

CHAPTER 5. ROADSIDE FEATURES

5.1 Rock Facings

A. Rock facings may be used for the erosion protection of cut or fill embankments up to a maximum height of 8 feet above the keyway in stable soil conditions, which will result in no significant foundation settlement or outward thrust upon the walls. See figures 5-003 through 5-006. A structural wall of acceptable design, stamped by a licensed structural engineer, is required for rock facings heights greater than 4 feet above the keyway or when the wall is surcharged or the soil is unstable. Terracing of rock facings is subject to approval by the Director or designee. Terracing shall not surcharge lower rock facings.

B. Materials

1. Size categories shall include:

Two-person rock	200 to 700 lb.	18 to 28in.
Three-person rock	701 to 2,000 lb.	28 to 36 in.
Four-person rock	2,001 to 4,000 lb.	36 to 48 in.

Four-person rocks shall be used for bottom course rock in all rock facings over 6 feet in height.

2. The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The quarried trap rock shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. Rock quality shall meet all the test requirements of Section 9- 13, "Riprap, Quarry Spalls, and Slope Protection" of the current Washington State Department of Transportation (WSDOT) Standard Specifications."

C. Keyway

A keyway consisting of a shallow trench of minimum 12-inch depth shall be constructed the full rockery length, and slightly inclined towards the face being protected. It shall be excavated the full rockery width including the rock filter layer. The keyway subgrade shall be firm and acceptable to the Director or designee. See figures 5-003 through 5-006.

D. Underdrains

1. A minimum 6 inch diameter perforated or slotted drainpipe shall be placed in a shallow excavated trench located along the inside edge of the keyway. The pipe shall be bedded on "Gravel Backfill for Drains" (WSDOT/APWA 9-03.12(4)). The pipe shall be completely surrounded and covered with the gravel backfill to a minimum height of 18 inches from the bottom of the trench. Non-woven geotextile for underground drainage shall surround the gravel backfill and shall have a minimum one-foot overlap along the top surface of the gravel. This requirement for geotextile may be waived by the

Director or designee, if shown that soils and water conditions make it unnecessary. See figures 5-003 through 5-006.

2. The perforated pipe shall be connected to the storm drain system or to an acceptable outfall. Cleanouts must be provided at main angle points.

E. Rock Selection and Placement:

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 be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the facing so that it 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 to the face. The rocks shall have all inclined faces sloping to the back of the facing. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. The rocks shall be placed so that there are no continuous joint planes either horizontally or vertically. 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. See figures 5-003 through 5-006.

F. Rock Filter Layers:

The rock filter layer shall consist of quarry spalls with a maximum size of 4 inches and a minimum size of 2 inches. This material shall be placed to a 12 inch minimum thickness between the entire facing 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.

G. Geosynthetic Treatment:

Embankment behind rock facings exceeding 4 feet in height above the keyway shall be reinforced with a geosynthetic fabric or geogrid specifically manufactured for soil reinforcement, designed on a project-specific basis by a professional engineer. See figures 5-004 and 5-006.

H. Sidewalks Above Rockery Facings:

When a sidewalk is to be built over a rock facing, the top of the facing shall be sealed and leveled with a cap constructed of cement concrete Class 4000 in accordance with the applicable provisions of Section 6-02 of the WSDOT/APWA Standard Specifications, but with reduced water content resulting in slump of not over 2 inches. See figure 5-005.

I. Fences and Handrails:

A vinyl coated chain link fence shall be installed when rockery is 18 inches or greater in height or as required by the Director or designee. See figures 5-003 through 5-005, 5-007 and 5-008.

5.2 Side Slopes

- A. Side slopes shall generally be constructed no steeper than 2:1 on both fill slopes

and cut slopes. Steeper slopes may be approved by the Director or designee upon showing that the steeper slopes, based on soil analyses, will be stable. Side slopes on projects funded by federal grants shall be constructed in conformance with WSDOT Local Agency Guidelines.

- B. Side slopes shall be stabilized by grass sod or seeding or by other planting or surfacing materials acceptable to the Director or designee.

