

Chapter 5

STORMWATER

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5.000 STORM DRAINAGE

5.010 General

The standards established by this chapter are intended to represent the minimum standards for the design and construction of storm drainage facilities.

The referenced document, latest edition of the *Drainage Design and Erosion Control Manual for Olympia (Drainage Manual)*, is considered a part of this chapter of the Development Standards. This Drainage Manual sets forth the minimum drainage and erosion control requirements as supplemented herein.

Replaced surfaces are not required to be brought up to new stormwater standards if the replaced spaces are solely maintenance or repair and no improvement thresholds are exceeded.

5.020 Design Standards

The design of storm drainage and/or retention/detention systems will depend on their type and local site conditions. The design elements of storm drainage systems will conform to City standards as set forth herein and the Drainage Manual and follow current design practice as set forth.

The General Notes on the following page will be included on any plans dealing with storm systems.

GENERAL NOTES (STORM DRAIN CONSTRUCTION)

1. All workmanship and materials will be in accordance with City of Olympia Standards and the most current copy of the [State of Washington Standard Specifications for Road, Bridge and Municipal Construction \(WSDOT/APWA\)](#).
2. The contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA and the State of Washington, Department of Labor and Industries.
3. Temporary erosion/water pollution measures will be required in accordance with the Standard Specifications and the latest edition of the *Drainage Design and Erosion Control Manual for Olympia*.
4. Comply with all other permits and other requirements by the City of Olympia or other governing authority or agency.

5. A preconstruction meeting will be held with the [City of Olympia Community Planning and Development Department](#), prior to the start of construction.
6. All storm conveyances and retention/detention areas will be staked for grade and alignment by an engineering or surveying firm capable of performing such work.
7. Special structures, oil/water separators, and outlet controls will be installed pursuant to plans and manufacturer's recommendations.
8. The contractor shall be responsible for all traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic control is in place.
9. The contractor shall be fully responsible for the location and protection of all existing utilities. Call [Underground Locate](#) at 1-800-424-5555 a minimum of 48 hours prior to any excavations.
10. Where connections require "field verifications," connection points will be exposed by contractor and fittings verified 48 hours prior to distributing shutdown notices.
11. All storm lines and catch basins will be high-velocity cleaned and pressure tested in accordance with Division 7 of the Standard Specifications prior to paving in conformance with the above-referenced specifications. (See [Note 1.](#)) Hydrant flushing of lines is not an acceptable cleaning method.
12. Testing of the storm main will include television inspection of the main by the City at the contractor's expense. Additional televising that is deemed necessary may be addressed in either of two manners: at the City's discretion, the contractor can have the City perform the work and reimburse the City for all associated labor and materials; or the contractor may perform the inspection under direct supervision of City personnel. Immediately prior to television inspecting, enough water will be run down the line so it comes out the lower manhole and the line is flushed clean. Acceptance of the line will be made after the television inspection tape has been reviewed and approved by the inspector. All catch basins shall have curb marker, anti-dumping discs. All solid round catch basin covers shall be City of Olympia decorative standard (per Standard Drawing 5-12). All surface storm water facilities shall have informational signs installed adjacent to them.

5.024 Testing

Prior to acceptance and approval of construction, the following tests shall apply to the storm sewer:

- A. All storm lines and catch basins will be high-velocity cleaned and pressure tested in accordance with Division 7 of the [Washington State Department of Transportation Standard Specifications](#) prior to paving. Hydrant flushing of lines is not an acceptable cleaning method. The contractor shall furnish all equipment and personnel for conducting the test under the observation of the City Inspector. The testing equipment will be subject to the approval of the City.
- B. Testing of the storm main shall include a television inspection by the City. The television inspection shall be conducted at the applicant's expense. All television inspections shall be performed in accordance with the City's Sewer Television Inspection and Assessment Services Specifications.

Under special conditions, when approved on a case-by-case basis by the Public Works Director, contractors may be permitted to perform the television inspection under the direct supervision of City personnel.

Any additional televising that is deemed necessary may be addressed in either of two manners: at the City's discretion, the contractor can have the City perform the work and reimburse the City for all associated labor and materials; or the contractor may perform the inspection under direct supervision of City personnel. Television inspections performed without City personnel present will be deemed invalid and shall be repeated at the contractor's expense.

Television inspection shall be done after the air test has passed, all underground utilities are installed and compaction of the roadway subgrade is completed, and before the roadway is paved. Immediately prior to a television inspection, enough water shall be run down the line so it comes out the lower manhole and the line is flushed clean.

Acceptance of the line will be made after the television inspection record has been reviewed and approved by the inspector. Any tap to an existing system needs to be televised at the applicant's expense.

5.025 Conveyance Pipes

Pipe: Storm pipes within a public right-of-way or easement will be sized to carry the maximum anticipated runoff for a 24-hour storm event without street

flooding from the possible contributing area. Additional design criteria for stormwater conveyance pipes is provided in the Drainage Manual.

Pipe outfalls shall be designed to pass the 25-year design storm event and suffer no structural or erosion damage in a 100-year design event.

Design flows may be calculated from any standard engineering methodology provided that the design flow is the peak discharge for the contributing area and land cover conditions and the stated return period. The City Engineer may require more detailed hydrologic and hydraulic analysis if special conditions apply.

The minimum main size will be 12 inches in diameter. Lateral lines may be 8 inches in diameter. Nothing will preclude the City from requiring the installation of a larger-sized main if the City determines a larger size is needed to serve adjacent areas or for future service.

The minimum cover for storm drain pipe shall be 2-feet. Where the minimum depth includes the roadway section, structural calculations for the appropriate H-loading shall be submitted along with the plans. All pipe specified where the cover is 2-feet or less shall be concrete or ductile iron of a class determined by the structural calculations.

All conveyance pipes shall be installed on a uniform slope between structures. The allowable tolerance for sags or bellies in a newly installed pipe shall be 1/16 the diameter of the pipe. Deviations from this tolerance shall be evaluated on a case-by-case basis and shall be solely the decision of the City Engineer.

Structures: All changes in pipe direction, slope, size and junctions must be made inside of a structure. Only those structures approved by [Washington State Department of Transportation](#) shall be used within the public right-of-way.

Pipe Slope: The maximum slope of piped conveyances shall be 20% or a maximum full pipe velocity of 30 feet per second, whichever is most restrictive. If full pipe velocities exceed 15 feet per second, the installation shall provide anchors at bends and junctions.

Trash Rack: Where open channels of ponds discharge into a conveyance pipe, trash racks are required on all storm sewer inlets 18 inches in diameter and larger. Trash racks must be removable with ordinary hand tools.

All pipe for storm mains will comply with one of the following types:

- A. Plain concrete pipe conforming to the requirements of [AASHTO M 86](#), Class 2.

- B. Reinforced concrete pipe conforming to the requirements of AASHTO M 170.
- C. PVC pipe conforming to ASTM D 3034 SDR 35, ASTM F 794, or ASTM F 679 Type 1 with joints and gaskets conforming to ASTM 3212 and ASTM F 477.
- D. Ductile iron pipe conforming to the requirements of AWWA C 151 thickness class as shown on the plans.
- E. High-density polyethylene smooth interior pipe conforming to AASHTO M252 Type S or AASHTO M294 Type S with gasketed bell and spigot joints.
- F. Aluminized steel helical or spiral rib pipe in diameter of 30 inches or greater with Manning's "N" value of 0.020 or less.

5.026 Catch Basins

Maximum catch basin spacing will be 300 feet on arterials and collectors and 500 feet on all other street classifications. No surface water will cross any roadway to private property.

Catch basins located in "low points" will have a "through curb" feature as shown in Standard Drawing 5-9.

Catch basin spacing shall be designed to allow a maximum of a 5-foot-wide stormwater runoff gutter flow width in the design storm event.

5.027 Catch Basins Anti-Dumping Message

Each catch basin shall be marked with an anti-dumping message curb marker. The marker shall be a 4-inch disc which is epoxy glued to the top of the curb adjacent to the catch basin grate. The curb marker shall be oriented so that it is readable from the sidewalk.

The curb marker shall be the City of Olympia standard decorative bubbles with fish. The curb markers can be purchased from the City of Olympia at City Hall, 601-4th Avenue East, or ordered in bulk from [Das Manufacturing, Inc.](#)

5.028 Solid Round Catch Basin Covers

All catch basins designed to have a solid round frame and cover shall install the City of Olympia decorative feet with fish cover. The decorative cover is manufactured by the [East Jordan Iron Works](#) and is available through local suppliers. The decorative cover conforms to [WSDOT standard plan](#) circular cover dimensions.

5.030 Staking

All surveying and staking will be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work will be licensed by the State of Washington. Staking will be maintained during construction.

A preconstruction meeting will be held with the City prior to commencing staking. All construction staking will be inspected by the City prior to construction.

The minimum staking of storm sewer systems will be as follows:

- A. Stake centerline alignment every 25 feet with cuts and/or fills to bottom of trench.
- B. Stake location of all catch basins/manholes and other fixtures for grade and alignment.
- C. Stake location, size, and depth of retention/detention facility.
- D. Stake finished grade of catch basin/manhole rim elevation and invert elevations of all pipes in catch basins, manholes, and those that daylight.

5.040 Trench Excavation

See Chapter 6.160 for requirements regarding trench excavation.

5.050 Backfilling

See Chapter 6.170 for requirements regarding backfilling.

5.060 Street Patching and Restoration

See [Chapter 4B.170](#) and 4B.180 for requirements regarding street patching and trench restoration.

5.70 Storm Pond Information Signs

Detention ponds, infiltration ponds, wet ponds and combined ponds shall have an informational sign. The sign shall be placed for maximum visibility from adjacent streets and sidewalks and paths.

Signs may be purchased from the City of Olympia at City Hall, 601-4th Avenue, East, or the equivalent signs can be fabricated and installed. Signs shall be fabricated from 1/8-inch aluminum sheet with 3-inch radius corners. The graphic print shall be as supplied by the City of Olympia and shall be screen-printed with City of Olympia colors and background specifications.

Signs shall be mounted on 2 ½-inch metal posts. The bottom of the sign shall be 5 feet from the ground.

5.80 Design Criteria for Channels

Channels shall be designed to suffer no erosion or scour damage for the conveyance system design event. Channels must be stabilized against erosion at the completion of construction. This may require temporary erosion control practices until the design vegetation is established.

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