ADDENDUM # 010

Date: 05/22/18

RE: Cherokee Nation Entertainment
Tahlequah Casino

From: James R Childers Architect, Inc.
45 South 4th Street
Fort Smith, Arkansas 72901

This addendum forms part of the Contract Documents, and modifies the documents as noted below. Bidder must acknowledge receipt of this addendum in the FMC Bid Form. Failure to do so may subject the bidder to disqualification.

Item 1 Fire Suppression Spec

Item 2 Spec Section 221413 - Facility Storm Drainage Piping
Per RFI 043

Item 3 Architecture Sheets:

A1.0 Overall Floor Plan
A3.9 Wall Section Details

Item 4 Structure Summary of Changes

Item 5 Structure Drawings

Item 6 MP Drawing Sheet Index

Item 7 Plumbing Drawings

Item 8 Mechanical Drawings

Item 9 Electrical Description of Changes

Item 10 Electrical Drawings

Item 11 IT Drawing Sheet Index

Item 12 IT Drawings

SECTION 21 05 00

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 GENERAL

1.05 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 – General Requirements Specification Sections apply to this Section.

B. Where contradictions occur between this Section and Division 1, the most stringent of the two shall apply.

1.06 WORK INCLUDED

A. Wet-pipe sprinkler systems in all areas except those subject to freezing.

B. Dry-pipe sprinkler systems in all areas subject to freezing.

C. Backflow preventer.

1.07 GENERAL DESCRIPTION OF SYSTEM

A. The automatic fire sprinkler system shall consist of approved backflow preventer, piping, valves, alarm and flow valve assemblies, fire department connection, sprinkler heads and other equipment herein specified. The entire system shall be designed and installed in accordance with all codes and requirements.

1.08 QUALITY ASSURANCE

A. Contractor Qualifications: Work shall be performed by a Contractor regularly engaged in the design and installation of fire protection systems in accordance with NFPA requirements and having at least five (5) years continuous experience in this type of work.

1.09 DESIGN REQUIREMENTS

A. Design Criteria: Comply with all requirements of NFPA 13, NFPA 24, Owner's Insurance Underwriter, Oklahoma State Fire Marshal and local codes.

B. Provide fire protection systems of types, pressure, flow and densities required by Owner's insurance underwriter and NFPA 13.

C. Pipe sizes and hydraulic calculations shall provide for a minimum of 10 psig or 10% excess available pressure, whichever is greater.

D. Prior to submitting final shop drawings, submit preliminary shop drawings showing all sprinkler head locations. The Architect may make changes and add additional heads to the proposed layout for appearance purposes. His decision regarding these changes shall be final.

E. Requirements of Regulatory Agencies: Total system shall be acceptable upon completion and testing to the following:

1. Authority Having Jurisdiction
2. Owner's Insurance Underwriter.
3. Engineer.

F. Coordinate the sprinkler installation with the building structure and all other trades. All sprinkler and standpipe piping shall be offset as required to avoid conflict with ductwork and structure.

G. Sprinkler shop drawings shall show light and diffuser locations. Also indicate design areas and hydraulic reference points on the drawings.

H. For areas with lay-in ceilings, install offsetting elbows on sprinkler drops to allow for adjusting heads to centerline with lights, diffusers and ceiling panels.

I. Provide auxiliary drains at low points in the system and for trapped sections as required by NFPA 13.

J. Provide automatic or manual air-venting appliances at high points within the system as required by NFPA 13.

K. Certificate of Installation: Submit certificate upon completion of fire protection work, stating that the work has been completed and tested in accordance with the specified standards, that there are no defects in the system and it is fully operational.

1.10 SUBMITTALS AND SHOP DRAWINGS

A. General:

1. All equipment and material submitted shall bear evidence of UL-listing and FM-approval for use in fire sprinkler systems.

2. Do not cut any piping until shop drawings are reviewed and approved by all parties.

B. Shop Drawings:

1. Furnish preliminary shop drawing to Architect for review showing all sprinkler head, light textures, air inlets/outlets and ceiling material. Incorporate these corrections into the final shop drawing.

2. Furnish final shop drawings and hydraulic calculations showing piping and heads simultaneously to Owner's Insurance Carrier and local code authority. Show elevations where necessary to clear ductwork, lights, structural elements, etc.

3. Incorporate comments from Owner's Insurance Carrier and local code authority into completed shop drawing and submit to Engineer for review. This shop drawing shall bear the approval stamp of the Owner's Insurance Carrier and local code authority.

C. Submit Manufacturer's Data for the following:

1. Sprinkler system:

a. Sprinklers

b. Fire protection valves

c. Fire department connections

d. Pipe, fittings and specialties

e. Pressure gages

f. Alarm devices

g. Backflow preventer

h. Access panels

1.11 TESTING

A. General:

1. Tests shall be conducted in the presence of the Architect/Owner or his designated representative. Equipment, materials, and instruments for testing shall be furnished by the Contractor without additional cost to the Owner.

B. Automatic Sprinkler Piping:

1. The automatic sprinkler systems shall be hydrostatically tested in their entirety or in zones defined by shut-off valves. The piping shall be tested at a pressure of 200 psig, measured at the low point in the system or zone, and shall be proved tight at this pressure for a period of

not less than 2-hour. Leaks detected shall be repaired by tightening, rewelding joints, or replacing damaged pipe or fittings.

C. Dry Pipe Air Test:

1. All dry pipe piping shall be shall be tested at 40 psig and allowed to stand for 24 hours. All leaks which allow a loss of pressure over 2 psi shall be repaired.

D. Compressed Air System:

1. All compressed air piping shall be pneumatically tested at a pressure of 100 psig for a period of not less than 2 hours. No loss in pressure will be permitted. Leaks detected shall be repaired by tightening or replacing pipe and fittings.

1.12 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Operating and Maintenance Instructions, printed and bound in hard cover, three ring, loose leaf notebooks, shall be provided for each item of equipment listed below; 3 separate copies shall be provided. Each notebook shall be provided within an identifying label under a clear plastic cover shield on the front cover which shall identify the Project, Engineer, Contractor and Date.

1. Wet and dry pipe riser assemblies.
2. Air compressor.
3. Approved shop drawings.
4. Approved submittals.

PART 2 PRODUCTS

2.01 FIRE SPRINKLER SYSTEM

A. Piping:

1. Standard Weight Schedule 40, Black Steel Pipe, 1” and smaller: ASTM A 53/A 53M, Type E, Grade B
2. Schedule 10 or Schedule 40, Black-Steel Pipe, 1-1/4” and larger: ASTM A 135 or ASTM A 795/A 795M
3. Fittings: 250 lb. cast iron screwed or flanged. No cast iron screwed or flanged fittings above the casino floor except for sprinkler drops or flexible connections.
4. Ridge grooved joint (cut not rolled) mechanical fittings, with maximum working pressure rating of at least 300 PSIG.
    a. Design basis: Victaulic

B. Gate Valves:

1. Manufacturers:
    a. Design Basis: Nibco
    b. Other Acceptable Manufacturers:
        (1) Fairbanks
        (2) Kennedy
        (3) Milwaukee
        (4) Mueller
        (5) Watrous
2. Cast iron, OS&Y, 175 lb.

C. Butterfly Valves:

1. Manufacturers:
    a. Design Basis: Victaulic
    b. Other Acceptable Manufacturers:
        (1) Kennedy
        (2) Milwaukee
        (3) Mueller
        (4) TRW Mission
2. With gear actuator, 175 lb. flag indicator hand crank and locking bracket.

D. Check Valves:
1. Manufacturers:
    a. Design Basis: Nibco
    b. Other Acceptable Manufacturers:
        (1) Central Sprinkler
        (2) Fairbanks
        (3) Kennedy
        (4) Milwaukee
        (5) Mueller
        (6) TRW Mission
2. Spring-loaded wafer, 250 lb.