5.3 Street Trees and Landscaping

- A. Street trees and landscaping should be incorporated into the design of road improvements for all classifications of roads. Such landscaping in the right-of-way, by applicants/developers, shall be coordinated with off-street landscaping required on applicant's property under the provisions of SeaTac Municipal Code Section 15.445.
- B. The preservation of existing trees and vegetation is required, where feasible. Placement of new trees and landscaping shall be compatible with road features and natural elements of the environment. In particular, mature tree heights and spacing shall not conflict with overhead utilities or impact line of sight. Natural root growth shall not impact sidewalks, curbs and underground utilities. Street tree planting shall conform to the standards in the drawings contained herein.
- C. The preference in approving the planting of trees within the public right-of-way shall be for planting between the curb and sidewalk. Planting strips shall be approved by the Director or designee only as part of a landscape plan in which the standards have been considered, including but not limited to compatibility with above and below ground utilities, size and growth habit, traffic safety, and a lifetime maintenance commitment for the caring of the planting strip and the repairing of any associated damages to sidewalks, curbs & gutters, drainage, and other structures.
- D. When planting strips are located adjacent to the curb they shall meet the following requirements:
 - 1. The minimum width from back of curb to sidewalk shall be 5 feet, trees shall be planted in the center of the planter strip.
 - 2. Minimum distance from the center of any tree to the face of curb shall be 3 feet.
 - 3. Only deciduous trees and shrubs that mature less than 24 inches in height, such as ground covers or grasses shall be planted in the planting strips.
 - 4. All trees shall be staked so as to be parallel to the walk and curbs. All tree planting shall include the installation of an approved root barrier adjacent to walks and curbs for each tree, unless otherwise approved by the Director or designee.
 - 5. Location of trees shall take into consideration fixed objects so as not to

- obstruct sight distance, bus shelters, street signs, luminaries, mailboxes, utility boxes and other fixtures.
6. The top 12 inches of soil within the entire planting strip shall be removed prior to planting and replaced with amended soil as specified by the City of SeaTac Addendum to the King County Surface Water Design Manual (Appendix B). Provision for drainage and watering shall be considered required relative to the plant species approved. Permanent irrigation systems are not allowed in the right-of-way. The applicant/developer shall ensure that temporary irrigation systems are either removed or properly disconnected to prevent water leakage prior to final roadway acceptance by the City.
 7. The Director or designee may restrict the use of plant materials in the right-of-way where sight distance, traffic safety, pedestrian conflicts and maintenance issues are of concern.
- E. Minimum setback of trees in right-of way from fixed objects shall meet the following criteria, as shown in figure 5-009:
1. 50 feet from intersection vertical curb line
 2. 20 feet from luminaries and utility poles
 3. 20 feet from signs
 4. 15 feet from bus shelters,
 5. 10 feet from driveways
 6. 10 feet from utility vaults/boxes
 7. 10 feet back of sidewalk for all evergreen trees
 8. 5 feet from hydrants
 9. 2 feet from back of sidewalk for all deciduous trees
 10. Outside identified sight distance restricted areas
- F. All trees adjacent to walkways shall have a 7-foot minimum branching height at time of planting. This may be reduced if trees are more than 5 feet back of sidewalk. Minimum height clearance of existing trees adjacent to new road shall be 15 feet above the finished roadway grade.
- G. Commercial root barriers shall be required for all trees planted back of sidewalks and curbs. See figure 5-011.
- H. The use of tree blockouts, figure 5-010, shall meet ADA standards for minimum sidewalk clear width of 48 inches. Tree grates that meet ADA standards may be considered for meeting the minimum sidewalk width.
- I. Trees planted within the clear zone shall have a breakaway mature trunk diameter of four inches or less. Trees with mature trunk diameters of greater than 4 inches shall be located outside the clear zone. Clear zone setbacks for larger diameter trees shall meet the requirements of Section 5.10. See figure 5-010.
- J. Traffic islands may be paved or planted. Traffic circles shall be planted.

