



# Section 221400

# Facility Storm Drainage

## DESIGN GUIDE

## 1 General

### 1.1 General

- A. Coordinate with Structural engineer and Civil Engineer regarding potential need for foundation drainage system. Include duplexing sump pump as required. See Section 221300 for sump pump requirements.
- B. Section includes requirements for facility storm drainage.

## 2 Materials

### 2.1 Storm Drain Piping (primary and overflow drain)-gravity drainage

- A. Cast Iron Pipe and fittings: service weight
  - 1. Joints: Hub-and-spigot, compression type with neoprene gaskets
  - 2. Joints: neoprene gasket and heavy-duty stainless-steel clamp and shield assemblies, minimum 3/8" stainless hex head screw. Husky SD 4000 series or equivalent.
- B. DWV ABS Pipe and Fittings: Schedule 40
  - 1. Joints: solvent weld
  - 2. Hollow core and cellular core pipe and fittings are not allowed.
- C. DWV PVC/CPVC Pipe and Fittings: Schedule 40.



1. Joints: solvent weld
2. Hollow core and cellular core pipe and fittings are not allowed.

## 2.2 Sump Pumps

- A. Refer to Section 221300.

## 2.3 Roof Drains

- A. Reserved for future content

## 2.4 Cleanouts

- A. This item reserved for future content.

# 3 Execution

## 3.1 Testing

- A. Test in the presence of the Owner's representative. Provide copies of test to the Owner's representative and include in the O&M manual.
- B. Test all primary and overflow storm drainage piping to ensure system is watertight.
- C. Drainage piping shall be tested to the point of connection to mains outside the building.
- D. Water test: The water test shall be applied to the drainage and vent systems either in its entirety or in sections.
  1. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow.
  2. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested



with less than a 10 foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet of the system shall have been submitted to a test of less than 10 feet head of water.

3. The water shall be kept in the system, or in the portion under test, for at least fifteen minutes before inspection starts.

## **3.2 General**

- A. Provide easy access to all, cleanouts and equipment requiring service and replacement for operation and servicing.

## **3.3 Storm Drainage Piping**

- A. Slope for drainage at 1/8 inch per foot (1%) unless indicated otherwise on drawings.
- B. PVC/ABS pipe and fittings
  1. Allowed for direct buried piping not required to be cast iron (see below)
  2. Allowed for overflow drain piping (above grade) installed in non-plenum areas.
- C. Cast iron pipe and fittings:
  1. Cast iron pipe and fittings are required for all under slab drainage piping from the mechanical room to the exterior cleanout.
  2. Pipe not specifically permitted to be PVC/ABS/CPVC shall be cast iron.

## **3.4 Direct Buried Utilities**

- A. The Architect/Engineer must identify and/or verify critical utilities location on a project-by-project basis.
- B. Provide locator tape with metallic strip for all major non-metallic underground utility lines, including main irrigation lines. Locator tape to be placed twelve inches (12") minimum above all main lines, 4" or



greater. Site and/or utilities plans shall indicate this tracer wire and locator tape requirement.

- C. Provide pea gravel or sand bedding and cover around all utility lines.
- D. During construction all pipe ends must be closed when left unattended.
- E. Utilities Easement. All underground utilities design must be conceived and designed with an "easement approach" in mind, thus facilitating their maintenance and accessibility. The Schematic Design utility site plan and all other utilities site plan(s) thereafter, must clearly indicate the outline of this utility easement.

### **3.5 Sump pumps**

- A. Provide in all exterior vaults in a depressed sump (CWU has found it impossible to perfectly water seal concrete exterior vaults).
- B. All concrete utility trenches shall drain to vaults equipped with sump pumps for drainage. Provide weep holes in vault wall between utility trench and the vault.

### **3.6 Roof drainage**

- A. Roof drainage shall be provided with primary and overflow roof drains and interior roof drainage piping due to freeze/thaw conditions.
- B. Primary and overflow drains shall be piped separately outside of the building.
- C. Primary drains shall terminate 5 feet outside the building where it is picked up by Civil for termination to swale or other method of disposal determined by the Civil Engineer.
- D. Overflow drains may terminate with exterior downspout (located near grade). Exterior downspouts shall not be located high on buildings due to staining of condensation and freeze/thaw conditions. Downspouts shall terminate in planted area of areas outside of walkway where water/ice will not become a hazard.
- E. Residential facilities and some smaller facilities with sloped roofs may utilize gutters and downspouts. Due to winter conditions, gutters and



downspouts require heat trace. Gutters shall terminate similar to overflow downspouts indicated above.

### **3.7 Cleanouts**

- A. Provide in accordance with 221300.

## **4 Appendix**

### **4.1 Reserved for future.**