E. Hose Outlet Valves:
1. Manufacturers:
    a. Design Basis: Potter-Roemer
    b. Other Acceptable Manufacturers:
        (1) Fairbanks
        (2) Kennedy
        (3) Milwaukee
        (4) Mueller
        (5) Watrous
        (6) Nibco
2. Adjustable pressure restricting type.
3. Threads: Coordinate with local fire department.
4. Size: 2½" x 1½" reducer with 1½" cap.
5. Polished brass finish.
6. Accessories: Provide cap and chain.

F. Sprinklers Heads:
1. Manufacturers:
    a. Automatic Sprinkler

b. Reliable

c. Tyco

d. Victaulic

e. Viking

2. Type: Glass bulb-type, 165ºF except as noted, pendent, sidewall or upright as required.

3. Finish:

a. Public areas: Chrome plated or painted

b. Back-of-house areas: Chrome plated or painted

c. Utility areas: Brass

d. Exterior areas: Rough Brass

4. Escutcheons:

a. For Removable Ceiling Panels: Split, adjustable, chrome plated or painted.

b. For Permanent Ceilings: Solid, adjustable, chrome plated or painted.

5. Spare Sprinklers: For each style and temperature range required, furnish additional fire sprinklers, amounting to one unit for every 100 installed units, but not less than six units of each type and finish.

6. Sprinkler Cabinet and Wrench: Furnish steel, baked red enameled, sprinkler box with capacity to store sprinklers and wrench sized to sprinklers. Provide one box with heads for each floor of the tower.

G. Fire Department Connections:

1. Manufacturers:

a. Design Basis: Potter-Roemer

b. Other Acceptable Manufacturers:

(1) Edwards

(2) Elkhart

(3) Grunau

(4) Croker-Standard

2. Exposed Wall Type:

a. Double clapper, 4" x 2½" x 2½" (additional 2½" outlets required if demand greater than 500 gpm)

b. Material: Polished brass.

c. Lettering: “Auto Spkr,” “Standpipe,” or “Auto Sprinkler-Standpipe” as required.

d. Hose Threads: Local fire department standard.

e. Escutcheon: Polished brass.

f. Caps: Polished brass with chains.

H. Water Flow Indicators:

1. Manufacturers:

a. Design Basis: Notifier.

b. Other Acceptable Manufacturers:

(1) Potter-Roemer

(2) Reliable

2. WFD, vane-type, designed for vertical or horizontal piping.

a. Provide instantly recycling retard element, adjustable 0 to 60 seconds.

b. Provide weatherproof, dust-tight enclosure with red enamel finish.

I. Waterflow Alarm:

1. Manufacturers:

a. Design Basis: Automatic Fire-Trols.

b. Other Acceptable Manufacturers:

(1) Aames Security.

(2) Grunau.

(3) Reliable Automatic Sprinkler.

2. Model: Farr-Larm.

3. Features: Electric, weatherproof, horn and light, approved for hard-of-hearing areas.

J. Pressure Gauges:

1. Manufacturers:

a. Marsh.

b. Ernst.

c. Potter-Roemer.

2. Type: 3½" diameter, Bourdon-type with brass or chrome case and ring.

K. Supervisory Switch:

1. UL, FM and IRI approval.

2. On each shut-off valve.

L. Sprinkler Dry-Pipe Valves:

1. Design Basis: Tyco

a. Other Acceptable Manufacturers:

(1) Automatic Sprinkler Corp

(2) Viking

(3) Reliable

2. Trim:

a. Pressure gauges.

b. Fill cup.

c. Air pressure maintenance device.

d. Accelerator (for systems over 300 gallons volume).

e. Test valves.

f. Main drain.

M. Compressed air piping:

1. Pipe and Fittings:

a. Schedule 40 galvanized steel pipe, ASTM A120, with screwed joints and 150 pound threaded malleable iron fittings.