Plantings shall be low shrubs (24" mature height or less) and ground covers, if long-term maintenance is provided by the applicant and they have no traffic or pedestrian safety issues. These planter islands shall be at least 9 feet wide from curb face to face. The first 20 feet of these islands may be planted with low shrubs and ground covers. Deciduous trees may be used if set back a minimum of 20 feet from the front of the island and evergreens at a minimum of 30 feet, provided they meet the requirements of 5.03(I).

- K. When rock facings or retaining walls are proposed adjacent to sidewalks, they shall generally be placed as close to the right-of-way line as practicable and a minimum of 10 feet from the edge of the traveled way or edge line and in accordance with figure 5-001.
- L. Planting of street trees within the right-of-way shall be in accordance with the list herein. Alternative tree plantings, not on this list, may be used subject to review and approval by the Director or designee.
- M. Deciduous trees identified as not acceptable in planting strips less than fifteen feet wide include, but are not limited to; london plane, sycamore, sweetgum, soft or sugar maple, alder, boxelder, black locust willow species, oak, elm, mountain ash, cherry, cottonwood, lombardy poplar, yellow or tulip poplar, walnut, catalpa, paulownia, honeylocust, hawthorne, big leaf maple, bamboo, larch and evergreen trees including but not limited to cedar, fir, spruce, pine, monkey puzzle, cypress evergreen, redwood, holly, juniper, madrone, or any other tree the department determines has potential to disrupt utilities or impact roadway improvements. Evergreen trees shall not be allowed in planting strips between walk and curb, due to their size and the potential to impact visibility. Evergreen trees may be proposed for planting at back of walk where they meet the requirements as detailed in Figure 5-009 and are planted outside the established "clear zone" for that roadway.
- N. The tree list is a guide for selecting street trees for planting within the right-of-way and no preference is given by their order of listing. There may be other tree species and varieties not on this list that may be acceptable to the Director or designee. Unless otherwise approved, no trees that: bear fruit, have poisonous features or thorns, host disease, require special maintenance, cause damage to infrastructure or pose any health or safety risk to the general public will be approved for use as street trees. Native trees are generally not acceptable for planting in strips between walk and curb, as they become too large and are not typically "nursery grown" (shaped/pruned) as street trees.

See Figure 5-1 for the list of approved street trees

- O. All street tree plans shall consider the natural form, size, habits, (including trunk diameter growth), impact on current and future sight distance, disease resistance, hardiness, level of maintenance, etc. in selecting the appropriate tree(s).
- P. The preparation and planting of street trees is required to follow the general

details, specifications and corresponding text contained within the adopted Standards. Alternative planting practices and emerging technologies that achieve the same intent of these requirements will be considered and may be approved during the review process.

5.4 Mail Boxes

A. The responsibilities for location support structures, and installation of mailboxes in connection with the construction or reconstruction of City roads are as follows:

1. The Director or designee will:
 - a. Require road improvement plans, whether for construction by the City or by a private builder, to show clearly the designated location or relocation of mailboxes, whether single or in clusters.
 - b. Require with this information any necessary widening or reconfiguration of sidewalks with suitable knockouts or open strips for mailbox posts or pedestal.
 - c. Require these plans to include a statement on the first sheet that mailbox locations as shown on these plans have been coordinated with the serving post office in SeaTac, Washington. This will be a prerequisite to plan approval.
 - d. Require construction of mailbox locations in accordance with these plans, through usual inspection and enforcement procedures.
2. The Postmaster or designated serving post office will:
 - a. Designate location and manner of grouping of mailboxes when so requested by the design agency. Note on the plans the type of mailbox delivery: NDCBU (Neighborhood Delivery and Collection Box Unit), or Rural type box. Authenticate by stamp or signature when these data have been correctly incorporated into the plans.
3. Owners or residents served by mailboxes, at time of original installation, will:
 - a. If using individual mailboxes, clustered or separate, install and thereafter maintain their own mailboxes as instructed by the post office.
 - b. If NDCBU delivery, rely on Post Office to provide and maintain NDCBUs.
4. Applicants or their contractors shall:
 - a. Where there are existing mailboxes and no plans to replace them with NDCBUs:

When it becomes necessary to remove or otherwise disturb existing mailboxes within the limits of any project, install the boxes temporarily in such a position that their function will not be impaired. After construction work has been completed, reinstall boxes at original locations or at new approved locations as indicated on the plans or as directed by the Director or designee. Use only existing posts or materials

except that any damage caused by the builder or his/her contractor is to be repaired at the expense of the applicant.

