SECTION 221413 - STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following storm drainage piping inside the building and to a point 5 feet outside of building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.

1.2 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water.

1.3 SUBMITTALS

A. Product Data: For each product indicated, include manufacturer’s name, materials of construction and joining materials.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency. Pipe shall be marked with Manufacturer’s name.


PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Flexible Transition Couplings for Underground Nonpressure Piping: ASTM C 1173 with elastomeric sleeve. Include ends of same sizes as piping to be joined and include corrosion-resistant metal band on each end.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AB & I.
   b. Tyler.

2. Gaskets: ASTM C 564, rubber.

C. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. AB & I.
      b. Tyler.

2. Couplings:
   a. Manufacturers and Products: Subject to compliance with requirements, provide one of the following products:
      1) Clampall Model Hi Torque 125.
      2) Husky Model SD4000.
   b. Heavy-Duty, Couplings. ASTM C 1540 assembly consisting of Type 304, stainless-steel shield; stainless-steel bands; and ASTM C 564 rubber sleeve with integral center pipe stop. Listed by IAPMO and complying with FM1680 Class 1.
      1) NPS 1-1/2 to NPS 4: 3-inch- wide shield with 4 bands.
      2) NPS 5 to NPS 10: 4-inch- wide shield with 6 bands.

D. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
   1. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Transition and special fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.

B. Aboveground Storm Drainage Piping: Use any of the following piping materials for each size range:
1. NPS 2 to NPS 12: Service weight, cast-iron soil piping; gaskets; and gasketed joints.

2. NPS 2 to NPS 15: Hubless, cast-iron soil piping with heavy-duty, Type 304 Stainless steel couplings.

3. NPS 2 to NPS 6: PVC pipe, PVC socket fittings, and solvent-cemented joints.
   
C. Underground Storm Drainage Piping: Use any of the following piping materials for each size range:
   
1. NPS 2 and NPS 6: PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.2 PIPING INSTALLATION
   
A. Storm sewer and drainage piping outside the building are specified in Division 2.

B. Basic piping installation requirement are specified in Division 15 Section “Common Work Results for Plumbing”.

C. Reduce pipe sizes using concentric reducer fittings. Bushings shall not be used.

D. **Cast-iron pipe shall only be used above grade.**

E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall, Thunderline Link Seal or approved equal. Select number of interlocking rubber links required to make installation watertight. Refer to Division 22 Section "Common Work Results for Plumbing" for sleeves and mechanical sleeve seals.

F. Install cast-iron storm drainage piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

G. Make changes in direction for storm piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

H. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

I. Install below grade PVC pipe according to MAG Standard 601, with pipe layed in 6" sand or pea gravel bed and covered with 6" sand or pea gravel.

J. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:

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STORM DRAIN PIPING
1. Building Storm Drain: Minimum 1 percent downward in direction of flow or as shown on Drawings.
2. Horizontal Storm-Drainage Piping: Minimum 1 percent downward in direction of flow, or as shown on Drawings.

K. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

L. Install PVC storm drainage piping according to ASTM D 2665.
M. Install underground PVC storm drainage piping according to ASTM D 2321.
N. Do not enclose, cover, or put piping into operation until it is inspected and approved by SRP’s Construction Inspector.

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 15 Section “Common Work Results for Plumbing”.


1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.

C. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.4 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Division 22 Section “Vibration and Seismic Controls for Plumbing Piping and Equipment”.

B. Pipe hangers and supports are specified in Division 15 Section “Hangers and Supports for Plumbing Piping and Equipment”. Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:

   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.
C. Install supports according to Division 15 Section "Hangers and Supports for Plumbing Piping and Equipment."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron storm drainage piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
   2. NPS 3: 60 inches with 1/2-inch rod.
   3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
   4. NPS 6 through NPS 12: 60 inches with 3/4-inch rod.
   5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron storm drainage piping every 15 feet.

H. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 2: 48 inches with 3/8-inch rod.
   2. NPS 3: 48 inches with 1/2-inch rod.
   3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
   4. NPS 6 through NPS 12: 48 inches with 3/4-inch rod.

I. Install supports for vertical PVC piping every 48 inches.

J. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

B. Connect storm drainage piping to roof drains and storm drainage specialties.

3.6 FIELD QUALITY CONTROL
A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection. Make corrections with new material.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction.

3.7 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION