

AASHTO 150/IEC 17025, or the American Association for Laboratory Accreditation and further approved by the City. Testing shall be done on all materials and construction as specified in the Standard Specifications and with frequency as specified herein.

**TABLE 5-5****Testing and Sampling Frequency Guide****Earthwork**

<b>Item</b>	<b>Location</b>	<b>Test</b>	<b>Testing Frequency</b>
Undisturbed Native Soil	Structures	In Place Density <sup>(3)</sup>	Two random tests in building footings and two tests on subgrade within building line.
		Moisture Density Relationship (Modified Proctor)	One test and any time material type changes.
Fills and Backfills	Structures (adjacent to)	In Place Density <sup>(3)</sup>	One test per structure Backfills per 2,000 sq. ft. taken 12 inches below finished Grade.
		Moisture Density Relationship (Modified Proctor)	One test and any time material type changes.
Subgrades	Site	In Place Density <sup>(3)</sup>	One test per lift per 2,500 sq. ft.
		Moisture Density Relationship (Modified Proctor)	One test and any time material type changes.
Embankments or Borrow	Any	In Place Density <sup>(3)</sup>	One test per lift per 500 cubic yards placed.

**Trenching**

<b>Item</b>	<b>Test</b>	<b>Testing Frequency</b>
Pipe Bedding	Gradation <sup>(1)</sup>	One for each material source.
Trench Backfill	Gradation <sup>(1)</sup>	One for each material source.
	In-Place Density <sup>(1)(2)(3)(4)</sup>	One every 100 feet of trench and every 2 feet in depth of backfill material.

Item	Test	Testing Frequency
	Moisture Density Relationship (Modified Proctor) <sup>(3)</sup>	One prior to start of backfilling operations, one every 20 densities and any time material type changes.

### Aggregate Materials

Item	Test	Testing Frequency
Crushed Surfacing Base Course	Gradation, SE and Fracture	1 – 2,000 TN.
	Density <sup>(1)</sup>	One test on every lift on material placed at a frequency of 250 square yards of completed area.
Crushed Surfacing Top Course	Gradation, SE and Fracture	1 – 2,000 TN.
	Density <sup>(1)</sup>	One test on every lift on material placed at a frequency of 250 square yards of completed area.

### Hot Mix Asphalt and Asphalt Treated Base

Item	Test	Testing Frequency
Commercial HMA and ATB	Rice Density	1 – project.
HMA Cl. ____ PG ____ Project Quantity ≤ 400 tons	Rice Density	1 – project.
HMA Cl. ____ PG ____ Project Quantity > 400 tons ≤ 800 tons	Rice Density, Gradation and Asphalt Content	1 – project.
HMA Cl. ____ PG ____ Project Quantity > 800 tons	Rice Density, Gradation and Asphalt Content	1 – 800 TN. <sup>(5)</sup>
Commercial HMA, HMA Cl. ____, PG ____, ATB	Compaction <sup>(1)</sup>	1 – 80 TN.

### Hot Mix Asphalt Aggregate<sup>(9)</sup>

Item	Test	Testing Frequency
Aggregate	SE, Fracture	1 – 1,600 TN.
Blend Sand	SE	1 – Project.
Mineral Filler	Sp. G and Pl	Certificate.

**Asphalt Reinforcement Mesh**

Item	Test	Testing Frequency
Asphalt Reinforcement Mesh	Adhesion Test	1 – 3,000 SF.

**PCC Paving<sup>(8)</sup>**

Item	Test	Testing Frequency
Course Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Fine Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Combined Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Air Content	Air	1 – 500 CY.
Cylinders (28 Day)	Compressive Strength	1 – 500 CY.
Core	Density Thickness	1 – 500 CY. 1 – 500 CY.
Cement <sup>(6)</sup>	Chemical and Physical Certification	

**PCC Structures<sup>(8)</sup>**

Item	Test	Testing Frequency
Course Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Fine Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Combined Aggregate <sup>(7)</sup>	Gradation	1 – 1,000 CY.
Consistency	Slump	1 – 50 CY.
Item	Test	Testing Frequency
Air Content	Air	1 – 50 CY.
Cylinders (28 Day)	Compressive Strength	1 – 50 CY.
Cement <sup>(6)</sup>	Chemical and Physical Certification	
Grout	Compressive Strength	1 set/day.