N. Dry Pipe Air Compressor:

1. General:

a. The air compressor shall be a tank mounted single stage air cooled type with intake-filter-silencer, centrifugal unloader, visual oil sight gauge, and belt guard. The air compressor shall be controlled by an automatic (start-stop) pressure switch. The air compressor shall be sized to deliver the required free air at 100 psig.

PART 3 EXECUTION

3.01 GENERAL

A. Identification:

1. Apply signs to control, drain, test and alarm valves to identify their purpose and function.

2. Provide lettering size and style selected by Engineer from NFPA's suggested styles.

B. Flushing: Prior to connecting risers, flush water feed mains and lead-in connections.

3.02 SPRINKLER LAYOUT

1. Provide complete sprinkler layout with shop drawing submittal.

2. Coordinate with ceiling layout, plumbing, electrical, ductwork and structural.

3.03 FREEZE PROTECTION

A. Use dry pipe sprinkler system for all areas subject to freezing.

PART 4 REQUIREMENTS

4.01 SPRINKLER SYSTEMS

A. Provisions shall be made to prevent cold air intrusion in areas containing wet pipe systems; minimum temperature of 40^0F.

B. Wet system alarm valves shall use a flow switch as water flow indication.

C. Signs on each sprinkler riser shall include the following:

1. Location of the design area or areas

2. Discharge densities over the design area or areas

3. Required flow and residual pressure demand at the base of the riser

4. Occupancy classification or commodity classification and maximum permitted storage height and configuration

5. Hose stream demand included in addition to the sprinkler demand

6. Static pressure, residual pressure and gpm flow at point of connection to water supply

D. All control, drain, and test connection valves shall be provided with signage indicating what the valve controls, and where it is fed from.

E. Flow switches, pressure switches, and where tamper switches are not internal to the butterfly valve, shall be Potter or equivalent. All exterior valves (i.e. OS&Y) also shall be electronically supervised through the building fire alarm system.

F. A stock of spare sprinklers shall be provided as specified in NFPA 13.

G. A stock of spare sprinkler escutcheons and concealed caps shall be provided including any custom colors as specified.

H. Low air on all dry pipe systems shall send a supervisory signal through the building fire alarm system.

I. Sprinkler system piping shall be marked as to flow direction.

END OF SECTION

SECTION 221413

FACILITY STORM DRAINAGE PIPING

PART 1 - **GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Hub-and-spigot, cast-iron soil pipe and fittings.
2. Hubless, cast-iron soil pipe and fittings.
3. ABS pipe and fittings.
4. PVC pipe and fittings.
5. Specialty pipe and fittings.

B. Related Requirements:

1. Section 334400 "Stormwater Utility Equipment" for storm drainage piping outside the building.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

C. Retain "Shop Drawings" Paragraph below if retaining controlled-flow or siphonic roof drainage system.

D. Shop Drawings: For controlled-flow roof drainage system. Include calculations, plans, and details.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Detail storm drainage piping. Show support locations, type of support, weight on each support, required clearances, and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 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

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings:

1. Marked with CISPI collective trademark and NSF certification mark.

2. Class: ASTM A 74, Service class.

B. Gaskets: ASTM C 564, rubber.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings:

1. Marked with CISPI collective trademark and NSF certification mark.

2. Standard: ASTM A 888 or CISPI 301.

B. CISPI, Hubless-Piping Couplings:

1. Couplings shall bear CISPI collective trademark

2. Some authorities having jurisdiction may have additional compliance requirements besides those specified below. Insert additional standards that are applicable because of Project location. Coordinate with authorities having jurisdiction and with manufacturers.

3. Standards: ASTM C 1277 and CISPI 310.

4. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Standard: ASTM C 1540.

2. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

D. Cast-Iron, Hubless-Piping Couplings:

1. Standard: ASTM C 1277.

2. Description: Two-piece ASTM A 48/A 48M, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.4 ABS PIPE AND FITTINGS

A. NSF Marking: Comply with NSF 14, "Plastics Piping System Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic storm drain and "NSF-sewer" for plastic storm sewer piping.

B. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.

C. Cellular-Core ABS Pipe: ASTM F 628, Schedule 40.

D. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.

2.5 PVC PIPE AND FITTINGS

A. NSF Marking: Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic storm drain and "NSF-sewer" for plastic storm sewer piping.

B. Solid-Wall PVC Pipe: ASTM D 2665; drain, waste, and vent.

C. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.

D. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

2.6 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections same size as and compatible with pipes to be joined.

2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.

3. Unshielded, Nonpressure Transition Couplings:

    a. Standard: ASTM C 1173.
    b. Description: Elastomeric sleeve, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    c. 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.

4. Shielded, Nonpressure Transition Couplings:

    a. Standard: ASTM C 1460.
    b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
    c. End Connections: Same size as and compatible with pipes to be joined.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.

2. Install piping as indicated unless deviations from layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Retain first paragraph below for projects in seismic areas if piping is required to withstand specific design loads.

K. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

L. Make changes in direction for piping using appropriate branches, bends, and long-sweep bends.

1. Do not change direction of flow more than 90 degrees.

2. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

a. Reducing size of drainage piping in direction of flow is prohibited.

M. Lay buried building piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.

2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

3. Maintain swab in piping and pull past each joint as completed.

N. Install piping at the following minimum slopes unless otherwise indicated:

1. Building Storm Drain: **2** percent downward in direction of flow for piping NPS 3 (DN 80) and smaller; 1 percent downward in direction of flow for piping NPS 4 (DN 100) and larger.

2. Horizontal Storm Drainage Piping: **2** percent downward in direction of flow.

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

P. Install aboveground ABS piping according to ASTM D 2661.

Q. Install aboveground PVC piping according to ASTM D 2665.

R. Install underground ABS and PVC piping according to ASTM D 2321.

S. Install engineered **controlled-flow** drain specialties and storm drainage piping in locations indicated.

T. Plumbing Specialties:

1. Install backwater valves in storm drainage gravity-flow piping.

a. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."

2. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping.

a. Comply with requirements for cleanouts specified in Section 221423 "Storm Drainage Piping Specialties."

3. Install drains in storm drainage gravity-flow piping.

    a. Comply with requirements for drains specified in Section 221423 "Storm Drainage Piping Specialties."

U. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

V. Install sleeves for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

W. Install sleeve seals for piping penetrations of concrete walls and slabs.

1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

X. Install escutcheons for piping penetrations of walls, ceilings, and floors.

1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hubless, Cast-Iron Soil Piping Coupled Joints:

1. Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

C. **ABS** a**nd PVC**, Nonpressure-Piping, Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 appendices.

3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendices.

D. Joint Restraints and Sway Bracing:

1. Provide joint restraints and sway bracing for storm drainage piping joints to comply with the following conditions:

    a. Provide axial restraint for pipe and fittings **5 inches** and larger, upstream and downstream of all changes in direction, branches, and changes in diameter greater than two pipe sizes.

    b. Provide rigid sway bracing for pipe and fittings 4 inches and larger, upstream and downstream of all changes in direction 45 degrees and greater.

c. Provide rigid sway bracing for pipe and fittings **5 inches** and larger, upstream and downstream of all changes in direction and branch openings.

3.4 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in ODs.

2. In Drainage Piping: **Unshielded**, nonpressure transition couplings.

3.5 VALVE INSTALLATION

A. General valve installation requirements for general-duty valve installations are specified in the following Sections:

1. Section 220523.12 "Ball Valves for Plumbing Piping."

2. Section 220523.13 "Butterfly Valves for Plumbing Piping."

3. Section 220523.14 "Check Valves for Plumbing Piping."

4. Section 220523.15 "Gate Valves for Plumbing Piping."

B. Shutoff Valves:

1. Install shutoff valve on each sump pump discharge.

2. Install gate for piping NS 2 (DN 50) and smaller.

3. Install gate valve for piping NPS 2-1/2 (DN 65) and larger.

C. Check Valves: Install swing-check valve, between pump and shutoff valve, on each sump pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves

2. Install backwater valves in accessible locations.

3. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.

