminate existing gravel surfaces outside the trench area.

SECTION 02512 – PLANT MIX PAVEMENTS

3.02 – Application:

H. ROLLERS

ADD the following to heading H part 1:

A minimum of two rollers shall be present on all paving projects.

SECTION 02520 – PORTLAND CEMENT CONCRETE PAVEMENT

3.12 – Final Strikeoff:

AMEND part F to read:

- F. After the final finish, but before the concrete has taken its initial set, the edges of the pavement along each side of each slab, and on each side of transverse expansion joints, formed joints, transverse construction joints, and emergency construction joints shall be worked with an approved tool and rounded to a radius of one-half (1/2) inch.

SECTION 02528 – CONCRETE CURBS AND COMBINED CURBS AND GUTTERS

2.01 – Materials:

AMEND part A to read:

- A. PORTLAND CEMENT CONCRETE – Air-entrained Portland Cement Concrete shall conform to the requirements of Table No. 03304-2.08 in Section 03304, Subsection 2.09, Class 4000.

3.04 – Finishing:

DELETE part E in its entirety.

3.05 – Jointing:

AMEND parts A and D to read:

- A. CONTRACTION JOINTS – Transverse weakened-plane contraction joints shall be constructed at right angles to the curb line at intervals not exceeding 10 feet. Joint depth shall average at least 1/3 of the cross section of the concrete. Joints in new construction shall match joints in adjacent existing concrete.
- D. Curbs or combined curbs and gutters constructed adjacent to existing concrete shall have the same type of joints as in the existing concrete, with similar spacing; however, contraction joint spacing shall not exceed 10 feet.

3.06 – Protection:

ADD the following part:

- C. Concrete shall not be subjected to vehicular wheel loading for a period of seven (7) days following placement, except as approved by Engineer.

3.09 – Tolerances:

AMEND part D to read:

- D. Final elevation shall not depart from plan elevation by more than one-quarter (1/4) inch.

SECTION 02552 – SEAL COAT

3.02 – Application:

B. EQUIPMENT

AMEND heading B part 3 to read:

3. A pneumatic-tired roller which shall be self-propelled, the gross load of which shall be adjustable to apply 200 to 350 pounds per square inch of compaction width as directed. The operating weight shall be as directed. Tire pressure or contact pressure may be specified for pneumatic-tired rollers. Pneumatic-tired roller shall be operated at a maximum speed of 5 miles per hour.

SECTION 02645 – FIRE HYDRANTS

2.01 – Materials:

A. DRY-BARREL FIRE HYDRANTS

AMEND heading A part 2 to read:

2. Hydrants shall be Red Mueller, Model No. A-423 Super-Centurion 250, counter-clockwise open, for six-foot cover or as approved by Engineer. All cap screws below finish grade shall be stainless steel.

DELETE heading A part 3 in its entirety.

3.01 – Installation:

AMEND last sentence in part B to read:

Hydrant installation shall be in accordance with the City of Torrington Standard Drawing #29 (Fire Hydrant & Valve Assembly), or as specified in the Special Provisions.

SECTION 02665 – WATER DISTRIBUTION AND TRANSMISSION SYSTEMS

2.01 – Materials:

A. PIPE

AMEND heading A part 1 to read:

- A. Pipe used in new water main construction shall be Polyvinyl Chloride Pressure Pipe as specified to follow, unless otherwise called out in the

Special Provisions. All other water main installations shall be in accordance with the following specifications:

AMEND heading A part 2 items (a) and (d) to read:

- a. Ductile Iron Pipe (DIP) shall conform to the provisions of AWWA Specifications C-151. Wall thickness shall be as shown in the Special Provisions. DIP shall have a minimum pressure rating of 150 psi. All above ground DIP shall have a paintable primed coating.
- d. When polyethylene encasement is required, the requirement of AWWA Specification C105/A21.5-10 shall be met.

AMEND heading A part 3 item (a) to read:

- a. PVC pipe for the water mains shall meet the requirement of AWWA Specification C-900, "Polyvinyl Chloride Pressure Pipe", made to ductile iron O.D.'s for "Push-On" joints, Class 150 (DR 18). Pipe joints shall be with an elastomeric gasket or joint.

AMEND heading A part 7 item (a) to read:

- a. Pipe used to case waterline – sewerline crossings shall be (PVC) DR-26 water pipe, (PVC) DR-35 sewer pipe, or smooth steel pipe, with a minimum inside diameter of 1.25 times outside diameter of carrier pipe.

ADD the following items to heading A part 7:

- c. The minimum yield point of smooth steel casing pipe shall be 35,000 psi with wall thickness to withstand superimposed loads or as required by Engineer. Minimum casing pipe thickness shall be 0.25 inches.
- d. The ends of smooth steel casing pipe shall be beveled for field welding.
- e. All smooth steel casing pipe shall have a coal-tar enamel exterior coating. Damaged coating and field welds shall be painted in accordance with AWWA C203-86, Section 2, prior to installation. Bonded epoxy coatings or other specific cathodic protection may be required in aggressive soils.

B. FITTINGS AND COUPLINGS

AMEND heading B part 1 to read:

1. Cast iron or ductile iron fittings used for water mains shall be Class 350 conforming to AWWA C-153, gray-iron and ductile iron fittings for water and other liquids, and shall be connected to the new main with approved

mechanical restraints. Joints for ductile iron and PVC pipe shall be mechanical joint or "Push-On" joints conforming to AWWA C-111. The interior of the fitting shall have a cement mortar lining conforming to AWWA C-104. The outside surface of the fitting shall receive a bituminous coating of at least one (1) mil thick. Couplings for making connections to existing pipelines and fire hydrants shall be mechanical-joint connecting pieces and mechanical-joint sleeves, or an approved equal. If stainless steel cap screws and T-bolts are required below finish grade, anti-seize compound shall be applied to all stainless steel to stainless steel bolt and nut connections prior to assembly.

