

**ROCKERY WALL CONSTRUCTION
NEVADA STANDARD GUIDELINES
April 15, 2005**

100 Scope

101 This document provides a standard throughout Nevada for the structural analysis and construction of Rockery Walls.

200 Definitions

201 **Rock** is natural solid mineral matter occurring in large masses or fragments.

202 **Rockery Wall** is a system of stacked rocks constructed to retain soil.

203 **Landscape Materials** such as vegetation, “landscape rock/gravel,” chad, mulch and similar materials that are used are decorative elements.

300 Permit Application Requirement/Submittal Criteria

301 Construction of Rockery Walls five feet (5’) high and greater shall require a permit issued by the authority having jurisdiction. The height of a Rockery wall shall be measured from the bottom of the base rock layer to the top of the uppermost rock layer.

302 Permit Documents

302.1 A dimensioned drawing that identifies the location of each Rockery Wall with respect to the property lines, easements, streets, and other rights-of-way. Existing construction, required setbacks as noted below, and drainage features shall clearly be identified on drawings.

302.2 Cross section of wall showing the approximate rock size for each lift, maximum height, backfill, drainage, slope of ground, embedment, cuts, and required face inclination.

302.3 Structural Analysis. All Rockery Walls five feet (5’) high and greater shall require engineering analysis.

302.4 Geotechnical Report. All Rockery Walls five feet (5’) high and greater shall require a geotechnical report.

303 Construction and Limitations

303.1 Construction

303.1.1 The base rock shall be embedded at least 12” into the soil. Placement of base rocks at grade followed by subsequent backfilling of the “toe area” shall not be permitted unless specific recommendations are provided by the Geotechnical and/or Structural Engineer(s). The base should be level and shall not have a slope greater than 1 Vertical to 10 Horizontal, otherwise a stepped base shall be required.

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- 303.1.2 The wall shall have a face inclination ratio of at least 1 Horizontal to 6 Vertical (1H:6V) measured at the exposed face of wall. The ratio may be greater than 1:6 (i.e. 1:5, 1:4 etc.)
- 303.1.3 The surrounding site shall be graded such that water cannot flow over the top of the wall. Exception: where not in conflict with other requirements and when specifically shown on the approved drawings, a slope having a maximum tributary area of 15 feet per unit length of wall may descend to the top of the wall. In this case provisions shall be made to prevent the descending slope from eroding and prevent the wall from being damaged by runoff.
- 303.1.4 Landscape materials, if used, shall not have detrimental effect on the wall. The use of landscape materials in close proximity to Rockery Walls shall be specifically addressed in the structural analysis.
- 303.1.5 Walls greater than ten feet high (10') shall have a slope a stability analysis performed by the Geotechnical Engineer.
- 303.1.6 Caliche and other "cemented soils" formed by precipitation shall not be used in Rockery Wall construction unless special design considerations are provided to address their suitability for use.
- 302.2 Limitations
- 303.2.1 The height of any single Rockery Wall shall not exceed 16 feet.
- 303.2.2 No Rockery Wall shall be constructed as the sole means of repair to provide stability to an unstable slope. In this case a Rockery Wall may only be used after the slope is first stabilized by MSE, soil nailing or some other approved engineered repair.
- 303.2.3 Multiple terraced (also sometimes referred to as stacked or tiered) Rockery Walls with a total height of 16 feet or more shall require a slope stability analysis performed by the Geotechnical Engineer. Total height shall be measured from the bottom of the base rock at the lowest wall to the top of the highest wall. Exception: slope stability analysis identified in this section is not required where the setback

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distance from adjacent rockery walls is equal to or exceeds the height of the lower wall.

303.2.4 Rockery Walls 5 feet high and greater: Rocks sized as “two man” (approximately 200- 700 pounds and 18-28 inch nominal diameter) or greater shall be tightly fitted and interlock with neighboring rocks. Smaller rocks may be intermittently used for “structural chinking” which allows large rocks to rest in a stable movement free position. Void spaces between larger rocks shall be tightly filled or “aesthetically chinked” such that large gaps between rocks in the exposed face are reasonably well filled. There shall be no loose rocks or scree present at any point in the exposed face or top of a Rockery Wall.