- (1) All acceptance tests shall be conducted from in-place samples.
- (2) Additional tests shall be conducted when variations occur due to the Contractor's operations, weather conditions, site conditions, etc.
- (3) All compaction shall be in accordance with the Compaction Control Test of Section 2-03.3(14)D. The nuclear densometer, if properly calibrated, may be used for the required testing frequency and procedures. The densometer shall be calibrated and is recommended for use when the time for complete results becomes critical.
- (4) Depending on soil conditions, it is anticipated that compaction tests will be required at depths of two feet above the pipe and at each additional two feet to the existing surface plus a test at the surface.
- (5) A minimum of three samples, on a random basis, shall be taken and tested.
- (6) Cement may be accepted by the Engineer based on the Manufacturer's Mill Test Report number indicating full conformance to the Specification.
- (7) The frequency for fine, course, and combined concrete aggregate samples for PCC Paving and PCC Structures shall be based on the cubic yard (CY) of concrete.
- (8) Commercial concrete will be accepted with Certificate of Compliance; no testing is required.
- (9) Hot mix asphalt aggregate tests are not required for HMA

## **5.19 SIDEWALKS, CURBS AND GUTTERS**

### **A. Design Standards**

Plans for the construction of sidewalks, curbs and gutters are to be submitted as part of the street plans when applicable.

The City has set forth minimum standards as shown in details, which must be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, they may be modified by the City should the City Engineer feel circumstances require variances to minimum design standards.

### **B. Sidewalks**

Sidewalks shall be constructed of Portland Cement Concrete, 4 inches thick (6-inch thick at driveway sections) per Section 8-14 of the Standard Specifications. Sidewalks shall be Class 3,000 psi except at driveway approaches where it shall be Class 4,000 psi.

Sidewalks shall be constructed in accordance these standards and in accordance with the Standard Specification and Standard Details. In the event of a conflict the more rigorous standard shall apply. The City shall be at liberty to vary required sidewalk dimensional characteristics and location as shown in the standard details to meet localized or existing conditions. Low Impact Development design may be incorporated into the design of the sidewalk if site conditions meet the standards required for Low Impact Development design.

Alternate designs that incorporate Low Impact Development standards may be approved on a case-by-case basis. For example, sidewalk slopes can be reversed (i.e., away from the street) if part of a city approved low impact development design.

### **C. Curb and Gutter**

Cement concrete curb and gutter shall be used for all street edges unless otherwise approved by the Manager. All curbs and gutters shall be constructed of Class 3,000 psi Cement Concrete in accordance with Section 8-04 of the Standard Specifications. Curbs shall be of the vertical face type. No rolled curb and gutter profile will be allowed. Curb cuts may be allowed as an alternative Low Impact Development design.

Extruded curb and gutter per Standard Specifications is allowed only with the specific approval of the City Engineer.

Form and subgrade inspection by the City are required before curb and gutter are poured.

Forms, wood or steel, shall be staked securely in place, true to line and grade.

Sufficient support shall be given to the form to prevent movement in any direction, resulting from the weight of the concrete or the concrete placement. Forms shall not be set until the subgrade has been compacted within one inch of the established grade. Forms shall be clean and well oiled prior to setting in place. When set, the top of the form shall not depart from grade more than 1/8 inch when checked with a 10-foot straightedge. The alignment shall not vary more than 1/4 inch in 10 feet. Immediately prior to placing the concrete, forms shall be carefully inspected for proper grading, alignment and rigid construction. Adjustments and repairs as needed shall be completed before placing concrete.