AMEND heading B part 2 to read:

2. Stainless steel tapping sleeves used for 4" to 12" water mains shall be Class 200 conforming to AWWA C-223 standards manufactured by Smith Blair, style 662 or approved equal. Use of tapping sleeve requires approval from the Engineer prior to installation.

ADD the following part to heading B:

3. All service connections made to the PVC water main shall be made with Smith Blair 317 TaperSeal saddles, or equal, unless otherwise shown in the Special Provisions.

C. AIR RELIEF VALVES, BLOW OFFS, FLUSHING HYDRANTS

AMEND heading C part 2 to read:

2. Flushing hydrants shall be Kupferle Mainguard #77, fabricated post type flushing hydrants. These shall meet pressure and flow requirements equal to or exceeding the main installation or as required by the manufacturer. See City of Torrington Standard Drawing #26 (Water Line Blow-Off Detail).

D. GATE VALVES

DELETE heading D in its entirety.

E. BUTTERFLY VALVES

AMEND heading E part 1 to read:

1. Butterfly valves for use in the water distribution system shall be Mueller Lineseal XP butterfly valves, Class 250B unless indicated otherwise in the Special Provisions. Butterfly valves shall be furnished with mechanical joint ends and lubricated screw type operators designed for underground service.

F. RESILIENT SEATED GATE VALVES

AMEND heading F part 4 to read:

4. Resilient seated gate valves, Class 250, for underground installation shall have two-inch square wrench nut for key operation. Valves up to and including 12" shall be Mueller A-2362 resilient wedge gate valves (no substitutes allowed). Gate valves greater than 12" shall be Mueller A-2361 ductile iron resilient wedge gate valves. Valves greater than 12" may be butterfly valves when approved by the Engineer. All valves shall open counter-clockwise unless otherwise indicated in the Special Provisions. See City of Torrington Standard Drawing #31 (Waterline Valve, Valve Box and Trace Wire).

H. WATER SERVICE PIPE

AMEND heading H part 1 to read:

1. Pipe used in water service line construction shall be one inch (1"), one and one-half inch (1-1/2"), or two inch (2") Eagle Pure-Core, CTS 200 psi @ 23° C, SDR 9, ASTM D2737, PE 3408, C3 AWWA C-901, or equal, unless otherwise indicated in the Special Provisions and/or on the drawings. See City of Torrington Standard Drawing #30 (Water Service Line Detail).

I. CORPORATION STOPS

AMEND heading I part 1 to read:

1. Corporation stops shall be Mueller B-25008, 300 psi (cc/compression) for one inch (1"), one and one-half inch (1-1/2"), and two inch (2"), unless otherwise indicated in the Special Provisions and/or the drawings.

L. CURB STOPS

AMEND heading L part 1 to read:

1. Curb stops shall be Mueller B-25209, quarter turn 300 psi (compression / compression) for one inch (1"), one and one-half inch (1-1/2"), and two inch (2"), unless otherwise indicated in the Special Provisions and/or the drawings.

ADD part 2 to heading L:

2. Curb boxes shall be McDonald 5601 to 5607 Series. Concrete lids shall be 5607L and grass lids shall be 5601L. All curb boxes require rods, unless otherwise indicated in the Special Provisions and/or the drawings.

ADD the following headings and parts to **SECTION 2.01**

N. CASING SEALS

1. Casing seals shall be constructed of high density rubber with stainless steel bands.

O. CASING SPACERS

1. Casing spacers shall be constructed of stainless steel or polymer supports, or an approved equal, and approved by the Engineer.

P. BANDS

1. Bands shall be stainless steel and shall have a minimum thickness of 0.015 inches and a minimum width of 3/4 inches.

Q. TRACE WIRE

1. Trace wire shall be a minimum 10 gage THHN solid strand copper. All bare wire shall be coated with an approved sealant. See City of Torrington Standard Drawing #31 (Waterline Valve, Valve Box and Trace Wire), Line 6.

R. TRACE WIRE CONNECTORS

1. Connectors shall be an Ideal Industries, model 60/64, underground connector or 3M DBR-6 direct bury connector, or an approved gel-filled direct bury connector.

3.01 – Construction:

E. LAYING OF PIPE

ADD the following to part 10 of heading E:

10. Blocking shall bear against undisturbed material and shall be designed on 150 psi minimum main pressure and a maximum of 2,000 psf allowable soil bearing capacity, unless otherwise indicated in the Special Provisions. All fittings must have restraints and shall be Megalug, by EBAA Iron Sales, Inc.

ADD the following parts 12 and 13 to heading E:

12. Trace wire shall be installed on new water pipe by attaching with vinyl plastic electrical tape, 7 mil thick, 2" wide, to pipe.
13. Burial ribbon shall be placed two feet above water pipe and shall be 3 inch wide, 4 mil thick, low-density blue polyethylene plastic film with "water" printed in black letters, suitable for direct bury.

ADD the following headings and parts to **SECTION 3.01**

G. CASING PIPE INSTALLATION

1. Casing pipe shall be installed at the grade and alignment shown on the drawings.
2. Contractor shall provide a smooth, continuous, and uniform casing pipe with no exterior voids. All voids between casing pipe and the soil shall be filled with an approved grout and in a method approved by the Engineer.
3. Each section of casing pipe shall be welded with a full penetration butt weld around the circumference of the joint to form a watertight continuous conduit with sufficient strength to withstand all stress of loading and jacking.
4. Operations shall be performed in such a manner that will preclude any deflections of the carrier pipe in excess of that allowable by this section for grade and alignment.

