

CHAPTER 5. ROADSIDE FEATURES

5.01 Rock Facings

- A. Rock facings may be used for the protection of cut or **fill** embankments up to a maximum height of eight feet above the keyway in stable soil conditions which will result in no significant foundation settlement or outward thrust upon the walls. See Drawing Nos. 5-004 through 5-006. For heights over eight feet above the keyway or when soil is unstable, a structural wall of acceptable design shall be used. As an exception, rock facing heights may exceed eight feet to a limited extent based on favorable soils analyses and a design by a geotechnical engineer or other professional engineer qualified in rock wall design, subject to approval by the Engineer. Terracing of rockeries subject to approval by the Engineer.
- B. Materials
1. Size categories shall include:
 - Two-man rocks (200 to 700 pounds), 18"-28" in average dimension;
 - Three-man rocks (701 to 2000 pounds), 28-36" in average dimension; and
 - Four-man rocks (2001 to 4000 pounds), 36-48" in average dimension.

Four-man rocks shall be used for bottom course rock in all rock facings over six 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. The rock density shall be a minimum of 160 pounds per cubic foot, measured according to WSDOT Test Method 107 (Bulk Specific Gravity - S.S.D. basis). Additionally, rock subjected to the U.S. Army Corps of Engineers Test Method **CRD-C-148** ("Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol") must have less than 15 percent breakdown.
- 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 engineer. See Drawing No. 5-004.
- D. Underdrains
1. A minimum six-inch diameter perforated or slotted drain pipe shall be placed in a shallow excavated trench located along the inside edge of the keyway. The pipe shall be bedded on and surrounded by "Gravel Backfill for Drains" (**WSDOT/APWA 9-03.12(4)**) to a minimum height of 18

inches above bottom of pipe. A filter fabric shall surround the gravel backfill and shall have a minimum one-foot overlap along the top surface of the gravel. This requirement for fabric may be waived by the Engineer if shown that soils and water conditions make it unnecessary. See Drawing Nos. 5-004 through 5-006.

2. The perforated pipe shall be connected to the storm drain system or to an acceptable **outfall**.

- 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 six 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 two-inch square probe. See Drawing Nos. 5-004 through 5-006.
- F. **Rock Filter Layers:** The rock filter layer shall consist of quarry spalls with a maximum size of four inches and a minimum size of two 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 six 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. **Fill Rockery Facing Supporting Roadway Embankment:** Embankment behind rockeries exceeding four 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 **qualified** engineer. See Drawing No. 5-007.
- 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 3000 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 two inches. See Drawing No. 5-006.
- I. **Fences and Handrails**

A chain link fence or metal handrail shall be installed when rockery is three feet or greater in height. (See Drawing Nos. 5-004 through 5-006 and 5-008)

5.02 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 Engineer upon showing that the steeper slopes, based on soils analyses, will be stable. Side slopes on projects funded by federal grants shall be constructed in conformance with Local Agency Guidelines.
- B. Side slopes shall be stabilized by grass sod or seeding or by other planting or surfacing materials acceptable to the Engineer.

5.03 Street Trees & 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 shall be coordinated with off-street landscaping required on developer's property under the provisions of King County Code Chapter 21.51.
- B. Planting strips are optional along all classifications of roads and may be considered as part of the landscape mitigation requirements established during the SEPA review process. The design of planting strips must be approved by the Engineer and must include a landscaping plan in which plant maintenance, utilities and traffic safety requirements are discussed.
- C. Existing trees and landscaping shall be preserved where desirable and placement of new trees shall be compatible with other features of the environment. In particular, maximum heights and spacing shall not conflict unduly with overhead utilities, or root development with underground utilities. If street trees are planted, they shall conform reasonably to standards in Drawing No. 5-009.
- D. New trees shall not include poplar, cottonwood, soft maples, gum, any fruit bearing trees or any other tree or shrub whose roots are likely to obstruct sanitary or storm sewers. See King County Code 13.04.230.
- E. Street tree plans on bus routes shall be reviewed by Metro Service Planning, phone 684-1622.