The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of the concrete. Concrete shall be spaded and tamped thoroughly into the forms to provide a dense, compacted concrete free of rock pockets. The exposed surfaces shall be floated, finished and brushed longitudinally with a fiber hair brush approved by the City's inspector and/or engineer.

The face form of the curb shall be stripped at such time in the early curing as will enable inspection and correction of all irregularities that appear thereon.

Forms shall not be removed until the concrete has set sufficiently to retain its true shape. The face of the curb shall be trawled with a tool cut to the exact section of the curb and at the same time maintain the shape, grade and alignment of the curb. The exposed surface of the curb shall be brushed with a fiber hair brush.

Joints shall be cleaned and edged as shown on the drawings. All expansion and contraction joints shall extend entirely through the curb section above the pavement surface. Joint filler in the curb shall be normal to the pavement and in full and constant contact with pavement joint filler.

D. ADA Curb Ramps

All sidewalks must be constructed to provide for curb ramps in accordance with the current standards of applicable state law. Details provided herein are minimum and subject to change. It is the Developer's responsibility to verify current ADA requirements and install same per current standards even if the City has approved of construction drawings with non-compliant ADA requirements.

Curb Ramps shall be constructed of Cement Concrete. Form and subgrade inspection by the City are required before the curb ramp is poured.

E. Testing

Testing shall be required at the developer's or contractor's expense on all materials and construction as specified in the WSDOT Standard Specifications.

At a minimum, one slump test and two test cylinders shall be taken once per day. All other testing frequencies shall be as specified in Section 5.19.

## 5.20 ILLUMINATION

A. General

Illumination shall be required unless otherwise directed by the City Council. The illumination shall provide a minimum intensity of 0.4-foot candles within the right-of-way. The design shall be approved by Snohomish County PUD and the City. All power supply conduit and cables shall be underground.

B. Decorative Street Lighting

Properties that develop or redevelop shall install decorative streetlights in accordance with City standards per the direction of the City Manager or designated appointee.

These lights shall be installed at a maximum spacing of 80 feet and located in back of the sidewalk and within the right-of-way. Conduit and wiring shall be installed to allow for continuation of the circuit(s) and to provide power to each light.

**City Standard – Lumec (Philips)** and available through Seatac Lighting.

Pole	AM6U-12-BAS16-GN8TX
Luminaire	31" x 18.5-in cast 356 aluminum L80-40W49L-ES- PC-CS-LE3-120-SF80-GN8TX
Shielding	L80-70HPS-PC-CS-SE3-SF80-HS (if required)
Bulb	LED Lumileds Rebel ES. Composed of 49 high-performance white LEDs, 40w lamp wattage. Color temperature of 4000 Kelvin nominal, 70 CRI
Bracket	GFI-GN8TX to include duplex receptacle, 15 A, 120 volts, GFI type complete with weatherproof cover.
Color	Dark Forest Green Textured (GN8TX)

## **5.21 SIGNALS**

### **A. General**

Signalization will be required if warranted as determined by an existing study and/or transportation study performed by the Developer at the request of the City. The developer shall pay the entire cost of signalization if it is warranted, or wait until the City has procured sufficient monies to cause signalization improvements at the intersection(s). All components of the signal shall become the property of the City upon project acceptance.

## **5.22 ROADSIDE FEATURES**

### **A. General**

Miscellaneous features included herein shall be developed and constructed to encourage the uniform development and use of roadside features wherever possible.

### **B. Design Standards**

The design and placement of roadside features included herein shall adhere to the specific requirements as listed for each feature.

C. Survey Monuments

1. All existing (or new) survey control monuments and/or markers which are disturbed, lost, or destroyed during surveying or building shall be replaced with the proper monument as outlined below by a land surveyor currently registered (licensed) in the State of Washington at the expense of the responsible contractor, builder or developer.
2. A precast concrete monument with cast iron monument case and cover installed per City of Granite Falls Standards is required.