H. CARRIER PIPE INSTALLATION

1. Carrier pipe shall be installed at the grade and alignment as shown on the drawings.
2. Pipe joints shall be adequately protected by spacers to protect joints from over insertion when pipe is being pushed into casing.
3. Stainless or polymer casing spacers shall be evenly spaced along each section of pipe. A minimum of three casing spacers shall be attached for each joint of pipe. The linear distance between spacers shall not exceed 6 feet. The spacers shall be attached to the pipe in accordance with the manufacturer's recommendations.
4. The distance between the inside of the casing pipe and the outside diameter of the casing spacers shall not be such as to allow excess movement. In no case shall movement in the pipe be allowed that results in excess movement under pressure or joint deflection in water mains, or movement in sewers to such a degree that results in lamp test failure or standing water.
5. The ends of the pipe shall be sealed with approved casing seals.

3.02 – Setting Valves and Valve Boxes:

ADD the following part:

- E. Valve boxes shall be centered in a 2' x 2' x 6" deep concrete pad.

3.03 – Service Connections:

A. GENERAL

AMEND the last two sentences in heading A part 1 to read:

All services shall have a minimum of 5 feet and a maximum of 6 feet of cover. See City of Torrington Standard Drawing #30 (Water Service Line Detail).

AMEND heading A part 3 to read:

- 3. Installation of water service lines shall be in accordance with City of Torrington Standard Drawing #30 (Water Service Line Detail).

ADD the following parts 4 and 5 to heading A:

- 4. Curb stops shall be centered in a 12" x 12" x 4" concrete pad in undeveloped areas and shall also have a steel "T" post placed next to the concrete pad. Curb stops shall be placed in sidewalks in developed areas. See City of Torrington Standard Drawing #30 (Water Service Line Detail).
- 5. All existing water service lines that are abandoned shall be abandoned at the main by shutting the corporation cock, cap corporation, and remove a 2' section of the abandoned service line.

3.04 – Valve Thrust Blocks:

DELETE SECTION 3.04 in its entirety.

SECTION 02700 – SANITARY SEWER SYSTEMS

1.03 – Quality Assurance:

AMEND part A to read:

- A. All new sewer pipe and fittings shall be Polyvinyl Chloride (PVC) pipe, SDR-35, as specified to follow, unless otherwise indicated in the Special Provisions. Wye or tee branches shall be of the same material and design as the sewer pipe used.

2.01 – Materials:

F. CASING PIPE

AMEND heading F part 1 to read:

1. Pipe used to case waterline or sewer line crossings shall be PVC DR-26 water pipe, PVC DR-35 sewer pipe, smooth steel pipe of pipe as approved by the Engineer with a minimum inside diameter of 1.25 times outside diameter of carrier pipe.

G. MANHOLES

AMEND heading G part 1 to read:

1. Manholes shall be constructed of precast concrete rings with frames and covers and steps in accordance with details shown on City of Torrington Standard Drawings #19 (Standard Precast Manhole) and #22 (Standard Precast Manhole Under 7'-0" Deep).

H. RINGS AND COVERS

AMEND heading H part 1 to read:

1. Rings and covers shall be Deeter No. 1256-1258 or equivalent, unless otherwise indicated in the Special Provisions.

3.02 – Manhole Installation:

AMEND parts F and G to read:

F. Manholes shall be located at all changes in pipe sizes, vertical or horizontal alignment, pipe intersections, and the end of lines.

G. Manhole rings shall be centered in a 6' x 6' x 6" deep concrete pad.

3.03 – Service Line Installation:

A. GENERAL

AMEND heading A part 1 to read:

1. Service lines shall be constructed in accordance with City of Torrington Standard Drawing #28 (Sanitary Sewer Service Line).

ADD part 3 to heading A:

3. All existing sanitary sewer service lines that are abandoned shall be abandoned at the main.

D. END PIPE MARKER

AMEND heading D to read:

- D. The end of newly installed sewer service lines shall be marked by Contractor at the property line by a 2" steel post six feet (6') long, buried in the ground a distance of three feet (3'), and shall be centered in a 2' x 2' x 4" concrete pad.

3.04 – Testing:

B. T.V. INSPECTION

AMEND heading B to read:

1. All sewer, sanitary or storm, shall be inspected by the use of a Closed-Circuit television camera (CCTV) before final acceptance. The cost of the initial inspection and any follow up inspections shall be borne by the Contractor unless otherwise indicated in the Special Provisions.
2. Contractor shall bear all costs incurred in correcting all deficiencies found during television inspection including the cost of any additional television inspection that may be required by the Owner to verify the correction of said deficiency.
3. Contractor shall be responsible for all costs incurred in any television inspection performed solely for the benefit of Contractor.
4. Thirty (30) days prior to CCTV inspection the Contractor must submit detailed information on the CCTV company, equipment and software to be used to the City Engineer and Water/Sewer Department Supervisor for prior approval.
5. CCTV inspections shall be conducted after all utilities have been installed and backfill compaction has been completed, but prior to final paving and/or road surfacing.
6. The Contractor shall notify the City Engineer and Water/Sewer Department Supervisor two (2) working days in advance of the anticipated date of televising so that the City Engineer and Water/Sewer Department Supervisor may observe CCTV inspection operations. Schedule shall also include time for pre-cleaning operations if necessary.

7. The Contractor is responsible for cleaning and removing any debris in piping. The Contractor shall coordinate with and shall have prior approval from the City Engineer and Water/Sewer Department Supervisor for determination of equipment required and its use.
8. CCTV inspections shall be digitally recorded. Three copies in a flash drive or DVD format with a detailed software generated report in PDF format shall be provided to Owner.
9. Minimum Requirements:
 - a. Self-propelled motor operated wheeled or track transporter with Optical Zoom Pan and Tilt color Camera must have lighting that provides directional lighting for 6"-72" pipe.
 - b. Continuous video capability up to 1000'.
 - c. Must be capable of inspecting all joints, taps and manholes.
 - d. Inspection must be clear and visible and able to operate under high humidity conditions.
 - e. Must provide a detailed software report in PDF and video format of all footage, Manhole #'s, location, project #, project name, contractor name, tap locations, distance between manholes, size of pipe, type of pipe, detailed notes of any debris, imperfections and any issues found.

