

# Chapter 2

## BASIC SLOPE GRADING DESIGN STANDARDS

*The purpose of the slope grading design standards is to establish design solutions for developments that are acceptable to the City of Sparks in the preliminary stages of design. The objective is to design developments by utilizing contour grading to minimize the visual scaring of the natural terrain from public, and/or private areas.*

*Major cuts and major fills shall be avoided in grading configurations including, but not limited to the designs of lots, common areas, drainage areas, open space, and roadway systems for a proposed development area. If unavoidable, major cut slopes and/or major fill slopes shall be required to be reviewed by the Public Works Director and Administrator.*

*The developer shall be required to demonstrate in a preliminary grading plan how the proposed design, with major cut slopes, and/or major fill slopes, is the best design solution for the development area.*

### A. DEFINITIONS

1. Contour grading: Grading a site to shape an area into the natural occurring contours of the land.
2. Rockery wall: Nearly vertical stacked boulders to form a barrier utilized to retain soil.
3. Rip-Rap: Irregular forms of rock approximately 6 inches in diameter or greater generally used to stabilize a slope or line a drainage ditch.
4. Retaining walls: A structurally engineered vertical barrier designed to retain soil and resist water pressure.
5. Major fill slopes: A major fill slope is defined as any fill slope that has a total fill height of 20 vertical feet or more, when measured from the crest of the fill to the catch point of the fill slope with the natural ground.
6. Minor fill slopes: A minor fill slope is defined as any fill slope that has a total fill height of less than 20 vertical feet, when measured from the crest of the fill to the catch point of the fill slope with the natural ground.
7. Major cut slopes: A major cut slope is defined as any cut slope that has a total height cut of 15 vertical feet and greater, or a length of cut slope greater than 100 horizontal feet.
8. Minor cut slopes: A minor cut slope is defined as any cut slope that has a total cut height of less than 15 vertical feet or a length of cut slope less than 100 horizontal feet.

## B. BASIC SLOPE GRADING

1. Cut and fill slopes shall have curvilinear configurations and shall be consistent with the recommendation(s) of the soil engineer, engineering geologist, and the Public Works Director.
2. At the intersection of a manufactured cut or fill slope and a natural slope, a gradual transition, rounding or contour shall be provided. Manufactured slope banks intersecting at or near right angles shall be rounded with a radius at the building pad.

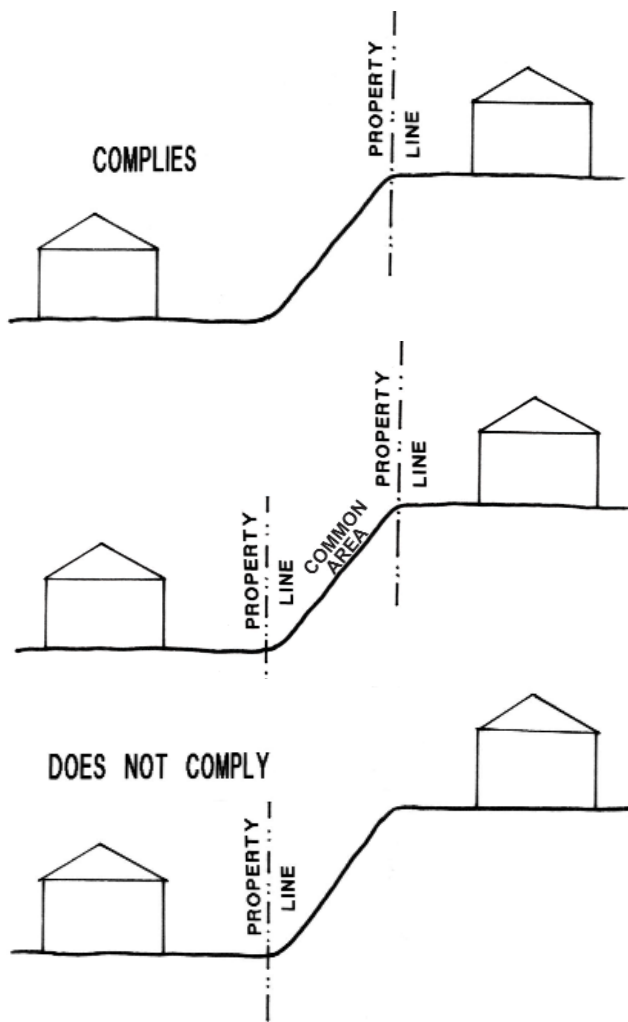


FIGURE 2-1—LOCATION OF PROPERTY LINE ON SLOPE BETWEEN PROPERTIES FOR STANDARD B.3

3. When there are cut/fill slopes between properties, the property line shall be located at the top of the slope to encourage maintenance of the slope area.

## C. MAJOR CUT/MAJOR FILL SLOPES

The following items shall be demonstrated in the preliminary grading plan for major cut slopes, and/or major fill slopes to meet the approval of the Public Works Director and Administrator.

