



## **DESIGN STANDARDS FOR: RETAINING WALLS**

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1. In accordance the latest edition of the International Building Code, retaining walls supporting a surcharge load or retaining walls over 4 feet in height shall be carefully engineered and detailed to ensure that drainage, hardware, footing sizes, and other necessary components are adequate for the site specific conditions. Calculations, drawings, and geotechnical report shall be submitted the Park's Project Manager and the City of Bellingham Permit Center for review and approval. An approved Building Permit is required for all retaining walls over 4 feet in height or walls retaining a surcharge load as described in the International Building Code, latest edition.
2. Retaining wall materials must be appropriate for the site and must be preapproved by the Park's Project Manager. Design options for retaining walls along trails are as follows. Alternative designs must be preapproved by the Park's Project Manager.
  - a. MSE Wall (Keystone or similar) in sandstone color
  - b. Geocell wall (or equal) in dark green or black color
  - c. Concrete crib-lock wall (or equal) with plantings and suitable planting soil in each open cell
  - d. Rock wall built to meet requirements of WSDOT and City of Bellingham Standards, except as specified in Item 8 of this design standard.
3. Cast-in-Place Concrete may be used as appropriate and must be preapproved by the Park's Project Manager. This type of wall design shall include permanent graffiti coating. Finish texture, reveals, color, and stamped pattern must be preapproved by the Park's Project Manager.
4. All proprietary wall systems must be built by a qualified installer in accordance with the manufacturer's recommendations.
5. A pedestrian guardrail is required on top of retaining walls adjacent to the trail.
6. A 2 foot shoulder of WSDOT shoulder ballast rock is required between the edge of the trail surfacing and the inside face of the guardrail.
7. A 2 foot shoulder of WSDOT shoulder ballast rock is required between the edge of the trail surfacing and the face of the retaining wall on the uphill side of the trail.

8. Rock walls within active public park spaces where seating and enhanced aesthetic characteristics are desired, or as otherwise elected by the Park project manager, shall be constructed per the following. Amend WSDOT rock specification 9-13.7(1) and Public Works rock wall detail MS-1000 as follows:
  - a. Source and type of rock shall be pre-approved by the Park Project Manager.
  - b. Rocks must be individually picked from the quarry to meet these specifications.
  - c. Rock size shall be minimum 2-man rock. 1-man may be utilized, provided the minimum weight is approximately 150 pounds and minimum dimension is 18 inches.
  - d. Rocks that cannot be modified or incorporated into the project to meet the specifications herein shall be removed and replaced with a new rock at no additional cost to the project. Sorting, rejecting, and replacing unsuitable rock shall be considered incidental to the bid price. No additional compensation will be allowed. Payment will only be made for rock wall constructed and accepted by the Park Project Manager.
  - e. Rocks may be chiseled, diamond bladed or ground down to remove any sharp edges and to reshape the rock to meet these specifications.
  - f. The Park Project Manager shall be the sole judge as to the suitability of the rock for the rock wall.
  - g. All rock shall be individually placed in rock wall.
  - h. Rocks shall be stacked so that joints are staggered. No continuous vertical joints.
  - i. Larger rock shall be placed on the bottom progressing to smaller rocks on top.
  - j. Voids between adjoining rocks shall be no more than 4 inches average dimension in any direction. Void space is defined as the area where two or more adjoining rocks are not in continuous contact.
  - k. Void spaces shall be filled with "chinking" rock so that the chink rock is wedged and supported by larger rock. Chinking rock that is loose and can be removed by hand shall be deemed as unsecure and shall be reinstalled so that the rock cannot be removed by hand.
  - l. Rocks shall be stable and supported on all sides so that there is no movement or pivoting of the rock. Mortar shall be placed as directed by the Park project manager.
  - m. Top face of an individual rock on the top row (cap stone) shall be flat, no sharp edges. In order to be determined "flat," the variation along the top face of an individual rock in the top row shall be no more than 2 inches differential height over the entire face of the rock.
  - n. The top face of a rock in the top row (cap stone) shall have a minimum dimension of 18" in the plane of the face.
  - o. The top face of an individual rock in the top row of the wall shall have no points or sharp edges. Examples of "points" and "sharp" edges may be provided by the Project Manager if requested.
  - p. The variation in height of the top surface of any two adjoining rocks in the top row shall not exceed 2 inches at the joint.
  - q. The front face of an individual rock shall not vary more than 4 inches differential height over the entire face of the rock.
  - r. The front face of adjoining rocks shall not vary more than 2 inches out-of-plane at the joint for at least 75% of the rocks in the wall.
  - s. A suitable existing rock wall example may be provided by the Park Project Manager upon request.
  - t. If requested, a rock wall mock-up of at least 8 feet in linear feet must be constructed for review and approval by the Park Project Manager.