- b. Where there are existing NDCBUs or plans to install NDCBUs:

Call on the Postmaster or designated serving post office to locate or relocate NDCBUs and make the necessary installation.

B. Installation methods are as follows:

1. Mailboxes, in the general case, shall be set in accordance with figures 5-014, 5-015, 5-016, or 5-017. Boxes shall be clustered together when practical and when reasonably convenient to the houses served.
2. NDCBUs will be installed by the Postal Service generally in accordance with figure 5-017.
3. Non-yielding and non-breakaway mailbox structures will not be allowed within the clear zone. See Section 5.10 of these Standards.

5.5 Street Illumination

Street illumination shall be provided on all arterial roadways where there are three or more lanes of travel. Illumination will also be required as identifiers when a local road intersects an arterial. Illumination of roadways with turn channelization will include all lane tapers.

All new street lights shall be Light Emitting Diode (LED) type. Contact the City Engineer for the most current acceptable make, model and manufacturers of LED light fixtures.

Where existing illumination systems are modified, all fixtures within the project limits and turn channelization being extended shall be LED-type, unless otherwise approved. The calculation area will include only the driving lanes, no shoulder areas.

The illumination systems shall be designed to provide a minimum of 1.2 foot-candles with an average-to-minimum uniformity ration of 3:1, except at intersections where the system shall be designed to provide a minimum of 1.5 foot-candles with an average-to-minimum uniformity ratio of 3:1.

When illumination is required for sag vertical curves the system shall be designed to provide a minimum of 0.4 foot-candles within the limits of the sag curve with a maximum average foot-candle value of 1.0. The intersection is the area bounded by the stop bars and/or the radius tangent points, whichever is closer to the center of the intersection. The road approach calculation area will include the turn lanes and tapers.

When illumination is required to satisfy a variance for a sag vertical curve the system shall be designed to provide a minimum of 0.4 foot candles within the limits of the sag curve with a maximum average foot-candle value of 1.0. If an intersection is adjacent to the sag vertical curve, the illumination must include the intersection. If the adjacent intersection is an arterial, the design criteria (foot candle and uniformity values) above will apply. If the adjacent intersection does not have an arterial

classification, then the 0.4 minimum foot candle value shall be met throughout the intersection as well as the sag curve area.

Steel poles shall be used for the street illumination system unless otherwise approved. See Section 5.10, Roadside Obstacles for direction regarding placement of poles. Where poles are installed along roadways with posted speed limits of 40 mph or more, slip bases will be required, regardless of the presence of curb. Fixed based poles are permitted on roadways with posted speeds of less than 40 MPH as long as they are placed such that the face of pole is at least 10-feet from the edge of traveled way on shoulder-type roadways or behind sidewalk meeting the width requirements of Section 5.10.

Where street illumination is required by the City, the applicant shall bear all costs associated with installation. Photometric lighting plans, prepared and stamped by a professional engineer are required and must be reviewed and approved by the City prior to beginning construction. Where the street illumination serves the arterial roadway system, the City will pay for maintenance and energy usage of the system upon acceptance by the City. Where the street illumination serves non-arterial roadways, the applicant shall bear all costs associated with maintenance and energy usage, or assign such costs to homeowners and/or homeowners associations.

Decorative poles and fixtures shall not be installed within City rights-of-way without approval. All maintenance and energy usage associated with decorative poles and fixtures shall be the responsibility of the party seeking approval and will not be assumed by the City, unless authorized in writing.

All equipment shall meet current illumination design standards. Design standards and current electronic drawing files for equipment will be provided upon request.

5.6 Survey Monuments

A. Monuments that conform with Figure 5-019 shall be placed at all street intersections, boundary angle points, points of curves in streets and at such

intermediate points as may be required by the Director or designee.