ADD the following **SECTION 02701**:

SECTION 02701 – SANITARY SEWER REHABILITATION CURED-IN-PLACE-PIPE (CIPP)

PART 1 GENERAL

1.01 Summary:

- A. The Contractor shall furnish all labor, equipment and materials necessary to complete the lining of sanitary sewers as stipulated herein and as shown on the Contract Drawings. The work shall include the preparation of the construction site, including cleaning and flushing of existing piping; flow control bypass pumping, protection of existing conditions during installation work; unloading; hauling; distribution and installation; testing of all pipe fittings, scaffolding, piping, valves, boilers, etc. and other accessories as required for proper installation; protection of

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the site during the work, including protection of necessary watchmen, warning lights, barricades, traffic control, dust control and maintenance of detours, as needed; and the cleanup of the work site.

- B. It is the intent of this section to provide for the stabilization of the identified pipeline(s) or conduit(s) by the installation of a resin-impregnated flexible tube that is expanded to fit tightly against the host pipeline. The resin shall be cured by means of hot water or hot steam to produce a hard, impermeable pipe that is continuous and tight fitting.

1.02 **References:**

- A. ASTM D-543 - Standard Test Method for Resistance of Plastics to Chemical Reagents
- B. ASTM D-638 - Test Method for Tensile Properties of Plastics
- C. ASTM D-790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D. ASTM D-1682 - Test Methods for Breaking Load and Elongation of Textile Fabric
- E. ASTM D-2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
- F. ASTM D-3567 - Standard Practice for Determining Dimensions of Reinforced Thermosetting Resin Pipe (RTRP) and Fittings
- G. ASTM D-5813 - Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe
- H. ASTM F-1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
- I. ASTM F-1743 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe
- J. ASTM F-2019 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured in Place Thermosetting Resin Pipe (CIPP)
- K. DIN EN 761 - Plastic Piping Systems: Glass-Reinforced Thermosetting Plastics (GRP) Pipes – Determination of the Creep Factor Under Dry Conditions
- L. APS - Water Porosity Standard

1.03 **Qualifications:**

The CIPP system proposed (materials, methods, and workmanship) must be proven through previous successful installations to an extent and nature satisfactory to the Owner and the Engineer that said prior experience is commensurate with the size of the project being proposed herein. Since CIPP is intended to have a minimum 50-year design service life, only products incorporating the materials, methods of installation, and QA/QC procedures deemed to have this performance level will be accepted.

Products and Installers seeking approval must meet ALL of the following criteria to

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be deemed commercially acceptable:

- A. Minimum of 50,000 linear feet or 100 line sections must have been successfully installed.
- B. The Manufacturer (Licensor) shall have completed sufficient enough testing to document that the materials and method(s) of installation proposed will produce the desired long-term performance.
- C. Installer must satisfy all insurance, financial, and bonding requirements of the Owner, and must have at least three years active experience in the commercial installation of the product bid.
- D. The Installer's key personnel shall have at least 50000 linear feet and/or 100 line sections of successful experience (including a sufficient quantity of the sizes proposed for this project) and must be on-site at all times during the installation of the CIPP products.
- E. Installer shall be "ISO" certified or demonstrate he/she has a similar third-party quality assurance system in place.
- F. Installer shall designate a wet-out facility which they own or are closely associated with and shall provide liner tubes from the designated facility only.

Suitable documentation of the above qualifications shall be provided with or prior to the proposal submission.

1.04 Submittals:

After award of the Contract and before any materials are delivered to the job site, the Contractor shall submit to the Engineer the following information:

- A. CIPP System Manufacturer's certification that the materials and the installation procedures to be used in the work performed meets the referenced standards and these specifications.
- B. License or certificate verifying CIPP System Manufacturer's approval of the installer; including the level of training that the Contractor's proposed installation team has completed.
- C. Proposed equipment information and written performance work procedures for accomplishing the items of work on this specific project.
- D. CIPP product technical data (i.e., resin, tube material, resin enhancer, bond enhancer, sealant/caulking material, resin curing schedule including time and temperature, certifications of applicability, qualified testing results, etc.) and the CIPP System Manufacturer's instructions for the resin and catalyst system.

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- E. Design calculations for wall thickness designs which are to be completed by a registered professional engineer proficient in the design of close-fit pipe lining systems.
- F. Certification: Affidavit for flat plate samples.
- G. Public Relations: Notification Flyers.
- H. Lateral Reinstatement: Products and Methods.
- I. Inspection Information: Video recordings (DVD or USB Thumb Drive) of pre and post-insertion inspections and curing logs.

Upon approval of the Engineer, the manufacturer's recommendations shall become the basis for acceptance or rejection of actual methods of installation used in the work.

1.05 Delivery, Storage, and Handling:

- A. Protection: The Contractor shall use reasonable means to protect sewer lining materials before, during, and after installation and to protect the installed work and materials of all other trades.
- B. Replacement: In the event of damage to the sewer lining materials, the Contractor shall make timely repairs and replacements necessary to the approval of the Engineer at no additional cost to the Owner.

1.06 Warranty:

- A. The Contractor shall warrant all work to be free from defects in workmanship and materials for a period of one year from the date of final completion of the project.

1.07 Existing Sewer System:

- A. Active Sewers: The Contractor shall maintain in operating condition all active sanitary and storm sewers encountered in the sewer lining installation.
- B. Existing Manhole Connections: The Contractor shall make connections in accordance with local standards and shall exercise reasonable care to prevent debris from entering sewers.