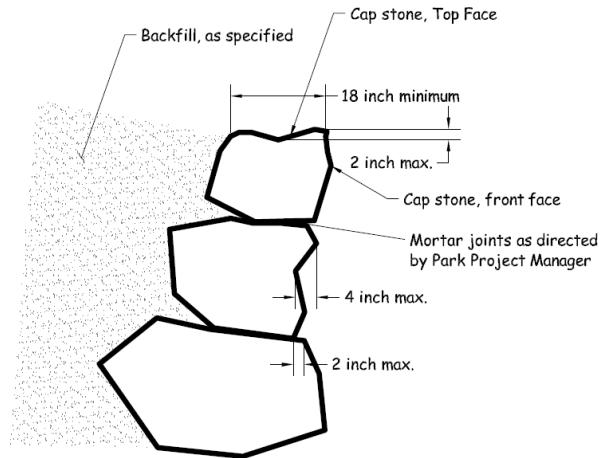


Figure 1 - Rock Wall Partial Section View

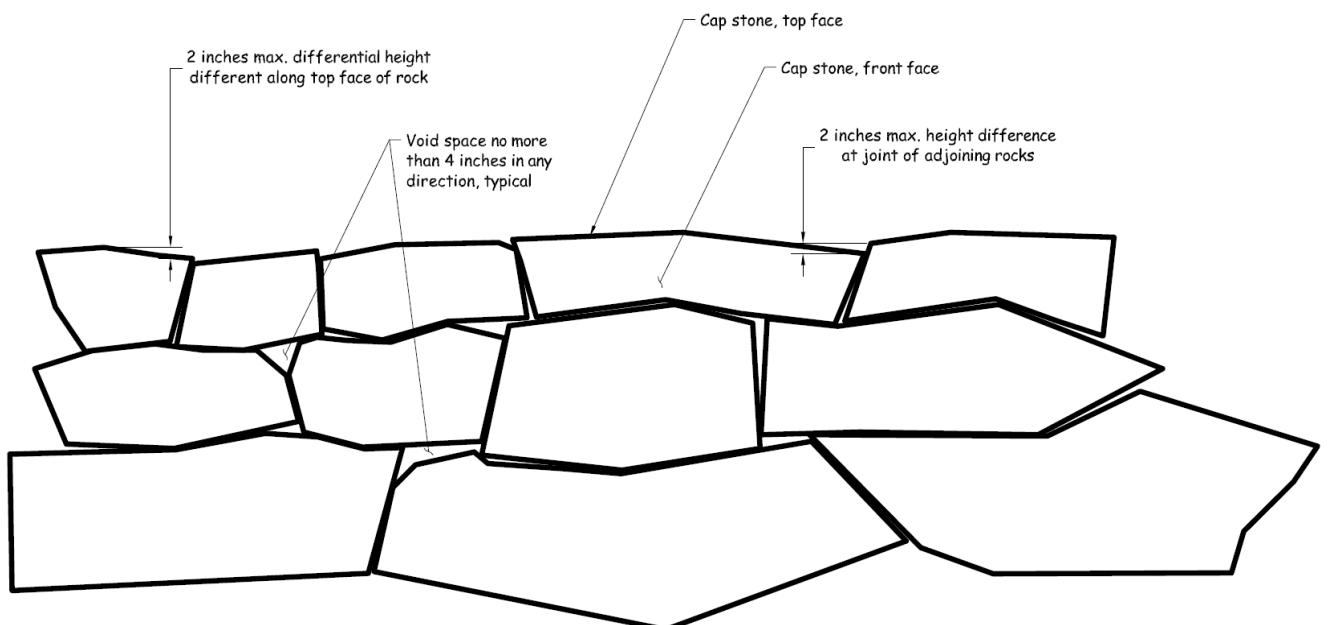


Figure 2 - Front Face Partial Elevation View

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