If the monument case and cover are placed in cement concrete pavement, the precast base will not be necessary.

3. Monument Locations

Appropriate monuments shall be placed:

- a. At all street intersections;
- b. At the PC and PTs of all horizontal curves;
- c. At PI of all horizontal curves of streets where the PI lies within the limits of the traveled roadway;
- d. At all corners, control points and angle points around the perimeter of subdivisions as determined by the City;
- e. At all section corners, quarter corners, and sixteenth corners that fall within the right-of-way.

D. Mailboxes

1. During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the local U.S. Postal Service. The mailboxes shall be reinstalled at the original location or to a new location as may be required by the local Postmaster, as further outlined below and approved by the U.S. Postal Service.

2. Location

- a. Bottom or base of box shall be 41" to 45" above the road surface.
- b. Front of mailbox 0 to 12 inches behind vertical curb face or outside edge of shoulder.
- c. New developments. Clustered mailboxes will, in all likelihood, be required. Contact the U.S. Postal Service for details. Sidewalks shall be constructed to facilitate same.
- d. Buck-outs in sidewalks and sidewalk realignment may be required to maintain minimum sidewalk width behind the mailbox.

3. Mailboxes shall be set on posts strong enough to give firm support but not to exceed 4-inch x 4-inch wood or one 1-1/2-inch-diameter pipe, or material and design with comparable breakaway characteristics. Deviations may be allowed only with the written approval of the City.

E. Guardrails

For purposes of design and location, all guardrails along roadways shall conform to the criteria of the "Washington State Department of Transportation Design Manual" as may be amended or revised.

F. Rock Walls

1. Rock walls may be used for erosion protection of cut embankments up to a maximum height of 3 feet in stable soil conditions, which will result in no significant foundation settlement or outward thrust upon the walls. For heights over 3 feet or when soil is unstable, a structural wall of an acceptable design, stamped by a structural engineer currently licensed in the State of Washington, shall be used and the design shall be approved by the City. Design and construction shall be per the Association of Rockery Contractors (ARC) Specifications and/or applicable geotechnical recommendations. Rock walls over 3-feet high shall be subject to inspection by a geotechnical engineer as outlined in the following paragraph.
2. Any rock wall with an exposed surface over 3-inches high in a fill section shall require an engineered design by a geotechnical

engineer. The geotechnical engineer shall inspect the installation of the wall as it progresses and shall submit inspection reports, including compaction test results and photographs taken during the construction, documenting the techniques used and the degree of conformance to the geotechnical engineer's design.

3. The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The rock material shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. The rock density shall be a minimum of 160 pounds per cubic foot.
4. The rock wall shall be started by excavating a trench having a depth below subgrade of one half the base course or 1 foot (whichever is greater).
5. Rock selection and placement shall be such that there will be minimum voids and, in the exposed face, no open voids over 6 inches across in any direction. The final course shall have a continuous appearance and shall be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the rockery so that the wall will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the rockery face. The rocks shall have all inclining faces sloping to the back of the rockery. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. After setting each course of rock, all voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a 2-inch square probe.
6. The rock wall backfill shall consist of quarry spalls with a maximum size of 6 inches and a minimum size of 4 inches or as specified by a licensed engineer. This material shall be placed to a 12-inch minimum thickness between the entire wall and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately 6 inches below the top of each course of rocks as they are placed, until the uppermost course is placed. Any backfill material on the bearing surface of one rock course shall be removed before setting the next course.
7. Perforated drainage pipe and filter fabric shall be installed as required by the City.

G. Street Trees and Landscaping Items

Preservation of natural vegetation and healthy, existing mature trees, (particularly conifers) is preferred if available on the site. Otherwise, street trees and/or landscaping items (including irrigation if appropriate) shall be furnished and installed as may be specifically required by the City. If such is required, landscaping shall be of one of the referenced types as specified herein or in the Snohomish PUD “Tree Book” (available at: <https://www.snopud.com/?p=1219>) and/or as otherwise may be approved by the City. These landscaping items, including trees and irrigation, shall be furnished and installed at the City’s sole discretion, direction, and approval. Exact size, spacing, type, location, and quantity to be as specified by the City.