1. Grading configurations including but not limited to, the design of lots, common areas, drainage areas, open space, and roadway systems represent the least amount of visual scaring. The proposed plan shall identify the design constraints imposed by hydrological, and geotechnical conditions, including slopes and other natural features. A preliminary geotechnical report is required.
2. Linear slope faces (cut and/or fill) are visually integrated into the natural terrain by using techniques identified in the Design Standards for cut and fill slopes. The design standard solutions shall be provided in plan and cross section. The Administrator may require photo simulation that illustrate major view vantages from public streets, and where appropriate, from neighboring properties.
3. Terraced slopes are allowed. The following design elements shall be included and implemented as a part of a terrace design solution:
  - Retaining walls and/or rockeries
  - Landscaping with permanent irrigation
  - Wall and landscape maintenance
  - Address wall stability:
    - Static loads
    - Seismic conditions

- Provide a six foot (6) wide minimum landscape buffer area between the back of the sidewalk and face of wall.

## D. MAJOR AND MINOR FILL SLOPES

1. **Design Standards for Fill Slopes.** The following design standards shall be applied to any proposed fill slope:

- a. Fill slopes shall be constructed no steeper than 3 horizontal to 1 vertical, unless design includes terracing or other erosion control methods.
- b. Fill slopes shall be designed to blend into the natural topography through the use of undulating contour grading.
- c. Fill slopes shall be stabilized against erosion. All slopes utilizing vegetation for stabilization shall include temporary and/or permanent irrigation to be determined by the Administrator. The use of rip-rap for fill slopes is prohibited.
- d. Engineered fill slopes shall not intersect natural slopes at ninety (90) degree angles. The intent is to construct rounded intersecting sloped which blend into the natural topography of the area.

2. Special considerations for major fill slopes

- a. Geotechnical report – A final geotechnical report shall be submitted to and approved by the Public Works Director prior to the construction of major fills. Fills that are greater than 20 feet in height that are to be constructed on natural slopes of 10 degrees (6 horizontal: 1 vertical) or greater shall require complete geotechnical analysis.

## E. MAJOR AND MINOR CUT SLOPES

1. **Design Standards for Cut Slopes.** The following design standards shall be applied to any proposed cut slope:

- a. Minor cut slopes shall be constructed no steeper than 3 horizontal to 1 vertical, unless design includes terracing or other erosion control methods.
- b. Minor cut slopes shall be stabilized against erosion. All slopes utilizing vegetation for stabilization shall include temporary and/or permanent irrigation to be determined by the Administrator. The use of riprap for cut slopes is prohibited.
- c. Major cut slopes shall be constructed as steep as possible to limit the degree of scaring.
- d. Major cut slopes shall include benches and terraces. Rockeries used for terraces will be limited to a maximum vertical height of 6 feet and shall include a landscape bench of no less than 6 horizontal feet.
- e. Engineered cut slopes shall not intersect natural slopes at ninety (90) degree angles. The intent is to construct rounded



FIGURE 2-2-CROSS SECTION ILLUSTRATING SEPARATION BETWEEN SIDEWALK AND RETAINING WALL FOR STANDARD E.1.d

intersecting slopes which blend into the natural topography of the area

2. Geotechnical report - A final geotechnical report shall be submitted to, and approved by the Public Works Director prior to the construction of any major cut slope.

## F. SLOPE REVEGETATION AND EROSION CONTROL

1. All disturbed areas shall be revegetated, either landscaped with permanent irrigation or hydroseeding with temporary irrigation until established as approved by Public Works Director and Administrator.
2. All slopes 3:1 or less shall be covered with herbaceous shrubby and/or prostrate ground covers. Bark mulches, stone cobble (4-inches minus) are required to cover bare ground temporarily exposed during the maturation period of the ground cover. Planting areas shall be designed to achieve 90% ground coverage of any disturbed area within 3 years. Non-living materials (bark mulches and stone cobble) may not be used for more than 10% of the total landscape area and excludes the areas of temporary coverage allowed for all plants and ground cover maturity.
3. Disturbed areas shall be revegetated with plant groundcover and ornamental grasses that are disease and pest resistant, tolerant of native soil and drought.
4. Grading plans shall include reclamation bonds, storm water pollution prevention plans, revegetation plans and/or landscape plans. Prior to issuance of a grading permit, reclamation plans, revegetation plans and/or landscape plans shall be submitted and approved by the Public Works Director and Administrator as part of the Grading Permit.
5. All constructed slopes steeper than 3:1 shall be revegetated within the growing season (May - September). If the work cannot be completed within that timeframe, developer/contractor shall provide surety for completion of revegetation during the next growing season. The constructed slopes shall be covered with material capable of controlling erosion to support the revegetation. Riprap shall not be used.
6. Slopes greater than 3:1 shall be reviewed on a case-by-case basis, with solutions to stabilize the slope and mitigate the visual impacts by the Public Works Director and Administrator.
7. Trees, shrubs and plant groundcovers shall be planted in undulating massings and groupings to reduce the constructed character of manufactured slopes.
8. All irrigation systems shall be automatically controlled and include full coverage as approved by the Public Works Director and Administrator.
9. The property owner is responsible for maintaining the disturbed and revegetated/landscaped area(s) to the satisfaction of the Public Works Director and Administrator.
10. Revegetation seed mix shall be compatible with the on-site soil conditions (such as alkaline, salt or upland) as approved by the Administrator.



FIGURE 2-3—EXAMPLE OF NATURAL LANDSCAPED DRAINAGEWAY FOR SECTION F



FIGURE 2-4-EXAMPLE OF REVEGETATED DETENTION AREA FOR SECTION F



FIGURE 2-5-EXAMPLE OF TERRACED SLOPED STANDARD C.3. WITH LANDSCAPING IN ASSOCIATION WITH ROCKERIES