Southern Nevada Building Officials

DATE: December 1, 2008

TO: Architects, Engineers, Contractors, Construction Industry Representatives and Associations, and Interested Parties

FROM: Neil Burning, Chairman, SNBO Steering Committee

SUBJECT: Structural analysis and construction of rockery walls

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The following are the minimum requirements for the structural analysis and construction of rockery walls.

1. A dimensioned drawing that identifies the location of each rockery wall with respect to the property lines, easement, streets, and other rights-of-way. Existing construction, required setbacks as noted below, and drainage features shall clearly be identified on drawings.
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.
3. All rockery walls five feet (5') high and greater shall require engineering analysis.
4. All rockery walls five feet (5') high and greater shall require a geotechnical report.
5. 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 unit vertical to 10 units horizontal (10-percent); otherwise a stepped base shall be required.
6. The wall shall have a face inclination ratio of at least 1 unit horizontal to 6 units vertical (1:6) measured at the exposed face of wall. The ratio may be greater than 1:6.
7. The surrounding site shall be graded such that water cannot flow over the top of the wall.
8. 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.
9. Walls greater than ten feet high (10') shall have a slope stability analysis performed by the Geotechnical Engineer.
10. Caliches 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.
11. The height of any single story rockery wall shall not exceed 16 feet.

12. No rockery wall shall be constructed as the sole means of repair to provide stability to any 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.

13. Multiple terraced (also sometimes referred to as stacked to 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.

14. Rockery walls five feet (5') 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.

15. Rockery walls five feet (5') 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.

16. 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 height side or slow side of the rockery walls. *Exception: Where rockery walls are less than five feet (5') in height this requirement may be waived at the option of the authority having jurisdiction.*

17. Multiple rockery walls, designed as terraced (stacked or tiered) retaining walls, shall be minimum distance of ½ the height of the lower rockery wall to another rockery wall. Surcharge loading from on wall to another shall be considered in the design.

18. Ornamental fences, guards, or screen walls shall be a minimum of four feet (4') 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.

19. 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.

20. 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.

21. 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.

22. The following analysis provisions shall apply:

    a. 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 the source rock materials.

    b. The maximum coefficient of friction between rocks in a rockery wall shall be 0.5.

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

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

    e. 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 climate conditions.

    f. The Structural and/or Geotechnical Engineer(s) of record shall provide specific acceptance critical to address special inspection details. Specific information shall be provided regarding how the special inspector should determine compliance with embedment requirements outlined in Items 5 through 10.

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

24. Special inspection of rockery wall construction shall be required for all walls five feet (5') tall and greater.

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