- B. All existing monuments, which are disturbed, lost, or destroyed during construction or surveying, shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible applicant, contractor, builder, developer, or utility per RCW 58.09.130 and 58.04.015.
- C. Plat monumentation shall comply with these standards and in conformance with figure 5-019 and 5-020 on developments such as subdivisions, residential, commercial, binding site plans, or any other construction that establish new roadways or reconstruct existing roadways. Monuments shall be set along the center of the right of way at the PC's and PT'S of curves. When the PI of the curve falls within the paved area of the road, a PI monument may be set in lieu of setting monuments at the PC and PT.
- D. All lot and block corners shall be set with an iron pipe or steel reinforcing bar at least 24 inches in length within 90 days after recording of the plat. All lot corners shall be identified with the land surveyor's registration number.
- E. The monument case will be installed after the final course of surfacing has been placed on the road.

5.7 Roadway Barricades

Temporary and permanent barricades shall conform to the standards described in Section 6C-8 of the Manual on Uniform Traffic Control Devices (MUTCD) and figure 5-002.

- A. Type I or Type II barricades may be used when traffic is maintained through the area being constructed/reconstructed.
- B. Type III barricades shall be used when roadways and/or proposed future roadways are closed to traffic. Type III barricades shall extend completely across a roadway (as a fence) or from curb to curb. Where provision must be made for access of equipment and authorized vehicles, the Type III barricades may be provided with movable sections that can be closed when work is not in progress, or with indirect openings that will discourage public entry. Where job site access is provided through the Type III barricades, the applicant/contractor shall assure proper closure at the end of each working day.
- C. Unless otherwise approved, Type III permanent barricades shall be installed to close arterials or other through streets hazardous to traffic. They shall also be used to close off lanes where tapers are not sufficiently delineated.
- D. Type III barricades shall be used at the end of a local access street terminating abruptly without a cul-de-sac bulb or on temporarily stubbed off streets. Each such barricade shall be used together with an end-of-road marker.
- E. Barricades placed across shoulders shall meet the clear zone requirements outlined in Section 5.10.

5.8 Bollards

When necessary to deny motor vehicle access to an easement, tract, or trail, except for maintenance or emergency vehicles, the point of access shall be closed by a line of bollards. These shall include one or more fixed bollards on each side of the traveled way and removable, locking bollards across the traveled way. Spacing shall provide one bollard on centerline of trail and other bollards spaced at a minimum of 50 inches on center on trails 10 feet wide or less. Spacing shall be 60 inches on center on trails wider than 10 feet. Bollard design shall be in accordance with figure 5-018 or other design acceptable to the Director or designee. No fire apparatus access roads shall be blocked in this manner without the concurrence of the Fire Marshal. Bollards shall be located outside the designated clear zone.

5.9 Guardrail/Embankment Heights

New roadways shall be designed with due regard to safety for the traveling public. To ensure a safe roadway configuration, the following features shall be included in the roadway design in order of preference:

1. Provide 4:1 or flatter fill slopes adjacent to the roadway where vertical drops will be greater than 6'.
2. Provide 3:1 or flatter fill slopes where 4:1 slopes cannot be provided and vertical drops will exceed 6'.
3. Design location of storm water runoff ponds where they are not accessible from errant vehicles.
4. Evaluate need for barrier systems and provide design in conformance with WSDOT/APWA Standard Plans, Standard Specifications, and the WSDOT Design Manual

5.10 Roadside Obstacles

Non-yielding or non-breakaway structures exceeding 6 inches in height, including rock facings, retaining walls and any other objects, which may be potential hazards to the traveling public shall be placed with due regard to safety. On shoulder or mountable curb roads, such as rolled curb, extruded curb, or thickened edge, hazardous objects that are essential to the roadway network shall be placed as close to the right-of-way line as practicable and a minimum distance of 10 feet measured from the edge of the traveled way or edge line and in accordance with figure 5-001.

Non-essential items, (e.g., decorative items) shall not be placed within the right-of-way unless otherwise approved by the Director or designee through the road variance process. Additionally, no open water facilities, with the exception of ditches and bio-swales shall be located within the road right-of-way, unless the Director or designee grants an engineering variance. Landscaping placed within the right-of-way shall meet the minimum requirements specified in Section 5.03 of these Standards.

