

<b>AMTRAK ENGINEERING PRACTICES</b> <b>Structures Department</b> <b>Standard Design Practices (SDP)</b>	<b>Section 3 – Minimum Building Technical Requirements</b>	<b>EP4000</b>
	<b>Chapter 33 – Utilities</b>	<b>SDP: 3.33</b>
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## Utilities

### I. Storm Drainage Utilities

#### A. General

1. The design for all stormwater systems should meet all State and Federal laws, rules, and regulations.
2. The storm drainage system should be designed for positive drainage away from all surface structures that are not intended to receive drainage such as railroad tracks, building foundations, manholes, cleanouts, fire hydrants, valve boxes, light poles, junction boxes, conduit, etc.
3. Volume and velocity calculations for stormwater running onto the site in addition to the anticipated runoff from the site must be prepared early in the design process.
4. Designs should incorporate, to the maximum extent practical, best management practices-low impact development.
5. Stormwater systems shall at no time be connected to a sanitary system.
6. All stormwater systems shall be designed to the 100-year storm unless otherwise approved in writing by the Design Manager. If an existing building and/or infrastructure is within the existing 100-year storm, finishes and structural materials that are “resistant” to flood damage shall be employed.
7. No stormwater drainage system shall have “Standing Water Situation” lasting longer than 72 hours unless specifically designed to accommodate ponding.

#### B. Platform Storm Drainage

1. The design for all platform stormwater systems should meet all state and Federal laws, rules, and regulations.
2. The platform storm drainage system should be designed for positive drainage away from railroad tracks.
3. Volume and velocity calculations for stormwater running onto the site in addition to the anticipated runoff from the site must be prepared early in the design process.
4. Platform stormwater drainage system shall be designed to drain standing water from the platform within 24 hours of a rain event and no portion of the platform shall be designed to encourage ponding of stormwater. Design professional shall provide calculations that demonstrate that the platform drainage system, including piping and trench drain, can perform accordingly, and has been sized properly.
5. There should be no standing water on the platform in the case of a 25-year (or 100-year, if design feasible) storm event.
6. Trench style drainage systems must have grates that contain multiple slots or openings and are provided with an ADA heel proof configuration. Single slot style openings or grates are not permitted.

#### C. Building Storm Drainage

1. A storm drainage system shall be provided to convey water from building roofs to the site storm sewer system. New buildings shall be equipped with a separate relief overflow storm drainage system with a secondary independent piping system to grade near a sidewalk or public area, in addition to the primary storm drainage system. Scuppers should be avoided.
2. Heat tracing shall be furnished and installed for all storm water lines, valves and/or traps that are outside heated areas.

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#### **D. Distribution**

1. Below ground storm water piping shall be service weight cast iron with push-on, bell and spigot ends. PVC or HDPE may be used with Amtrak approval. The design shall take into consideration existing and proposed catenary systems and piping shall not be of a metallic nature where stray currents may be present.
2. Above ground indoor storm water piping shall be Schedule 40 PVC DWV with drainage pattern fittings and solvent cement joints. ASTM D2665-94, D2122-90.
3. Horizontal aboveground storm drainage piping shall be insulated to control condensation.
4. Piping exposed to freezing conditions shall be insulated and heat traced.

### **II. Foundation Drainage**

#### **A. Slabs-on-grade**

1. Provide 6" minimum crushed stone drainage below slabs-on grade.
2. Where recommended by a geotechnical or civil engineer, or where the water table is known or suspected to be above or at the level of the lowest floor, provide additional drainage below the slab designed by the Design Consultant.

#### **B. Foundation Perimeter Drain**

1. Provide an exterior perimeter drain at the entire building perimeter. The exterior perimeter drain may be deleted if the site is located in a well-drained gravel or located in a sand/gravel mixture soil where a civil or geotechnical engineer deems the perimeter drain unnecessary.
  - a. Drainage shall include a continuous and sloped 4" drainage tile or perforated pipe set in gravel or crushed stone containing not more than 10 percent material that passes a no. 4 sieve. Drainage pipe shall be set on no less than 2" of crushed stone and be covered with no less than 12" of crushed stone. The top of the drainage pipe shall be below the top of the lowest floor and slope down to the point of discharge. The drainage pipe and crushed stone shall be protected at all sides with a continuous filter fabric.
    - i. The perimeter drainage system described is a minimum requirement. Provide additional components and capacities based on the recommendations of geotechnical or civil engineer.

#### **C. Drainage Discharge.**

1. Any foundation and under-slab drainage shall drain by gravity to daylight or to the storm drainage system for on-site infiltration or off-site conveyance.
2. Where drains carry water to grade, install ¼" welded mesh rodent screening at next to last joint.
3. Where it is not feasible to drain completely by gravity, mechanical drainage, including backup systems shall be provided.