PART 2 MATERIAL AND EQUIPMENT

2.01 Felt Lining CIPP System:

- A. Tube Materials

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1. The tube shall consist of one or more layers of an absorbent flexible needled felt or an equivalent nonwoven or woven or combination material, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit irregular pipe sections, bridge missing pipe, and negotiate bends.
2. The tube should be fabricated to a size that, when installed, will tightly fit the internal circumference and the length of the original conduit. Allowances should be made for the longitudinal and circumferential stretching that occurs during placement of the tube.
3. The tube shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness.
4. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough that the resin is clearly visible, and shall be firmly bonded to the felt material.
5. The tube shall be marked at regular intervals not to exceed 5 feet along its entire length. Markings shall also include the lining manufacturer's name or identifying symbol. The tubes must be manufactured in the United States.
6. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured meets the minimum requirements given herein or those that are to be utilized in the design of the CIPP for this project.
7. The wall color of the interior CIPP surface shall be a light reflective color to allow detailed examination and inspection with closed circuit television (CCTV).
8. Seams in the tube shall be stronger than the non-seamed felt material.

PART 3 STRUCTURAL REQUIREMENTS

3.01 Structural Requirements:

- A. CIPP shall be designed as per ASTM F-1216 or ASTM F-2019. The CIPP design shall assume no bonding to the original pipe wall.
- B. The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing as defined within the relevant ASTM

standard. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Retention values exceeding 50% of the short-term test results shall not be applied unless substantiated by qualified third party test data to the Owner's satisfaction. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

- C. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If the layers separate during field sample testing, new samples will be required to be obtained from the installed pipe. Any reoccurrence may cause rejection of the work.
- D. The cured CIPP material shall conform to the minimum structural properties listed below:
 - 1. Felt Liner
 - i. Modulus of Elasticity (ASTM D-790): 250,000 psi
 - ii. Flexural Stress (ASTM D-790): 4,500 psi
 - iii. Mil thickness (ASTM D-3567): 6 Mil

PART 4. QUALITY ASSURANCE

4.01 Quality Assurance:

- A. Chemical Resistance - CIPP shall meet the chemical resistance requirements of ASTM F-1216. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. CIPP samples must meet these testing requirements.
- B. CIPP Field Samples - The Contractor shall prepare a sample of each installation of CIPP. These shall be restrained samples for diameters less than 18"; and flat plate samples for diameters larger than 18". The flat plate samples shall be taken directly from the wet out tube, clamped between flat plates and cured in the downtube. Restrained samples will be tested for thickness and initial physical properties; flat samples will be tested for initial physical properties only. Samples will be submitted by the Contractor to an independent third party laboratory. These test results must verify that the CIPP physical properties specified are met. Contractor shall be responsible for all costs associated with repair or replacement of failed work.
- C. Video inspection should confirm tightness of the fit of CIPP to the host pipe, and identify any imperfections. The finished liner shall be continuous over its entire length and be free of any visual defects.

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- D. Wall thickness will be measured in accordance with ASTM D-5813 and D-3567. Porosity test will be conducted in accordance with APS Water Porosity Standard.
- E. Wrinkle height shall not exceed 2% of the host pipe diameter.
- F. Non-conforming work shall be subject to either a reduction in payment for that work proportional to the degree of non-conformance, or to replacement at the cost of the Contractor.

PART 5 PREPARATION

5.01 Installation Responsibilities for Incidental Items:

- A. Access Points: Contractor will locate and designate all manhole access points, open and make access points available for the work.
- B. Cleaning of Sewer Lines: The Contractor shall remove all roots and internal debris (including grease) from the sewer line prior to CIPP installation by any means necessary. The City of Torrington landfill or other approved location will be used for disposal of debris that is removed from the sewer during the cleaning process.
- C. Inspection of Pipelines: Inspection of pipelines shall be performed by National Association of Sewer service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP)-certified personnel, experienced and trained in locating defects, breaks, obstacles, and service connections by CCTV.
- D. Infiltration: Minor infiltration is a normal condition sometimes encountered during the CIPP process. It is not a "changed condition" and should not be regarded as a reason for change orders. If in the opinion of the Engineer, infiltration is significant enough to adversely affect the curing process, chemical grouting or other remedies may be required. This additional work will be paid for by the Owner as a change order.
- E. Site Restoration: Areas damaged or modified by the work for this project shall be repaired or restored to a condition equal to or better than the original condition. Site restoration is incidental to the Work and shall not be regarded as a reason for change orders.
- F. Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. Plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system shall make the bypass. The pump(s) and bypass line(s) shall be of adequate capacity to accommodate the sewage flow. The Owner may require a detail of the bypass plan to be submitted.
- G. Public Relations: Contractor shall be responsible for contacting each home or business who will be affected by the construction activities and informing them of the work to be done and estimated timing for the work. Written notice shall be delivered to

each home or business at least 48 hours prior to installation. Notice shall include a local telephone number of the Contractor they can call to discuss the project, and how the homeowner or business will be affected. The written notice must be reviewed by the Owner prior to the start of any work. Customers should not be without service for more than a 12 hour period. Personal contact must be made with any home or business, which cannot be reconnected within the time stated in the written notice.

- H. Service Connections: Determine by dye test, running water or visual inspection whether connections are active or abandoned and provide results to Engineer prior to insertion. Engineer and Contractor shall agree prior to insertion which services are to be reopened. Only reopened services will be paid for.
- I. Process Water: The City of Torrington shall allow access to water for cleaning, installation and other process related items requiring water with use of a City hydrant meter and backflow assembly or at the City bulk water fill location. Cost of water is available upon request.