On urban vertical curb roadways with speed limits less than 40 miles per hour,

hazardous objects shall be placed as far from the edge of the traveled way or edge line as practical. Such an object shall not be placed in a sidewalk or with the object edge nearest the roadway less than 8.5-feet from the face of curb in commercial/business areas and 5.5-feet from face of curb in residential areas. On urban roads with speed limits of 40 miles per hour or greater, hazardous objects shall be placed as close to the right-of-way line as practicable and a minimum distance of 10 feet from the edge of the traveled way or edge line and in accordance with figure 5-001. When sidewalks are constructed or will be constructed in the future, structures shall be placed a minimum distance of two (2) feet behind the sidewalk.

The Director or designee must approve the placement of roadside obstacles within a planter strip, provided the minimum roadside obstacle requirements are met. Placement of utility structures shall be in accordance with requirements of Chapter 8 and figure 5-001 to include constraints on placement of poles on the outside of curves. The applicant or his engineer may apply for the setback variance for the obstacle or utility structure when justified by a traffic safety evaluation. The applicable utility company shall be contacted for the opportunity to submit a written recommendation.

Figure 5-1

SMALL / MEDIUM TREES:

Small/medium trees are acceptable for use in planting strips 4 feet or wider. Use of a root barrier required. (Maintenance of some species listed is required to maintain clearance under lower power lines).

Acer campestre ‘Evelyn’ / Queen Elizabeth Maple
Acer ginnala / Amur Maple
Acer glabrum / Rocky Mountain Maple
Amelanchier x grandiflora ‘Autumn Brilliance’ / Serviceberry
Cercis canadensis / Eastern Redbud
Cornus kousa / Chinese or Korean Dogwood
Cornus nuttallii / Pacific Dogwood
Fraxinus pennsylvanica ‘Johnson’ / Leprechaun Ash
Malus ‘Spring Snow’ / Flowering Crabapple (non-fruiting)
Malus tschonoskii / Flowering Crabapple (sparse to non-fruiting)
Pyrus calleryana ‘Autumn Blaze’ / Flowering Pear
Pyrus calleryana ‘Capital’ / Capital Flowering Pear
Pyrus calleryana ‘Chanticleer’/Flowering Pear
Pyrus calleryana ‘Cleveland Select’/ Cleveland Flowering Pear
Stewartia koreana / Korean Stewartia
Stewartia mondelpha / Tall Stewartia

MEDIUM / LARGE TREES:

Acceptable for use in planting strips 6 feet or wider. Use of a root barrier required. (Not for use under power line locations).

Acer rubrum ‘Armstrong’ / Armstrong Maple
Acer rubrum ‘Bowhall’ / Bowhall Maple
Acer rubrum ‘Scarsen’ / Scarlet Maple
Carpinus betulus ‘Fastigiata’ / European Hornbeam
Fraxinus pennsylvanica ‘Patmore’ / Patmore Ash
Fraxinus pennsylvanica ‘Summit’ / Summit Ash
Fraxinus pennsylvanica ‘Urbanite’ / Urbanite Ash
Ginkgo biloba ‘Princeton Sentry’ / Princeton Sentry Ginkgo (males only)
Tilia cordata ‘Greenspire’ / Greenspire Linden
Zelkova serrata ‘Village Green’ / Village Green Zelkova

LARGER TREES:

Acceptable for use in planting strips that are 15 feet minimum, or when planted 10 feet back of sidewalk. Use of a root barrier is required unless waived by Director or designee. (Not for use under power line locations).

Acer saccharum ‘Bonfire’ / Bonfire Maple
Acer saccharum ‘Green Mountain’ / Green Mountain Maple
Acer saccharum ‘Commemoration’ / Commemoration Maple

Cercidiphyllum japonicum / Katsura
Fagus sylvatica 'Fastigiata' / Columnar Beech
Prunus serrulata 'Kwanzan' / Kwanzan Cherry
Quercus robur 'Fastigiata' / Skyrocket Oak
Quercus robur 'Pyramied' / Skymaster Oak