5.04 Mail Boxes

- A. The responsibilities for location and installation of mailboxes in connection with the construction or reconstruction of County roads are as follows:
 - 1. County Road Engineer or his representative will:
 - a. Require road improvement plans, whether for construction by the Department of Public Works 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 knock-outs or open strips for mailbox posts or pedestal.
 - c. Require these plans to bear a statement on the first sheet that mailbox locations as shown on these plans have been coordinated with the serving post office at (City/Community), 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. Seattle 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.
 - b. Do all necessary coordination with owners or residents involved to secure agreement as to mailbox location and to instruct them regarding mailbox installation. Actually install or relocate NDCBU's if these are the type of box to be used in the neighborhood.
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 NDCBU's.
4. Builders or their contractors shall:
- a. Where there are existing mailboxes and no plans to replace them with NDCBU's:

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 Engineer or Reviewing Agency. Use only existing posts or materials except that any damage caused by the builder or his contractor is to be repaired at the expense of the builder.
 - b. Where there are existing NDCBU's or plans to install NDCBU's:

Call on Seattle Postmaster or designated serving post office to locate or relocate NDCBU's and make the necessary **installation**.

B. Installation methods are as follows:

1. Mailboxes, in the general case,, shall be set in accordance with Drawing No. 5-010 or 5-011. Boxes shall be clustered together when practical and when reasonably convenient to the houses served.
2. NDCBU's will be installed by the Postal Service generally in accordance with Drawing No. 5-012.

5.05 Street Illumination

Continuous illumination will be required for channelization accommodating additional lanes including the tapers. Illumination will also be required as identifiers where roads intersect arterials or for frequently used pedestrian areas on arterials.

Widening of arterials with existing continuous illumination will require maintaining the continuous illumination. Widening to the ultimate roadway width will require illumination designed to current construction practices.

Illumination intensity and uniformity shall conform with current King County design practices. Luminaire fixtures shall be consistent with fixtures maintained by the local electrical utility.

5.06 Survey Monuments

- A. All existing survey monuments which are disturbed, lost, or destroyed during surveying or building shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible builder or developer.
- B. Survey monuments shall be placed or replaced in accordance with recognized good practice in land surveying, and in conformance with Drawings No. 5-014 and 5-015.

5.07 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 Drawing No. 5-003.

- A. Type I or Type II barricades may be used when traffic is maintained through the area being constructed/reconstructed.
- B. Type III barricades may be used when roadways and/or proposed future roadways are closed to traffic. Type III barricades may 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 **developer/contractor** shall assure proper closure at the end of each working day.

- C. In the general case, 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 cul-de-sac bulb or on temporarily stubbed off streets. Each such barricade shall be used together with an end-of-road **marker**.

5.08 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 minimum 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 Drawing No. 5-013 or other design acceptable to the Engineer or Reviewing Agency. No fire apparatus access roads shall be blocked in this manner without the concurrence of the Fire Marshal. Bollards shall be located at least 10 feet laterally from the paved edge of roadway.

5.09 Guardrail/Embankment Heights

Guardrail installations shall conform to **WSDOT/APWA Standard Plan C-1, Beam Guardrail Type 1 and C-2, Guardrail Placement**. End anchors shall conform to **WSDOT/APWA Standard Plan C-6, Beam Guardrail Anchor Type 1**.

Evaluation of embankments for guardrail installations shall be in accordance **with** Figure 710-6 of the **WSDOT Design Manual**.

5.10 Off-Street Parking Spaces

The number of off-street parking spaces required shall conform to King County Code Title 21.50. The specifications for off-street parking spaces shall be as provided in King County Code Title 16.74 and **implementing document** entitled "King County Specifications for Off-Street Parking, 1982," as updated.

5.11 Roadside Obstacles

Non-yielding or non-breakaway structures, including rockeries and retaining walls, which may be potential hazards to the traveling **public** shall be placed with due regard to safety. On roads with a shoulder or mountable curb, hazardous objects shall 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 auxiliary lane. On urban roads with a vertical

curb section, hazardous objects shall be placed as far from the edge of the traveled way or auxiliary lane as practical. Such an object shall not be placed in a sidewalk or with the object edge nearest the roadway less than eight and one-half feet from the face of the curb in business areas or five and one-half feet from face of curb in residential areas. Placement of any utility structures shall be in accordance with requirements of Chapter 8, to include constraints on placement of poles on the outside of curves.