PART 6 INSTALLATION

6.01 Installation of Felt-Lining CIPP System:

- A. CIPP installation shall be in accordance with ASTM F-1216, or ASTM F-1743, with the following modifications:
 - 1. Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the potential loss of resin during installation through cracks and irregularities in the original pipe wall, as applicable.
 - 2. Tube Insertion - The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method as defined within relevant ASTM standards previously stipulated. If pulled into place, a power winch or its equivalent should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.
 - 3. Temperature gauges shall be placed between the tube and the host pipe's invert position to monitor the temperatures during the cure cycle.
 - 4. Curing shall be accomplished by utilizing hot water under hydrostatic pressure or steam pressure in accordance with the manufacturer's recommended cure schedule. A cool-down process shall be conducted that complies with the resin manufacturer's specification.

6.02 Lateral Connections and Drop Manhole Reinstatement:

- A. It is the intent of these specifications that lateral connections to homes or

businesses, any outside drop manholes be re-opened without excavation, utilizing a remotely controlled cutting device, monitored by a CCTV. The Contractor shall certify a minimum of two complete functional cutters, plus key spare components, are on the job site before each installation or can be quickly obtained. Engineer and Contractor shall agree with laterals to be reinstated. No additional payment will be made for excavations for the purpose of reopening connections and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work.

PART 7 METHOD OF MEASUREMENT

7.01 Method of Measurement:

- A. Measurement shall be made for CIPP liner using an accurate measuring device to determine the total number of lineal feet of pipe liner in place and accepted. Measurement shall be made from inside of manhole connection to inside of manhole connection, or to the outside of other structures.
- B. Measurement shall be made for service lateral connections by counting the number of reinstated laterals.

PART 8 BASIS OF PAYMENT

8.01 Basis of Payment:

The accepted quantity will be paid for at the contract unit price for:

PAY ITEM	UNIT
Pipe Liner Installation	Lineal Ft.
Reconnect Service Connections	Each

ADD the following **SECTION 02702:**

SECTION 02702 – MANHOLE REHABILITATION (GROUT & EPOXY)

PART 1 GENERAL

1.01 Summary:

- A. This specification applies to and shall govern the coating and rehabilitation of deteriorated brick and concrete structures to repair voids and enhance structural

integrity of the manholes in the City of Torrington's Sanitary Sewer Improvements Project. Manholes shall be repaired using industry standard materials (grout or hydraulic cement).

1.02 References:

This specification references the American Society for Testing and Materials (ASTM) standards and specifications, which are made a part hereof by such reference and shall be the latest edition and revision thereof.

- A. D-543 Test Methods for Resistance of Plastics to Chemical Reagents
- B. D-638 Tensile Properties of Plastics
- C. D-695 Compressive Properties of Rigid Plastics
- D. D-790 Flexural Properties of Unreinforced and Reinforced Plastics
- E. D-4060-95 Taber Abrasion Test
- F. D-4541 Pull-off Strength of Coatings Using a Portable Adhesion Tester
- G. D-2584 Volatile Matter Content
- H. D-2240 Durometer Hardness, Type O
- I. D-2990 Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
- J. C-109 Compressive Strength of Hydraulic Cement Mortars
- K. F-1216-09 Appendices X1-X7

Additional Standards

- Mannings "n" Determination
- Creep Test for Long Term Properties
- APS Standard – Porosity Test Protocol

1.03 Submittals:

- A. Product
 - 1. Material type and manufacturer to be used.
 - 2. ASTM references
 - 3. Manufacturers recommended specifications (installation/application process including mixing, additives, set time, cure time, and all equipment required for product delivery).
 - 4. Manufacturers recommended procedure for handling and storing.
 - 5. Technical data sheets showing physical, chemical properties and chemical resistance.
 - 6. Detailed description of all required field testing process and procedures.
 - 7. Material Safety Data Sheets (MSDS).
 - 8. Third Party Testing results.
 - 9. Verification of minimum installation requirements from manufacturer
 - 10. Certification that backup installation equipment is available either on site or can be onsite the morning of the next business day.
- B. Installer
 - 1. Verification of "certified applicator" status.

- 2. Verification of minimum installation requirements from manufacturer
- C. Manufacturer
 - 1. For resin based products, verification that the manufacturing company operates under ISO 9000:2000 certification.
 - 2. Certification that the products comply with the test specification.
- D. Approved Equals
 - 1. To be considered an approved equal, product will have to meet minimum characteristics of the applicable ASTM standards and be approved by the City.

PART 2 PRODUCTS

2.01 Cementitious Repair Material (CRM):

- A. The CRM shall be a factory blended, rapid setting, high early strength, calcium aluminate corrosion resistant non-shrink grout that is specifically formulated for use in the underground wastewater environment.
- B. The CRM shall be capable of being troweled or pneumatically spray applied.
- C. The CRM shall be mixed with water only and applied according to manufacturer recommendations.
- D. The CRM must be compatible with the Protective Coating Material that is going to be used. The CRM manufacturer must certify compatibility.
- E. The physical properties of the CRM shall meet the following minimum requirements:
 - Compressive Strength (24 hours) 2500 psi
 - Compressive Strength (28 days) 8000 psi
 - Tensile Strength (28 days) 800 psi
 - Flexural Strength (28 days) 1000 psi
- F. Apply to structure at a minimum thickness of ½ inch.

Approved Products:

Strong Seal MS2®C
Strong Seal® Bench Mix
Strong Seal High Performance
The Strong Company, Inc.
4505 Emmett Sanders Road
Pine Bluff, AR 71601

2.02 Hydraulic Cement Material (HCM):

- A. The HCM shall be specifically designed to stop minor water infiltration and develop high early strengths.