Hedges are not allowed on planter strips. Trees or low shrubs (<2.5 feet) are acceptable. Trees must be planted to the following standards:

- 3 feet back from the face of curb.
- 5 feet from underground utility lines.
- 10 feet from power poles (15 feet recommended).
- 7-1/2 feet from driveways (10 feet recommended).
- 20 feet from street lights or existing trees.

The following trees are prohibited from the Right-of-Way:

- Acer Macrophyllum (Big Leaf Maple, Oregon Maple).
- Populus Trichocarpa, P. deltoides (Cottonwoods)
- Populus Nigra (Lombardy Poplar)

These species have aggressive roots. The wood of some species is brittle and can break in the wind. Trees planted next to low impact development facilities such as porous pavements should have minimal tree litter. Recommended trees for bioretention areas are referenced in Appendix 1 of the Low Impact Development Technical Guidance Manual for Puget Sound. Trees to be planted in City right-of-way, or right-of-way to be dedicated to the City, shall be approved by the City prior to planting. The City reserves the right to remove any tree not so approved.

The following is a list of trees acceptable for planter strips. Other tree species may be allowed at the City's discretion:

### Acceptable Tree Planting

<i>Botanical Name</i> Common Name	Height in Feet	Spread in Feet	Flowers	Fall Color	Comments/Notes
<i>Acer campestre</i> Hedge Maple	20	20		Yellow	Prefers Moist Soil
<i>Acer ginnala</i> 'Evelyn' Queen Elizabeth Maple	35	30		Yellow	Tolerates heat, cold, and drought
<i>Acer palmatum</i> Japanese Maple	25	25		Orange/Red	Filtered Shade
<i>Amelanchier X</i> Juneberry	20	15	White	Orange/Red	Bright Fall Colors
<i>Cornus kousa</i> Japanese Dogwood	30	25	White	Raspberry like Fruit	Dense Foliage
<i>Crataegus crus-galli</i> 'Inermis' Thornless Cockspur Hawthorn	25	30	Small White	Orange to Scarlet	Red persistent fruit
<i>Crataegus X lavalii</i> Lavalle Hawthorn	25	20	Small White	Bronze	Thorns on younger trees
<i>Crataegus phaenopyrum</i> Washington Hawthorn	25	20	Small White	Scarlet	Thorny
<i>Cornus mas</i> Cornelian Cherry Dogwood	25	20	Yellow	Red/Yellow	Cherry like Fruit
<i>Magnolia grandiflora</i> 'Victoria'	25	20	White	Evergreen	
<i>Malus</i> 'Tschonoskii'	28	14	White	Scarlet	Sparse green fruit, pyramidal

<i>Botanical Name</i>	<b>Height in Feet</b>	<b>Spread in Feet</b>	<b>Flowers</b>	<b>Fall Color</b>	<b>Comments/Notes</b>
<i>Prunus x hillieri</i> ‘Spire’	30	10	Pink	Orange Red	
<i>Pyrus calleryana</i> ‘Capital’ Pear	35	12	White	Reddish Purple	Smaller than ‘Aristocrat’, may break up in snow
<i>Pyrus calleryana</i> ‘Aristocrat’ Pear	40	45	White	Red	
<i>Pyrus calleryana</i> ‘Redspire’ Pear	35	25	White	Yellow to Red	Pyramidal
<i>Pyrus calleryana</i> ‘Autumn Blaze’ Pear	30	25	White	Scarlet	Vigorous
<i>Sorbus Tianshanica</i> Red Cascade Mt. Ash	16	8	White	Yellow/ Orange	Orange Red Fruit
<i>Sorbus x hybridia</i> Oakleaf Royal Mt. Ash	30	20	White	Rust	
<i>Styras japonica</i> Japanese Snowbell	25	25	White	Yellow	Plentiful, green 1/2” seeds.
<i>Tilia cordata</i> ‘De Groot’ Linden	30	20		Yellow	Compacts, suckers less than other Lindens.