2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.

3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.

5. Vertical Piping: MSS Type 8 or Type 42, clamps.

6. Install individual, straight, horizontal piping runs:

   a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.

   b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.

   c. Longer Than 100 Feet (30 m) if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting**[, valve,]** and coupling.

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

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

F. Maximum spans in remaining paragraphs were taken from MSS SP-58 for water service and from model plumbing codes. The most restrictive piping and spacing dimensions allowed are indicated. For large piping, maximum spans indicated may result in excessive point loads. Coordinate with Project structural engineer.

G. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.

2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.

3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.

4. NPS 6 and NPS 8 (DN 150 and DN 200): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.

5. NPS 10 and NPS 12 (DN 250 and DN 300): 60 inches (1500 mm) with 7/8-inch (22-mm) rod.

6. Spacing for 10-foot (3-m) pipe lengths may be increased to 10 feet (3 m). Spacing for fittings is limited to 60 inches (1500 mm).

H. Install supports for vertical cast-iron soil piping every 15 feet (4.5 m).

I. Support piping and tubing not listed above according to MSS SP-58 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

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

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

1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.

2. Second option in first subparagraph below should be indicated on Drawings.

3. Install horizontal backwater valves with cleanout cover flush with floor.

4. Comply with requirements for [backwater valves] [cleanouts] [and] [drains] specified in Section 221423 "Storm Drainage Piping Specialties."

D. Where installing piping adjacent to equipment, allow space for service and maintenance.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.

2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.8 IDENTIFICATION

A. Identify exposed storm drainage piping.

B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.9 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. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved.

a. Expose work that was covered or concealed before it was tested.

3. Test Procedure:

a. Test storm drainage piping, except outside leaders, on completion of roughing-in.

b. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

5. Prepare reports for tests and required corrective action.

C. Piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.10 CLEANING AND PROTECTION

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.

3.11 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Retain " any of" option in first paragraph below to allow Contractor to select piping materials from those retained.

C. Aboveground storm drainage piping **NPS 6 (DN 150) and smaller** shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.

3. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints.

4. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

5. Dissimilar Pipe-Material Couplings: **Unshielded**, nonpressure transition couplings.

D. Aboveground, storm drainage piping [**NPS 8 (DN 200) and larger**] shall be[**any of**] the following:

1. Retain one or more of first three subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings and show points of transition from one material to another.

2. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

3. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.

4. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

5. Dissimilar Pipe-Material Couplings: **Unshielded**, nonpressure transition couplings.

E. Underground storm drainage piping **NPS 6 (DN 150) and smaller** shall be the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

2. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.

3. [Solid-wall] [Cellular-core] ABS pipe, ABS socket fittings, and solvent-cemented joints.

4. [Solid-wall] [Cellular-core] PVC pipe, PVC socket fittings, and solvent-cemented joints.

5. Dissimilar Pipe-Material Couplings: **Unshielded**, nonpressure transition couplings.

F. Underground, storm drainage piping **NPS 8 (DN 200) and larger** shall be[**any of**] the following:

1. Retain one or more of first four subparagraphs below. If using more than one type of material and joining method, identify various materials on Drawings and show points of transition from one material to another.

2. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.

3. Hubless, cast-iron soil pipe and fittings; CISPI, hubless-piping couplings; and coupled joints.

4. PVC piping in first subparagraph below is limited in size to NPS 12 (DN 300).

5. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

6. Cellular-core, sewer and drain series, PVC pipe; PVC socket fittings; and solvent-cemented joints.

7. Dissimilar Pipe-Material Couplings: **Unshielded**, nonpressure transition couplings.

END OF SECTION