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- B. The HCM shall be capable of being hand mixed and applied in either a “wet” or “dry” state.
- C. The water used to mix the HCM should be clean and free of contaminants.
- D. The HCM should be formulated with calcium silicate, calcium aluminate cements, mineral fillers, and specially selected additives for set control.
- E. The HCM should be used according to the manufacturer recommendations.
- F. The physical properties of the HCM shall meet the following minimum requirements:
 - Compressive Strength (1 hour) 400 psi
 - Compressive Strength (24 hours) 1000 psi
 - Pull out Strength 14,000 lbs.
 - Set Time <1.0 mins

Approved Products:

Strong-Plug®
The Strong Company, Inc.
4505 Emmett Sanders Road
Pine Bluff, AR 71601
Custom Plug™
Standard Cement Materials, Inc.

2.03 Chemical Grout Material (CGM):

- A. The chemical grout shall be a semi ridged injection grout designed for sealing larger volume leaks in concrete cracks and fissures.
- B. The chemical grout shall be capable of filling voids, stabilize soils or gravel.
- C. The chemical grout shall be a two part system (grout and accelerator) that, when it makes contact with water, is designed to set-off and cut-off gushing water. Set times must be adjustable.
- D. The water used to activate the chemical grout must be in the range of pH 3-10 for proper cross-linking of the materials and optimum foam quality.
- E. Once cured, the chemical grout shall become closed cell polyurethane foam that is resistant to most organic solvents, mild acids, alkali, petroleum and microorganisms.
- F. The chemical grout physical properties when cured shall meet the following minimum requirements:
 - Density 8.75-9.17 lbs. /gal
 - Tensile Strength 56 psi
 - Compressive Strength 895 psi

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Bending Strength 213 psi
Bond Strength to Bending Bond Strength 28 psi
Mortar Joints Shearing Bond Strength 255 psi
Toxicity Non-Toxic
Absorption (6 month immersion) 15 %

Approved Product:

Hydro Active Cut®
Deneef Const. Chemicals, Inc.
5610 Brystone Dr.
Houston, TX 77041

2.04 Protective Coating Material (PCM):

- A. The PCM shall be a spray applied, ultra-high-build, self-priming polyurethane resin system.
- B. The PCM shall be 100% solids and VOC (Volatile Organic Compounds) free.
- C. The PCM shall have the ability to reinstate structural integrity, provide infiltration control, and supply chemical resistance to the structure.
- D. The PCM shall be a two component (A and B) resin system that uses a heated plural component spray system. After the components are mixed, the PCM shall gel in about 10 seconds with a “tack-free” condition after one minute.
- E. In its final state, the PCM shall be rigid and capable of being applied at any thickness in a single mobilization.
- F. The physical properties of the PCM shall meet the following minimum requirements:
 - Flexural Modulus (short-term) 730,000 psi
 - Flexural Modulus (long-term) 529,000 psi
 - Flexural Strength 14,000 psi
 - Compressive Strength 19,000 psi
 - Tensile Strength 7,400 psi
 - Tensile Modulus 420,000 psi
 - Elongation 4% at break
 - Manning’s “N” Factor .009
 - Abrasion (Taber CS17) 17.7 mg loss
 - Hardness, Shore D 90
 - Density 87 lbs. /cf
 - Adhesion to concrete substrate failure

Approved Product:

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SprayWall™
Sprayroq, Inc.
4707 Alton Court
Birmingham, AL 35210

PART 3 EXECUTION

3.01 Installation:

- A. Prior to repair operations, the City and the Contractor shall review and confirm the condition of each structure and agree on the appropriate repair methods.
- B. Pressure wash and clean structure. Fill any missing sections and voids with brick and/or a Cementitious Repair Material (CRM) as necessary.
- C. Remove existing ladder rungs prior to rehabilitation.
- D. Stop any infiltration using appropriate products and methods (i.e., hydraulic cement and/or injection of chemical grout).
- E. Apply correct repair product (refer to part 2 above) or an engineer approved equal to the structure. Repair products shall be applied per manufacturer's recommendations.
- F. Surface shall be troweled smooth then given a "broom finish".
- G. Required protective coatings shall be applied a minimum of 48 hours after cementitious repair materials. Apply a minimum of 125 mils thickness of a Protective Coating Material (PCM), (i.e., The SprayWall Lining System as manufactured by SprayRoq, Inc.) or approved equal.
- H. The City shall make a final visual inspection. Any deficiencies in the finish coating shall be marked and repaired according to manufacturer recommendations.
- I. Thickness testing of the CRM shall be done during the application by the use of a thickness gauge (example: nail or bar).

PART 4 BASIS OF PAYMENT

4.01 Basis of Payment:

- A. Rehabilitation of manholes shall be measured per vertical foot of manhole, and shall include rehabilitation of the floor/shelf in addition to structure walls. Also included in this pay items is the removal of existing ladder rungs prior to rehabilitation.

SECTION 02725 – STORM DRAINS AND CULVERTS

2.01 – Materials:

AMEND part A to read:

- A. Pipe used in new storm drain construction shall be Hancor Hi-Q Sure-Lok™, or equal, unless otherwise indicated in the Special Provisions. All other storm drain installations shall be in accordance with the specifications set forth to follow.

E. HIGH DENSITY POLYETHYLENE (HDPE) PIPE

AMEND part E item 1 to read:

1. The use of HDPE pipe and fittings shall be as approved by the Engineer unless otherwise indicated in the Special Provisions.

ADD item 3 to part E:

3. HDPE pipe and fittings shall conform to the requirements of ASTM F1759-97(2004) Standard Practice for Design of HDPE Manholes for Subsurface Applications.

F. MANHOLES

AMEND part F item 1 to read:

2. Manholes shall be constructed of precast concrete rings with frames and covers and steps in accordance with details shown on City of Torrington Standard Drawings #19 (Standard Precast Manhole) and #22 (Standard Precast Manhole Under 7'-0" Deep).