## 5.23 PARKING LOTS

Plans shall be submitted for review and approval by the City prior to the work being completed. The Plans and any other submittals shall address storm drainage discharge and onsite retention or detention, connection to street and/or sidewalk, access locations, and parking layout. The City shall also check for future street improvement conformity and City zoning regulations.

Where possible, parking areas should be placed near the entrance to the site to reduce long driveways and impervious areas

Parking lot surfacing materials shall satisfy the requirement for a permanent all-weather surface. Asphalt concrete pavement and cement concrete pavement satisfy this requirement and are approved materials. Gravel surfaces are not acceptable or approved surface material types.

Internal driving lanes within parking lots shall be a minimum of 24-feet wide if parking spaces are oriented between 90 degrees and 45 degrees from the driving lane. The minimum width for the driving lane shall be 20 feet if angle parking is oriented at less than 45 degrees from the driving lane.

## **5.24 UTILITIES**

Utilities shall be furnished and installed within the right-of-way beneath new roads, or in existing roadways and rights-of-way so as to provide minimal interference with existing utilities and shall be located as generally shown in Standard Details listed herein. Where existing utilities are in place, new utilities shall conform to these Standards as nearly as practical and yet be compatible with the existing installations. Exceptions may be approved by the City when necessary to meet special or localized requirements. Utilities shall be sized and designed to serve adjacent and tributary areas. Typically, utilities shall be required to be extended to “far” property lines. Easements shall be procured and provided by the developer to facilitate same. Utilities shall not be “land locked.”

### **A. Sanitary Sewers**

See Chapter 8.

### **B. Waterlines**

See Chapter 7.

### **C. Other Utilities**

Other utilities (gas, power, telephone, and cable TV) shall be located as follows: underground, either side of road, at plan location and depth compatible with other utilities and storm drains.

If site topography or other site conditions prevent reasonable underground installation utilities shall be on poles (as applicable) set back of ditchline, sidewalk or curb, at locations compatible with driveways, intersections, and other essential road features. To extent practical, utilities should share facilities so that a minimum of poles are needed, and preferably on only one side of road.

Notwithstanding other provisions, underground systems shall be located at least 5 feet away from road centerline and where they will not otherwise disturb existing survey monumentation.

D. Utility Crossings in Existing Streets

Utility crossings shall be made without surface cut of the traveled portion where the street surface is newer than 5 years old. The crossing shall be made by pushing or boring a pipe under the road. Where rock is known or expected in the area of the crossing, the attempt need not be first, open cutting will be permitted, but prior approval of the City is required.

**5.25 ASPHALT CONCRETE PEDESTRIAN PATHS AND/OR BIKEWAYS**

- A. Minimum Easement or Right-of-Way Width: Fifteen feet minimum. Unless otherwise approved by City Engineer.
- B. Constructed Width: Five feet minimum. Greater widths may be required by the City up to 12 feet maximum.
- C. Subgrade: Prepared per Section 2.06 of the Standard Specifications.
- D. Gravel backfill for foundations (Class A) shall be used as required.
- E. Crushed rock base course shall conform to Section 9-03.9(3) of the Standard Specifications at a depth of one and one-half inch minimum. Greater depths may be required by the City Engineer based on use and local ground conditions.
- F. Crushed rock top course shall conform to Section 9-03.9(3) of the Standard Specifications at a minimum depth of 1-1/2 inch. Greater depths may be required by the City Engineer based on use and local ground conditions.
- G. Paving course shall be 2-inches hot mix asphalt concrete. Greater depths may be required by the City Engineer based on use and local ground conditions.