303.2.5 Rockery Walls 5 feet high and greater: No rocks smaller than the nominal “two man” size (approximately 200- 700 pounds and 18-28 inch nominal diameter) shall be permitted to be exposed in the front face or top rock layer. Tightly fitted smaller rocks used for the purpose of filling voids or “chinking” shall not be subject to this limitation.

304 Setbacks

304.1 The setback from a Rockery Wall to a building or structure shall be not less than the height of the retained earth. The distance shall be measured from the outside of the foundation of the structure to the exposed face of the Rockery Wall. This provision applies to buildings or structures (except other site walls or fences) on either the high side or low side of the Rockery Walls. Exception: where Rockery Walls are less than 5 feet in height this requirement may be waived at the option of the authority having jurisdiction.

304.2 Multiple Rockery Walls, designed as terraced (stacked or tiered) retaining walls, shall be a minimum distance of $\frac{1}{2}$ the height of the lower Rockery Wall to another Rockery Wall. Surcharge loading from one wall to another shall be considered in the design.

304.3 Ornamental fences, guards, or screen walls shall be a minimum of 4 feet from the front face at the top of the Rockery Wall. Ornamental fences, guards, or screen walls shall have their own foundations and not rely on the Rockery Wall for structural support. Exception: This requirement may be waived at the option of the authority having jurisdiction when overturning resistance equal to an independent foundation can be demonstrated. When this exception is used, the ornamental fence attached

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to the top rock layer shall be able to resist a 200 pound point load at the fence top applied perpendicular to the running length axis.

304.4 Rockery walls shall be set back the required distances from fire hydrants, light standards, gas meters, water meters, electrical transformers, utility boxes or similar features. These distances shall be established and enforced by the authority having jurisdiction. Where permitted, Rockery Walls located within a utility or other easement shall be in accordance with the published standards of the department or agency having authority of the easements.

305 Structural Analysis

305.1 All structural analysis shall be in accordance with adopted building code of the jurisdiction having authority, the local amendment adopted by the authority having jurisdiction, and this document.

305.2 The minimum factor of safety for sliding and overturning in a Rockery Wall shall be in accordance with the adopted codes and regulations of the authority having jurisdiction.

305.3 The following analysis provisions shall apply:

305.3.1 The maximum unit weight of the rocks used in the design of a Rockery Wall shall be 155 pcf unless field verified by special inspection or preconstruction lab analysis of samples from source rock materials.

305.3.2 The maximum coefficient of friction between rocks in a Rockery Wall shall be 0.5.

305.3.3 Applied loads from adjacent foundations, surcharge materials, or dynamic/transient loads shall be taken into consideration in the analysis.

305.3.4 Specifications shall be provided to clearly define acceptance criteria for rock materials.

305.3.5 Design documents shall clearly address the need (or lack thereof) for drainage provisions behind the wall. Items to be addressed are a gravel/cobble drainage blanket, filter fabric and drainage pipes. Specific requirements may be implemented by the authority having jurisdiction based upon prevailing geologic and climatic conditions.

305.4 The Structural and/or Geotechnical Engineer(s) of record shall provide specific acceptance criteria to address special inspection details identified

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in Section 402.4. Specific information shall be provided regarding how the special inspector should determine compliance with embedment requirements outlined in Section 303.1.1.

400 Inspections

401 Inspections shall be performed as required by the authority having jurisdiction.

402 Special Inspections

402.1 Special inspection of Rockery Wall construction shall be required for all walls Five feet (5') tall and greater.

402.2 Continuous or periodic special inspection shall be specified on the construction documents.

402.3 Qualification of the special inspector shall comply with the requirements of the authority having jurisdiction.

402.4 Details of special inspection:

1. Type of rock
2. Unit weight, if design exceeds 155 pcf
3. Rock size
4. Rock placement
5. Drainage layer (filter fabric and drainage pipe)
6. Embedment
7. Wall face inclination (slope or batter)
8. Mechanically Stabilized Earth, or other slope stabilization method if specified

402.5 A final report by the special inspector shall be submitted to the authority having jurisdiction.