G. RINGS AND COVERS

AMEND heading G part 1 to read:

1. Rings and covers shall be Deeter No. 1256-1258 or equivalent, unless otherwise indicated in the Special Provisions. Manhole lids shall be stamped with "STORM".

K. INLETS AND CATCH BASINS

AMEND heading K part 1 to read:

1. Inlet frames and gratings shall be standard cast iron frames and grates of the design shown on the drawings or as indicated in the Special Provisions. Unless other specified, grates shall be Neenah R-3246-AR, or equivalent.

**SECTION 02776 – CONCRETE SIDEWALKS, DRIVEWAY APPROACHES, CURB
TURN FILLETS, VALLEY GUTTERS AND MISCELLANEOUS NEW CONCRETE
CONSTRUCTION**

1.01 – Summary:

AMEND last sentence in part A to read:

See applicable City of Torrington Standard Drawings.

2.01 – Materials:

AMEND last sentence in part A to read:

Unless otherwise indicated in the Special Provisions, all items shall be Class 4000.

3.04 – Placing and Finishing Concrete:

AMEND part D item 3 to read:

3. When the concrete has hardened sufficiently, the surface shall be given a broom finish. The broom shall be of an approved type. The strokes shall be square across the concrete from edge to edge on sidewalks and parallel with the curb line on curb and gutter, adjacent strokes shall be overlapped. Strokes shall be made without tearing the concrete. The broom finish shall produce regular corrugations not over one-eighth inch (1/8") in depth.

3.06 – Protection:

ADD the following part:

- C. Concrete shall not be subjected to vehicular wheel loading for a period of seven (7) days following placement, except as approved by the Engineer.

3.10 – Tolerances:

AMEND part D to read:

3. Final elevation shall not depart from plan elevation by more than 1/4 inch.

DIVISION 3: CONCRETE

SECTION 03304 – PORTLAND CEMENT CONCRETE

2.04 – Coarse Aggregate:

ADD to part A:

Unless otherwise indicated in the Special Provisions, all coarse aggregate shall be Grade 57.

ADD the following parts and items:

D. Determine coarse aggregate soundness in accordance with ASTM C 88.

1. Weight loss not exceeding 12 percent by weight when subjected to 5 cycles of sodium sulfate or 18 percent by weight when subjected to 5 cycles of magnesium sulfate.

E. Determine alkali-silica reactivity in accordance with ASTM C 289. Do not use aggregates determined either potentially or actually deleterious unless service records have shown the aggregates to be innocuous and Engineer approves.

2.05 – Fine Aggregate:

ADD the following parts and items:

C. Determine fine aggregate soundness in accordance with ASTM C 88.

1. Weight loss not exceeding 10 percent by weight when subjected to 5 cycles of sodium sulfate or 15 percent by weight when subjected to 5 cycles of magnesium sulfate.

D. Determine alkali-silica reactivity in accordance with ASTM C 289. Do not use aggregates determined either potentially or actually deleterious unless service records have shown the aggregates to be innocuous and Engineer approves.

2.07 – ACI Mix Design:

ADD the following part:

C. Unless otherwise indicated in the Special Provisions or approved by the Engineer, concrete shall be a six (6) sack mix, minimum twenty-eight (28) day strength of 4,000 psi and four and one-half inch (4-1/2") maximum slump with five to seven percent (5-7%) air entrainment.

SECTION 03304 – CONCRETE WORK

1.01 – Summary:

AMEND part A to read:

Concrete placement operations for cast-in-place slabs on grade, slabs on fill, structural frame, drive approaches, curb and gutter, sidewalk, and other concrete components.

3.08 – Control Testing:

ADD the following parts:

- D. Engineer may require a set of at least three standard six-inch test cylinders made and tested for every concrete placement.
- E. Engineer may require one test for air content of the concrete for each batch of concrete placed in the work. An air content test shall also be made each time a compression test cylinder is made.

SECTION 03600 – GROUT

2.02 – Portland Cement Grout:

AMEND part A to read:

- A. Grout shall be 4 sack mix, Type II Portland Cement Concrete, 65% sand, 35% pea gravel, 5" to 7" slump with 5% to 7% air entrainment.

ADD the following SECTION:

SECTION 09080 – CHAIN LINK FENCING

2.01 – Materials:

- A. All fencing, wire, gates, posts, rails, and accessories shall be galvanized to ASTM A-525 G-90.
- B. All pipe shall be schedule 40.
- C. Chain link fabric shall be 9 gage, 2" mesh, 6' tall, closed loop top and bottom.
- D. Line posts shall be 2" O.D., corner or brace posts shall be 3" O.D., gate posts shall be 4" O.D. and brace rail shall be 1-1/2" O.D.

- E. Tension wire shall be one strand of 7 gage steel, tie wire shall be one strand of 9 gage aluminum.
- F. Tension bars shall be 3/16" x 3/4".
- G. Gate frames shall be constructed of schedule 40 pipe. Galvanized pipe shall have all welds painted with aluminum paint. Gates shall be furnished with malleable cast hinges, truss rods as shown, and freeze proof locking devices and gate holdbacks.

3.01 – Construction:

- A. Chain link fabric shall be installed on the outside of the fence.
- B. Posts shall be of sufficient length that field welding post extensions is not required and it will not be permitted.
- C. Brace panels shall be placed at a maximum of 500' centers along the fence line, at corners and deflection points. End panels shall be placed at begin/end points and at gate posts.
- D. Tension wire and tie wire shall both be stretched from terminal to terminal and secured firmly to the fabric with 9 gage hog rings on 24" center. The fence fabric shall be tied to the posts with 9 gage wire 15" on center.
- E. Gate frames shall be assembled by welding. Pipe diameters of horizontal vertical members are as shown. Gate posts and gate holdbacks shall be set in concrete.